VPS® Installation and Operation Manual

V1 R8.0

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Summary of Enhancements

The following table contains the fix numbers assigned to major VPS enhancements and/or fixes.

VPS V1 R8.0 Fixes	
VPS V1 R8.0.098 (02/20/2001)	page xix
VPS V1 R8.0.134 (04/12/2001)	page xix
VPS V1 R8.0.180 (07/16/2001)	page xix
VPS V1 R8.0.185 (08/15/2001)	page xix
VPS V1 R8.0.193 (09/06/2001)	page xix
VPS V1 R8.0.200 (10/02/2001)	page xix
VPS V1 R8.0.208 (10/09/2001)	page xx
VPS V1 R8.0.258 (03/12/2002)	page xx
VPS V1 R8.0.259 (03/20/2002)	page xx
VPS V1 R8.0.305 (06/25/2002)	page xx
VPS V1 R8.0.308 (07/02/2002)	page xx
VPS V1 R8.0.326 (08/16/2002)	page xx
VPS V1 R8.0.339 (10/03/2002)	page xx
VPS V1 R8.0.341 (10/17/2002)	page xxi
VPS V1 R8.0.355 (12/06/2002)	page xxi
VPS V1 R8.0.359 (12/16/2002)	page xxi
VPS V1 R8.0.386 (03/06/2003)	page xxi
VPS V1 R8.0.396 (03/21/2003)	page xxii
VPS V1 R8.0.404 (04/08/2003)	page xxii
VPS V1 R8.0.406 (04/08/2003)	page xxiii
VPS V1 R8.0.417 (04/30/2003)	page xxiii
VPS V1 R8.0.434 (06/11/2003)	page xxiii
VPS V1 R8.0.436 (06/23/2003)	page xxiii

The following table contains the fix numbers assigned to major LRS/OS/API enhancements and/or fixes.

LRS/OS/API V1 R1.2 Fixes	
LRS/OS/API V1 R1.2.002 (02/04/2002)	page xxiv
LRS/OS/API V1 R1.2.003 (04/29/2002)	page xxiv
LRS/OS/API V1 R1.2.004 (06/10/2002)	page xxiv
LRS/OS/API V1 R1.2.005 (06/11/2002)	page xxiv
LRS/OS/API V1 R1.2.006 (08/28/2002)	page xxiv
LRS/OS/API V1 R1.2.008 (10/17/2002)	page xxiv
LRS/OS/API V1 R1.2.009 (12/06/2002)	page xxiv
LRS/OS/API V1 R1.2.013 (04/04/2003)	page xxv

VPS V1 R8.0.098 (02/20/2001)

- Implement the capability of sending PJL commands before or after print file to a TCP/IP sockets printer.
- Implement new keywords and capabilities for VPS/Email connections:

  FILEDESC - descriptor records for attachments

  MAILCSET - character set for text messages
- Implement conversion of line data to PDF format for VPS/Email printers.
- Add support to pass PDF conversion parameters to VPS/AnyQueue.
- Add support for jobnames which are different than the actual name of the job or started task which created the SYSOUT file, and add the capability of passing the jobname associated with a SYSOUT file to the VPS/PageCenter product.
- Add support for JESQUEUE printer keyword to allow JES3 sites to select from WTR, HOLD or HOLD FOR EXTERNAL WRITER queue when using SAPI.
- Remove support for IUCV (TCPTYPE=IBM221).

These changes were implemented by a variety of zaps, source changes, macro updates, and new macros. Customers who need these changes should contact LRS to request updated product distribution materials.

VPS V1 R8.0.134 (04/12/2001)

- Enhancement to retain the original jobname and jobid when REQROUTE=N is specified with PRTROPTS=xxxx2xxx.

This fix is not available as a 'zap'. Customers who need this fix should contact LRS to request updated product distribution materials.

VPS V1 R8.0.180 (07/16/2001)

- Enhancement to allow a larger LRECL for the VPS control library (VPSLIB DD statement).

This enhancement is not available as a zap. Customers who need this change should contact LRS to request updated product distribution materials.

VPS V1 R8.0.185 (08/15/2001)

- Enhancement to allow customers to requeue a sysout file instead of edraining the printer when VPS User Exit 28 sets a non-zero return code.

VPS V1R8.0 fix 8.0.098 is a prerequisite to this fix.

VPS V1 R8.0.193 (09/06/2001)

- Enhancement for DRS sysout tracking support. DRS V1R3.4 will add a new sysout tracking feature which will enable DRS to monitor the progress of all sysout datasets it creates using the JES client/server print interface functions.

VPS V1R8.0 fix 8.0.098 is a prerequisite to this fix.

VPS V1 R8.0.200 (10/02/2001)

- Product does not support Z/OS 1.2 operating system.

Changes in Z/OS 1.2 have resulted in job numbers up to 999,999, exceeding the old limit of 65,534. Without this fix, there will be problems with many processes relating to job numbers. Additionally, JES-dependent exits will get assembly errors if the revised ASM and MACLIB libraries are not used.

This fix is not available as a zap. Customers who require these changes should contact LRS to request updated product distribution materials.

When VPS V1R8.0 is upgraded to level 8.0.200 or higher, VMCF V1R8.0 must be upgraded to level 8.0.045 or higher, and LRS Server (VSV) V1R8.0 must be upgraded to level 8.0.066 or higher, regardless of whether or not Z/OS 1.2 is in use. All JES-dependent VPS, VMCF, LRS Server (VSV) and Report Browse modules must be re-assembled and linked, using the updated source (ASM) and MACLIB libraries.

VPS V1 R8.0.208 (10/09/2001)

- Excessive CPU utilization and I/O to JES is possible when using the sample JES3 version of VPS User Exit 15.

This fix is not available as a zap. Customers who need this change should contact LRS to request updated product distribution materials.

VPS V1 R8.0.258 (03/12/2002)

- Sysout event notification enhancement.

VPS V1R8.0 fix 8.0.098 is a prerequisite to this fix.

VPS V1 R8.0.259 (03/20/2002)

- The read-only mode enhancement has been added to PageCenter. VPS must be changed to allow printers used for import to wait for PageCenter to return to normal mode before sending import data.

This fix is not available as a zap. Customers who need this fix should contact LRS to request updated product distribution materials.

VPS V1 R8.0.305 (06/25/2002)

- Updates to VPS to enable VPS to send to DRS V1R3.4 using LRSQueue connection.

This fix is not available as a zap. Customers who need this fix should contact LRS to request updated product distribution materials.

VPS V1 R8.0.308 (07/02/2002)

- Enhancements for VPS/IPDS and VPS/PCL.

This fix is not available as a zap. Customers who need this fix should contact LRS to request updated product distribution materials.

VPS V1 R8.0.326 (08/16/2002)

- Enhancement to support z/OS 1.4 operating system. VPS User Exits 13 and 24 will not assemble or work due to changes made in z/OS 1.4.

This fix is not available as a zap. Customers who need this fix should contact LRS to request updated product distribution materials.

VPS V1R8.0 fix 8.0.200 is a prerequisite.

VPS V1 R8.0.339 (10/03/2002)

- Enhancement to allow sysout file retention if using SAPI.
- Enhancement to allow a file with invalid DBCS data to be requeued instead of edraining the VPS printer.

This fix is not available as a zap. Customers who need this fix should contact LRS to request updated product distribution materials.

VPS V1 R8.0.341 (10/17/2002)

- Add support for Lexmark printers to VPS/Secure.

This fix is not available as a zap. Customers who need this fix should contact LRS to request updated product distribution materials.

LRS/OS/API fix 1.2.008 must also be applied to make this fix effective.

VPS V1 R8.0.355 (12/06/2002)

- Enhancement to support the VPS/PDF product.

This fix is not available as a zap. Customers who need this fix should contact LRS to request updated product distribution materials.

LRS/MVS Server V1R8.0 fix 8.0.136, VMCF V1R8.1 fix 8.1.042, and LRS/OS/API V1R1.2 fix 1.2.009 must also be applied when this fix is applied to VPS.

VPS V1 R8.0.359 (12/16/2002)

- Add support to VPS/Secure for Intermate Secure Printing Protocol (ISPP) for cards supplied by LCI Intermate which will be installed on PJL-compatible printers.

This fix is not available as a zap. Customers who need this fix should contact LRS to request updated product distribution materials.

VPS V1R8.0 fix 8.0.355 is a prerequisite.

VPS V1 R8.0.386 (03/06/2003)

- Support for IPDS for TCP/IP printers.
- VPS/LCDS changes:

Enhancement for LPD servers which use keyword information from the OUTPUT JCL statement to format the LPD print file (for example, remote PSF and OCE Prisma print servers which convert AFP or line data to IPDS). This enhancement requires a valid KEYLCDS.

Enhancement to allow sending LCDS print files to AnyQueue.

Enhancement to search for a DJDE indentifier in each print file record for printers with COMMTYPE=(,,LCDS) and to modify the carriage control byte of that record if a matching identifier is located.

Enhancement to allow sending multiple commands with length field prefixes for LCDS or record devices when using Exit 14 or the PCMDSTRT and PCMDEND keywords.

Accumulate VPS/LCDS printer page statistics.

- Enhancement to allow PRMODE=BINARY to indicate a file should be treated as transparent data. Also, the TRNCLASS keyword values are formattted incorrectly in a SNAP dump if the strings specified exceed 8 bytes in length.
- Enhancement for separators for each copy of the SYSOUT dataset.
- Enhancement to modify the job information control (JIF) control block for TCP/IP sockets connections to send the form name associated with the file as the sender's user name.
- Enable SAR interface.
- Possible S0C4 abend in VP00SNAP or VP80SNAF when a SNAP command is issued and printer control blocks are being released by the printer task.
- S806 abend after fix VPS V1R8.0 fix 8.0.355 if module VP80PDFA is not available in VPS load library.

- Use of the linkage stack in some frequently used modules increases CPU usage.

This fix is not available as a zap. Customers who need this fix should contact LRS to request updated product distribution materials.

VPS V1 R8.0.396 (03/21/2003)

- Enhancements and corrections to VPS/PDF.

1. Customers want to encrypt PDF files that are converted to PDF and delivered to a user for browsing. This fix will implement OUTPUT JCL keywords and printer keywords to control the PDF encryption.
2. Invalid characters could be displayed if a PTX 'SCFL' sequence is encountered with the default font ID X'FF'. When the PTX 'SCFL' sequence was received with a font ID of X'FF', the default font was set to courier and the encoding was set to EBCDIC. The resource table entry from the previous font was not being cleared. If the previous font was translating the data, characters displayed using the default font will be invalid.
3. 'Free form' text mixed with PTOCA commands was not showing up in the converted PDF document. Module VF80PTCA was bypassing free form text in the input AFP data stream.
4. Text to PDF conversion of DBCS data was failing with a 'FONT NOT FOUND' error after VPS V1R8.0 fix 8.0.355. Uppercase DBCS CMAPS (CODEPAGES) were not being converted into the proper mixed case format expected by the PDF library.
5. VPS/PDF issues VPS743E if fonts are not present in the document resource group. If a font character set or code page table is mapped in the PDFRTAB but not in the resource group, VPS/PDF issues VPS743E and exits conversion. If the font is mapped in the PDFRTAB, the font character set / code page table is not needed to process the font and should not be required to be present in the resource group.
6. The PDFRTABS (VPSSPTAB, VPSSPTB1) distributed with VPS/PDF have font mapping entries that cause AFP character sets to always be mapped to Adobe core fonts. A new PDFRTAB (VPSSPTB2) will be added which maps the tray and media entries, but does not map any font resources.
7. Possible PDF_STRDUP errors when retaining AFP font metrics. When building the fontname keyword for the AFM file, module VF80PCHR was using a string that was too small for the fontname, causing the keyword to be invalid. PDFLIB did not set the fontname because it was invalid, resulting in a null string being passed to PDF_STRDUP.

This fix is not available as a zap. Customers who need this fix should contact LRS to request updated product distribution materials.

VPS V1 R8.0.404 (04/08/2003)

- VPS/PCL does not support all functions for 2-D bar code PDF417.

Several modules and macros related to VPS/PCL will be changed to support the following:

- Numeric compaction
- Binary string compaction
- MACRO PDF417
- Escape sequence handling (GLI code page switching and reader programming)

This fix is not available as a zap. Customers who need this fix should contact LRS to request updated product distribution materials.

VPS V1 R8.0.406 (04/08/2003)

- Enhancement to save the address of the dataset token in the VPS Cross Memory Attributes control block (XMAT) when using SAPI. This token can be used to obtain information about the dataset (job #, job ID, dataset ID, etc.). The XMAT control block is passed to several printer-related VPS user exits.

Module VP80SAP2 will be zapped to copy the value from field SSS2DSTR to a new field named XMADSTR in the XMAT control block. XMADSTR will occupy the first four bytes of the area previously defined as XMADRSV (reserved) at offset X'3DC' in the XMAT.

VPS V1R8.0 fix 8.0.386 is a prerequisite to this fix.

VPS V1 R8.0.417 (04/30/2003)

- This fix enables PDF encryption for line data conversions.

This fix is not available as a zap. Customers who need this fix should contact LRS to request updated product distribution materials.

VPS V1 R8.0.434 (06/11/2003)

- VPS/IPDS and VPS/PCL only support 240-dpi and 300-dpi fonts.

  VPS/IPDS and VPS/PCL will be changed to support AFP fonts with any resolution.

- VPS/PCL only allows font grid (global resource ID) mapping in VPS User Exit 26. Message “VPS763E INVALID FULLY QUALIFIED NAME ID 84” is received when the AFP ‘MCF - Map Coded Font’ command specifies a font by grid instead of by AFP font resource name(s).

VPS/PCL will allow grid mapping.

Note: This fix also corrects problems with 240- to 300- dpi font character set conversion. Negative values (such as for a-space, descender, etc) were being handled incorrectly.

This fix is not available as a zap. Customers who need this fix should contact LRS to request updated product distribution materials.

VPS V1 R8.0.436 (06/23/2003)

- Enhancement to provide AFP support for separators.

Customers want to convert the separator lines using AFP resources and send them to the printer. This fix provides the capability to specify that the separator should be converted if either CONVTYPE=PCL or CONVTYPE=IPDS is also specified.

These source changes also include changes to prevent "VPS261E - PROCESSING LOGIC ERROR IN VPSSPRTR - NON-ZERO RC, PRINTER NOT EDRAINED' after "INTERVENTION REQUIRED" during processing of the AFP message datasets (PIMSG=Y).

This fix is not available as a zap. Customers who need this fix should contact LRS to request updated product distribution materials.

LRS/OS/API V1 R1.2.002 (02/04/2002)

- Macros changes and source updates to support VPS/Secure and VPS/PDF.

This fix is not available as a zap. Customers who need these changes should contact LRS to request updated product distribution materials.

LRS/OS/API V1 R1.2.003 (04/29/2002)

- Enhancement to add common code functions for the MVS subsystem interface.

New modules and control blocks were created to support these functions.

This fix is not available as a zap. Customers who need these changes should contact LRS to request updated product distribution materials.

LRS/OS/API V1 R1.2.004 (06/10/2002)

- Enhancement to add trace formatting support for new DRS V1R3.4 buffer trace records.

Module LR12GTFO was source updated to include these new buffer types.

This fix is not available as a zap. Customers who need these changes should contact LRS to request updated product distribution materials.

LRS/OS/API V1 R1.2.005 (06/11/2002)

- Macro changes were made to support VMCF V1R8.1 fix 8.1.012 for DMCF support.

Macro #LRMDTAB was source updated.

This fix is not available as a zap. Customers who need these changes should contact LRS to request updated product distribution materials.

LRS/OS/API V1 R1.2.006 (08/28/2002)

- Macro changes to coordinate with VPS V1R8.0 fix 8.0.305 and to support DRS V1R3.4 file transfer.

The following macros were updated:

#LRCICA

LRSCMD62

This fix is not available as a zap. Customers who need these changes should contact LRS to request updated product distribution materials.

LRS/OS/API V1 R1.2.008 (10/17/2002)

- Changes needed to be made to LRS common code to support VPS V1R8.0 fix 8.0.341.

An internal LRS/OS/API macro was updated, and a new “C” program was added to the LRS/OS/API load library.

This fix is not available as a zap. Customers who need this fix should contact LRS to request updated product distribution materials.

LRS/OS/API V1 R1.2.009 (12/06/2002)

- Changes were made to several modules and macros to support the VPS/PDF product.

The GTF trace formatting programs, a "C" program, and a macro were source changed.

This fix is not available as a zap. Customers who need this fix should contact LRS to request updated product distribution materials.

VPS V1R8.0 fix 8.0.355, LRS/MVS Server V1R8.0 fix 8.0.136, and VMCF V1R8.1 fix 8.1.042 should also be applied as the same time that this fix is applied.

LRS/OS/API V1 R1.2.013 (04/04/2003)

- Enhancements for VPS/Secure to work with Lexmark 'printcryption'. Lexmark introduced a new feature in their printer encryption product to allow the dynamic generation of AES encryption keys on a per-job basis.

Module LR12LXCR has been updated with the new interface between VPS/Secure and the various APIs provided to LRS by Lexmark.

This fix is not available as a zap. Customers who need this fix should contact LRS to request updated product distribution materials.

VPS V1R8.0 must be at level 8.0.341 or higher to support encryption for Lexmark printers.

Section 1
Overview

Description

WHAT IS VPS®?

The VTAM Printer Support System (VPS) is a logical extension of JES which fills a void in JES output delivery facilities. VPS provides the ability to route JES spooled output to any VTAM LU-0 (non-SNA), LU-1 (SNA/SCS) or LU-3 (SNA/DSC) device. This includes all local and remote models of the 3270-family, as well as any other printer that attaches to a 3174/3274/3276 control unit. Some examples include HP laser printers, Xerox laser printers, IBM 5210 letter quality printers, IBM 4245 high-speed printers and many, many more.

WHY USE VPS?

The Job Entry Subsystem of MVS (JES2 or JES3) provides the facilities for printing spooled output on local and remote (RJE) printers. However, the equipment costs associated with this type of printing are high, and the type of printers supported is very limited. With VPS, extensive print capability is available at a justifiable cost, because all 3270-type printers, both locally and remotely attached, are supported as output devices by VPS. Printers already installed for other teleprocessing applications, such as IMS or CICS, can be shared by that application and VPS, totally eliminating the additional printer cost.

VPS will print SAS/GRAPH output, eliminating the need to run SASWTR. VPS will also print graphs created by GDDM (version 2 or later), eliminating the need to run ADMPRINT.

HOW DOES VPS FUNCTION?

VPS retrieves SYSOUT datasets from the JES spool using either the SYSOUT Application Program Interface (SAPI) or the Process SYSOUT Interface (PSO). Both interfaces provide a release independent means of accessing SYSOUT datasets which are available for printing. SAPI is the default interface because it provides enhanced capability and performance that is not available in PSO. As SYSOUT which matches the user-specified selection criteria becomes available, VPS retrieves it from JES and uses standard VTAM or TCPIP facilities to print it on the appropriate printer. The SYSOUT dataset is then purged from the JES spool, as if it had been printed by JES.

WHAT SUPPORT PRODUCTS ARE AVAILABLE FOR VPS?

Dynamic Report System (DRS) (Host product)

The Dynamic Report System (DRS) product allows CICS online transactions, other TP monitor applications, and batch programs to dynamically create reports on the JES spool. These reports are then available for printing before the originating application is shut down.

DRS/TCPIP (Host product)

DRS/TCPIP allows receiving print files from remote TCP/IP hosts and placing those print files on the JES spool to be printed at a printer attached to the MVS system. The same DRS/VPI address space can be used to receive print data from VTAM online applications (CICS, IMS, IDMS, etc.) and from TCP/IP hosts. All print queues can be displayed and controlled using DRS/VPI console commands. DRS/TCPIP provides the functions of a Line Printer Daemon (LPD) print server on MVS. DRS/TCPIP listens for connections on the PORT specified at DRS/VPI system initialization; the PORT should be set to 515 to receive print data using LPR/LPD protocols. The LPR/LPD protocol defines a 'receive print job' command which provides a print queue name. DRS/TCPIP uses the print queue name to locate a virtual printer. Because the print queue name is also the name of a member in the DRS/VPI control library, it is must be 1 to 8-characters, beginning with an alphabetic or a national character. If any part of the name is received in lower case, it will be translated to upper case. The virtual printer definition contains the SYSOUT characteristics (DEST, CLASS, FORM, WRITER, OUTREF, etc.) to be associated with the print data on the JES spool.

VMCF (Host product)

The VPS user also receives the VPS Monitor and Control Facility (VMCF). VMCF is a full-screen, menu driven interface to VPS which executes under TSO. This interface can be used to distribute control of VPS printers to the end user community. Optionally, the VPS user can purchase VMCF/CICS, which executes as a pseudo-conversational CICS transaction, or VMCF/VTAM, which executes as a stand-alone VTAM application. Both of these products offer the same interface to VPS as the TSO version of VMCF.

VPS/CDI (Host product)

VPS/CDI allows users to automatically transfer SYSOUT datasets from the JES2 or JES3 spool to the CONNECT:Direct product from Sterling Commerce, Inc. VPS/CDI works in conjunction with Sterling's JES Spool Transfer Option, which utilizes standard CONNECT:Direct information transportation capabilities, including automation, reliability, management, interoperability, and security. With VPS/CDI, you can use VPS to route SYSOUT datasets from the JES2 or JES3 spool to any remote system running CONNECT:Direct.

VPS/Email (Host product)

VPS/Email allows sending print datasets from the JES spool to an e-mail address using Simple Mail Transfer Protocol (SMTP) and the TCP/IP network. VPS/Email requires VPS/TCPIP.

VPS/IPDS, VPS/PCL, and VPS/PDF (Host products)

The **VPS AFP** products extend the features of VPS to include support for the Advanced Function Presentation Data Stream (AFPDS). These products will accept either AFPDS or line data as input, will combine this data with any required resources, such as FORM DEFINITION and PAGE DEFINITION, and will create an output datastream in the selected Page Description Language (PDL). VPS/IPDS creates the output in IBM's Intelligent Printer Data Stream (IPDS). VPS/PCL creates the output in Hewlett Packard's Printer Command Language (PCL). VPS/PDL creates the output in Adobe Acrobat Portable Document Format (PDF).

VPS/LCDS (Host product)

VPS/LCDS sends print data to printers which support the LCDS datastream. VPS/LCDS uses VPS/TCPIP and the TCP/IP network to deliver the print data.

PageCenter (Host product)

PageCenter is a report management system which allows for the viewing, printing, indexing, bundling, short-term and long-term archiving and retrieval of printed output. Documents can be imported into the PageCenter system by directing them to a PageCenter printer. The system provides full control over document retention periods and storage. Documents are stored as VSAM datasets. Long-term storage may be defined on mountable disk, tape, and optical storage devices, and can be interactively restored. The system includes intelligent handling of AFP documents and resources, preventing the redundant archiving of AFP resources.

VPSPRINT (Host product)

In addition to the VPS product itself, the VPS user also receives the VPSPRINT TSO command processor. The VPSPRINT command is a functional replacement for DSPRINT and provides the ability to create SYSOUT datasets on the JES spool. These datasets can then be printed through VPS or through JES.

VPS/Report Browse (Host product)

The VPS/Report Browse product is an optional feature of VMCF which can be purchased to extend the capabilities of VMCF. It allows users to browse output on the JES2 spool.

VPS/Secure (Host product)

VPS/Secure allows users to distribute output over open TCP/IP networks, including the Internet, while maintaining confidentiality and integrity of sensitive data.

VPS/TCPIP (Host product)

VPS/TCPIP sends print datasets from the JES spool on MVS to TCP/IP devices. The same VPS address space can be used to deliver output to both VTAM and TCP/IP devices.

VPS/XES to AFP (Host product)

The **VPS/XES to AFP** conversion routines convert documents containing Xerox 3700, 2700, and 404x escape sequences into standard AFP documents. These AFP documents can then be printed using VPS/IPDS and VPS/PCL and can also be archived and viewed using PageCenter or PageCenter Plus. This conversion provides a migration path for Xerox customers who have written applications based on the XES printer language and enables them to migrate to newer hardware without the requirement to re-write existing applications.

DRS/PC (PC product)

DRS/PC allows LAN workstation print jobs to be printed to the mainframe. It monitors a specified NetWare print queue for reports. As reports appear in the queue, they are selected and sent to the mainframe DRS product, then placed in the JES spool. DRS/PC communicates via LU 6.2 with DRS on the mainframe to move reports and data from the local area network to the JES spool. Reports which are placed on the JES spool can be printed or re-routed as mainframe processes dictate.

VMCF Client for Windows (PC product)

VMCF Client for Windows is a Microsoft Windows Multiple Document Interface to the VTAM Printer Support (VPS) product. This interface can be used to distribute control of VPS printers to the end user. A security interface has been built into VMCF to ensure that normal VPS operation is not affected. This interface can use a VMCF security table (VMCF internal security) generated by installation support personnel to specify each user's level of authorization, or it can use your own system security package (VMCF external security), such as RACF, CA-ACF2, or CA-TOP SECRET.

VPS/PC (PC product)

VPS/PC is a program that runs in a LAN environment. It receives reports from VPS and places them in network print queues or network files or local print queues and files for subsequent printing or viewing by normal LAN facilities. It requires a communications link to the mainframe and the VPS product. It communicates via LU 6.2 or TCP/IP sockets with VPS to receive reports and data from the mainframe JES2 or JES3 spool. As reports are received, they are placed into any print queue or file on any server in the LAN and will then be processed using standard network or third party print services and queue inquiry facilities.

AnyQueue (PC product)

AnyQueue is a product that runs in a LAN environment and its purpose is to receive files from the mainframe JES2 or JES3 spool, via Host VPS, and distribute those files to a variety of LAN destinations (print files; print queues, etc.). The files can also be placed into the AnyQueue/WebTRAC (Temporary Retention and Control) area.

AnyQueue runs on a PC that can be located anywhere on a large internetwork of LANs. The AnyQueue/WebTRAC feature is accessible by end users via a Web Browser. To utilize this feature will require a Window based Web Server, and LRS/Web Connect.

The only definitions required on the Host are:

- one Host VTAM LU definition or Host TCP/IP definition
- and one Host VPS printer definition.

After the initial Host definitions are defined, the LAN administrator retains a great deal of flexibility to reconfigure the LAN environment and redirect files to new or modified network print queues. The printers used to print these Host files are the same printers used for the normal printing of LAN files.

The communications link can be via LU 6.2 or TCP/IP sockets.

AnyQueue/PageSorter (PC product)

AnyQueue/PageSorter runs on a personal computer and its purpose is to identify and extract reports from an ASCII input file, generating one or more output files. AnyQueue/PageSorter uses a configuration file. Within this configuration file, **Report Definitions** are defined which contain **Identification Records** that determine how to create separate reports from a multi-page report. For instance, now you may have a report that is generated every month. After the report has been generated and printed, someone must manually sort through the report and separate it by Divisions. Using AnyQueue/PageSorter, the entire process can be automated.

PageCenter Web Access (PC product)

PageCenter Web Access provides an interface to PageCenter from an Internet browser. This addition to an Internet Server allows users to access PageCenter from an Internet browser. PageCenter Web Access produces HTML (HyperText Markup Language) pages with embedded JavaScript to present the PageCenter information in a similar format to the PageCenter Client for Windows. PageCenter Web Access receives HTTP (HyperText Transfer Protocol) requests from an Internet Server. The HTTP requests are then translated into PageCenter requests and the data is retrieved through a LRS/LAN Server from Host PageCenter. Once the data is retrieved, PageCenter Web Access formats the data into HTML with JavaScript functions allowing subsequent requests for more information and sends the HTML page back to the Web Access user for presentation.

VPS/RemoteQueue (PC product)

VPS/RemoteQueue is a product that runs in a LAN environment. Its purpose is to receive files from the mainframe JES2 or JES3 spool, via Host VPS, and distribute those files to local or network print queues (limit of two). VPS/RemoteQueue runs on a PC that can be located anywhere on a large internetwork of LANs. The only definitions required on the Host are one Host VTAM LU definition or Host TCP/IP definition and one Host VPS printer definition. After the initial Host definitions are defined, the LAN administrator retains a great deal of flexibility to reconfigure the LAN environment and redirect files to new or modified network print queues. The printers used to print these Host files are the same printers used for the normal printing of LAN files. VPS/RemoteQueue requires a communications link to the Host in order to communication with Host VPS. The communications link can be via LU 6.2 or TCP/IP sockets.

Features

SUPPORT OF ALL LEVELS OF JES2, JES3 and MVS

VPS functions with all IBM supported releases of JES2 and JES3. In addition, the minimum level of MVS (OS/390) supported by VPS is MVS 4.2.0.

SUPPORT OF ALL 3270-TYPE PRINTERS

VPS supports all 3270-type printers or any other printers attached to a 3174/3274/3276 control unit, both local and remote, including LU-0 (Non-SNA), LU-1 (SNA/SCS), and LU-3 (SNA/DSC).

EASE OF INSTALLATION

VPS installation consists of restoring the VPS modules, building the VPS started task JCL and defining the desired printers in the VPS control library dataset. Because VPS uses standard interfaces for both SYSOUT retrieval and SYSOUT printing, no operating system or JES modifications are required.

EASE OF USE

SYSOUT data is routed to VPS printers through any combination of the standard JCL or TSO command parameters of SYSOUT class, destination, form and special writer program name.

COMPATIBILITY WITH JES PRINTING

VPS supports all SYSOUT record formats (variable, fixed and undefined) and all control character types (ASA, machine or none).

UNATTENDED OPERATION

VPS automatically, without operator intervention, selects and prints SYSOUT datasets as they become available for printing.

SHARED PRINTER SUPPORT

VPS will share its devices with other VTAM applications through the use of a VTAM RELREQ exit. (This is the standard method used by CICS and IMS to share printers.)

COEXISTENCE WITH LOCAL COPIES

VPS “brackets” its output, preventing screen hardcopies from being interspersed with VPS output. VPS also determines whether a printer is in bracket state (busy doing a screen copy) before it initiates printing.

SMF TYPE-6 RECORDS

VPS writes SMF Type-6 (JES output) records which account for all SYSOUT printed by VPS.

EXTENSIVE ERROR RECOVERY

VPS is designed to recover wherever possible from any error conditions which may arise during its processing. These possibilities include power loss, forms jams, intervention required, etc.

FLEXIBILITY

Significant operational flexibility is attained through a wide range of VPS system and printer keyword parameters, as well as through a full set of operator commands.

HIGH PERFORMANCE

VPS compresses SYSOUT data wherever possible to minimize disk I/O and line traffic. VPS also uses data chaining on SCS devices for optimum printer performance.

SPECIAL FORMS CONTROL

VPS allows the user to specify automatic forms control for any or all of its printers. When this option is in effect, VPS will print a message on the appropriate printer requesting the correct form to be mounted as required.

FORMS CONTROL BUFFER (FCB) SUPPORT

VPS will automatically load the appropriate image from SYS1.IMAGELIB and print the SYSOUT dataset using the page length, lines per inch, and channel positions specified in the image.

SEPARATOR PAGE ROUTINE

Source code for the VPS separator page routines is distributed, allowing user modifications or rewriting as deemed necessary. Separators can be printed for jobs, output groups, or datasets.

ENFORCEMENT OF SYSOUT DATASET SIZE LIMITS

VPS allows specification of a maximum number of lines per dataset allowed for each of its printers. If this limit is exceeded, VPS can requeue the SYSOUT dataset to a user specified SYSOUT class and destination.

COMPREHENSIVE OPERATOR COMMANDS

VPS supports a full set of operator commands for controlling and displaying the status of VPS and its printers. Printer oriented commands can be issued for specific printers, groups of printers, printers in a given state or all printers whose name starts with a specified character string.

DYNAMIC ADDITION/REMOVAL OF PRINTERS

VPS supports the addition and removal of printers to and from the VPS system through the issuance of operator commands. This facility allows for maximum flexibility without impacting the running VPS system.

COMMAND AND MESSAGE LOGGING

If requested through the appropriate VPS parameters, VPS logs all commands that it receives, as well as all messages that it generates. This log dataset can be “spun off” (made immediately available for printing) at any time by issuing a CLOSELOG command.

PA KEY AND CANCEL PRINT KEY SUPPORT

VPS supports both PA-1 and PA-2 keys as well as the Cancel Print Key on SCS printers. The PA-1 key notifies VPS to restart printing the current SYSOUT dataset, PA-2 notifies VPS to back up the current SYSOUT dataset four or five pages and the Cancel Print Key notifies VPS to cancel the current SYSOUT dataset.

MISSING RESPONSE DETECTOR

A Missing Response Detector monitors all printers in the VPS system and notifies the operator if a VTAM or TCP/IP SEND has been outstanding for more than a user specified time interval.

VMCF/TSO INTERFACE

Included with VPS is a TSO full-screen interface command processor. This interface allows VPS and its printers to be controlled by time sharing users.

VPSPRINT COMMAND PROCESSOR

Also included with VPS is the VPSPRINT command processor, which can be installed to easily migrate from DSPRINT to VPS. (This command processor is distributed in both source code and load module format).

DIAL-UP SUPPORT

VPS supports dial-up devices.

GDDM SUPPORT

VPS will print GDDM graphs that are created using GDDM Version-2 or later, eliminating the need to run ADMPRINT.

SAS SUPPORT

VPS will print SAS/GRAPH output, eliminating the need to run SASWTR.

IPDS SUPPORT

VPS will print Intelligent Printer Data Stream (IPDS) datasets, which is IBM's Systems Application Architecture host-to-printer data stream for advanced function printing (AFP) subsystems. An exit allows for customized processing of IPDS commands and customized ACK/NACK processing.

PRINTER POOLING

A pool of printers can be defined, each specifying the same selection criteria. As work which meets this selection criteria becomes available, VPS will print it on the first available printer in the pool.

USER EXITS

VPS allows for special needs of users by providing exits at key processing points.

VPS NEWS

The contents of a "news" dataset can be printed on VPS banner pages.

TRANSPARENCY

VPS can insert special transparency codes into output to accommodate special requirements of printers, printer emulation packages, or protocol converters.

EXTERNAL SECURITY INTERFACE

VPS includes an external security interface allowing system security rules to be written to control access to designated VPS printers using RACF, CA-ACF2, or CA-TOPSECRET.

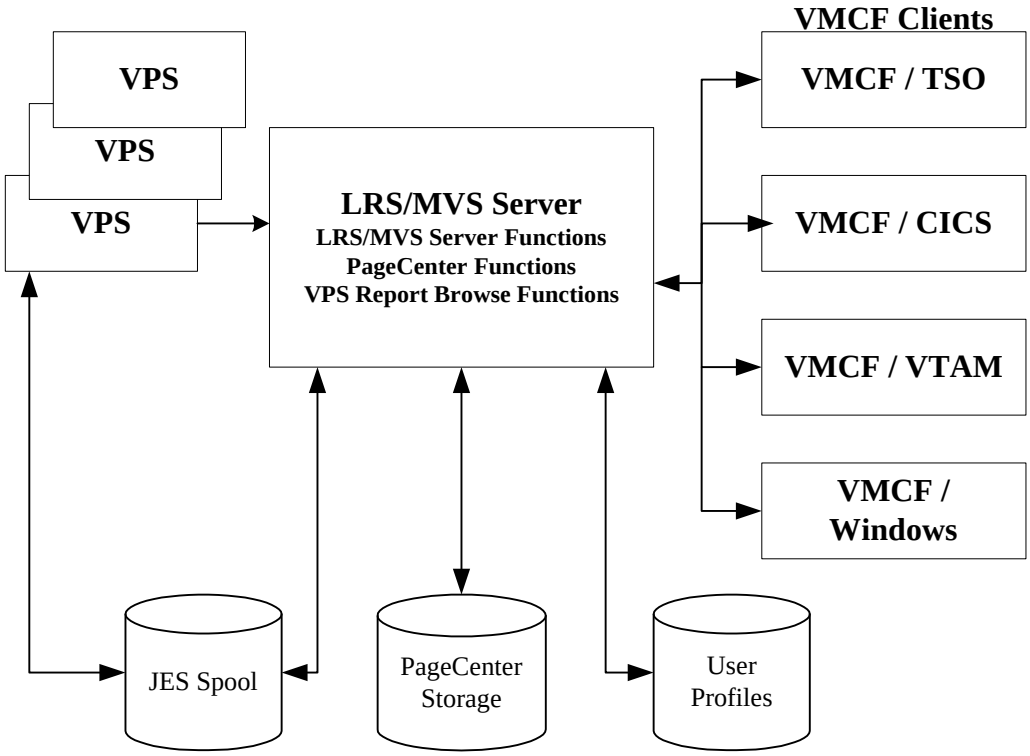
Client/Server Architecture

VPS Release 7.0 introduced a new client/server architecture for communicating with VMCF, the VPS Monitor and Control Facility, and other VPS-related products such as PageCenter. The LRS/MVS Server, which is licensed as a component of VPS, uses Cross Memory Services to communicate with VPS and JES.

VMCF executes VPS, MVS, and JES commands via the authorized LRS/MVS Server. Access to each command can be strictly controlled through the VMCF security interface. Users with special security requirements can optionally modify or replace the supplied security interface.

Because VMCF and PageCenter can all act as clients of a common server component, only one copy of the RACF rules needs to be loaded per LRS/MVS Server. Because all functions that require authorization are performed in the LRS/MVS Server address space, VMCF no longer requires an authorization SVC.

Note that it is possible to run more than one LRS/MVS Server address space simultaneously. The VMCF user may then choose to connect to a specific LRS/MVS Server from a VMCF menu of available LRS/MVS Server address spaces.



Section 2
System Requirements

Overview

This section describes the software and hardware environment required for VPS® to function. The topics presented include:

- MVS Requirements
- JES requirements
- Storage requirements
- VTAM definition requirements
- Hardware requirements
- CPU Serial Number Verification (see **Note** below)

Some of the information presented, particularly in the discussion of VTAM definition requirements, is fairly complex and assumes some prior knowledge of VTAM components. If you are not the person responsible for VTAM support at your installation, you may wish to make this information available to your VTAM support staff and discuss its implications with them.

For information pertaining to VPS/TCPIP, see "TCP/IP System Requirements" on page 10.4.

Note: Beginning with VPS V1 R8.0, LRS has implemented CPU serial number verification into the base product and other VPS extension products (VPS/TCPIP, VPS/PCL, etc.). The keys for VPS and the extension products will be supplied by LRS and will contain the CPU serial number for the machine on which the product is licensed. This means that if you are executing VPS and other VPS extension products on multiple CPUs, then you will receive multiple keys for each licensed product when you receive the distribution cartridge.

The product keys are 60 characters in length and are in the following format:

Byte	Description
1	T - trap key or L - license key
2-4	Machine manufacturer (e.g. IBM)
5-8	Machine type (e.g. 2003)
9-13	CPU serial number
14-60	Encrypted customer id, CPU serial number, expiration date, etc.

Note that the product keys must be entered exactly as supplied by LRS. Modified product keys are considered invalid and will prevent the product from being used.

A grace period has been built into the products that will allow them to function normally on an unauthorized CPU. During the grace period, the product will issue warning messages informing you that you are executing the product on an unauthorized CPU. Warning messages will indicate the number of days remaining in the grace period. After the grace period has expired, the product will automatically terminate and will not restart until a valid product key has been obtained from LRS. Therefore, in order to avoid any unexpected downtime, you should contact LRS administration as soon as possible after receiving the warning messages in order to obtain a valid product key.

MVS Requirements

The minimum level of MVS (OS/390) supported by VPS is MVS 4.2.0.

The “C” runtime libraries must also be available to VPS, either via the linklist or via the STEPLIB DD in the VPS JCL.

JES Requirements

VPS allows any combination of SYSOUT class, destination, form, and special writer program name to be specified for its SYSOUT selection criteria. Since all of these specifications are available for use through standard JCL specifications, no modifications to JES are required. If destination is used as one of the selection criteria, the destination specified must be considered valid by JES. Methods of establishing valid JES destinations are discussed below.

JES2 Destinations

Prior to JES2 V4.1, there were two JES2 queues which could contain SYSOUT datasets. The JES2 LOCAL queue contained SYSOUT datasets that were created with a destination of LOCAL or Unnnn (where “nnnn” was a value from 1 to 9999). The JES2 REMOTE queue contained SYSOUT datasets that were created with a DESTINATION of Rnnnn, RMnnnn, or RMTnnnn, (where “nnnn” was a value from 1 to 9999). Some JES2 installations also chose to associate more meaningful names with an “U” or “R” number by using the DESTID parameter in their JES2 parms. If an attempt was made to allocate a SYSOUT dataset with a destination that did not fall into one of these categories (LOCAL, “U” number, “R” number, or DESTID), the allocation attempt would be rejected or a JCL error would occur.

Beginning with JES2 V4.1, there is a third JES2 queue, which is referred to as the userid queue. This queue contains SYSOUT datasets which have a destination that cannot be identified by JES2 as either a local or remote destination. This means that any value that follows the syntax for a JES2 destination (alphanumeric, eight characters or less, etc.) can be used when creating a SYSOUT dataset. These newer versions of JES2 also include parameters to indicate that even certain “U” or “R” values should be considered to be userids rather than local or remote destinations.

VPS’ ability to select a SYSOUT dataset is not dependent upon the queue in which the SYSOUT dataset resides.

JES3 Destinations

JES3 does not prevent the creation of a SYSOUT dataset if the destination value is considered invalid; instead, it will allow the SYSOUT dataset to be placed onto the JES3 spool, but it will not pass that dataset to VPS when VPS makes a request for work. There are various methods that can be used to define valid destinations to JES3. These methods are described in the appropriate JES3 manuals.

However, definition of JES3 destinations is not required if certain maintenance has been applied to JES3. Refer to “USEROPTS” on page 3.70 for further information.

Storage Requirements

Virtual Storage Requirements

The **total VPS storage requirement** is equal to the sum of base system requirements, in-session printer requirements, and actively printing printer requirements. These requirements are computed as follows:

Base System Requirements

Below 16M line:	226K
Above 16M line:	280K + (maxprts * 2048) + (trtsize * 4k)
CSA:	586 + (numbufs * 160)

- "Maxprts" is the maximum number of printers that can be concurrently activated within the VPS address space. This is determined by the value of the first subparameter of the MAXPRTS system keyword.
- "Trtsize" is the number of pages allocated for VPS' internal trace tables. This is determined by the value of the second subparameter of the TRACE system keyword.
- "Numbufs" is the number of subsystem command buffers specified as the third subparameter of the SSI system keyword.

In-Session Printer Requirements

Below 16M line:	0
Above 16M line:	400 * maxsess
CSA:	0

Note: See "Storage Requirements" on page 8.18 for additional storage required for VPS AFP products.

- "Maxsess" is the maximum number of printers that can concurrently be in session with VTAM within the VPS address space. The highest possible value for maxsess would be the value of maxprts, as described in Base System Requirements, if you have the RELREQ parameter coded to continue VPS' session with a printer until another VTAM application requests it (RELREQ=E or RELREQ=W) or to never terminate VPS's session with a printer (RELREQ=N). However, if you have the RELREQ parameter coded to terminate the VTAM session when a printer finishes printing a job (RELREQ=A) or when a printer finishes printing all available work (RELREQ=I), the highest number of printers with which VPS could have a VTAM session at one time would be equal to the value of the second subparameter of the MAXPRTS keyword.

Actively Printing Printer Requirements

Below 16M line: (4096 + tcpsizeb) * maxbusy

Above 16M line: (linestack + rusize + qbufsize + rtabsize + tcpsizea) * maxbusy

CSA: 0

Note: See "Storage Requirements" on page 8.18 for additional storage required for VPS AFP products.

- "Maxbusy" is the maximum number of printers that can concurrently be printing within the VPS address space. This is determined by the second subparameter of the MAXPRTS system keyword.
- "Linestack" is the length of the longest line in the dataset being printed, rounded up to a double word and multiplied by 6.
- "Rusize" is the RUSIZE (VTAM or TCP/IP send buffer size) specification in the printer definition.
- "Qbufsize" is the QBUFSIZE (staging area size) specification in the printer definition.
- "Rtabsize" is 480 for SCS (LU-1) printers and 0 for non-SCS printers.
- "Tcpsizea" is 8224 for TCP/IP printers and 0 for all other printers.
- "Tcpsizeb" is 1024 for TCP/IP printers and 0 for all other printers.

DASD Space Requirements

When using the PSO interface to JES, VPS copies the SYSOUT dataset from the JES spool into a staging area before printing the dataset. This process is known as staging. Staging is also performed in some situations when using the SAPI interface. Refer to "Staging Methods in VPS" on page 6.22 for a detailed explanation of the staging process.

The amount of Direct Access Storage required for staging depends on the maximum size SYSOUT dataset a given VPS printer will print. VPS compresses SYSOUT data before it places it on the VPS staging dataset, so the DASD space required for a given dataset depends on the characteristics of that dataset (number of repetitive characters, number of spaces, etc.).

We have found that, on the average, we are able to stage about 800-1000 print lines per 3380 track using half-track blocking (QBUFSIZE=23476). This is a good number for initial estimates. If the VPS staging dataset is not large enough to hold the entire dataset, an X37 abend will occur and VPS will place that particular printer in an EDRAINED (drained due to error) status. Larger staging dataset allocations should then be specified in the QSPACE parameter in the Printer Definition member, and a "REACTIVATE" command should be issued to make the new parameter values effective for that printer.

The QBUFSIZE value must be at least as large as the largest record to be read by VPS for that printer. If you are planning to print datasets with very large record lengths, such as IPDS datasets, you must specify a QBUFSIZE which is large enough to accommodate the largest record. If the record size exceeds the QBUFSIZE value, VPS will truncate the records at the specified QBUFSIZE length, and will issue message VPS510N. For example, if you create a SYSOUT dataset with a record length of 32K, and QBUFSIZE=8192 is specified for the printer, each record longer than 8192 bytes will be truncated.

VTAM Definition Requirements

Application Definition

An APPL must be added to VTAM for VPS. An example of this statement is shown below.

```
         VBUILD TYPE=APPL
VPSAPPL  APPL  ACBNAME=VPSAPPL,    See note 1    X
               AUTH=(ACQ,VPACE),   See note 2    X
               EAS=200,            See note 3    X
               APPC=YES,           See note 4    X
               PARSESS=YES,        See note 4    X
               DMINWNL=1,          See note 4    X
               DMINWNR=0,          See note 4    X
               DSESLIM=1           See note 4
```

Notes:

1. The name specified as ACBNAME should be used in the APPLID parameter in the VPS Initialization Member. (See "Building the System Initialization Member" on page 3.16.)
2. ACQ is required by VPS to initiate its sessions with printers. VPACE is the default and should be used for SCS (LU-1) or APPC (LU-6) printers.
3. Specify the approximate number of printers to be driven by VPS in the EAS parameter.
4. These parameters are required only if you install VPS/PC or AnyQueue and define VPS printers with COMMTYPE=APPC. See "Installing VPS/PC, AnyQueue® or VPS/RemoteQueue" on page 3.285.
5. The member name of this APPL definition entry (the VTAM major node name) cannot be the same as either the name on the APPL statement or the ACBNAME specified on the APPL statement.

Cross Domain Considerations

If using static definitions for the cross-domain resources in VTAM, and the printers are cross-domain to VPS, then the printers should be defined in the VPS domain as a CDRSC. Also, the VPS application ID should be defined in the printer domain as a CDRSC. VPS application IDs should be unique network wide. In other words, if you run VPS on two systems which share printers, you must use a different name for the VPS application ID on each system.

Terminal Definitions

The LU types referred to in these sample terminal definitions and elsewhere in VPS are:

LU-0: Non-SNA local or bisync

LU-1: SNA/SCS

LU-3: SNA/DSC

LU-6: APPC

To correctly define a printer for VPS, you need to know if the printer is SNA (and, if so, if it is SCS or DSC) or non-SNA. The appropriate statements in the VTAM definition will establish the correct definition for VTAM. (Refer to the ALOGMODE printer keyword for a method of overriding the VTAM definition for a device).

An “LU” statement should be coded for an SNA printer. The determination of whether it will function as SCS or DSC is based upon the bind parameters for the device. A “LOCAL” or “TERMINAL” statement should be coded for a non-SNA printer.

The following sample VTAM definitions show only the parameters that have a direct impact on VPS.

LU-1 on an SNA/LOCAL Control Unit

```
TERM1    LU         LOCADDR=N,                  X
                    VPACING=1       Note 1
```

LU-3 on an SNA/LOCAL Control Unit

```
TERM1    LU         LOCADDR=N,                  X
                    VPACING=0,      Note 2      X
                    PACING=0
```

LU-1 on an SDLC/REMOTE Control Unit

```
TERM1    LU         LOCADDR=N,                  X
                    PACING=1,       Note 1      X
                    VPACING=2       Note 3
```

LU-3 on an SDLC/REMOTE Control Unit

```
TERM1    LU         LOCADDR=N,                  X
                    PACING=0,       Note 2      X
                    VPACING=0
```

LU-0 on a NON-SNA LOCAL Control Unit

```
TERM1    LOCAL      CUADDR=XXX,     Note 4      X
                    TERM=3286
```

LU-0 on a NON-SNA REMOTE Control Unit

```
TERM1    TERMINAL   ADDR=XXXX,                  X
                    TERM=3286,                  X
                    VPACING=0
```

LU-6 APPC definition for VPS/PC Product

```
APPC1   LU   LOCADDR=n,                          X
             PACING=p,              Note 1       X
             VPACING=p,             Note 3       X
             MODETAB=mmmmmmmm,      Note 5       X
             USSTAB=ISTINCDT,                    X
             SSCPFM=FSS
```

Note 1: PACING should be specified as a non-zero value for LU-1 and LU-6 definitions.

Note 2: No PACING is required or recommended for an LU-3 printer.

Note 3: VPACING should be specified as a non-zero value to protect the NCP from buffer slowdown conditions.

Note 4: For VTAM versions 3.2 and above, FEATUR2=(PRINTR) should be added to the definition to prevent VTAM from breaking the session when an asynchronous device-end (caused by lifting the cover) occurs.

Note 5: MODETAB should be specified for LU-6 definitions. The logon mode table should contain the logmode entry specified in ALOGMODE in the VPS printer definition for the VPS/PC product. (See "Installing VPS/PC, AnyQueue® or VPS/RemoteQueue" on page 3.285 for more information on valid logon mode entry values).

Miscellaneous Notes on VTAM Parameters

MODETAB= This parameter must specify the name of the logon mode table which contains the mode table entry for the printer. If this parameter is not coded, the mode table entry is assumed to be in the IBM default mode table (ISTINCLM). (See "IBM-Supplied Mode Table Entries" on page 2.12.)

DLOGMOD= This parameter specifies the name of the particular mode table entry within the "MODETAB" to be used.

The name of the mode table entry can be specified in one of two manners. One method is the specification of the VTAM DLOGMOD parameter. The second method is the specification of the ALOGMODE VPS parameter on the printer definition control statement. The VPS ALOGMODE parameter will override the VTAM parameter specification.

PACING= For LU-1 printers, PACING is required.

Remote Printers If this printer is remote, the PACING parameter for the session parameters comes from the SRCVPAC value of the mode table entry. If this value is zero, the PACING parameter from NCP gen is used. If PACING is also zero, the OPNDST request will fail with message VPS312E prtrid OPNDST FAILED RC=04 F2=04 SNS=0821xxxx or SNS=0835xxxx.

Local Printers If this printer is attached via a local SNA controller, the PACING value comes from the PSNDPAC value of the mode table entry. If this value is zero, the VPACING value specified for the LU in the VBUILD is used. If VPACING is also zero, the OPNDST request will fail with message VPS312E prtrid OPNDST FAILED RC=04 F2=04 SNS=0821xxxx or SNS=0835xxxx.

Note: The NVPACE parameter on the APPL statement will override any VPACING value specified and also cause the session to fail.

For LU-0 and LU-3 printers, PACING is not recommended. PACING on these printers serves no purpose and causes unnecessary processing and line usage.

VPACING= VPACING is not required or recommended for LU-0 or LU-3 printers.

VPACING is required for LU-1 printers attached to a local SNA controller, and is highly recommended for remotely attached LU-1 printers that use chaining.

VPACING is recommended for LU-6 definitions.

Local LU-1 Printers

VPACING is required for locally attached LU-1 printers. This requirement exists because single stage PACING is used for local controllers. In single stage PACING, the VPACING value alone paces the data flow, and the PACING value is ignored.

Remote LU-1 Printers Using Chaining

VPACING is not mandatory, but is highly recommended for remotely attached LU-1 printers that use chaining. If VPACING is specified as zero or as a very high number, NCP slowdowns may occur. This happens because VPS can output data faster than the NCP can deliver it to the printer. Consequently, the data builds up in the NCP and causes a slowdown. VPACING is specifically designed to prevent this situation. A value of two (2) allows good data flow without causing a large build up in the NCP.

Remote LU-1 Printers Without Chaining

If chaining is not used on an LU-1 printer, VPACING is not required.

IBM-Supplied Mode Table Entries

The mode table entries described on this page are available in your IBM-supplied logmode table (ISTINCLM). They can be used in the ALOGMODE parameter in a VPS printer definition or in the DLOGMOD parameter in a VTAM definition. See "VPS-Supplied VTAM Log Modes" on page 6.14 for a description of additional logmodes available in VPS.

LU-0

```
S3270    MODEENT LOGMODE=S3270,              X
            FMPROF=X'02',                    X
            TSPROF=X'02',                    X
            PRIPROT=X'71',                   X
            SECPROT=X'40',                   X
            COMPROT=X'2000'
```

LU-1

```
SCS      MODEENT LOGMODE=SCS,                X
            FMPROF=X'03',                    X
            TSPROF=X'03',                    X
            PRIPROT=X'B1',                   X
            SECPROT=X'90',                   X
            COMPROT=X'3080',                 X
            RUSIZES=X'87C6',                 X
            PSNDPAC=X'01',                   X
            SRCVPAC=X'01',                   X
            PSERVIC=X'01000000E100000000000000'
```

LU-3

```
DSC2K    MODEENT LOGMODE=DSC2K,              X
            FMPROF=X'03',                    X
            TSPROF=X'03',                    X
            PRIPROT=X'B1',                   X
            SECPROT=X'90',                   X
            COMPROT=X'3080',                 X
            RUSIZES=X'8787',                 X
            PSERVIC=X'030000000000185018507F00'

DSC4K    MODEENT LOGMODE=DSC4K,              X
            FMPROF=X'03',                    X
            TSPROF=X'03',                    X
            PRIPROT=X'B1',                   X
            SECPROT=X'90',                   X
            COMPROT=X'3080',                 X
            RUSIZES=X'8787',                 X
            PSERVIC=X'03000000000018502B507F00'
```

Hardware Requirements

3174/3274 Customization

The descriptions of the SNA and non-SNA environments discuss values for the printer authorization matrix. The possible values are:

SYSTEM: Only VTAM applications allowed

LOCAL: Only local copies allowed

SHARED: Both VTAM applications and local copies allowed

SNA Environment

- Be sure to specify the printer authorization matrix correctly. A printer must be defined as “SHARED” or “SYSTEM” mode to be used by VPS.
- Specify a “1” when asked if extended data stream support is required. Printers perform much better and have more capabilities in SCS mode.
- Specify a “1” when asked if between bracket printer sharing is required. Between bracket printer sharing (as opposed to between session printer sharing) allows local copies to be performed by terminal operators between jobs on a printer in session with VPS. VPS will bracket the entire job to prevent local copies from interspersing with SYSOUT datasets being printed by VPS.

Non-SNA Environment

Non-SNA control units do not support brackets, so VPS cannot prevent local copies from interspersing with SYSOUT datasets on a printer defined as “SHARED”. The only way to prevent local copy interference on a non-SNA printer is to define the printer in “SYSTEM” mode only in the printer authorization matrix. This will disallow local copies.

Section 3
Installation

Overview

In this section, we give detailed instructions for installing VPS®. These instructions include everything from restoring the distribution cartridge to defining how a particular VPS printer will operate. For the "first-time" VPS user, this section contains the bulk of the information necessary to make VPS work.

If you have already installed VPS V1 R8.0 and are simply implementing an upgraded version, you may wish to read "Installing an Upgrade to VPS Version 1 R8.0" on page 6.15. If you are a user of VPS V1 R7.0 who is now installing VPS V1 R8.0 for the first time, you may wish to read "Converting from VPS V1 R7.0 to VPS V1 R8.0" on page A.1.

Before you begin installation, you should also read "VPS Control Library" on page 3.2 for an explanation of the purpose and contents of the VPS Control Library.

VPS Control Library

VPS uses a partitioned dataset, known as the "VPS Control Library", as the source for information about VPS' operating environment and the definition of the printers which VPS is to control. The dataset name of this library is specified on the VPSLIB DD statement in the VPS started task JCL. (See "Defining the VPS Execution JCL" on page 3.14 for the complete description of VPS JCL). This dataset must have a logical record length between 80 and 128 and a block size that is a multiple of LRECL.

This control library can contain six different types of members. They are:

- System Initialization Member
- Message Modification Member (optional)
- Printer Activation Inclusion List Member (optional)
- Printer Activation Exclusion List Member (optional)
- Printer Default Member(s) (optional)
- Printer Definition Members - one for each printer

Syntax of VPS Control Library Members

All VPS control library members must use the following syntax:

- Control statements must begin between position 2 and 16 inclusive.
- Continuation is signified by ending the last parameter on a control statement with a comma.
- As many parameters as desired can be specified on a given statement as long as they do not extend past position 72.
- Any statement containing an asterisk in position 1 is considered to be a comment statement.
- Comments can also be specified on actual control statements by leaving at least one space after the control statement information.

System Initialization Member

The System Initialization Member contains several keyword parameters which apply to the overall VPS System. The member name of this member is determined by the PARM on the VPS execute statement. If no PARM is specified, a member name of VPSSTART is assumed.

Message Modification Member

The Message Modification Member contains one or more entries describing modifications to the "type" of a VPS message. The valid message modification types are:

A Action
N Normal
I Informational
L Enter in VPS log and SYSLOG, but do not issue WTO
X Do not log or issue WTO ("no-ops" the message)

In this member, a particular message type can be modified by coding:

MSGnnn=x

where “nnn” is the VPS message number and “x” is the type to which the message should be changed from its normal value. The member name of this member is determined by the MSMODMEM keyword in the System Initialization Member. See “Using a Message Modification Member” on page 6.21 for more information about this process.

Under some circumstances, the following VTAM error messages cannot be modified by using the message modification member. If it is necessary to change the message type for any of these messages, the WTO Exit (VPS User Exit 05) should be used.

VPS301E
VPS306N
VPS310E
VPS311E
VPS312E
VPS317E
VPS319N
VPS320E
VPS324E
VPS331E
VPS332E
VPS334E
VPS335E
VPS336E
VPS337E
VPS352E
VPS355E

Printer Activation Inclusion List Member

The Printer Activation Inclusion List Member is a list of member names in the VPSLIB library which contain the parameters describing the printers that are to be activated when VPS is initialized. The member name of this member is determined by the MLISTMEM keyword in the System Initialization Member.

This member is optional and mutually exclusive with the Printer Activation Exclusion List Member. However, if neither an Inclusion List Member nor an Exclusion List Member is specified, no printers will be automatically active in the VPS System at initialization. Printers can, however, be brought into the VPS System after initialization by issuing the VPS ACTIVATE command, or by the VPS Pre-Selection Exit.

Printer Activation Exclusion List Member

The Printer Activation Exclusion List Member is a list of member names in the VPSLIB library which do not contain parameters describing VPS printers to be activated at VPS initialization. The member name of this member is determined by the XLISTMEM keyword in the System Initialization Member.

This member is optional and mutually exclusive with the Printer Activation Inclusion List Member. However, if neither an Exclusion List Member nor an Inclusion List Member is specified, no printers will be automatically active in the VPS System at initialization. Printers can, however, be brought into the VPS System after initialization by issuing the VPS ACTIVATE commands, or by the VPS Pre-Selection Exit.

If a Printer Activation Exclusion List Member is specified, it should include not only the member names of printers which are not to be automatically activated at VPS initialization, but also the member names of any members in the VPSLIB library which are not VPS printer definitions. VPS will automatically exclude the “master” Printer Default Member (indicated by the DEFLTMEM keyword in the System Initialization Member), the Message Modification Member (indicated by the MSMODMEM keyword in the System Initialization Member), the Printer Activation Exclusion List Member (indicated by the XLISTMEM keyword in the System Initialization Member), and the System Initialization Member itself (indicated by the PARM on the EXEC statement in the VPS JCL). Default Printer Members other than the “master” must be explicitly excluded.

Users with a very large number of VPS printers may find it less time consuming to specify a Printer Activation Exclusion List Member than to specify a Printer Activation Inclusion List Member which must be updated each time a new printer is added to VPS.

Note: The Exclusion List Member will not work correctly if you concatenate more than one library on the VPSLIB JCL statement. To use an Exclusion List Member, all VPS-related members must exist in a single library.

Printer Default Member

A Printer Default Member allows the VPS user to establish default values for individual printer keyword parameters. This can help limit the number of printer keyword parameters which must be specified in the Printer Definition Members, because VPS can pick up the parameter values from the appropriate Default Member if a keyword is not specified in the Printer Definition Member.

The member name of this member is determined by the DEFLTMEM keyword in either the Printer Definition Member or in the System Initialization Member. The member name specified in the DEFLTMEM keyword in the System Initialization Member can be considered the “master” default member.

VPS assigns a value to each printer keyword parameter for a printer from one of four sources. The first of these sources to specify a value for a keyword is the one which is used. The four sources and the order in which they are searched are:

1. the Printer Definition Member for the printer
2. the member specified in the DEFLTMEM keyword in the Printer Definition Member (if any)
3. the member specified in the DEFLTMEM keyword in the System Initialization Member (if any)
4. VPS’ default value for the keyword parameter

A VPS user may wish to set up a default member for different VPS printer types such as LU-0, LU-1, LU-3, TCP/IP and PCL. Each of these members could specify printer keyword parameter values unique to those types, and specifying the DEFLTMEM keyword in the individual Printer Definition Members to point to the appropriate default would eliminate the need to specify the parameters in each Printer Definition Member. Printer Default Members are read only at VPS initialization time. Changes to a default printer member will not take effect until the next VPS initialization. A printer default member should never be activated as a ‘real’ VPS printer.

It might also be desirable to set up a default member for a particular type of printer, such as a graphics printer, and define those keywords which must have special values for this type of device.

Many VPS users set up a “master” default member which contains the staging dataset keyword parameters, the requeuing keyword parameters, and any other keyword parameters which they wish to apply to the majority of their VPS printers.

Printer Definition Members

The Printer Definition Member is used to define the attributes and options associated with the printer being defined. There must be a Printer Definition Member for each printer that is to be used by VPS. The member names of these members can be any valid partitioned dataset member name, with two exceptions: VPS will not accept a member name of "SYSTEM" or a member name that starts with the characters "EXIT". Changes to a Printer Definition Member will not take effect until the VPS printer is activated or re-activated.

VPS Installation Steps

WARNING: If VPS V1 R8.0 will be running in the same OS/390 (MVS) operating system as VPS V1 R7.0, then VPS fix 156 must be applied to VPS V1 R7.0 before installing VPS V1 R8.0.

The steps required to install VPS are:

1. Code required JES parameters (if any—see "JES Requirements" on page 2.3).
2. Code required VTAM parameters (see "VTAM Definition Requirements" on page 2.7).
3. Restore the VPS files from the distribution cartridge (see "Restoring the Distribution Cartridge" on page 3.8).
4. Copy VPS load modules into appropriate libraries (see "Copying VPS Modules into Appropriate Libraries" on page 3.12).
5. Define VPS checkpoint dataset (see "Defining the VPS Checkpoint Dataset" on page 3.13).
6. Define the VPS execution Job Control Language (see "Defining the VPS Execution JCL" on page 3.14).
7. Build the System Initialization Member (see "Building the System Initialization Member" on page 3.16).
8. Build the Printer Activation Inclusion List or the Printer Activation Exclusion List (optional) (see "Building the Printer Activation Inclusion List" on page 3.77 and "Building the Printer Activation Exclusion List" on page 3.78).
9. Build the Printer Default Member(s) (optional) (see "Building the Printer Default Member" on page 3.79).
10. Build the Printer Definition Members (see "Building the Printer Definition Members" on page 3.80).

Restoring the Distribution Cartridge

The VPS system is distributed on 3480 cartridge in IEBCOPY unloaded format with the following attributes:

- Standard labels
- VOL=SER=VPSR80

The following files are on the distribution cartridge:

1	**JCL**	LRS.PRODUCT.JCL (Sample JCL to Restore Product Files)
2	**LRS/OS/API**	LRS.V1R12.ASM
3		LRS.V1R12.MACLIB
4		LRS.V1R12.CNTL
5		LRS.V1R12.LOAD
6	**VPS**	LRS.VPS.V1R80.ASM
7		LRS.VPS.V1R80.MACLIB
8		LRS.VPS.V1R80.CNTL
9		LRS.VPS.V1R80.LOAD
10	**LRS_SERVER**	LRS.VSV.V1R80.ASM
11		LRS.VSV.V1R80.MACLIB
12		LRS.VSV.V1R80.CNTL
13		LRS.VSV.V1R80.LOAD
14	**VMCF**	LRS.VMCF.V1R81.ASM
15		LRS.VMCF.V1R81.MACLIB
16		LRS.VMCF.V1R81.CNTL
17		LRS.VMCF.V1R81.LOAD
18	**VPSPRINT**	LRS.VPSPRINT.R61.ASM
19		LRS.VPSPRINT.R61.MACLIB
20		LRS.VPSPRINT.R61.CNTL
21		LRS.VPSPRINT.R61.LOAD
26	**DRS**	LRS.DRS.V1R34.ASM
27		LRS.DRS.V1R34.MACLIB
28		LRS.DRS.V1R34.CNTL
29		LRS.DRS.V1R34.LOAD
30	**VPS/AFP**	LRS.VPS.V1R80.PDEFLIB
31		LRS.VPS.V1R80.FDEFLIB
32		LRS.VPS.V1R80.FONT300
33		LRS.VPS.V1R80.OVLYLIB
34		LRS.VPS.V1R80.PSEGLIB
35	**PAGECENTER**	LRS.VPC.V1R11.ASM
36		LRS.VPC.V1R11.MACLIB
37		LRS.VPC.V1R11.CNTL
38		LRS.VPC.V1R11.LOAD
39	**LRS/Net**	LRS.LNT.V1R10.ASM
40		LRS.LNT.V1R10.MACLIB
41		LRS.LNT.V1R10.CNTL
42		LRS.LNT.V1R10.LOAD
43		LRS.LNT.V1R10.HTML

44	**LRS/Web Connect**	LRS.WCT.V1R0.PAX
46	**DMCF**	LRS.DMCF.V1R10.ASM
47		LRS.DMCF.V1R10.MACLIB
48		LRS.DMCF.V1R10.CNTL
49		LRS.DMCF.V1R10.LOAD
50	**PageCenter Web Access**	LRS.PWA.V1R21.PAX
51		LRS.PWA.V1R21.HTML
52		LRS.PWA.V1R21.LOAD

There are several files on the distribution cartridge. The files which need to be restored for VPS are documented here.

FILE NUMBER	DSNAME	CONTENTS
3	LRS.V1R12.MACLIB	Mapping macros for Common Product Interfaces
6	LRS.VPS.V1R80.ASM	Source for sample exits
7	LRS.VPS.V1R80.MACLIB	Mapping macros for sample exits
8	LRS.VPS.V1R80.CNTL	Sample VPS control members
9	LRS.VPS.V1R80.LOAD	VPS load modules

Files 6, 7, and 8 each include a member named $$$INDEX, which is a list of member names and a short description of each member in that file.

Sample JCL to restore the files on the distribution cartridge is supplied in file 1, which is named "LRS.PRODUCT.JCL". (This is a sequential file of 80-byte records. You may wish to use IEBGENER to restore it to a sequential file or to a member of a PDS).

The portion of that JCL which pertains to VPS is reproduced here.

```
//JOBNAME JOB ACCT,PROGRAMMER,TIME=25,REGION=1024K
//*
//ALLOC     PROC   PREFIX=,       ** HIGH LEVEL QUALIFIER
//          VOLSER=XXXXXX,       ** DISK VOLUME SERIAL
//          ASM=23440,     ** ASM BLKSIZE      <---- Note 1
//          CNTL=23440,    ** CNTL BLKSIZE     <---- Note 1
//          MACLIB=23440,  ** MACLIB BLKSIZE   <---- Note 2
//          LOAD=4096      ** LOAD BLKSIZE     <---- Note 3
//*
//ALLOC     EXEC   PGM=IEFBR14
//*
//DIST03    DD     DSN=&PREFIX.LRS.V1R12.MACLIB,
//          DISP=(,CATLG),UNIT=SYSALLDA,VOL=SER=&VOLSER,
//          DCB=(BLKSIZE=&ASM,LRECL=80,RECFM=FB),
//          SPACE=(&ASM,(00300,00020,00025),RLSE)
//*
//DIST06    DD     DSN=&PREFIX.LRS.VPS.V1R80.ASM,
//          DISP=(,CATLG),UNIT=SYSALLDA,VOL=SER=&VOLSER,
//          DCB=(BLKSIZE=&ASM,LRECL=80,RECFM=FB),
//          SPACE=(&ASM,(01200,00200,00100),RLSE)
//*
//DIST07    DD     DSN=&PREFIX.LRS.VPS.V1R80.MACLIB,
//          DISP=(,CATLG),UNIT=SYSALLDA,VOL=SER=&VOLSER,
//          DCB=(BLKSIZE=&MACLIB,LRECL=80,RECFM=FB),
//          SPACE=(&MACLIB,(00200,00050,00100),RLSE)
//*
//DIST08    DD     DSN=&PREFIX.LRS.VPS.V1R80.CNTL,
//          DISP=(,CATLG),UNIT=SYSALLDA,VOL=SER=&VOLSER,
//          DCB=(BLKSIZE=&CNTL,LRECL=80,RECFM=FB),
//          SPACE=(&CNTL,(00010,00005,00025),RLSE)
//*
//DIST09    DD     DSN=&PREFIX.LRS.VPS.V1R80.LOAD,
//          DISP=(,CATLG),UNIT=SYSALLDA,VOL=SER=&VOLSER,
//          DCB=(BLKSIZE=,&LOAD,RECFM=U),
//          SPACE=(&LOAD,(00400,00080,00075),RLSE)
//*
//     PEND
//*
//RESTORE   PROC   PREFIX=,       ** HIGH LEVEL QUALIFIER
//          TAPE=CART            ** TAPE UNIT NAME
//*
//RESTORE   EXEC   PGM=IEBCOPY
//SYSPRINT  DD     SYSOUT=*
//*
//TAPE03    DD     DSN=LRS.V1R12.MACLIB,DISP=OLD,
//          VOL=(,RETAIN,SER=VPSR80),LABEL=(003,SL),UNIT=&TAPE
//DIST03    DD     DSN=&PREFIX.LRS.V1R12.MACLIB,DISP=OLD
//*
```

```
//TAPE06    DD     DSN=LRS.VPS.V1R80.ASM,DISP=OLD,
//           VOL=(,RETAIN,SER=VPSR80),LABEL=(006,SL),UNIT=&TAPE
//DIST06    DD     DSN=&PREFIX.LRS.VPS.V1R80.ASM,DISP=OLD
//*
//TAPE07    DD     DSN=LRS.VPS.V1R80.MACLIB,DISP=OLD,
//           VOL=(,RETAIN,SER=VPSR80),LABEL=(007,SL),UNIT=&TAPE
//DIST07  DD     DSN=&PREFIX.LRS.VPS.V1R80.MACLIB,DISP=OLD
//*
//TAPE08  DD     DSN=LRS.VPS.V1R80.CNTL,DISP=OLD,
//         VOL=(,RETAIN,SER=VPSR80),LABEL=(008,SL),UNIT=&TAPE
//DIST08  DD     DSN=&PREFIX.LRS.VPS.V1R80.CNTL,DISP=OLD
//*
//TAPE09  DD     DSN=LRS.VPS.V1R80.LOAD,DISP=OLD,
//         VOL=(,RETAIN,SER=VPSR80),LABEL=(009,SL),UNIT=&TAPE
//DIST09  DD     DSN=&PREFIX.LRS.VPS.V1R80.LOAD,DISP=OLD
//*
//          PEND
//*
//ALLOC   EXEC   ALLOC
//*
//RESTORE EXEC   RESTORE
//SYSIN   DD     *
COPY INDD=((TAPE03,R)),OUTDD=DIST03
COPY INDD=((TAPE06,R)),OUTDD=DIST06
COPY INDD=((TAPE07,R)),OUTDD=DIST07
COPY INDD=((TAPE08,R)),OUTDD=DIST08
COPY INDD=((TAPE09,R)),OUTDD=DIST09
/*
```

Note 1: BLKSIZE can be any multiple of 80.

Note 2: BLKSIZE should be the same as the BLKSIZE of SYS1.MACLIB.

Note 3: BLKSIZE can be any valid value for the device type.

Copying VPS Modules into Appropriate Libraries

After the distribution cartridge has been restored, the entire VPS load module library (LRS.VPS.V1R80.LOAD) should be copied into an authorized user library, an authorized linklist library or SYS1.LPALIB.

Note: We do not recommend copying the VPS load modules into SYS1.LPALIB, because any maintenance to VPS modules would require an IPL with CLPA to become effective.

Defining the VPS Checkpoint Dataset

This release of VPS requires a VSAM dataset that is used by VPS as a checkpoint file. Sample JCL to define this dataset is supplied as member CKPTDEF in file LRS.VPS.V1R80.CNTL. The VPS procedure must also include a DD statement with a DD name of VPSCKPT to refer to this dataset.

Checkpoint Dataset Sizing

The space requirements for the checkpoint dataset change depending on the VPS features being used and system activity. When the SYSOUT retention feature is used, a retention record is written for each dataset that is currently retained on the JES spool. If you plan to use the retention feature, you can calculate the checkpoint dataset space requirement using the following guide:

Space in cylinders = Number of datasets retained / 1000

For example, if you expect to have a maximum of 5000 SYSOUT datasets retained on the JES spool at any one time, the primary allocation for the checkpoint dataset should be at least 5 cylinders.

Sample JCL to increase the size of an existing checkpoint dataset can be found in member CKPTSIZE of dataset LRS.VPS.V1R80.CNTL.

Defining the VPS Execution JCL

VPS generally is run as a started task but can be run as a batch job. The JCL requirements are the same for both methods.

See "Installing the VPS AFP Products Within VPS" on page 8.4 for additional DD statements required for VPS AFP products.

Sample VPS started task JCL:

```
//*************************************************
//* VTAM PRINTER SUPPORT SYSTEM --- VERSION 1 R8.0 ***
//*************************************************
//*
//VPS  EXEC   PGM=VP80DRIV,PARM=VPSSTART,REGION=nnnnK,  See Notes 1-3
//   TIME=1440
//STEPLIB     DD   DSN=YOUR.AUTHLIB,DISP=SHR            See Note 4
//VPSLIB      DD   DSN=LRS.VPS.V1R80.CNTL,DISP=SHR      See Note 5
//SYSUDUMP    DD   SYSOUT=A
//VPSLOG      DD   DSN=YOUR.VPSLOG.DSNAME,DISP=SHR      See Note 6
//VPSCKPT     DD   DSN=YOUR.VPS.CKPT,DISP=SHR           See Note 7
```

Note 1: The name of the procedure that you start for VPS cannot be the same as the value of the first positional parameter on the SSI keyword in the VPS System Initialization member.

Note 2: The optional PARM on the execute statement specifies the member name in the VPSLIB library which contains the system initialization parameters. If no PARM is specified, a member name of VPSSTART is assumed. (See "Building the System Initialization Member" on page 3.16).

Note 3: See "Virtual Storage Requirements" on page 2.4 to determine region requirements.

Note 4: A STEPLIB should not be specified if you restored the VPS modules into a linklist library or SYS1.LPALIB.

If you use VPS to print GDDM output (one or more VPS printers have the GDMCLASS parameter coded in their printer definitions), the library which contains GDDM modules must either be concatenated here or must be a linklist library. The library in which the GDDM modules reside must be authorized, since MVS will not allow an authorized module to load a module from an unauthorized library. Failure to authorize the library containing the GDDM modules will result in an S306-0C abend. Also, printing GDDM output may require that you include an ADMDEFS DD statement for character coded defaults and an ADMSYMBL DD statement for symbol sets (fonts) in your VPS JCL.

The "C" runtime libraries must also be available to VPS, either via the linklist or via the STEPLIB DD in the VPS JCL.

Note 5: The VPSLIB DD statement must be a partitioned dataset which contains all VPS parameters for system initialization, as well as parameters for each printer that is to be supported. This dataset must have a logical record length between 80 and 128 and a block size that is a multiple of LRECL.

Note 6: The VPSLOG DD statement is optional and should only be used if you want the VPS log file to be written on a preallocated DASD dataset. If a VPSLOG DD statement is not present, VPS will dynamically allocate a SYSOUT dataset for the VPS log. The characteristics for this SYSOUT dataset are specified by the LOGOUTP and LOGHOLD system initialization keywords.

If you do include a VPSLOG DD statement, you need not specify DCB attributes for the dataset. VPS will choose an optimum block size, based on the record size and the device type. If you have specified DCB attributes, but they are invalid, VPS will override them with correct values.

Note 7: The VPSCKPT DD statement is required. It must refer to the VSAM checkpoint dataset created by step 5 of the "VPS Installation Steps" on page 3.7.

Building the System Initialization Member

The function of the VPS system initialization member is to provide VPS with all parameters which relate to the overall VPS system. Parameters which relate to specific printers within the VPS system are described within the individual VPSLIB printer definition members, as described in "Building the Printer Definition Members" on page 3.80.

The system initialization member must reside in the VPSLIB PDS which is defined in the VPS job control language. The member name must be "VPSSTART" unless specified otherwise by the parm on the VPS execute statement.

The various VPS keyword parameter values are specified by coding the keyword followed by an equal sign (=) followed by the keyword value. For example:

APPLID=VPSAPPL

The format of VPS control statements is defined in the earlier topic of this section, "Syntax of VPS Control Library Members" on page 3.2.

The system initialization keywords are divided into these basic categories.

1. **Product Key Parameters**

   The basic VPS product and each of the optional "add-on" products require that a unique key value be specified in the System Initialization member. This encrypted key value supplies information to the product concerning your license status. Without the correct value in the appropriate keyword, the product will not function.

   The values for these keys are unique to each installation, and are supplied in file # 1 on the VPS product distribution cartridge.

   The product key parameters are:

   - KEYANYQ
   - KEYCDI
   - KEYEMAIL
   - KEYIPDS
   - KEYLCDS
   - KEYPC
   - KEYPCL
   - KEYPDF
   - KEYRMTQ
   - KEYTCP
   - KEYVPS
   - KEYVSECR
   - KEYXSAFP

2. **Message/Command Logging Parameters**

   VPS can log all messages and operator commands. The log dataset can be a dynamically allocated SYSOUT dataset that can be "spun off" (made immediately available for printing) by issuing a "CLOSELOG" command. A new log SYSOUT dataset will then automatically be allocated for continued logging of VPS commands and messages.

   Alternatively, the log dataset can be a preallocated DASD dataset. In this case, a "CLOSELOG" command is not considered valid. However, when the dataset is full, VPS will close it, reopen it, and begin recording at the beginning of the dataset. A preallocated DASD dataset is specified by including a DD statement with a DDNAME of VPSLOG in the VPS JCL. The keywords LOGOUTP and LOGHOLD do not apply to a preallocated DASD dataset.

   The message/command logging parameters are:

   - LOG
   - LOGHOLD
   - LOGOUTP

3. **VPS Snap Dump Parameters**

   VPS provides a snap dump facility that is used for VPS debugging. Snap dumps are invoked by issuing the "SNAP" command. The snap dataset is a dynamically allocated SYSOUT dataset that will be automatically "spun off" (made immediately available for printing) after completion of the "SNAP" command. The following parameters are applicable to the VPS snap dump facility. Snap dumps can also be automatically generated by VPS (see the SNAP printer keyword).

   The VPS snap dump parameters are:

   - SNAPHOLD
   - SNAPOUTP

4. **VPS Console Message Processing Parameters**

   This parameter controls how VPS will issue console messages. For an additional method of controlling messages, see "Message Modification Member" on page 3.2 and "Using a Message Modification Member" on page 6.21.

   The VPS console message processing parameter is:

   - WTO

5. **Pre-selection Parameters**

   The pre-selection parameters are passed to the Pre-selection Exit. If no Pre-selection Exit is in effect, these parameters are not needed.

   The pre-selection parameters are:

   - PSACTIVE
   - PSCLASS
   - PSDEST
   - PSFORM
   - PSSELECT
   - PSWRITER

6. User Exit Parameters

   At VPS initialization, VPS will look for user exit members of the name VPSSUEnn. If a member is found and is not overridden by the EXITnn keyword, VPS will use the member of the name VPSSUEnn, set the status of the member to disabled, and set recovery on.

   The user exit parameter is:

   - EXITnn

7. **Subsystem Related Parameters**

   This release of VPS runs as a subsystem. You can choose to control it as a subsystem by specifying values in the subsystem related parameter.

   The subsystem related parameter is:

   - SSI

8. **TCP/IP Parameters**

   For an explanation of the VPS TCP/IP product, see "VPS/TCPIP" on page 10.1.

   The TCP/IP related parameters are:

   - TCPIPID
   - TCPDMN
   - TCPLHOST
   - TCPPORT
   - TCPTYPE

9. **VPS/Email Parameters**
   - MAILHOST

10. **Miscellaneous Parameters**

    The miscellaneous parameters are:

    - APPLID
    - CROPTS
    - DEFLTMEM
    - DESTVAL
    - IDTYPE
    - INTERVAL
    - JSCMDCHR
    - MAXPRTS
    - MLISTMEM
    - MRDINTVL
    - MSMODMEM
    - SAFCLASS
    - SAPI
    - STAINTVL
    - SWAPABLE
    - TRACE
    - USEROPTS
    - VPDESC
    - XLISTMEM

The system initialization parameters are listed in alphabetical order, starting on the next page.

APPLID
in SYSTEM INITIALIZATION MEMBER

APPLID= Specifies the VTAM application ID that is to be used by VPS. The APPLID must be defined to VTAM before it can be used by VPS. See "Application Definition" on page 2.7.

Valid Values: VTAM application ID that has been defined to VTAM for VPS.

Default: VPSAPPL

Example: APPLID=VPSAPL01

This specification indicates that the VTAM application ID for the VPS task is VPSAPL01.

CROPTS
in SYSTEM INITIALIZATION MEMBER

CROPTS= A 4-byte hex representation that specifies the "C" language run time options to be used for VPS system tasks. The option bit specifications are as follows:

80000000 = Disable LE/390 recovery
40000000 = Enable LE/390 storage reporting
20000000 = Enable LE/390 runtime options reporting
10000000 = Reserved
08000000 = Reserved
04000000 = Reserved
02000000 = Reserved
01000000 = Reserved
00800000 = Reserved
00400000 = Reserved
00200000 = Reserved
00100000 = Reserved
00080000 = Reserved
00040000 = Reserved
00020000 = Reserved
00010000 = Reserved
00008000 = Reserved
00004000 = Reserved
00002000 = Reserved
00001000 = Reserved
00000800 = Reserved
00000400 = Reserved
00000200 = Reserved
00000100 = Reserved
00000080 = Reserved
00000040 = Reserved
00000020 = Reserved
00000010 = Reserved
00000008 = Reserved
00000004 = Reserved
00000002 = Reserved
00000001 = Reserved

Valid Values: 00000000 to FFFFFFFF

Default: 00000000

Example: CROPTS=C0000000

This specifies that VPS should disable LE/390 recovery and enable LE/390 storage reporting for all VPS system tasks.

DEFLTMEM
in SYSTEM INITIALIZATION MEMBER

DEFLTMEM= Specifies a member within the VPSLIB PDS that describes user defined defaults. If this parameter is not specified, VPS will use the default printer keyword values.

Valid Values: Member name of a member that exists in the VPSLIB PDS.

Default: None.

Example: DEFLTMEM=VPSDEFLT

This specification indicates that member VPSDEFLT in the VPSLIB PDS contains default specifications for the VPS printers. (See "Printer Default Member" on page 3.5 and "Building the Printer Default Member" on page 3.79.)

DESTVAL
in SYSTEM INITIALIZATION MEMBER

DESTVAL= Specifies whether VPS should validate the destinations specified in VPS keywords, such as DEST, LOGOUTP, SNAPOUTP, etc.

Valid Values: Y or N

Default: Y

Example: DESTVAL=N

This specification indicates that destination validation should not be performed at VPS initialization or when a printer is activated.

Note: USEROPTS=8000 can be used by JES3 sites who have applied APAR OW02887 to JES3.

Without APAR OW02887, JES3 sites must define to JES3 each destination that they want to use in the DEST= keyword in a VPS printer definition. JES3 will allow output to be placed on the spool with an undefined destination value, but when VPS requests work from JES3 for that destination, JES3 gives a return code of 1C to VPS, indicating that the destination is invalid. This will cause VPS to EDRAIN the printer.

JES3 APAR OW02887 provides external writers the ability to retrieve SYSOUT with destinations that were not previously defined in the JES3 initialization deck.

The VPS user can take advantage of this capability by performing these steps:

- Apply maintenance associated with APAR OW02887 to JES3
- Install VPS.
- Specify USEROPTS=8000 in the VPS Initialization member
- Specify DESTVAL=N in the VPS Initialization member

EXITnn
in SYSTEM INITIALIZATION MEMBER

EXITnn= Specifies, using five positional parameters, the status, recovery capability, member name, and tracing options of user exit “nn”, where “nn” is a value from 00 - 28.

Positional parameter 1 specifies the status of the exit, either enabled or disabled.

Valid Values: ENA or DIS

Default: DIS

Positional parameter 2 specifies the recovery capability of the exit, either on or off.

Valid Values: RECOV or NORECOV

Default: RECOV

Positional parameter 3 specifies the name of the load module to be used for the exit.

Valid Values: Any valid load module name that exists in the VPS load module library.

Default: VPSSUEnn

Positional parameter 4 specifies the tracing options in effect for the exit. This parameter is specified as a two-digit number, representing one hex byte. The trace bit specifications are as follows:

- **80 =** Normal exit tracing (results in a trace entry created before the exit is invoked and a trace entry after the exit returns)
- **40 =** Undefined
- **20 =** Undefined
- **10 =** Undefined
- **08 =** Undefined
- **04 =** GTF trace all control blocks passed to the exit
- **02 =** Undefined
- **01 =** GTF tracing active (tracing entries will be created for GTF)

Valid Values: 00 - FF

Default: 00

Positional parameter 5 specifies the programming language of the user exit.

Valid Values: ASM or C

Default: ASM

EXITnn
in SYSTEM INITIALIZATION MEMBER

Example: EXIT01=(ENA,RECOV,MYEXIT01,84,C)

This specification indicates that the module to be used for user exit 01 should be enabled at VPS initialization, that recovery should be on for this module, that the member name of the module to be used is MYEXIT01, that normal trace entries should be created, that all control blocks passed to the exit should be GTF traced, and that the programming language of the exit module is ‘C’.

Note: The TRACE printer definition keyword will also be checked to determine whether printer related exit information will be traced (TRACE=(Y,10)).

Specifying that recovery is on for a VPS user exit indicates that VPS should establish an ESTAE around each call of the exit routine. This allows VPS to disable the exit and generate a storage dump if an exit abnormally terminates (abends). See “Recovery Considerations” in “Introduction to User Exits” on page 5.6 for more information on this process.

Specifying GTF tracing as active does not create additional trace entries; it indicates that any system trace entries being created should also be recorded in the GTF file.

IDTYPE
in SYSTEM INITIALIZATION MEMBER

IDTYPE= Specifies whether the VPSLIB printer definition member name (IDTYPE=M), the printer VTAM network name (IDTYPE=L), or either (IDTYPE=B) will be used in identifying printer related VPS messages. This keyword also specifies whether the VPSLIB printer definition member name or the VTAM network name will be used when issuing printer oriented commands. (See "Communicating with VPS®" on page 7.1).

Valid Values: M, L, or B

Default: L

Example: IDTYPE=B

This specification indicates that either VPSLIB member name or printer VTAM network name can be used in VPS printer commands. VPS messages will contain the VPSLIB member name of the printer.

INTERVAL
in SYSTEM INITIALIZATION MEMBER

INTERVAL= Specifies, via 2 positional parameters, the intervals to be used for certain VPS processes.

Positional parameter 1 specifies the time interval, in MMSS format, at which VPS performs normal timer functions.

Valid Values: 0001 – 5959
MMSS (MM=minutes, SS=seconds)

Default: 0030 (30 seconds)

Positional parameter 2 specifies the time interval, in HHMM format, at which VPS will search for any retained SYSOUT files that have expired and remove them from the JES spool.

Valid Values: 0001 – 2459
HHMM (HH=hours, MM=minutes)

Default: 0000 (Do not retain SYSOUT files.)

Example: INTERVAL=(0100,0010)

This specification indicates that VPS should perform normal timer processes every minute, and that VPS should search at 10 minute intervals for SYSOUT files which should be expired.

Notes: If the second positional parameter of the INTERVAL is specified as 0000 or allowed to default, VPS will not retain any files on the JES spool; in that case, activation will be rejected for any printer with RETAIN=Y.

For more information about the functions performed by VPS when the interval expires which is specified in the first positional parameter, refer to "Performance" on page 4.1.

For details about the retention of SYSOUT files and when VPS will remove those files from the JES spool, see "Retaining SYSOUT Files using VPS" on page 6.94.

JSCMDCHR
in SYSTEM INITIALIZATION MEMBER

JSCMDCHR= Specifies the JES command character to be used by VPS when issuing JES commands.

Valid Values: Any character which is valid as a JES command character.

Default: $ for JES2 systems and * for JES3 systems.

Example: JSCMDCHR=/

This specification indicates that any JES commands issued by VPS should use the slash (/) as the JES command character.

KEYANYQ
in SYSTEM INITIALIZATION MEMBER

KEYANYQ= Specifies the trial/license code for the AnyQueue product. This keyword MUST be present in order to use the AnyQueue product.

Valid Values: 60 characters. This key is supplied by LRS and identifies the CPU serial number on which the product is licensed. This key is supplied in file 8 of the VPS distribution cartridge (LRS.VPS.V1R80.CNTL). The key is in the following format:

Byte	Description
1	**T** - trap key or **L** - license key
2-4	Machine manufacturer (e.g. IBM)
5-8	Machine type (e.g. 2003)
9-13	CPU serial number
14-60	Encrypted customer id, CPU serial number, expiration date, number of printers, etc.

Note that the product keys must be entered exactly as supplied by LRS. Modified product keys are considered invalid and will prevent the product from being used. Also, please note that if activation of a printer would exceed the maximum number allowed per the product key, the activation will fail and message VPS603N will be issued.

Default: None.

KEYCDI
in SYSTEM INITIALIZATION MEMBER

KEYCDI= Specifies the trial/license code for the VPS/CONNECT:Direct Interface product. This keyword MUST be present in order to use the VPS/CONNECT:Direct product.

Valid Values: 60 characters. This key is supplied by LRS and identifies the CPU serial number on which the product is licensed. This key is supplied in file 8 of the VPS distribution cartridge (LRS.VPS.V1R80.CNTL). The key is in the following format:

Byte	Description
1	**T** - trap key or **L** - license key
2-4	Machine manufacturer (e.g. IBM)
5-8	Machine type (e.g. 2003)
9-13	CPU serial number
14-60	Encrypted customer id, CPU serial number, expiration date, number of printers, etc.

Note that the product keys must be entered exactly as supplied by LRS. Modified product keys are considered invalid and will prevent the product from being used. Also, please note that if activation of a printer would exceed the maximum number allowed per the product key, the activation will fail and message VPS603N will be issued.

Default: None.

KEYEMAIL
in SYSTEM INITIALIZATION MEMBER

KEYEMAIL= Specifies the trial/license code for the VPS/Email product. This keyword MUST be present in order to use the VPS/Email product.

Valid Values: 60 characters. This key is supplied by LRS and identifies the CPU serial number on which the product is licensed. This key is supplied in file 8 of the VPS distribution cartridge (LRS.VPS.V1R80.CNTL). The key is in the following format:

Byte	Description
1	**T** - trap key or **L** - license key
2-4	Machine manufacturer (e.g. IBM)
5-8	Machine type (e.g. 2003)
9-13	CPU serial number
14-60	Encrypted customer id, CPU serial number, expiration date, number of printers, etc.

Note that the product keys must be entered exactly as supplied by LRS. Modified product keys are considered invalid and will prevent the product from being used. Also, please note that if activation of a printer would exceed the maximum number allowed per the product key, the activation will fail and message VPS603N will be issued.

Default: None.

KEYIPDS
in SYSTEM INITIALIZATION MEMBER

KEYIPDS= Specifies the trial/license code for the VPS/IPDS product. This keyword MUST be present in order to use the VPS/IPDS product.

Valid Values: 60 characters. This key is supplied by LRS and identifies the CPU serial number on which the product is licensed. This key is supplied in file 8 of the VPS distribution cartridge (LRS.VPS.V1R80.CNTL). The key is in the following format:

Byte	Description
1	**T** - trap key or **L** - license key
2-4	Machine manufacturer (e.g. IBM)
5-8	Machine type (e.g. 2003)
9-13	CPU serial number
14-60	Encrypted customer id, CPU serial number, expiration date, number of printers, etc.

Note that the product keys must be entered exactly as supplied by LRS. Modified product keys are considered invalid and will prevent the product from being used. Also, please note that if activation of a printer would exceed the maximum number allowed per the product key, the activation will fail and message VPS603N will be issued.

Default: None.

KEYLCDS
in SYSTEM INITIALIZATION MEMBER

KEYLCDS= Specifies the trial/license code for the VPS/LCDS product. This keyword MUST be present in order to use VPS/LCDS.

Valid Values: 60 characters. This key is supplied by LRS and identifies the CPU serial number on which the product is licensed. This key is supplied in file 8 of the VPS distribution cartridge (LRS.VPS.V1R80.CNTL). The key is in the following format:

Byte	Description
1	**T** - trap key or **L** - license key
2-4	Machine manufacturer (e.g. IBM)
5-8	Machine type (e.g. 2003)
9-13	CPU serial number
14-60	Encrypted customer id, CPU serial number, expiration date, number of printers, etc.

Note that the product keys must be entered exactly as supplied by LRS. Modified product keys are considered invalid and will prevent the product from being used. Also, please note that if activation of a printer would exceed the maximum number allowed per the product key, the activation will fail and message VPS603N will be issued.

Default: None.

KEYPC
in SYSTEM INITIALIZATION MEMBER

KEYPC= Specifies the trial/license code for the VPS/PC products. This keyword MUST be present in order to use these products.

Valid Values: 60 characters. This key is supplied by LRS and identifies the CPU serial number on which the product is licensed. This key is supplied in file 8 of the VPS distribution cartridge (LRS.VPS.V1R80.CNTL). The key is in the following format:

Byte	Description
1	**T** - trap key or **L** - license key
2-4	Machine manufacturer (e.g. IBM)
5-8	Machine type (e.g. 2003)
9-13	CPU serial number
14-60	Encrypted customer id, CPU serial number, expiration date, number of printers, etc.

Note that the product keys must be entered exactly as supplied by LRS. Modified product keys are considered invalid and will prevent the product from being used. Also, please note that if activation of a printer would exceed the maximum number allowed per the product key, the activation will fail and message VPS603N will be issued.

Default: None.

KEYPCL
in SYSTEM INITIALIZATION MEMBER

KEYPCL= Specifies the trial/license code for the VPS/PCL product. This keyword MUST be present in order to use the VPS/PCL product.

Valid Values: 60 characters. This key is supplied by LRS and identifies the CPU serial number on which the product is licensed. This key is supplied in file 8 of the VPS distribution cartridge (LRS.VPS.V1R80.CNTL). The key is in the following format:

Byte	Description
1	**T** - trap key or **L** - license key
2-4	Machine manufacturer (e.g. IBM)
5-8	Machine type (e.g. 2003)
9-13	CPU serial number
14-60	Encrypted customer id, CPU serial number, expiration date, number of printers, etc.

Note that the product keys must be entered exactly as supplied by LRS. Modified product keys are considered invalid and will prevent the product from being used. Also, please note that if activation of a printer would exceed the maximum number allowed per the product key, the activation will fail and message VPS603N will be issued.

Default: None.

KEYPDF
in SYSTEM INITIALIZATION MEMBER

KEYPDF= Specifies the trial/license code for the VPS/PDF conversion product. This keyword must be present in order to use VPS/PDF to convert AFP files to PDF format.

Valid Values: 60 characters. This key is supplied by LRS and identifies the CPU serial number on which the product is licensed. This key is supplied in file 8 of the VPS distribution cartridge (LRS.VPS.V1R80.CNTL). The key is in the following format:

Byte	Description
1	**T** - trap key or **L** - license key
2-4	Machine manufacturer (e.g. IBM)
5-8	Machine type (e.g. 2003)
9-13	CPU serial number
14-60	Encrypted customer id, CPU serial number, expiration date, number of printers, etc.

Note that the product keys must be entered exactly as supplied by LRS. Modified product keys are considered invalid and will prevent the product from being used. Also, please note that if activation of a printer would exceed the maximum number allowed per the product key, the activation will fail and message VPS603N will be issued.

Default: None.

KEYRMTQ
in SYSTEM INITIALIZATION MEMBER

KEYRMTQ= Specifies the trial/license code for the VPS/RemoteQueue product. This keyword MUST be present in order to use VPS/RemoteQueue.

Valid Values: 60 characters. This key is supplied by LRS and identifies the CPU serial number on which the product is licensed. This key is supplied in file 8 of the VPS distribution cartridge (LRS.VPS.V1R80.CNTL). The key is in the following format:

Byte	Description
1	**T** - trap key or **L** - license key
2-4	Machine manufacturer (e.g. IBM)
5-8	Machine type (e.g. 2003)
9-13	CPU serial number
14-60	Encrypted customer id, CPU serial number, expiration date, number of printers, etc.

Note that the product keys must be entered exactly as supplied by LRS. Modified product keys are considered invalid and will prevent the product from being used. Also, please note that if activation of a printer would exceed the maximum number allowed per the product key, the activation will fail and message VPS603N will be issued.

Default: None.

KEYTCP
in SYSTEM INITIALIZATION MEMBER

KEYTCP= Specifies the trial/license code for the VPS/TCPIP product. This keyword MUST be present in order to use the VPS/TCPIP product.

Valid Values: 60 characters. This key is supplied by LRS and identifies the CPU serial number on which the product is licensed. This key is supplied in file 8 of the VPS distribution cartridge (LRS.VPS.V1R80.CNTL). The key is in the following format:

Byte	Description
1	**T** - trap key or **L** - license key
2-4	Machine manufacturer (e.g. IBM)
5-8	Machine type (e.g. 2003)
9-13	CPU serial number
14-60	Encrypted customer id, CPU serial number, expiration date, number of printers, etc.

Note that the product keys must be entered exactly as supplied by LRS. Modified product keys are considered invalid and will prevent the product from being used. Also, please note that if activation of a printer would exceed the maximum number allowed per the product key, the activation will fail and message VPS603N will be issued.

Default: None.

KEYVPS
in SYSTEM INITIALIZATION MEMBER

KEYVPS= Specifies the trial/license code for the VPS product. This keyword MUST be present in order to use VPS.

Valid Values: 60 characters. This key is supplied by LRS and identifies the CPU serial number on which the product is licensed. This key is supplied in file 8 of the VPS distribution cartridge (LRS.VPS.V1R80.CNTL). The key is in the following format:

Byte	Description
1	**T** - trap key or **L** - license key
2-4	Machine manufacturer (e.g. IBM)
5-8	Machine type (e.g. 2003)
9-13	CPU serial number
14-60	Encrypted customer id, CPU serial number, expiration date, number of printers, etc.

Note that the product keys must be entered exactly as supplied by LRS. Modified product keys are considered invalid and will prevent the product from being used. Also, please note that if activation of a printer would exceed the maximum number allowed per the product key, the activation will fail and message VPS603N will be issued.

Default: None.

KEYVSECR
in SYSTEM INITIALIZATION MEMBER

KEYVSECR= Specifies the trial/license code for the VPS/Secure™ product. This keyword must be present in order to use the VPS/Secure product.

Valid Values: 60 characters. This key is supplied by LRS and identifies the CPU serial number on which the product is licensed. This key is supplied in file 8 of the VPS distribution cartridge (LRS.VPS.V1R80.CNTL). The key is in the following format:

Byte	Description
1	**T** - trap key or **L** - license key
2-4	Machine manufacturer (e.g. IBM)
5-8	Machine type (e.g. 2003)
9-13	CPU serial number
14-60	Encrypted customer id, CPU serial number, expiration date, number of printers, etc.

Note that the product keys must be entered exactly as supplied by LRS. Modified product keys are considered invalid and will prevent the product from being used. Also, please note that if activation of a printer would exceed the maximum number allowed per the product key, the activation will fail and message VPS603N will be issued.

Default: None.

KEYXSAFP
in SYSTEM INITIALIZATION MEMBER

KEYXSAFP= Specifies the trial/license code for the Xerox to AFPDS Converter product. This keyword MUST be present in order to use the Xerox to AFPDS Converter product.

Valid Values: 60 characters. This key is supplied by LRS and identifies the CPU serial number on which the product is licensed. This key is supplied in file 8 of the VPS distribution cartridge (LRS.VPS.V1R80.CNTL). The key is in the following format:

Byte	Description
1	**T** - trap key or **L** - license key
2-4	Machine manufacturer (e.g. IBM)
5-8	Machine type (e.g. 2003)
9-13	CPU serial number
14-60	Encrypted customer id, CPU serial number, expiration date, number of printers, etc.

Note that the product keys must be entered exactly as supplied by LRS. Modified product keys are considered invalid and will prevent the product from being used. Also, please note that if activation of a printer would exceed the maximum number allowed per the product key, the activation will fail and message VPS603N will be issued.

Default: None.

LOG
in SYSTEM INITIALIZATION MEMBER

LOG= Specifies whether the VPS logging facility is to be active.

Valid Values: Y or N

Default: Y

Example: LOG=Y

This specification indicates that command and message logging should be active.

LOGHOLD
in SYSTEM INITIALIZATION MEMBER

LOGHOLD= Specifies whether the log SYSOUT dataset should be allocated as a held SYSOUT dataset.

Valid Values: Y or N

Default: N

Example: LOGHOLD=Y

This specification indicates that the VPSLOG SYSOUT dataset should be allocated as held.

LOGOUTP
in SYSTEM INITIALIZATION MEMBER

LOGOUTP= Specifies, via five positional parameters, the characteristics to be used when allocating the VPS log SYSOUT dataset.

Positional parameter 1 specifies the SYSOUT class to be used for the VPS log SYSOUT dataset.

Valid Values: Any valid SYSOUT class (0 - 9 or A - Z).

Default: A

Positional parameter 2 specifies the destination to be used for the VPS log SYSOUT dataset.

Valid Values: Any valid JES destination.

Default: LOCAL for JES2 and ANYLOCAL for JES3

Positional parameter 3 specifies the form name to be used for the VPS log SYSOUT dataset.

Valid Values: Any 1 - 4 character alphanumeric form name.

Default: None.

Positional parameter 4 specifies the writer to be used for the VPS log SYSOUT dataset.

Valid Values: Any 1 - 8 character alphanumeric writer name.

Default: None.

Positional parameter 5 specifies the name of an OUTPUT JCL statement in the VPS started task JCL to be used to determine the characteristics of the VPS log dataset.

Valid Values: The name of an OUTPUT JCL statement that exists in the VPS started task JCL.

Default: None.

Note: If you specify the name of an OUTPUT JCL statement that does not exist in the VPS started task JCL, message VPS450E will be issued (LOG ALLOCATION FAILURE), with R15=04 and EC=04CC, and VPS will operate without logging.

Example 1: LOGOUTP=(B,U100,STD)

This specification indicates that the VPS log SYSOUT dataset should have a SYSOUT class of B, a destination of U100, and a form name of STD.

Example 2: LOGOUTP=(,,,,LOGOUT)

This specification indicates that the VPS log SYSOUT dataset should have the characteristics specified in the OUTPUT JCL statement named LOGOUT in the VPS started task JCL.

When positional parameter 5 is used alone, the SYSOUT class will be A and the destination will be LOCAL (for JES2) or ANYLOCAL (for JES3).

MAILHOST
in SYSTEM INITIALIZATION MEMBER

MAILHOST= Specifies the name or Internet address of a remote TCP/IP host that should be used to forward email notification messages.

Valid Values: One of the following must be specified:

- A 1 to 15 character IP address in “dotted decimal” format. The IP address of the host is specified as a series of 4 numbers, separated by periods. Each number must be in the range of 0 to 255. This format can be used for any TCPTYPE= value.
- A 1 to 24 character host name. This format can be used for any TCPTYPE= value.
- A 1 to 60 character host name. This format can be used for TCPTYPE=ICS. It can also be used for TCPTYPE=IBM310, IBM320 or IBM340 if USEROPTS=04 is specified to call a ‘C’ program to obtain the address associated with the MAILHOST name.

Default: None.

Example 1: MAILHOST=199.99.99.02

Example 2: MAILHOST=LRS02.LRS.COM

Notes: This keyword is required for notification of email users. For more information about notification of email users, see the printer NOTIFY (page 3.170) and NOTMAIL (page 3.171) keywords. Also refer to “Sending Notifications to Email or TSO Users” on page 6.81.

MAILHOST= will be ignored unless VPS/TCPIP and VPS/Email are both installed and enabled.

MAXPRTS
in SYSTEM INITIALIZATION MEMBER

MAXPRTS= Specifies, via two positional parameters, the maximum number of printers that VPS can be working with at one time.

Positional parameter 1 specifies the maximum number of printers that VPS can have defined within its network at any point in time.

Valid Values: 1 - 65536

Default: 100

Positional parameter 2 specifies the maximum number of printers that can be concurrently processing work.

Valid Values: 1 - 65536

Default: The value specified in the first positional parameter.

Example: MAXPRTS=(250,30)

This specification indicates that the maximum number of printers that can be defined (activated) in the VPS address space is 250, and that the maximum number of printers that can be concurrently busy is 30.

MLISTMEM
in SYSTEM INITIALIZATION MEMBER

MLISTMEM= Specifies a member within the VPSLIB PDS that defines the member names of those VPS printers that are to be automatically activated in the VPS system at startup.

Valid Values: Member name of a member that exists in the VPSLIB PDS.

Default: None.

Example: MLISTMEM=VPSMLIST

This specification indicates that member VPSMLIST in the VPSLIB PDS contains a list of members to be automatically activated at VPS startup. (See "Building the Printer Activation Inclusion List" on page 3.77).

MRDINTVL
in SYSTEM INITIALIZATION MEMBER

MRDINTVL= Specifies the length of time that a SEND can be outstanding before VPS will consider the printer to have had a missing response. (If this parameter is coded, the value specified should generally be more than ten minutes, since that is the length of time required for most printers to time out). The specification is in MMSS format.

Valid Values: 0000 (no MRD interval requested) or 0100 - 5959 (MM specification can be from 01 - 59 and SS specification can be from 00 - 59)

Default: 1100 (11 minutes)

Example: MRDINTVL=1500

This specification indicates that any printer that has had a SEND outstanding for more than fifteen minutes will be considered to have had a missing response.

Note: Each time the MRD interval expires, VPS will issue message VPS825E, indicating that a missing response has been detected, and will continue to wait for a response from the device.

See "Missing Response Detector (MRD)" on page 15.5 for more information about this process.

MSMODMEM
in SYSTEM INITIALIZATION MEMBER

MSMODMEM= Specifies a member within the VPSLIB PDS which contains a list of VPS messages which are to have their type modified.

Valid Values: Member name of a member that exists in the VPSLIB PDS.

Default: None.

Example: MSMODMEM=VMODMSGS

This specification indicates that a member named VMODMSGS exists in the VPSLIB PDS, and that this member contains information to be used to modify the types on some VPS messages.

Note: See "Message Modification Member" on page 3.2 and "Using a Message Modification Member" on page 6.21 for more information.

PSACTIVE
in SYSTEM INITIALIZATION MEMBER

PSACTIVE= Specifies, via three positional parameters, the actions VPS should take when the pre-selection exit finds work for a printer.

Positional parameter 1 specifies whether or not VPS should attempt to automatically activate a printer when the pre-selection exit finds work for a printer which is not currently activated. (VPS will use the destination, writer name, or form name of the output found on the JES spool as the member name that it will attempt to activate. The PSSELECT keyword determines which of these three characteristics is to be used as the member name).

Valid Values: Y or N

Default: N

Positional parameter 2 specifies whether or not VPS should attempt to dynamically define a printer when the pre-selection exit finds work for a printer, the printer which processes that work is not currently activated, and no printer definition for that printer exists in the VPS control library. (The value of positional parameter 2 is not significant if positional parameter 1 has a value of "N").

Valid Values: Y or N

Default: N

Positional parameter 3 specifies whether or not VPS should use PSCLASS, PSDEST, PSFORM and PSWRITER to locate work on the JES spool with the pre-selection exit. A value of N specifies that the VPS pre-selection exit should locate work on the JES spool using all currently active printer definitions. Specifying a value of Y will cause the VPS pre-selection exit to locate work using **only** PSCLASS, PSDEST, PSFORM and PSWRITER keywords. Printers with selection criteria outside the PSCLASS, PSDEST, PSFORM and PSWRITER range combination will **not** have work selected if the third positional parameter is set to Y.

Valid Values: Y or N

Default: N

Example 1: PSACTIVE=(Y,Y,Y)

This specification indicates that when the pre-selection exit finds work for a printer, but no printer is activated to print that work, VPS should first attempt to automatically activate a printer with a member name that matches the destination, writer name, or form name of the work it found. If no such printer definition exists in the VPS control library, VPS should then attempt to dynamically define a printer to process the work, using the printer keyword default values found in the master default printer definition member.

PSACTIVE
in SYSTEM INITIALIZATION MEMBER

Example 2: PSACTIVE=(N,N,Y)

This specification indicates that the pre-selection exit should only attempt to locate work for printers with selection criteria which match the values of the PSCLASS, PSDEST, PSFORM and PSWRITER keywords.

Note: If PSACTIVE is specified with values of (N,N,N) or is allowed to default, it is not necessary to code the PSCLASS, PSDEST, PSFORM, or PSWRITER keywords.

If any of the parameters is specified with a value of Y, one or more of the following parameters will be required: PSCLASS, PSDEST, PSFORM, or PSWRITER.

Specifying a value of N for positional parameter value 3 allows the flexibility of using any selection criteria (CLASS, DEST, FORM, or WRITER) for VPS printers. However, performance of the pre-selection exit can be improved by specifying PSACTIVE=(,,Y) and PSCLASS, PSDEST, PSFORM, and/or PSWRITER, because the extent of the search for SYSOUT datasets can be restricted.

PSCLASS
in SYSTEM INITIALIZATION MEMBER

PSCLASS= Specifies that SYSOUT class should be used for SYSOUT pre-selection.

Valid Values: From 1 to 8 valid SYSOUT classes.

Default: None.

Example: PSCLASS=ABC

This specification indicates that SYSOUT classes A, B, and C should be used for SYSOUT pre-selection.

Note: This keyword is necessary only when PSACTIVE=Y is also specified, and the selection criteria for your printers include CLASS.

PSDEST
in SYSTEM INITIALIZATION MEMBER

PSDEST= Specifies that destination should be used for SYSOUT pre-selection.

Valid Values: A single valid JES destination, a range of valid JES destinations, or a generic JES destination.

Default: None.

Example: PSDEST=U1-U999

This specification indicates that SYSOUT for all destinations from U1 through U999 should be used for SYSOUT pre-selection.

Note: On a JES3 system, a generic value in PSDEST indicates that any output with a destination starting with the specified generic value should be used for SYSOUT pre-selection.

On a JES2 system running JES2 Version 4 or higher, a generic value in PSDEST indicates that any output on the USERID queue which has a user ID value that starts with the specified generic value should be used for SYSOUT pre-selection.

This keyword is necessary only when PSACTIVE=Y is also specified, and the selection criteria for your printers include DEST.

PSFORM
in SYSTEM INITIALIZATION MEMBER

PSFORM= Specifies that form should be used for SYSOUT pre-selection.

Valid Values: Any valid 1 to 4 character form name, or a generic form name.

Default: None.

Example: PSFORM=STD

This specification indicates that SYSOUT for form STD should be used for SYSOUT pre-selection.

Note: A specification of PSFORM=A* indicates that any form name starting with the letter “A” should be used for SYSOUT pre-selection.

This keyword is necessary only when PSACTIVE=Y is also specified, and the selection criteria for your printers include FORM.

PSSELECT
in SYSTEM INITIALIZATION MEMBER

PSSELECT= Specifies whether the destination, writer name, or form name is to be used as the printer name when VPS automatically activates a printer for which the pre-selection exit found work. The value of this keyword is used only if PSACTIVE=Y is also specified.

Valid Values: D, W, or F

Default: D

Example: PSSELECT=W

This specification indicates that when the pre-selection exit finds work for a printer and VPS automatically activates the printer, the writer name of the data which it found for the printer should be used as the printer's member name for activation.

PSWRITER
in SYSTEM INITIALIZATION MEMBER

PSWRITER= Specifies that special writer program name should be used for SYSOUT pre-selection.

Valid Values: Any alphanumeric specification from one to eight characters in length, or a generic writer program name.

Default: None.

Example: PSWRITER=MYWTR

This specification indicates that SYSOUT that requested a special writer name of MYWTR should be used for SYSOUT pre-selection.

Note: A specification of PSWRITER=A34* indicates that any writer name starting with the characters “A34” should be used for SYSOUT pre-selection. A specification of PSWRITER=* indicates that any non-blank writer name should be used for SYSOUT pre-selection.

This keyword is necessary only when PSACTIVE=Y is also specified, and the selection criteria for your printers include WRITER.

SAFCLASS
in SYSTEM INITIALIZATION MEMBER

SAFCLASS= Specifies the SAF resource class for VPS in the SAF general resource table (ICHRRCDE). The SAF resource class is used when making SAF requests to verify a user's authority to direct output to a given printer.

Valid values: The name must be 4 to 8 characters in length and must consist of the following: A through Z, 0 through 9, # (X'7B'), @ (X'7C'), or $ (X'5B'). The first character must be A through Z, # (X'7B'), @ (X'7C'), or $ (X'5B'). Installations must include a # (X'7B'), @ (X'7C'), $ (X'5B'), or numeric character in the name of any class they define in order to guarantee that installation-defined classes do not conflict with IBM-defined classes.

Default: $VPS

Example: SAFCLASS=$VPS

This specification indicates that the class name of $VPS should be used as the resource class when making SAF requests to verify a user's authority to direct output to a given printer.

Note: For more information on VPS security validation, see "SAF" on page 3.245. For more information about implementing External Security using RACF, CA-ACF2 or CA-TOPSECRET, see "External Security" on page 6.65.

SAPI
in SYSTEM INITIALIZATION MEMBER

SAPI= Specifies whether VPS should use the SAPI interface to obtain SYSOUT datasets from JES.

Valid Values: Y or N

Default: Y (If the JES release supports SAPI.)

Example: SAPI=N

This indicates that VPS should use the PSO (Process SYSOUT) interface to JES, even though the current release of JES supports the newer SAPI interface.

SNAPHOLD
in SYSTEM INITIALIZATION MEMBER

SNAPHOLD= Specifies whether the SNAP SYSOUT dataset should be allocated as a held SYSOUT dataset.

Valid Values: Y or N

Default: N

Example: SNAPHOLD=Y

This specification indicates that the VPS SNAP SYSOUT dataset should be held.

SNAPOUTP
in SYSTEM INITIALIZATION MEMBER

SNAPOUTP= Specifies, via five positional parameters, the characteristics to be used when allocating the VPS snap dump dataset.

Positional parameter 1 specifies the SYSOUT class to be used for the VPS snap dump dataset.

Valid Values: Any valid SYSOUT class (0 - 9 or A - Z).

Default: A

Positional parameter 2 specifies the destination to be used for the VPS snap dump dataset.

Valid Values: Any valid JES destination.

Default: LOCAL for JES2 and ANYLOCAL for JES3

Positional parameter 3 specifies the form name to be used for the VPS snap dump dataset.

Valid Values: Any 1 - 4 character alphanumeric form name.

Default: None.

Positional parameter 4 specifies the writer to be used for the VPS snap dump dataset.

Valid Values: Any 1 - 8 character alphanumeric writer name.

Default: None.

Positional parameter 5 specifies the name of an OUTPUT JCL statement in the VPS started task JCL to be used to determine the characteristics of the snap dump dataset.

Valid Values: The name of an OUTPUT JCL statement that exists in the VPS started task JCL.

Default: None.

Note: If you specify the name of an OUTPUT JCL statement that does not exist in the VPS started task JCL, message VPS850E will be issued (SNAP ALLOCATION FAILURE), with R15=04 and EC=04CC, and the printer will be placed in EDRAINED status.

Example 1: SNAPOUTP=(B,U100,STD)

This specification indicates that the VPS snap dump dataset should have a SYSOUT class of B, a destination of U100, and a form name of STD.

Example 2: SNAPOUTP=(,,,,SNAPOUT)

This specification indicates that the VPS snap dump dataset should have the characteristics specified in the OUTPUT JCL statement named SNAPOUT in the VPS started task JCL.

When positional parameter 5 is used alone, the SYSOUT class will be A and the destination will be LOCAL (for JES2) or ANYLOCAL (for JES3).

SSI
in SYSTEM INITIALIZATION MEMBER

SSI= Specifies, via three positional parameters, information used for controlling VPS as a subsystem.

Positional parameter 1 specifies the subsystem name to be used by VPS.

Valid Values: Any valid 1 to 4 character subsystem name.

This name can be defined to MVS by adding an entry in member IEFSSNxx in SYS1.PARMLIB. The entry should contain only the name of the VPS subsystem. This is the IBM-recommended method of defining subsystems to MVS. However, this method does require an IPL. If VPS detects that the specified name has not been defined, it will dynamically add the subsystem to MVS.

Default: VP01 or some increment of VP01, such as VP02, VP03, etc., if more than one VPS started task is executing.

Positional parameter 2 specifies the command character for issuing commands to VPS when controlling VPS as a subsystem.

Valid Values: The cent sign, the vertical bar (|), the left parenthesis, the percent sign, the colon, the period, the ampersand, the plus sign, the underscore, the pound sign (#), the less-than symbol, the exclamation point, the minus sign, the greater-than symbol, the at sign (@), the double quote mark, the dollar sign, the slash, the question mark, the equal sign, the asterisk, and the logical “not” sign.

Default: None.

Positional parameter 3 specifies the number of command buffers to be allocated for issuing commands when controlling VPS as a subsystem. This storage will be GETMAINed from CSA when VPS is initialized. Each command buffer is 160 bytes in size.

Valid Values: 0 - 256

Default: 0

Example: SSI=(VPSX,*,10)

This specification indicates that a subsystem name of VPSX is to be used for VPS, that an asterisk (*) is the VPS subsystem command character to be used for issuing commands, and that ten command buffers should be allocated.

Note: If you specify a subsystem name in the first positional parameter of this keyword, it **cannot** be the same as the name of the proc used for the VPS started task. If you allow VPS to assign a default subsystem name, such as VP01, VP02, etc., you cannot use that name as the name of the proc used for the VPS started task.

If you specify a command character for VPS in the second positional parameter of this keyword, be sure that it is not the same as the command character used for some other subsystem. For example, the JES2 command character is usually the dollar sign ($). You should be sure that you do not use that character as the VPS command character.

STAINTVL
in SYSTEM INITIALIZATION MEMBER

STAINTVL= Specifies the interval (in hhmm format) at which VPS should create VPS log entries containing subsystem request timing statistics.

Valid Values: 0001 - 2400

Default: 2400 (twenty-four hours)

Example: STAINTVL=0100

This specification indicates that statistical log entries should be entered in the VPS log every hour.

Note: If this keyword contains a value less than that specified in the INTERVAL keyword, the INTERVAL value will be used.

SWAPABLE
in SYSTEM INITIALIZATION MEMBER

SWAPABLE= Specifies whether the VPS address space should run swapable. (N=non-swapable, Y=swapable)

Valid Values: Y or N

Default: Y

Example: SWAPABLE=N

This specification indicates that the VPS address space should run non-swapable.

TCPDMN
in SYSTEM INITIALIZATION MEMBER

TCPDMN= Specifies the domain name for the TCPIP host. This domain name will be appended to the host name if the host name obtained is not already a fully-qualified host name. A host name is considered fully qualified if it contains a period (.) in the name. This parameter is optional.

Valid Values: 1 - 32 alphanumeric characters. If specified, this value should match the value specified for DOMAINORIGIN in the tcpip.TCPIP.DATA file for the MVS TCP/IP job when TCPTYPE=IBM310, IBM320, or IBM340.

Default: None.

Example: TCPDMN=BXL.LRS.COM

This specification indicates that VPS is to append BXL.LRS.COM to the host name obtained from the "get host name" function, if that name was not already a fully qualified name. For example, if the host name obtained was LRS1, the resulting fully qualified host name would be LRS1.BXL.LRS.COM.

Note: This parameter is only used if the VPS/TCPIP product is installed. It is used to format the sender's host name for the control file when using LPR/LPD protocols to communicate with a VPS printer. It is not used to make any calls to the TCP/IP address space. This parameter is ignored if the host name obtained on the GET_HOST_NAME call is fully-qualified.

TCPIPID
in SYSTEM INITIALIZATION MEMBER

TCPIPID= Identifies the address space where MVS TCP/IP is running. This name will be used when VPS connects to the MVS TCP/IP address space.

Valid Values: 1-8 character name of the MVS TCP/IP system.

Default: None.

Example: TCPIPID=TCPIP

Note: This parameter is required if the VPS/TCPIP product is installed. For IBM's TCP/IP for MVS, specify the job or started task name of the MVS TCP/IP address space. For Interlink Computer Sciences, specify the 4-character subsystem ID; the default subsystem ID for ICS is ACSS.

TCPLHOST
in SYSTEM INITIALIZATION MEMBER

TCPLHOST= Specifies the address of the local host where VPS is running. This address is used when VPS uses the BIND to select the local address and PORT number. This keyword is OPTIONAL.

Valid Values: A 1 to 15 character IP address, in "dotted decimal" format. The IP address is specified in a series of 4 numbers, separated by periods. Each number must be in the range of 0 to 255.

Default: None.

Example: TCPLHOST=199.99.99.5

Note: This keyword is only used with VPS/TCPIP; the keyword is optional. If the TCPLHOST keyword is not specified, the TCP/IP system on MVS will assign a local address. If the TCPLHOST value is specified, it must be an address that is valid for the MVS system where VPS is running.

TCPPORT
in SYSTEM INITIALIZATION MEMBER

TCPPORT= Specifies a range or multiple ranges of ports to attempt to use as the port number for the TCP/IP connection. The port number, along with the IP address of the local MVS host, will become the local address of VPS during the connection.

Valid Values: 1 to 6 positional parameters; each value can be between 1 and 65535 or a range of numbers from 1 to 65535.

Default: 721-731

Example 1: TCPPORT=(722,724)

This specifies that VPS should attempt to connect to the TCP/IP address space using port 722. If that is not successful, VPS should attempt to connect using port 724.

Example 2: TCPPORT=(725-727,731)

This specifies that VPS should attempt to connect to the TCP/IP address space using ports 725 through 727. If none of those ports are available, 731 should be tried. When a connection attempt is successful, VPS will maintain the connection at that port until VPS is shut down or TCP/IP severs the connection.

Note: This keyword is used only if VPS/TCPIP is installed and the KEYTCP and TCPIPID keywords are specified.

If ports or ranges of ports are specified, it is recommended that they be in the range of 721 to 731.

If the port number is specified and the IBM TCP/IP product for MVS is used (TCPTYPE=IBM310, TCPTYPE=IBM320, or TCPTYPE=IBM340), a port number can be reserved in the MVS TCP/IP configuration file. See "Adding System Keywords for VPS/TCPIP" on page 10.5 and "How VPS/TCPIP Uses TCP/IP Ports" on page 10.19 for more information.

TCPTYPE
in SYSTEM INITIALIZATION MEMBER

TCPTYPE= Specifies the type of MVS TCP/IP product.

Valid Values: IBM310 - Use IBM V3R1 API interface

IBM320 - Use IBM V3R2 API interface

IBM340 - Use IBM V3R4 API interface

ICS - Use Interlink Computer Sciences API

Default: IBM340

Example: TCPTYPE=ICS

This specification indicates that VPS should use the Interlink Computer Sciences API to connect to the MVS TCP/IP address space.

Note 1: This keyword is only used if the VPS/TCPIP product is installed.

Note 2: TCPTYPE indicates the type of programming interface that will be used to access the MVS TCP/IP software. It is not necessary that the TCPTYPE value match the version and release number of the TCP/IP software that is installed on the MVS system. The TCPTYPE values show the earliest release of the TCP/IP software for which a particular interface is supported.

Setting **TCPTYPE=IBM310** indicates that the EZASMI macro programming interface should be used to communicate with IBM's TCP/IP for MVS. This interface was first made available by IBM with V3R1.0 of their TCP/IP for MVS. The EZASMI macro interface is also supported by V3R2.0 and later releases of the IBM TCP/IP for MVS software.

Setting **TCPTYPE=IBM320** indicates that the High Performance Native Sockets (HPNS) programming interface should be used to communicate with IBM's TCP/IP for MVS. HPNS was first made available with V3R2.0 of the IBM TCP/IP for MVS product and uses a new version of the EZASMI macro. This interface is available on all versions of TCP/IP for MVS which have been released since V3R2.0 and is the recommended interface for communicating with IBM's TCP/IP for those releases.

Setting **TCPTYPE=IBM340** indicates that the EZASMI application programming interface for IBM's TCP/IP V3R4 should be used to communicate with IBM's TCP/IP for MVS. This interface was assembled with macros made available by IBM with V3R4.0 of their TCP/IP for MVS product. The EZASMI macro interface is also supported by TCP/IP V3R4 and later releases of the IBM TCP/IP for MVS software.

TCPTYPE
in SYSTEM INITIALIZATION MEMBER

If you are running IBM's TCP/IP for MVS at V3R4 or later, TCPTYPE=IBM340 is recommended. For TCP/IP for MVS V3R2, TCPTYPE of IBM320 is recommended.

Setting **TCPTYPE=ICS** indicates that the Interlink Computer Sciences programming interface should be used to communicate with TCP/IP for MVS. There is currently only one programming interface for MVS TCP/IP software from Interlink Computer Sciences. It is supported for all versions of the ICS software.

TRACE
in SYSTEM INITIALIZATION MEMBER

TRACE= Specifies, via three positional parameters, the type of tracing to be in effect for VPS system-related activities.

Positional parameter 1 specifies which VPS system-related activities are to be traced, in addition to those that are always traced. This parameter is specified as a two-digit number, representing one hex byte. The trace type bit specifications are as follows:

80 = Dispatcher/timer interrupts

40 = ENQ/DEQ/LOCK requests

20 = Subsystem requests

10 = Undefined

08 = Undefined

04 = VSAM I/O Buffers (System Tasks)

02 = Storage management

01 = GTF tracing active

Valid Values: 00 - FF

Default: 00

Positional parameter 2 specifies the size of VPS' trace table, in 4K pages.

Valid Values: 1 - 99

Default: 3

Positional parameter 3 specifies the GTF format appendage ID to be used in VPS entries in the GTF trace file, when GTF tracing is on.

Valid Values: 0 - 80

Default: 80

Example: TRACE=(A0,10,03)

This specification indicates that dispatcher/timer and subsystem requests should be traced, that a 40K trace table should be allocated, and that any VPS entries in the GTF trace file should have a format appendage ID number of 03.

Note: See "Trace Options in VPS" on page 6.42, "Internal Trace Table" on page 15.6, and "External Trace Recording in GTF Trace Files" on page 15.7, for information about tracing in VPS.

Specifying GTF tracing as active does not create additional trace entries; it indicates that any system trace entries being created should also be recorded in the GTF file.

A load module named LRSPRGTF is supplied in the LRS/OS/API load library (LRS.V1R12.LOAD) on file 5 of the VPS distribution cartridge. This module can be used to format VPS' entries in the GTF file. Member PRINTGTF in the VPS control library (LRS.VPS.V1R80.CNTL) is a sample of JCL that can be used to execute this program.

USEROPTS
in SYSTEM INITIALIZATION MEMBER

USEROPTS= A two byte hex representation that specifies special user options to be used on a VPS system-wide basis. The user option bit specifications are as follows:

8000 = For JES3 sites, treat “invalid destination” same as “no work found” (see notes).

4000 = For JES2 sites, allow selection by WRITER from USERID queue. (PSO only.)

2000 = Undefined

1000 = Bypass issuing syslog messages for $$CBSET.

0800 = Continue printing after I/O error.

0400 = Call ‘C’ program for TCP/IP get_host_by_name call.

0200 = Disable Language Environment condition handler when executing C programs.

0100 = Assume DSID=0000 from JES3/NJE.

0080 = Bypass disabling SMF recording after an SMF error.

0040 = Allow printer EKEY value to be displayed.

0020 = Purge retained SYSOUT datasets when retention period expires irrespective of current SYSOUT attributes.

0010 = Rotate through pooled printers when searching for work to balance the print load.

0008 = Allow display of PDF encryption passwords.

0004 = Suppress RACF auditing messages.

0002 = Activate the VPS/SAR (VPS/CA-View) interface.

0001 = Reserved

Valid Values: 0000 - FFFF

Default: 0000

Example: USEROPTS=0800

This specification indicates that when an I/O error is encountered by VPS while reading a dataset from the JES spool, VPS should issue an error message, print as much of the dataset as it could read, delete the dataset from the spool, and go on to the next dataset, if any. (Without this option, VPS will put the printer into EDRAINED status when an I/O error is encountered).

USEROPTS
in SYSTEM INITIALIZATION MEMBER

Notes:

USEROPTS=8000 can be used by JES3 sites who have applied APAR OW02887 to JES3.

Without APAR OW02887, JES3 sites must define to JES3 each destination that they want to use in the DEST= keyword in a VPS printer definition. JES3 will allow output to be placed on the spool with an undefined destination value, but when VPS requests work from JES3 for that destination, JES3 gives a return code of X'1C' to VPS, indicating that the destination is invalid. This will cause VPS to EDRAIN the printer.

JES3 APAR OW02887 provides external writers the ability to retrieve SYSOUT with destinations that were not previously defined in the JES3 initialization deck.

The VPS user can take advantage of this capability by performing these steps:

- Apply maintenance associated with APAR OW02887 to JES3
- Install VPS
- Specify USEROPTS=8000 in the VPS Initialization member
- Specify DESTVAL=N in the VPS Initialization member

For additional information on the USEROPTS keyword, contact VPS Technical Support.

VPDESC
in SYSTEM INITIALIZATION MEMBER

VPDESC= Contains a short text description of the VPS started task for identification purposes. This text will appear on the VMCF VPS Started Task display and VPS message VPS973R.

Valid Values: Up to 48 characters of text.

Default: None.

Example: VPDESC='PRODUCTION VPS'

This specifies that this VPS started task will be identified as "PRODUCTION VPS" on the VMCF VPS Started Task display and on VPS message VPS973R. Message VPS973R is issued in response to the DISPLAY,SYSTEM command.

WTO
in SYSTEM INITIALIZATION MEMBER

WTO= Specifies, via four positional parameters, how VPS is to issue console messages.

Positional parameter 1 specifies whether or not VPS console messages should be prefixed with the VPS started task name.

Valid Values: Y or N

Default: Y

Positional parameter 2 specifies whether or not VPS action messages should be issued with a Descriptor Code of 2 (MVS action). If messages are issued with a descriptor code of 2, they will be deleted when the required action has been completed.

Valid Values: Y or N

Default: Y

Positional parameter 3 specifies whether or not VPS informational messages (those with a suffix of "I") should be issued.

Valid Values: Y or N

Default: Y

Positional parameter 4 specifies the route code that VPS should use when issuing unsolicited WTOs. This parameter does not apply to WTOs that are issued in response to a VPS command, since those WTOs will be issued to the console from which the command was issued.

Valid Values: 1 - 16

Default: 1

Example: WTO=(Y,Y,N,5)

This specification indicates that VPS messages should be prefixed with the VPS started task name, that VPS action messages should be issued with a Descriptor Code of 2, that no VPS informational messages are to be issued, and that unsolicited WTOs are to use a route code of 5.

XLISTMEM
in SYSTEM INITIALIZATION MEMBER

XLISTMEM= Specifies a member within the VPSLIB PDS that defines the member names of those VPS printers that are not to be automatically activated in the VPS system at startup.

Valid Values: Member name of a member that exists in the VPSLIB PDS.

Default: None.

Example: XLISTMEM=VPSXLIST

This specification indicates that member VPSXLIST in the VPSLIB PDS contains a list of members which are not to be automatically started by VPS at VPS startup. (See "Building the Printer Activation Exclusion List" on page 3.78).

Sample VPS System Initialization Member

This page gives an example of a VPS System Initialization Member. You may wish to follow the convention of putting only one parameter on each line and including comments to document the use of each parameter. Many of the values shown in this example are the same as the default values and would not necessarily have to be coded. They are simply shown here for documentation.

```
*====================================================================*
*                                                                    *
*        VPSSTART  VPS V1 R8.0 SYSTEM INITIALIZATION PARAMETERS      *
*                                                                    *
*====================================================================*
*                                                                    *
* THIS SAMPLE VPS INITIALIZATION MEMBER CONTAINS ALL OF THE KEYWORDS  *
* THAT CAN BE INCLUDED IN A VPS INITIALIZATION MEMBER.               *
*                                                                    *
* ALL KEYWORD VALUES IN THIS SAMPLE ARE IDENTICAL TO THE DEFAULT     *
* VALUES USED BY VPS.  KEYWORDS THAT DO NOT HAVE A DEFAULT VALUE     *
* ARE CODED AS COMMENTS IN THIS SAMPLE (ASTERISK IN COLUMN 1).       *
*                                                                    *
* THESE KEYWORDS ARE DESCRIBED IN SECTION 3 OF THE VPS V1 R8.0 MANUAL.*
*                                                                    *
* PLEASE NOTE THAT YOU CANNOT USE THIS MEMBER "AS IS".  IT IS PROVIDED*
* ONLY AS AN EXAMPLE.  YOU CAN COPY THIS MEMBER AND UPDATE IT TO     *
* INCLUDE THE PRODUCT KEYS UNIQUE TO YOUR SITE AND/OR CPU.  THOSE    *
* PRODUCT KEYS ARE SUPPLIED IN OTHER MEMBERS IN THE VPS CONTROL      *
* LIBRARY.  YOU SHOULD ALSO MODIFY AND/OR ADD KEYWORD VALUES TO      *
* MATCH YOUR PROCESSING REQUIREMENTS.                                *
*                                                                    *
* CUSTOMERS WHO ARE UPGRADING FROM VPS R6.2 OR R7.0 CAN USE THE      *
* "CONVERT" PROGRAM DESCRIBED IN APPENDIX A OF THE VPS V1 R8.0 MANUAL *
* TO CONVERT THE VPS INITIALIZATION MEMBER AND OTHER MEMBERS IN THE  *
* VPS CONTROL LIBRARY USED FOR THE PRIOR RELEASE TO THE FORMAT       *
* REQUIRED BY VPS V1 R8.0.  PRODUCT KEYS WILL NEED TO BE ADDED TO THE *
* VPS INITIALIZATION MEMBER AFTER CONVERSION.                        *
*                                                                    *
*====================================================================*
*
 APPLID=VPSAPPL,    VTAM APPLICATION ID TO BE USED BY VPS
*DEFLTMEM=,         MASTER DEFAULT PRINTER DEFINITION MEMBER NAME
 DESTVAL=Y,         SHOULD VPS VALIDATE DESTINATIONS? (Y OR N)
 EXIT00=(DIS,RECOV,VPSSUE00,00,ASM),   EXIT 00 PARAMETERS
 EXIT01=(DIS,RECOV,VPSSUE01,00,ASM),   EXIT 01 PARAMETERS
 EXIT02=(DIS,RECOV,VPSSUE02,00,ASM),   EXIT 02 PARAMETERS
 EXIT03=(DIS,RECOV,VPSSUE03,00,ASM),   EXIT 03 PARAMETERS
 EXIT04=(DIS,RECOV,VPSSUE04,00,ASM),   EXIT 04 PARAMETERS
 EXIT05=(DIS,RECOV,VPSSUE05,00,ASM),   EXIT 05 PARAMETERS
 EXIT06=(DIS,RECOV,VPSSUE06,00,ASM),   EXIT 06 PARAMETERS
 EXIT07=(DIS,RECOV,VPSSUE07,00,ASM),   EXIT 07 PARAMETERS
 EXIT08=(DIS,RECOV,VPSSUE08,00,ASM),   EXIT 08 PARAMETERS
 EXIT09=(DIS,RECOV,VPSSUE09,00,ASM),   EXIT 09 PARAMETERS
 EXIT10=(DIS,RECOV,VPSSUE10,00,ASM),   EXIT 10 PARAMETERS
 EXIT11=(DIS,RECOV,VPSSUE11,00,ASM),   EXIT 11 PARAMETERS
 EXIT12=(DIS,RECOV,VPSSUE12,00,ASM),   EXIT 12 PARAMETERS
 EXIT13=(DIS,RECOV,VPSSUE13,00,ASM),   EXIT 13 PARAMETERS
 EXIT14=(DIS,RECOV,VPSSUE14,00,ASM),   EXIT 14 PARAMETERS
 EXIT15=(DIS,RECOV,VPSSUE15,00,ASM),   EXIT 15 PARAMETERS
 EXIT16=(DIS,RECOV,VPSSUE16,00,ASM),   EXIT 16 PARAMETERS
 EXIT17=(DIS,RECOV,VPSSUE17,00,ASM),   EXIT 17 PARAMETERS
 EXIT18=(DIS,RECOV,VPSSUE18,00,ASM),   EXIT 18 PARAMETERS
 EXIT19=(DIS,RECOV,VPSSUE19,00,ASM),   EXIT 19 PARAMETERS
```

```
 EXIT20=(DIS,RECOV,VPSSUE20,00,ASM),   EXIT 20 PARAMETERS
 EXIT21=(DIS,RECOV,VPSSUE21,00,ASM),   EXIT 21 PARAMETERS
 EXIT22=(DIS,RECOV,VPSSUE22,00,ASM),   EXIT 22 PARAMETERS
 EXIT23=(DIS,RECOV,VPSSUE23,00,ASM),   EXIT 23 PARAMETERS
 EXIT24=(DIS,RECOV,VPSSUE24,00,ASM),   EXIT 24 PARAMETERS
 EXIT25=(DIS,RECOV,VPSSUE25,00,ASM),   EXIT 25 PARAMETERS
 EXIT26=(DIS,RECOV,VPSSUE26,00,ASM),   EXIT 26 PARAMETERS
 EXIT27=(DIS,RECOV,VPSSUE27,00,ASM),   EXIT 27 PARAMETERS
 EXIT28=(DIS,RECOV,VPSSUE28,00,ASM),   EXIT 28 PARAMETERS
 IDTYPE=L,           NAME TO USE TO IDENTIFY PRINTER (L, M, OR B)
 INTERVAL=0030,      INTERVAL FOR CERTAIN VPS FUNCTIONS (MMSS)
 JSCMDCHR=$,         JES COMMAND CHARACTER (DEFAULT IS $ FOR JES2
*                    AND * FOR JES3)
*KEYANYQ=,           ************************************************
*KEYCDI=,            *   PRODUCT KEYS UNIQUE TO YOUR SITE AND/OR THE   *
*KEYEMAIL=,          *   CPU AT YOUR SITE ON WHICH VPS IS TO BE RUN    *
*KEYIPDS=,           *   MUST BE INCLUDED IN THE VPS INITIALIZATION    *
*KEYLCDS=,           *   MEMBER.  THOSE KEYS ARE PROVIDED TO YOU IN    *
*KEYPC=,             *   OTHER MEMBERS IN THE VPS CONTROL LIBRARY ON   *
*KEYPCL=,            *   THE DISTRIBUTION CARTRIDGE.                   *
*KEYPDF=,            *                                                 *
*KEYRMTQ=,           *                                                 *
*KEYTCP=,            *                                                 *
*KEYVPS=,            *                                                 *
*KEYXSAFP=,          ************************************************
 LOG=Y,              SHOULD VPS LOGGING BE ACTIVE? (Y OR N)
 LOGHOLD=N,          SHOULD VPS LOG BE HELD? (Y OR N)
 LOGOUTP=(A,LOCAL), CHARACTERISTICS OF VPS LOG SYSOUT DATASET
*                    (CLASS,DESTINATION,FORM,WRITER,OUTPUT STMT NAME)
*                    DEFAULT DESTINATION FOR JES2 IS LOCAL
*                    DEFAULT DESTINATION FOR JES3 IS ANYLOCAL
*MAILHOST=,          TCP/IP HOST FOR EMAIL NOTIFICATIONS
 MAXPRTS=(100,100), MAXIMUM NUMBER OF PRINTERS DEFINED AND BUSY
*MLISTMEM=,          MEMBER NAME OF PRINTER ACTIVATION LIST
 MRDINTVL=1100,      MISSING RESPONSE INTERVAL (MMSS)
*MSMODMEM=,          MEMBER NAME OF MESSAGE MODIFICATION MEMBER
 PSACTIVE=(N,N,N),  PRESELECTION ACTIONS
*PSCLASS=,           PRESELECTION SYSOUT CLASSES
*PSDEST=,            PRESELECTION DESTINATION
*PSFORM=,            PRESELECTION FORM
 PSSELECT=D,         PRESELECTION TYPE
*PSWRITER=,          PRESELECTION WRITER
 SAFCLASS=$VPS,      SAF RESOURCE CLASS FOR VPS
 SAPI=Y,             SHOULD VPS USE SAPI INTERFACE? (Y OR N)
 SNAPHOLD=N,         SHOULD SNAP DUMPS BE HELD? (Y OR N)
 SNAPOUTP=(A,LOCAL,,,), CHARACTERISTICS OF SNAP DUMPS
*                    (CLASS,DESTINATION,FORM,WRITER,OUTPUT STMT NAME)
*                    DEFAULT DESTINATION FOR JES2 IS LOCAL
*                    DEFAULT DESTINATION FOR JES3 IS ANYLOCAL
 SSI=(VP01,,0),      SUBSYSTEM CONTROL INFORMATION
 STAINTVL=2400,      INTERVAL FOR LOGGING STATISTICS (HHMM)
 SWAPABLE=Y,         SHOULD VPS RUN SWAPPABLE? (Y OR N)
*TCPDMN=,            DOMAIN NAME FOR THE TCPIP HOST
*TCPIPID=,           NAME OF ADDRESS SPACE WHERE MVS TCPIP IS RUNNING
*TCPLHOST=,          ADDRESS OF THE LOCAL HOST WHERE VPS IS RUNNING
 TCPPORT=721-731,    PORTS TO USE FOR TCPIP CONNECTION
 TCPTYPE=IBM310,     TYPE OF TCPIP INTERFACE TO BE USED
 TRACE=(00,3,80),    VPS SYSTEM TRACING PARAMETERS
 USEROPTS=0000,      SPECIAL USER OPTIONS
*VPDESC=,            TEXT DESCRIPTION OF VPS FOR IDENTIFICATION PURPOSES
 WTO=(Y,Y,Y,1)       HOW VPS IS TO ISSUE CONSOLE MESSAGES
*XLISTMEM=           MEMBER NAME OF PRINTER EXCLUSION LIST
```

Building the Printer Activation Inclusion List

Printer activation inclusion list member The VPS Printer Activation Inclusion List specifies the member names of the VPSLIB members defining printers that should automatically be activated when the VPS system is initialized. This member is optional, but if neither it nor the Printer Activation Exclusion List is specified, no printers will be automatically activated when VPS is initialized. Printers can, however, be activated after the VPS system has been initialized via the ACTIVATE command.

The name of this member, if used, must be specified in the VPSSTART member by the MLISTMEM keyword.

Sample VPS Printer Activation Inclusion List:

```
* ------------------------------------------------------*
*                                                       *
*    VPSMLIST    VPS PRINTER ACTIVATION INCLUSION LIST     *
*                                                       *
* ------------------------------------------------------*
*
VPSPRT01,   ACTIVATE VPSLIB MEMBER (VPSPRT01) AT VPS STARTUP
VPSPRT02,   ACTIVATE VPSLIB MEMBER (VPSPRT02) AT VPS STARTUP
VPSPRT03    ACTIVATE VPSLIB MEMBER (VPSPRT03) AT VPS STARTUP
```

Building the Printer Activation Exclusion List

The VPS Printer Activation Exclusion list specifies the member names of the VPSLIB members which should not automatically be activated when the VPS system is initialized. This member is optional, but if neither it nor the Printer Activation Inclusion List is specified, no printers will be automatically activated when VPS is initialized. Printers can, however, be activated after the VPS system has been initialized via the ACTIVATE command.

VPS will automatically bypass the VPS System Initialization member (member name VPSSTART, unless otherwise specified in the PARM on the VPS started task JCL), the XLISTMEM member itself, and the members named in the DEFLTMEM and MSMODMEM parameters in the VPS System Initialization member.

The name of this member, if used, must be specified in the VPSSTART member by the XLISTMEM keyword.

Note: The Exclusion List Member will not work correctly if you concatenate more than one library on the VPSLIB JCL statement. To use an Exclusion List Member, all VPS-related members must exist in a single library.

Sample VPS Printer Activation Exclusion List

```
* ------------------------------------------------- *
*                                                   *
*  VPSXLIST    VPS PRINTER ACTIVATION EXCLUSION LIST  *
*                                                   *
* ------------------------------------------------- *
*
*
*        ACTIVATE ALL VPSLIB MEMBERS EXCEPT:
  VPSTEST1,        VPSLIB MEMBER (VPSTEST1) AND
  VPSTEST2,        VPSLIB MEMBER (VPSTEST2) AND
  APGMNAME         VPSLIB MEMBER (APGMNAME)
```

Building the Printer Default Member

This member is specified in the same format and has available the same keywords as the printer definition member. The purpose of this member is to establish printer default values different than the standard VPS default values. See "Building the Printer Definition Members" on page 3.80 for a description of all the VPS printer keywords.

The name of this member, if used, can be specified by the DEFLTMEM keyword in the VPSSTART system initialization member and/or by the DEFLTMEM keyword in a Printer Definition Member. See "Printer Default Member" on page 3.5 for an explanation of how VPS determines keyword values for a printer.

Sample VPS Printer Default Member:

```
* ---------------------------------------------------------------- *
*                                                                  *
*          VPSDEFLT         VPS PRINTER DEFAULT MEMBER             *
*                                                                  *
* ---------------------------------------------------------------- *
  SERVER=xxxxxxxx,       SEE NOTE 1
* ---------------------------------------------------------------- *
*SYSOUT REQUEUE - LIMIT AND SYSOUT ALLOCATION PARAMETER DEFAULTS   *
* ---------------------------------------------------------------- *
  REQLIMIT=100,          SYSOUT LIMIT (IN HUNDREDS) ...10,000 LINES
  REQOUTP=(A,LOCAL,STD), REQUEUE SYSOUT CLASS ...................A
*                        REQUEUE DESTINATION .................LOCAL
*                        REQUEUE FORM ........................STD
  REQROUTE=N,            REQUEUE VIA JES COMMAND .............NO
  REQDELT=N,             DELETE REQUEUED DATASETS ............NO
  REQHOLD=N,             HOLD REQUEUED DATSETS ...............NO
*
* ---------------------------------------------------------------- *
*  QUEUE RELATED PARAMETERS                                        *
* ---------------------------------------------------------------- *
  QSPACE=(T,20,10),      QUEUE ALLOCATION  ............. TYPE=TRACKS,
*                                PRIMARY QTY=20,    SECONDARY QTY=10
  QUNIT=(3380,2),        QUEUE ALLOCATION UNIT ...... UNIT TYPE=3380,
*                                                     UNIT COUNT=2
  QBUFSIZE=8192          QUEUE BUFFER SIZE ..................... 8192
```

Note 1: This should match the name of a LRS/MVS Server started task.

Building the Printer Definition Members

Overview

One VPSLIB member must be defined for each printer that is to be supported by VPS. Printer members should not be named SYSTEM or KEYS. Printer members define the characteristics and options applicable to each printer within the VPS system. (All keyword values need not be coded in each printer definition member, because VPS can also determine keyword values from a printer default member, or will use its own defaults if there is no printer default member. See "Printer Default Member" on page 3.5 and "Building the Printer Default Member" on page 3.79 for an explanation of this process).

The various VPS keyword parameter values are specified by coding the keyword followed by an equal sign (=) followed by the keyword value. For example:

DEST=U1

The printer definition keywords are divided into these basic categories:

1. **Selection criteria parameters**

   The selection criteria parameters signify to VPS what SYSOUT should be selected and printed on the particular printer that is being defined. At least one of the selection criteria parameters must be coded. If more than one is coded, all criteria must be satisfied before a given SYSOUT dataset will be selected for printing on the printer to which the parameters apply.

   You may wish to read "How VPS Selects Work for a Printer" on page 6.2 to aid in understanding how these keyword parameters are used by VPS.

   The selection criteria parameters are:

   - CLASS
   - DEST
   - FORM
   - WRITER

   The following keyword is used to determine which of the JES queues should be searched for SYSOUT datasets when VPS is using the SAPI JES interface.

   - JESQUEUE

2. **Staging parameters**

   VPS uses an internal storage area, with a size determined by the QBUFSIZE parameter, for staging its output before it is actually printed on the appropriate printer. If this storage area will not hold the entire SYSOUT dataset, it is written to a DASD dataset, with characteristics determined by the other staging parameters.

   The staging parameters are:

   - QBUFSIZE
   - QDSNAME
   - QALLDYN
   - QSPACE
   - QUNIT
   - QVOLUME
   - STGCLASS

3. **Requeuing parameters**

   VPS can limit the size of a SYSOUT dataset to be printed on a VPS printer. The requeuing parameters apply to this facility.

   CAUTION: The Requeue Exit allows the user to modify the requeuing process. Please refer to the description of the Requeue Exit in "Exit 13: Requeue Exit" on page 5.36.

   The requeuing parameters are:

   - REQDELT
   - REQHOLD
   - REQLIMIT
   - REQOUTP
   - REQROUTE

4. **VTAM parameters**

   The VTAM parameters describe to VPS the VTAM related information pertinent to the printer being defined. "VTAM Definition Requirements" on page 2.7 should be read prior to coding these VTAM related parameters.

   The VTAM parameters are:

   - ALOGMODE
   - ALUNAME
   - CHNSIZE
   - FMHCLASS
   - FMHJOB
   - LUNAME
   - PPM
   - RELREQ
   - RETRIES
   - RUSIZE
   - USERBIND

5. **Hardware characteristics parameters**

   The hardware characteristics parameters define to VPS the physical capabilities of the printer.

   The hardware characteristics parameters are:

   - ALARM
   - AUTONL
   - CPI
   - CRCHAR
   - FFSEQ
   - FORMFEED
   - MPP
   - NLSEQ

6. Operational characteristics parameters

The operational characteristics parameters define to VPS how the printer should operate.

The operational characteristics parameters are:

- APLCLASS
- AUTOEJCT
- CKPTLINE
- CKPTPAGE
- COMPRESS
- DCACLASS
- DRAINED
- DSBATCH
- EKEY
- ENCRYPT
- ERRACTN
- FCB
- IPDCLASS
- MAXLPG
- MERGE
- NCCSPACE
- PRTRMSGS
- TRAILBLK
- TRUNCATE

7. Miscellaneous parameters

The miscellaneous parameters are:

- COMMTYPE
- CONVTYPE
- DEFLTMEM
- CROPTS
- DEVTYPE
- DIAL
- DJDEIDEN
- GRPNAME
- LOGDATA
- NOTIFY
- NOTMAIL
- NOTTSO
- PCMDACTN
- PCMDDSNE
- PCMDDSNS
- PCMDEND
- PCMDOPTS
- PCMDSEPE
- PCMDSEPS
- PCMDSTRT
- POOL
- PRTROPTS
- RETAIN
- RETHOLD
- RETOUTP
- RJE
- SAF
- SEPAR
- SEPINFO
- SERVER
- SMF
- SNAP
- SVFACTN
- TPUTUSER
- TRACE
- UDATA
- WFWACTN

8. Graphics parameters

The graphics parameter is:

- TRNCLASS

9. **GDDM parameters**

   For an explanation of VPS' processing of GDDM datasets, see "GDDM Processing" on page 6.35.

   The GDDM parameters are:

   - GDMAPPL
   - GDMCLASS

10. **SAS parameters**

    For an explanation of VPS' processing of SAS/GRAPH datasets, see "SAS/GRAPH Processing" on page 6.32.

    The SAS parameters are:

    - SASCLASS
    - SASOPTP
    - SASOPTD
    - SASPLEN

11. **VPS AFP parameters**

    For an explanation of VPS AFP processing, see "AFP" on page 8.1.

    The VPS AFP parameters are:

    - AFPADJ
    - AFPKEYWD
    - AFPMSGS
    - AFPOPTS
    - AFPRTAB
    - AFPSEPE
    - AFPSEPS
    - CHARS
    - DCKACTN
    - DUPLEX
    - FDEFDD
    - FONTDD
    - FORMDEF
    - INTRAY
    - IPDOPTS
    - OUTBIN
    - OVERLAYB
    - OVERLAYF
    - OVLYDD
    - PAGEDEF
    - PCLOPMEM
    - PCLOPTS
    - PDEFDD
    - PDFDBCS
    - PDFENCD
    - PDFENCPY
    - PDFENMOD
    - PDFENMPW
    - PDFENPRT
    - PDFENTYP
    - PDFENUPW
    - PDFFONT
    - PDFKWDS
    - PDFOPTS
    - PDFPGSIZ
    - PDFRTAB
    - PIMSG
    - PSEGDD
    - SEPTYPE

12. **VPS/TCPIP parameters**

    For an explanation of VPS/TCPIP processing, see "VPS/TCPIP" on page 10.1.

    The VPS/TCPIP parameters are:

    - PJLCMDS
    - PJLINFO
    - PJLOPTS
    - PJLUSTAT
    - TCPDISC
    - TCPHOST
    - TCPLPORT
    - TCPMRD
    - TCPOPTS
    - TCPPRTR
    - TCPRPORT

13. **VPS/CDI parameters**

    The VPS/CDI parameters are:

    - CDNETMAP
    - CDPLIB
    - CDPMBR
    - CDSNODE
    - DDSNPFX
    - DSPACE
    - DUNIT
    - DVOLUME

14. **VPS/XES to AFP parameters**

    For an explanation of VPS/XES to AFP processing, see "VPS/XES to AFP" on page 9.1

    The VPS/XES to AFP parameters are:

    - XESCLASS
    - XESOPTS
    - XESRTAB

15. **Character translation parameters**

    For an explanation of single-byte and double byte character set translation, see "Creating a User Translation Table" on page 6.27.

    The character translation parameters are:

    - DBCCLASS
    - PRTXLATE
    - PRTXDBCS

16. **VPS/Email parameters**

    For an explanation of VPS/Email processing, see "VPS/EMAIL" on page 11.1.

    The VPS/Email parameters are:

    - MAILBOOK
    - MAILCSET
    - MAILFNAM
    - MAILKWDS
    - MAILOPTS
    - MAILSTAT

Minimum VPS Printer Definition Requirements

As this section shows, there are many parameters available to customize the definition of a printer to VPS. However, most VTAM printers will perform satisfactorily if you define the printer to VPS with only two types of information: the selection criteria and the VTAM name of the device.

VPS uses the selection criteria (some combination of DEST, CLASS, FORM, and/or WRITER) to determine which work on the JES spool is to be sent to the printer.

VPS uses the VTAM name of the device (LUNAME) to determine which device is to receive the selected work.

For a TCP/IP printer, VPS uses the IP address or host name from the TCPHOST keyword (and possibly the queue name from the TCPPRTR keyword) to determine which device is to receive the selected work.

When testing a device for the first time, it is usually easiest to first define the printer with a minimum of parameters. If the results indicate a condition unique to the device, it can be corrected with a parameter in the individual printer definition member. If the results indicate a condition that is common to many printers, it can be corrected either with a parameter in the individual printer definition members, or in a default printer definition.

Most printer keyword parameters have default values which will give satisfactory results for a wide range of devices.

The printer keyword parameters are listed in alphabetical order, starting on the next page.

AFPADJ
in PRINTER DEFINITION MEMBER

AFPADJ= Specifies, via four positional parameters, adjustment factors to shift the logical page on the physical page for VPS/PCL datasets (CONVTYPE=PCL) and viewable/printable areas for VPS/PDF datasets (CONVTYPE=PDF).

Positional parameter 1 is no longer used and will be ignored.

Positional parameter 2 is no longer used and will be ignored.

Positional parameters 3 and 4 specify the x- and y- values for adjustment factors to shift the logical page on the physical page.

These values are provided to help adjust AFP documents to PCL printers which have a much larger unprintable area than IPDS printers. On most PCL printers, the unprintable area is about 4.3 mm around all edges of the physical page. IPDS printers have a much smaller unprintable area, so documents originally created for IPDS printers may print on PCL printers with data truncated at the edges of the page. (Note that many new PCL 5 printers support 'edge-to-edge' or 'whole page' printing. When this option is set, the printer will not truncate data in the unprintable area. The 0200 flag of PCLOPTS should be set if this option is turned on at the printer.)

For example, if VPS/PCL output is consistently being printed with data truncated at the left and bottom edges of the page, the x-value could be set to some positive number of decipoints, and the y-value could be set to some negative number of decipoints. VPS/PCL would shift the printed data (both variable page data and OVERLAY data), for each job, to the right and up. Beware that this could result in truncation of data at the right or top of the page for other documents. These adjustment values affect every dataset printed through VPS/PCL for the printer. It is much better to alter specific FORMDEFs, PAGEDEFs, and/or OVERLAYs that push data into the PCL printer's unprintable area.

Adobe Acrobat typically imposes an additional .25" margin on the left and top sides of the printed PDF document. Positional parameters 3 and 4 can be used to shift the converted PDF to compensate for this. Those values can be used to adjust the centering of Text ->PDF converted documents as well.

These values are defined in decipoints (1 decipoint = 1/720 inch).

Valid Values: -720 to 720 for each factor.

Default: (0,0,0,0)

Example: AFPADJ=(,,120,-144)

This specifies that VPS/PCL should shift the logical page to the right about .167 inch and up about .2 inch.

Note: This keyword is valid only for printers with CONVTYPE=PCL or CONVTYPE=PDF.

AFPKEYWD
in PRINTER DEFINITION MEMBER

AFPKEYWD= A 4-byte hex representation that specifies which OUTPUT statement and printer definition keywords should trigger AFP to IPDS, MODCA, PCL, or PDF conversion. The user bit specifications are as follows:

80000000 = Convert for CHARS. *
40000000 = Convert for DUPLEX. *
20000000 = Convert for FORMDEF. *
10000000 = Convert for FORMLEN.
08000000 = Convert for INTRAY. *
04000000 = Convert for OFFSETXB.
02000000 = Convert for OFFSETXF.
01000000 = Convert for OFFSETYB.
00800000 = Convert for OFFSETYF.
00400000 = Convert for OUTBIN. *
00200000 = Convert for OVERLAYB. *
00100000 = Convert for OVERLAYF. *
00080000 = Convert for PAGEDEF. *
00040000 = Convert for TRC.
00020000 = Convert for USERLIB.
00010000 = Undefined.
00008000 = Undefined.
00004000 = Undefined.
00002000 = Undefined.
00001000 = Undefined.
00000800 = Undefined.
00000400 = Undefined.
00000200 = Undefined.
00000100 = Undefined.
00000080 = Undefined.
00000040 = Undefined.
00000020 = Undefined.
00000010 = Undefined.
00000008 = Undefined.
00000004 = Undefined.
00000002 = Undefined.
00000001 = Undefined.

('*' Indicates the keyword is both an OUTPUT JCL statement keyword and a VPS printer definition keyword.)

AFPKEYWD
in PRINTER DEFINITION MEMBER

Valid Values: 00000000 to FFFFFFFF

Default: 20080000

(Invoke the VPS/AFP conversion routines if FORMDEF or PAGEDEF is specified on the JCL OUTPUT statement or in the VPS printer definition.)

Example 1: E03C0000

This specification indicates to VPS that AFP conversion should occur if the CHARS, DUPLEX, FORMDEF, OVERLAYB, OVERLAYF, PAGEDEF, or TRC keyword is specified on the OUTPUT JCL statement or in the VPS printer definition.

Note: To be able to set default AFP values in the printer definition but NOT trigger AFP conversion because of those printer definition specifications, set the 0800 flag of the AFPOPTS printer definition keyword. When this AFPOPTS option is set, VPS will not check the printer definition AFP-related keywords to determine whether or not to invoke the AFP conversion routines.

AFPMSGS
in PRINTER DEFINITION MEMBER

AFPMSGS= Specifies, via three positional parameters, the names of the resources (form definition, page definition, and font) to use to print the VPS/AFP conversion messages and the VPS/IPDS NACK messages. (The VPS/AFP messages dataset RECFM is FBA, and the LRECL is 137.)

Positional parameter 1 specifies the form definition to use to print the VPS/AFP messages.

Valid Values: 1 - 6 alphanumeric characters.

Default: SMPLXL

Positional parameter 2 specifies the page definition to use to print the VPS/AFP messages.

Valid Values: 1 - 6 alphanumeric characters.

Default: 1UPP60

Positional parameter 3 specifies the font to use to print the VPS/AFP messages.

Valid Values: 1 - 4 alphanumeric characters.

Default: None.

Example 1: AFPMSGS=(SMPLXL,1UPL60,GT12)

This specification indicates that FORMDEF F1SMPLXL, PAGEDEF P1UPL60, and font X0GT12 should be used to print the VPS/AFP messages dataset.

AFPOPTS
in PRINTER DEFINITION MEMBER

AFPOPTS= A four-byte hex representation that specifies special user options to be used for a VPS/IPDS, VPS/PCL, or VPS/PDF printer. The user option bit specifications are as follows:

80000000 = Do not jog paper tray at end of job. (This option is ignored by VPS/PDF.)

40000000 = Clear printer resources after every dataset. (This option is ignored by VPS/PDF.)

20000000 = Jog output tray after every dataset. (This option is ignored by VPS/PDF.)

10000000 = Use FCB as PAGEDEF name.

08000000 = Do not check printer definition keywords to determine whether VPS/AFP conversion should occur.

04000000 = USERLIB resources are not secured. (This option is ignored by VPS/PDF.)

02000000 = Reserved for internal use.

01000000 = Ignore USERLIB datasets. (This option is ignored by VPS/PDF.)

00800000 = Use the largest available resource ID when numbering a resource. (This option is ignored by VPS/PDF.)

00400000 = Don't print warning and informational conversion messages. (This option is ignored by VPS/PDF.)

00200000 = Printer tray(s) contain letterhead paper. (This option is ignored by VPS/PDF.)

00100000 = Do not convert outline fonts to bitmap fonts; always attempt to map the AFP outline font character set name to an AFP bitmap font character set name. Refer to page C.13 for information about default character set name mapping.

00080000 = Reserved for future use.

00040000 = Always assume the FORMDEF 'cutsheet' option is on (i.e., so VPS/IPDS, VPS/PCL, and VPS/PDF will not ignore the medium orientation).

00020000 = Undefined

00010000 = Printer supports fonts with any resolution. (For PCL output, the font will be downloaded with its original resolution only if the resolution is a multiple of 300. If the resolution is not a multiple of 300, the font will be converted to a resolution of 300.)

00008000 = Ignore inline font character sets with resolutions that do not match the printer resolution (i.e., look for an external version of the character set).

00004000 = Undefined

00002000 = Undefined

00001000 = Undefined

00000800 = Undefined

00000400 = Undefined

00000200 = Undefined
00000100 = Undefined
00000080 = Undefined
00000040 = Undefined
00000020 = Undefined
00000010 = Undefined
00000008 = Undefined
00000004 = Undefined
00000002 = Undefined
00000001 = Undefined

Valid Values: 00000000 to FFFFFFFF

Default: 00000000

Example: AFPOPTS = 40000000

This specifies that VPS/IPDS or VPS/PCL should clear the printer of all downloaded resources after every dataset.

Note: When running VPS/PCL with VPS/PC or with TCP/IP LPR/LPD protocol (COMMTYPE=(APPC,VPSPC), COMMTYPE=(TCPIP,VPSPC), COMMTYPE=(TCPIP,LPD) or CONVTYPE=PCL), AFPOPTS=40000000 is recommended. This option causes VPS/PCL to send all resources required by a dataset when the dataset is sent, rather than assuming that the resources are present in the printer from a previous transmission. Because the PC or LPD printers can be used by other applications from the PC or IP networks, it cannot be assumed that resources will survive between dataset transmissions.

AFPRTAB
in PRINTER DEFINITION MEMBER

AFPRTAB= A 1 to 8 character value that specifies the name of the AFP resource mapping table to be used for this printer. This keyword is applicable only to printers with CONVTYPE=PCL.

If this keyword is specified, VPS will attempt to load a module with the specified name when the printer is activated. If a module of that name cannot be found in a library accessible to VPS, or if the module is found but fails validity checking, the printer will not be activated.

Valid Values: Any valid AFP resource mapping table name.

Default: VPSSRTAB

Example: AFPRTAB=VPSSRTB2

This specification indicates to VPS that this printer should use the resource mapping table named VPSSRTB2.

Note: This parameter is ignored unless CONVTYPE=PCL.

Various pre-assembled AFPRTABS are distributed with VPS due to different countries having different standards for paper sizes. See "Using the VPS/PCL Resource Mapping Table (AFPRTAB)" on page 8.44 for more information about AFP resource mapping tables and the paper sizes to which they refer.

AFPSEPE
in PRINTER DEFINITION MEMBER

AFPSEPE= Specifies, via three positional parameters, the names of the AFP resources (form definition, page definition and font) to use to convert and print the end separator pages.

Positional parameter 1 specifies the form definition to use to convert and print the end separator pages.

Valid Values: 1-6 alphanumeric characters.

Default: SMPLXL

Positional parameter 2 specifies the page definition to use to convert and print the end separator pages.

Valid Values: 1-6 alphanumeric characters.

Default: 1UPP60

Positional parameter 3 specifies the coded font to use to convert and print the end separator pages.

Valid Values: 1-4 alphanumeric characters.

Default: None.

Example: AFPSEPE=(SMPLXL,1UPL60,GT12)

This specification indicates that FORMDEF F1SMPLXL, PAGEDEF P11UPL60 and font X0GT12 should be used to convert and print the end separator pages.

Note: This parameter is ignored if SEPTYPE=AFP is not specified in the printer definition.

AFPSEPS
in PRINTER DEFINITION MEMBER

AFPSEPS= Specifies, via three positional parameters, the names of the AFP resources (form definition, page definition and font) to use to convert and print the start separator pages.

Positional parameter 1 specifies the form definition to use to convert and print the start separator pages.

Valid Values: 1-6 alphanumeric characters.

Default: SMPLXL

Positional parameter 2 specifies the page definition to use to convert and print the start separator pages.

Valid Values: 1-6 alphanumeric characters.

Default: 1UPP60

Positional parameter 3 specifies the coded font to use to convert and print the start separator pages.

Valid Values: 1-4 alphanumeric characters.

Default: None.

Example: AFPSEPS=(SMPLXL,1UPL60,GT12)

This specification indicates that FORMDEF F1SMPLXL, PAGEDEF P11UPL60 and font X0GT12 should be used to convert and print the start separator pages.

Note: This parameter is ignored if SEPTYPE=AFP is not specified in the printer definition.

ALARM
in PRINTER DEFINITION MEMBER

ALARM= Specifies whether the printer being defined has audible alarm support. This parameter is significant only if Automatic Forms Control support (FORM=AUTO) is being used for this printer, because VPS will sound the alarm on the printer only when requesting a form mount.

Valid Values: Y or N

Default: N

Example: ALARM=Y

This specification indicates that this printer supports the audible alarm.

ALOGMODE
in PRINTER DEFINITION MEMBER

ALOGMODE=Specifies the name of an alternate logmode table entry to be used when VPS connects to the printer. If this parameter is not coded, VPS will use the default logmode entry governed by the VTAM definitions for the printer. VPS also has five logmode images coded internally which can be requested by specifying a value for this parameter. They are: VPSLU0, VPSLU1, VPSLU3, VPSCOL, or VPSDCA. See "VPS-Supplied VTAM Log Modes" on page 6.14 for a description of these logmodes.

Valid Values: Any valid logmode entry name or VPSLU0, VPSLU1, VPSLU3, VPSCOL or VPSDCA

Default: VTAM default logmode entry for this printer

Example: ALOGMODE=VPSLU1

This specification indicates that the internal VPS logmode image for an LU-1 (SNA/SCS) printer should be used.

Note: This parameter is ignored if DIAL=Y is specified for the printer.

For printer definitions which allow connection with the VPS/PC product, the ALOGMODE keyword is required, and the value of ALOGMODE must be the name of a valid VTAM logon mode entry which is located in the logon mode table (MODETAB) which is associated with the device. The parameters in the logon mode entry must be those required for APPC/LU6.2. (See "Installing VPS/PC, AnyQueue® or VPS/RemoteQueue" on page 3.285).

VPS/IPDS must send a Function Management Header to LU-1 printers. This requires a VTAM LOGMODE entry with Common Protocol of X'7080'. The VPS internal logmode VPSCOL meets this requirement. If the VTAM LOGMODE specified for the LU has a COMPROT of X'7080', then this keyword can be omitted.

ALUNAME
in PRINTER DEFINITION MEMBER

ALUNAME= Defines an alternate printer LU to receive the output if the primary printer LU (LUNAME=) is unavailable for one of the following reasons:

- The printer is inactive to VTAM (RC=10 F2=00).
- The printer is not defined to VTAM (RC=14 F2=53).
- The LU is inhibited for sessions (RC=10 F2=02).

This parameter could be used to define the backup LUNAME in a recovery situation. This parameter is optional.

Valid Values: VTAM network name of the printer.

Default: None.

Example: ALUNAME=BKUPPR01

This specification would identify BKUPPR01 as the alternate LU.

Note: This parameter is ignored if DIAL=Y is specified for the printer.

The value of this parameter cannot be the same as the value for the LUNAME or ALUNAME parameter in any other printer activated to VPS at the same time.

APLCLASS
in PRINTER DEFINITION MEMBER

APLCLASS= Specifies the SYSOUT class(es) of datasets that should be treated as containing APL data. If the dataset does not contain the graphics escape character (X'08') ahead of each APL character, VPS will insert the character as it processes the data lines for these datasets. Also, if PRTXLATE=Y is specified, the translate table specified by the third positional parameter of the PRTXLATE keyword will be used for translation.

If the graphics escape character (X'08') is already present in the data, VPS will not insert a second graphics escape character.

Valid Values: From 1 to 8 valid SYSOUT classes.

Default: None.

Example: APLCLASS=FG

This specification indicates that any class "F" or "G" dataset should be processed as an APL dataset.

Note: The class(es) specified in this keyword must be among the classes normally processed by the printer. This keyword does not add to the list of classes selected by the printer.

AUTOEJCT
in PRINTER DEFINITION MEMBER

AUTOEJCT= Specifies, via four positional parameters, when VPS should perform extra form feeds. The positional parameters specify:

1. Whether or not a form feed should be performed at the beginning of a dataset if the first line in the dataset does not indicate that a skip to top of form is required.
2. Whether or not a form feed should be performed at the beginning of each job.
3. Whether or not a form feed should be performed at the beginning of each session.
4. Whether or not a form feed should be performed at the end of each job.

Valid Values: Y or N for each of the four positional parameters

Default: (Y,Y,Y,Y)

Example: AUTOEJCT=(Y,N,N,Y)

This specification indicates that each SYSOUT dataset should start on a new page, that no form feed is necessary at the beginning of each job nor at the beginning of each session, and that a form feed should be performed at the end of each job.

Note: To prevent VPS from sending form feeds at the beginning of the data or within the data for a printer with COMMTYPE=(TCPIP,EMAIL), specify AUTOEJCT=(N,N,N,N) and FORMFEED=N. Some mail systems do not understand a form feed (X'0C') or a form feed in combination with a carriage return (X'0D'). They can correctly interpret only a new line sequence (X'0D0A'). When viewing e-mail through one of these systems, the form feed sequence may appear as “garbage” characters.

Refer to “Blank Pages Between Jobs Printed by VPS” on page 6.25 for more information about the effects of form feeds between jobs and sessions.

AUTONL
in PRINTER DEFINITION MEMBER

AUTONL= Indicates whether or not this printer automatically performs a new line function when data lines are as long as the maximum print position (MPP). (This parameter is ignored for SCS (LU-1) printers).

Valid Values: Y or N

Default: N

Example: AUTONL=Y

This specification indicates that the printer will perform an automatic new line function after printing in the maximum print position, which indicates to VPS that it does not have to insert a new-line character into the buffer to position the printer for printing the next line.

Note: Specifying AUTONL=N when a printer really does advance to the next line after printing in the maximum print position will cause a blank line to appear in the output after the line which printed in the maximum print position. The correct value for this parameter must be determined on a printer-by-printer basis, but generally AUTONL=Y should be used for matrix printers and AUTONL=N should be used for line printers.

CDNETMAP
in PRINTER DEFINITION MEMBER

CDNETMAP= Specifies the alternate CONNECT:Direct Network Map dataset name. This dataset identifies the local CONNECT:Direct node and the nodes with which it can communicate. If not specified, the //DMNETMAP DD statement in the VPS execution JCL will be used. Note that this keyword is applicable only to VPS/CONNECT:Direct printers (i.e., printers with COMMTYPE=(DUMMY,CDI)).

Valid Values: Any valid DASD dataset name.

Default: None.

Example: CDNETMAP=PRT1.ALTCD.NETMAP

This specification indicates that the DASD dataset named PRT1.ALTCD.NETMAP is to be used instead of the dataset specified by the //DMNETMAP DD statement in the VPS execution JCL.

CDPLIB
in PRINTER DEFINITION MEMBER

CDPLIB= Specifies the alternate CONNECT:Direct Process Library dataset name. If not specified, the //DMPUBLIB DD statement in the VPS execution JCL will be used. Note that this keyword is applicable only to VPS/CONNECT:Direct printers (i.e., printers with COMMTYPE=(DUMMY,CDI)).

Valid Values: Any valid DASD dataset name.

Default: None.

Example: CDPLIB=PRT1.ALTCD.PLIB

This specification indicates that the DASD dataset named PRT1.ALTCD.PLIB is to be used instead of the dataset specified by the //DMPUBLIB DD statement in the VPS execution JCL.

CDPMBR
in PRINTER DEFINITION MEMBER

CDPMBR= Specifies the alternate member name of the CONNECT:Direct process that is to be submitted. If not specified, the name submitted will be generated by concatenating the printer member name and the SYSOUT class of the current dataset. Note that this keyword is applicable only to VPS/CONNECT:Direct printers (i.e., printers with COMMTYPE=(DUMMY,CDI)).

Valid Values: Any valid 1-8 character member name within the CONNECT:Direct Process library.

Default: Concatenation of the printer member name and the SYSOUT class of the current dataset.

Example: CDPMBR=PROC001

This specification indicates that process PROC001 is to be submitted to CONNECT:Direct to process the current SYSOUT dataset.

CDSNODE
in PRINTER DEFINITION MEMBER

CDSNODE= Specifies the CONNECT:Direct secondary node ID to receive the SYSOUT dataset. This name must be specified in the CONNECT:Direct Network Map dataset. Note that this keyword is applicable only to VPS/CONNECT:Direct printers (i.e., printers with COMMTYPE=(DUMMY,CDI)).

Valid Values: Any valid 1-16 character node ID specified in the Network Map dataset.

Default: None.

Example: CDSNODE=CD.MVS2

This specification indicates that the SYSOUT dataset is to be sent to node CD.MVS2.

CHARS
in PRINTER DEFINITION MEMBER

CHARS= Specifies the default character arrangement tables to be used for a VPS AFP printer. This parameter will be overridden by the values specified in the DD JCL statement or by the values specified in the OUTPUT JCL statement.

There are four character arrangement tables (fonts) available. From one to four can be specified, but no positions can be omitted (skipped).

Valid Values: 1 - 4 alphanumeric characters per position. Up to 4 fonts may be specified.

Default: None.

Example: CHARS=(GT10,GT12,GT18,GT24)

This specifies that the default font for this printer is GOTHIC with a variety of pitches.

Note: The values specified for CHARS, either obtained from this keyword or from the user's JCL, will be prefixed by the characters "X0" before being used as member names for retrieval from the library specified on the FONTLIB/FONT300 DD statement in the VPS execution JCL.

This keyword is used only for printers with CONVTYPE=IPDS, MODCA, PCL, or PDF.

CHNSIZE
in PRINTER DEFINITION MEMBER

CHNSIZE= Specifies the number of data buffers that should be sent before waiting for a response.

For VTAM devices, CHNSIZE specifies the number of elements (request units) within each chain, and is applicable only to LU-1 (SNA/SCS) printers. A specification of zero for this parameter indicates that full dataset chaining, which provides optimum performance, will be used for this device.

For TCP/IP devices, CHNSIZE specifies the number of data buffers that will be sent before waiting for completion of the SEND. CHNSIZE is ignored if using IBM TCP/IP for MVS (TCPTYPE=IBM310, TCPTYPE=IBM320, or TCPTYPE=IBM340). For Interlink Computer Sciences (TCPTYPE=ICS), the maximum number of outstanding sends will be set to CHNSIZE or the maximum send number allowed in the ICS configuration. A specification of zero indicates that VPS is to use the default send number supplied in the ICS configuration.

See "Printing Performance" on page 4.5 for more information about the impact of this keyword for both VTAM and TCP/IP printers.

Valid Values: 0 - 999

Default: 0

Example: CHNSIZE=10

This specification indicates that ten data buffers should be sent before waiting for a response.

Note: Specifying a non-zero value for this parameter for a VTAM SCS device can degrade printing performance. However, there are some cases where a device does not properly emulate support for full dataset chaining, and a non-zero value must be specified.

CKPTLINE
in PRINTER DEFINITION MEMBER

CKPTLINE= Specifies the number of print lines to be considered a “page” for checkpointing datasets without skips to channel 1.

Valid Values: 0 - 32767

Default: 0 (checkpointing not in effect for this printer)

Example: CKPTLINE=60

This specification indicates that when VPS encounters a dataset without channel 1 skips and checkpointing is in effect, a page should be assumed to consist of 60 lines.

Note: If either CKPTLINE or CKPTPAGE is specified as non-zero, both must be specified as non-zero. See the CKPTPAGE parameter for a description of the effect of checkpointing.

CKPTPAGE
in PRINTER DEFINITION MEMBER

CKPTPAGE= Specifies, in number of pages, the frequency with which VPS should update its checkpoint.

Valid Values: 0 - 32767

Default: 0 (checkpointing not in effect for this printer)

Example: CKPTPAGE=5

This specification indicates that VPS should update its checkpoint every five pages.

Note: When checkpointing is in effect for a printer (by specifying a non-zero value for CKPTPAGE and CKPTLINE), a printer EDRAINED due to some unrecoverable error and subsequently started (either via a START command or by the Error Retry User Exit), will begin printing the interrupted dataset at the page of the last checkpoint update. However, if the printer is inactivated or VPS terminates, checkpoint information is lost. In that case, an interrupted dataset will be reprinted in its entirety, just as it is if checkpointing is not in effect for the printer.

For a discussion of the possible impact of checkpointing on performance and its relationship to the ERRACTN parameter, see "Repositioning SYSOUT Datasets" on page 6.10.

If either CKPTLINE or CKPTPAGE is specified as non-zero, both must be specified as non-zero.

CKPTPAGE is required for VPS/IPDS printers, but it can be specified for VPS/PCL printers. If no value is specified, it will default to 10. This value determines how many pages VPS AFP will send to the printer before requiring that the printer send an acknowledgment.

CLASS
in PRINTER DEFINITION MEMBER

CLASS= Specifies, via two positional parameters, the SYSOUT class(es) that should be used for primary and secondary SYSOUT selection for this printer. If multiple classes are specified, VPS will select SYSOUT belonging to the first SYSOUT class before the second and from the second SYSOUT class before the third, etc.

CLASS is one of the four fields which are used to define the "selection criteria" for a printer. (See "How VPS Selects Work for a Printer" on page 6.2.)

Positional parameter 1 specifies the SYSOUT class(es) (if any) to be used for the printer's primary selection criteria.

Valid Values: From 1 to 8 valid SYSOUT classes.

Default: None.

Positional parameter 2 specifies the SYSOUT class(es) (if any) to be used for the printer's secondary selection criteria.

Valid Values: From 1 to 8 valid SYSOUT classes.

Default: None.

Example 1: CLASS=ABC

This specification indicates that SYSOUT classes A, B and C should be selected by this printer. SYSOUT class A would be selected before SYSOUT class B and SYSOUT class B would be selected before SYSOUT class C.

Example 2: CLASS=(AB,EF)

This specification indicates that SYSOUT classes A and B should be selected by this printer as part of the primary selection criteria. SYSOUT classes E and F should be selected by this printer as part of the secondary selection criteria.

COMMTYPE
in PRINTER DEFINITION MEMBER

COMMTYPE=Specifies, via three positional parameters, the type of communications connection that VPS will use to send data to this printer. Use this keyword to specify the connection type. This keyword replaces some of the functionality of the DEVTYPE keyword in previous releases.

Positional parameter 1 specifies the connection type.

Valid Values: APPC specifies an APPC (LU-6) connection

DUMMY is used to specify special connection options such as CONNECT:Direct.

TCPIP specifies a TCP/IP connection, either with sockets or the Line Printer Daemon

VTAM specifies a LU-0, LU-1, or LU-3 connection

Default: VTAM

Positional parameter 2 specifies a communications option for the connection type.

Valid Values: ANYQUEUE specifies a connection with the AnyQueue product.

CDI specifies a connection using VPS/CDI to a remote site running CONNECT:Direct. For more information on VPS/CDI, see "VPS/CONNECT:Direct Interface" on page 12.1.

DRSQ specifies a connection to the DRS/TCPIP product.

EMAIL specifies a connection with the VPS/Email product. For more information on VPS/Email, see "VPS/EMAIL" on page 11.1.

LPD specifies a TCP/IP connection using VPS/TCPIP and LPR/LPD protocols. For more information on using VPS/TCPIP, see "VPS/TCPIP" on page 10.1.

PAGECENT specifies a connection with PageCenter. For more information on PageCenter, see the "PageCenter Installation and Administration Guide".

RMTQUEUE specifies a connection with the VPS/RemoteQueue product. For more information on VPS/RemoteQueue, see the VPS/RemoteQueue manual.

SOK specifies a TCP/IP socket connection using VPS/TCPIP. For more information on using VPS/TCPIP, see "VPS/TCPIP" on page 10.1.

VPSPC specifies a connection with the VPS/PC product. For more information on VPS/PC, see the VPS/PC manual.

Default:	None.	(if first positional parameter = VTAM)
	None.	(if first positional parameter = DUMMY)
	VPSPC	(if first positional parameter = APPC)
	LPD	(if first positional parameter = TCPIP)

Positional parameter 3 specifies the communications protocol for the connection type.

Valid Values: LCDS specifies that the remote device is an LCDS printer. If the third parameter is LCDS, the second parameter must be ANYQUEUE, LPD or SOK and a valid product key for VPS/LCDS must be specified in the VPS system initialization member. For more information about LCDS devices, see "Defining an LCDS Printer to VPS V1 R8.0" on page 6.72.

LRSQUEUE specifies that the remote device uses a special protocol designed by LRS. If the second parameter is ANYQUEUE, RMTQUEUE or VPSPC, then the third parameter will default to LRSQUEUE. If the third parameter is specified as LRSQUEUE, the second parameter must be ANYQUEUE, RMTQUEUE, or VPSPC.

RECORD specifies that the remote device accepts data in 'AFP record' format, which includes a 2-byte length field at the beginning of each print record. Special records are sent in the LPD control file which contain information from the JCL, including PAGEDEF, FORMDEF, CHARS, etc. If the third parameter is RECORD, then the second parameter must be LPD, and a valid product key for VPS/LCDS must be specified in the VPS system initialization member. For more information about servers which process data in AFP record format, see "Sending Print Files to a Server in AFP Record Format" on page 6.77.

Default:	None.	(if second positional parameter = none)
	LRSQUEUE	(if second positional parameter = ANYQUEUE)
	None.	(if second positional parameter = CDI)
	None.	(if second positional parameter = EMAIL)
	None.	(if second positional parameter = LPD)
	LRSQUEUE	(if second positional parameter = RMTQUEUE)
	None.	(if second positional parameter = SOK)
	LRSQUEUE	(if second positional parameter = VPSPC)

Example 1: COMMTYPE=(VTAM)

Example 2: COMMTYPE=(TCPIP,LPD,LCDS)

COMPRESS
in PRINTER DEFINITION MEMBER

COMPRESS= Specifies, via four positional parameters, whether SYSOUT data should be compressed before it is sent to the printer, and the type of compression technique to be used. Generally, values should be used which allow compression to improve printer speed and reduce line traffic.

Positional parameter 1 specifies if normal line data should be compressed.

Valid Values: Y - Standard text compression

N - No text compression

S - String Control Byte compression

Default: Y

Note: When COMPRESS=Y is specified, VPS performs compression for SCS (LU-1) printers by using the SCS "Set Horizontal Format" (SHF) command. This includes setting a maximum print position. Unless a value other than 132 is specified in the MPP keyword, VPS will send a default MPP of 132 in the SHF command. If you do not wish to have lines wrap at 132, specify COMPRESS=N, or specify the appropriate value for the MPP keyword.

When COMPRESS=S is specified, VPS performs String Control Byte (SCB) compression for SCS printers. This type of compression is valid only for certain types of devices. See "Compression Methods Used by VPS" on page 6.26 for a complete description of VPS' data compression techniques.

COMPRESS=Y is ignored for printers with COMMTYPE=(TCPIP,LPD) or COMMTYPE=(TCPIP,SOK). For more information on VPS/TCPIP, see "VPS/TCPIP" on page 10.1.

Positional parameter 2 specifies if IPDS Write Text (WT) records produced by VPS/IPDS should be compressed. This has no effect on output from VPS/PCL.

Valid Values: Y - Standard text compression

N - No text compression

Default: Y

IPDS WT records are created from AFPDS Presentation Text (PTX) records and/or line data. They contain printer controls, such as location of data on a page, and the actual print data. When VPS/IPDS "compresses" these records, repeating characters are combined into "Repeat String" text controls to shorten the amount of data sent to the printer.

COMPRESS
in PRINTER DEFINITION MEMBER

Positional parameter 3 specifies if VPS/PCL should compress outbound PCL raster data. This has no effect on output from VPS/IPDS.

Valid Values: T - Tagged Image File Format (TIFF) encoding method

N - No compression of outbound raster data

Default: T

Note: VPS/PCL uses the Tagged Image File Format (TIFF) encoding method.

Positional parameter 4 specifies the level of compression for data converted from AFP to PDF by the VPS/PDF product.

Valid Values: 0 - 9

0 - No compression will be done.

9 - Highest level of compression.

Default: 4

Example: COMPRESS=(Y,Y,N,7)

This example indicates that VPS should compress normal text for this printer, that VPS/IPDS should compress Write Text records for this printer, that VPS/PCL should not compress output PCL raster data for this printer, and that VPS/PDF should use level 7 compression for data converted from AFP to PDF.

CONVTYPE
in PRINTER DEFINITION MEMBER

CONVTYPE= Specifies conversion options for AFP documents going to this printer. Use this keyword to specify the type of conversion. This keyword replaces some of the functionality of the DEVTYPE keyword in previous releases.

Valid Values:

IPDS - Specifies conversion using VPS/IPDS.

MODCA - Specifies ACIF conversion for viewing by PageCenter or PageCenter Plus.

PCL - Specifies conversion using VPS/PCL.

PDF - Specifies conversion using VPS/PDF.

Default: None.

Example: CONVTYPE=PCL

This specification indicates that VPS/PCL should convert the document before sending it to this printer.

Notes: IPDS is only allowed if KEYIPDS is specified in the VPS system initialization member. CONVTYPE=IPDS is only supported for COMMTYPE=VTAM or COMMTYPE=(TCPIP,SOK).

MODCA is only supported for the following values in the second parameter of the COMMTYPE= keyword: ANYQUEUE, CDI, PAGECENT, RMTQUEUE, VPSPC.

PCL is only allowed if KEYPCL is specified in the VPS system initialization member.

PDF is only allowed if KEYPDF is specified in the VPS system initialization member.

CONVTYPE=PDF is supported for the following values in the first parameter of the COMMTYPE= keyword: TCPIP or VTAM.

CONVTYPE=PDF is supported for the following values in the second parameter of the COMMTYPE= keyword: ANYQUEUE, CDI, EMAIL, PAGECENT, RMTQUEUE, VPSPC.

CPI
in PRINTER DEFINITION MEMBER

CPI=

Specifies the “characters per inch” to be printed horizontally on this printer. Some printers support multiple character print densities. You can use this keyword to select the print density to be used for all datasets printed by VPS. VPS will then send the SCS “set print density” (SPD) control code to the printer prior to the dataset.

The printer must be running as an SCS printer (LU-1). This is the only datastream which supports the programmatic setting of the character print density.

Valid Values: 1 - 2 digit numeric value from 0 - 99. The value given must be supported by the printer.

Default: 0 (no SPD sent to the device)

Example: CPI=16

This specification requests that VPS send an SPD command to the device to allow it to print at 16 characters per inch.

If print density is not specified or is specified as 0, VPS will not send the “set print density” SCS control code to the printer. The printer will then use its machine default or the value given via the operator panel on the printer.

The printer must be able to support the SCS control code “set print density” and the specific value given. Printers not supporting the set print density control code will cause the following message to be issued:

```
VPS332E prtrid SEND DATA FAILED RC=04 F2=04 SNS=1003
```

Printers which support the set print density control code, but not the specific value, will cause the following message to be issued:

```
VPS332E prtrid SEND DATA FAILED RC=04 F2=04 SNS=1005
```

Some CPI values supported on specific printer models are:

- IBM 3268 Values supported: 10, 16
- IBM 4224 Values supported: 10, 12, 15
- IBM 4234 Values supported: 10, 15

Note: SPD support is optional on the IBM 3268 base model. SPD is standard on the IBM 3268 color model.

“SCS Command Usage by VPS” on page 6.50 gives more information about the SCS commands that VPS sends to devices.

CRCHAR
in PRINTER DEFINITION MEMBER

CRCHAR= Specifies the carriage return order to be used for this printer, X'0D' or X'15'. This specification should always be '0D' unless the printer or printer control unit does not support carriage return orders. The control units which do not support carriage return are 3271 and 3272. The printers that do not support carriage return are 3284 and 3286.

This parameter is ignored for SCS printers. All SCS printers support CRCHAR=0D.

Valid Values: 0D or 15

Default: 0D

Example: CRCHAR=0D

This specification indicates that this printer supports a carriage return character of X'0D'.

CROPTS
in PRINTER DEFINITION MEMBER

CROPTS= A 4-byte hex representation that specifies the "C" language run time options to be used for this VPS printer task. The option bit specifications are as follows:

80000000 = Disable LE/390 recovery.
40000000 = Enable LE/390 storage reporting.
20000000 = Enable LE/390 runtime options reporting.
10000000 = Reserved
08000000 = Reserved
04000000 = Reserved
02000000 = Reserved
01000000 = Reserved
00800000 = Reserved
00400000 = Reserved
00200000 = Reserved
00100000 = Reserved
00080000 = Reserved
00040000 = Reserved
00020000 = Reserved
00010000 = Reserved
00008000 = Reserved
00004000 = Reserved
00002000 = Reserved
00001000 = Reserved
00000800 = Reserved
00000400 = Reserved
00000200 = Reserved
00000100 = Reserved
00000080 = Reserved
00000040 = Reserved
00000020 = Reserved
00000010 = Reserved
00000008 = Reserved
00000004 = Reserved
00000002 = Reserved
00000001 = Reserved

Valid Values: 00000000 to FFFFFFFF

Default: 00000000

Example: CROPTS=C0000000

This specifies that VPS should disable LE/390 recovery and enable LE/390 storage reporting for this VPS printer.

DBCCLASS
in PRINTER DEFINITION MEMBER

DBCCLASS= Specifies the SYSOUT class of datasets that should be considered to contain pure Double Byte Character Set (DBCS) data. VPS will expect datasets of the class(es) specified with the DBCCLASS parameter to contain only DBCS data without SOSI (shift-out, shift-in) codes. Such datasets will be translated using a DBCS translate table specified with the PRTXDBCS keyword.

For more information on DBCS translation, see "Creating a User Translation Table" on page 6.27.

Valid Values: From 1 to 8 valid SYSOUT classes.

Default: None.

Example: DBCCLASS=XM

This specification indicates that any class "X" or "M" dataset printed by VPS on this printer should be printed as Double Byte Character Set data.

Note: The DBCCLASS specification assumes that the datasets specified contain pure DBCS data. It does not scan the dataset for SOSI (shift out, shift in) codes. You must specify the DBCS translation table using the PRTXDBCS keyword.

The class(es) specified in this keyword must be among the classes normally processed by the printer. This keyword does not add to the list of classes selected by the printer.

DCACLASS
in PRINTER DEFINITION MEMBER

DCACLASS= Specifies the SYSOUT class of datasets that should be printed by VPS using Document Content Architecture (DCA) mode. DCA datasets are printed without compression or translation.

This parameter applies only to SCS (LU-1) printers.

Valid Values: From 1 to 8 valid SYSOUT classes.

Default: None.

Example: DCACLASS=X

This specification indicates that any class "X" dataset printed by VPS on this printer should be printed in DCA mode.

Note: The class(es) specified in this keyword must be among the classes normally processed by the printer. This keyword does not add to the list of classes selected by the printer.

DCKACTN
in PRINTER DEFINITION MEMBER

DCKACTN= Specifies whether the printer is to report certain data-check errors and what action the printer is to take when an exception is encountered. Coding this keyword parameter alters the IPDS Execute Order Anystate - Exception-Handling Control (XOA-EHC) command.

Positional parameter 1 specifies what data-check exceptions should be blocked.

Valid Values:

- UNBLOCK - Specifies that the printer is to report all data-check exceptions.
- BLKCHAR - Specifies that the printer is not to report invalid-character errors.
- BLKPOS - Specifies that the printer is not to report print-positioning errors.
- BLOCK - Specifies that the printer is not to report either invalid-character or print-positioning errors.
- BLKALL - Specifies that the printer is not to report invalid-character errors, print-positioning errors, or any other data-check errors for which alternate exception actions exist.

Default: BLOCK

Note: When BLKCHAR, BLKPOS, BLOCK, or BLKALL is specified, the printer will attempt to take an alternate exception action (AEA) when a data-check error, which the printer is not to report, is encountered. If an AEA is defined, the 2nd and 3rd parameters are ignored. If an AEA is not defined for the exception, the error is reported, and the 2nd and 3rd parameter specifications take effect.

Positional parameter 2 specifies whether the printer should try to take a page continuation action (PCA) when a data-check error, for which no AEA is to be taken or for which no AEA exists, is encountered.

Valid Values:

- NOPCACT - Specifies that when the printer encounters a datastream exception, for which no alternate exception action (AEA) exists or for which no AEA is to be taken, the printer should terminate processing of the page, overlay, or page segment and enter home state. In this case, the value for parameter 3 takes effect.
- PCACT - Specifies that when the printer encounters a datastream exception for which no AEA exists or for which no AEA is to be taken, the printer should take any defined page continuation action. A printer may take either a “skip and continue” action or a “page continuation” action, depending on the printer. In this case, positional parameter 3 is ignored.

Default: NOPCACT

DCKACTN
in PRINTER DEFINITION MEMBER

Positional parameter 3 specifies whether the printer should try to print as much of a page as possible up to the point of a data-check error for which no PCA is to be taken or for which no PCA exists.

Valid Values: NOEPPACT - Specifies that the printer should not print the page containing the error.

EPPACT - Specifies that the printer should end the page and try to print as much of the page, up to the point of the error, as possible. Processing may continue with the next page.

Default: NOEPPACT

Positional parameter 4 specifies whether the printer is to mark any print-positioning errors.

Valid Values: HLIGHT - Specifies that the printer is to mark print-positioning errors even though the printer is supposed to block these errors.

NOHLIGHT - Specifies that the printer is not to mark print-positioning errors.

Default: NOHLIGHT

Example: DCKACTN=(BLKALL,PCACT,EPPACT,NOHLIGHT)

This specifies that the printer should ignore all data-check errors and take an AEA if an exception is encountered. If no AEA exists for the exception, the printer should report the error and attempt to take a “skip and continue” or “page continuation” action. If no PCA exists for the data-check error, the printer should end the page and try to print as much of the page as possible, up to the point of the exception. Print-positioning errors will not be highlighted.

Example: DCKACTN=(,,EPPACT)

This specifies that the printer should report any data-check error. If an exception is encountered, the printer should end the page and try to print as much of the page as possible, up to the point of the exception. Processing may continue with the next page. Print-positioning errors will be highlighted.

Note: This parameter is similar to the “DATACK” keyword which can be coded on the OUTPUT JCL parameter and overrides the DCKACTN keyword. The only valid parameters for that keyword are UNBLOCK, BLKCHAR, BLKPOS, and BLOCK. If DATACK is coded, only invalid-character and print-positioning errors can be ignored. All other errors will be reported, regardless of the DATACK specification. Any print-positioning errors will be highlighted.

This parameter is ignored unless CONVTYPE=IPDS.

DDSNPFX
in PRINTER DEFINITION MEMBER

DDSNPFX= Specifies the DASD dataset high-level qualifier. Note that this keyword is applicable only to VPS/CONNECT:Direct printers (i.e., printers with COMMTYPE=(DUMMY,CDI)).

Valid Values: Any valid DASD dataset high-level qualifier (1 to 16 bytes)

Default: VPS

Example: DDSNPFX=VPS.CD

This specification indicates that the DASD dataset high-level qualifier will be "VPS.CD". The remaining portion of the DASD dataset name will be generated as followed:

VPS.CD.mbrname.Syyddd.Thhmmss.S##

mbrname: printer member name

syyddd: system date

thhmmss: system time

S##: sequence number

DEFLTMEM
in PRINTER DEFINITION MEMBER

DEFLTMEM= Specifies a member within the VPSLIB PDS that describes user defined defaults. If this parameter is not specified, VPS will use the value coded in the system initialization member DEFLTMEM keyword. If neither this keyword nor the system initialization member DEFLTMEM keyword is specified, the VPS internal default values will be used.

Valid Values: Member name of a member that exists in the VPSLIB PDS.

Default: None.

Example: DEFLTMEM=VDEFTLU1

This specification indicates that member VDEFTLU1 in the VPSLIB PDS contains default specifications for this printer. See "Printer Default Member" on page 3.5 and "Building the Printer Default Member" on page 3.79 for more information about default definitions.

DEST
in PRINTER DEFINITION MEMBER

DEST= Specifies, via two positional parameters, the destination(s) that should be used for primary and secondary SYSOUT selection for this printer.

DEST is one of the four fields which are used to define the "selection criteria" for a printer. (See "How VPS Selects Work for a Printer" on page 6.2).

Positional parameter 1 specifies the destination (if any) to be used for the printer's primary selection criteria.

Valid Values: Any valid JES destination (see "JES Requirements" on page 2.3) or * or <IP>

Default: None.

Positional parameter 2 specifies the destination (if any) to be used for the printer's secondary selection criteria.

Valid Values: Any valid JES destination (see "JES Requirements" on page 2.3) or *

Default: None.

Example 1: DEST=U99

This specification indicates that SYSOUT routed to destination U99 should be selected by this printer.

Example 2: DEST=(U99,U150)

This specification indicates that SYSOUT with a destination of U99 should be selected by this printer as part of the primary selection criteria. SYSOUT with a destination of U150 should be selected by this printer as part of the secondary selection criteria.

Note: Coding DEST=* indicates that the member name of this printer definition member should be used as the destination for SYSOUT selection.

Coding DEST=<IP> indicates that VPS should obtain SYSOUT datasets from JES which have an IP address. DEST=<IP> is only valid with SAPI=Y. (See "SAPI" on page 3.57.)

DEVTYPE
in PRINTER DEFINITION MEMBER

DEVTYPE= The DEVTYPE keyword is no longer used by VPS. The function of DEVTYPE is now performed by two keywords, COMMTYPE for communications parameters, and CONVTYPE for printer imaging command conversions.

Although the value assigned to DEVTYPE is ignored by VPS, the keyword has been retained and may be passed to user exits for your own purposes.

Valid values: 1 to 16 alphanumeric characters.

Default: None.

Example: DEVTYPE=IBM3816

This specification indicates that the DEVTYPE parameter holds the value IBM3816.

DIAL
in PRINTER DEFINITION MEMBER

DIAL= Specifies whether or not VPS should treat the printer as a self connecting logical unit. This parameter allows for less operator intervention to service dial-up printer devices.

Valid Values: Y or N

Default: N

Example 1: DIAL=N

This specification indicates that VPS will activate the printer in a “not drained” (IDLE) status. VPS assumes the printer is available (and connectable), and will immediately begin looking for datasets to print at the device.

Example 2: DIAL=Y

This specification indicates that VPS should activate the printer in a DRAINED status. VPS will automatically reset the drained status when the printer connects to VPS. When the session between VPS and the printer is terminated, VPS will again set the DRAINED status.

Note: Specifying RELREQ=A or RELREQ=I for a DIAL=Y printer may cause VPS to prematurely release the printer.

Also, in order for VPS to be notified when a given printer dials in, the VTAM LOGAPPL parameter on the LU statement should specify the VPS application ID.

DJDEIDEN
in PRINTER DEFINITION MEMBER

DJDEIDEN= Specifies, via 4 positional parameters, the location and value of DJDE identifier(s) that VPS should search for in print lines when sending LCDS data. If either of these DJDE identifiers is located at the offset specified, the carriage control will be modified for that line to be X'01' (print no space).

Positional parameter 1 specifies the offset within the line where a DJDE identifier should be located.

Valid Values: 0-32760

Default: None.

Positional parameter 2 specifies the value of the DJDE identifier to be located at the offset specified by positional parameter 1.

Valid Values: Up to 16 bytes of alphanumeric or special characters.

Default: None.

Positional parameter 3 specifies the offset within the line where a DJDE identifier should be located.

Valid Values: 0-32760

Default: None.

Positional parameter 4 specifies the value of the DJDE identifier to be located at the offset specified by positional parameter 3.

Valid Values: Up to 16 bytes of alphanumeric or special characters.

Default: None.

Example: DJDEIDEN=(0,$$DJDE$$,2,DJDE)

This specifies that VPS should search each line for LCDS printers to find "$$DJDE$$" at offset 0 or "DJDE" at offset 2. If either of these values is located, VPS will modify the carriage control for that line to X'01' (print no space).

DRAINED
in PRINTER DEFINITION MEMBER

DRAINED= Specifies whether this printer should be initialized in drained status. If this parameter is coded DRAINED=Y, a START command will need to be issued to this printer before it will begin selecting SYSOUT.

Valid Values: Y or N

Default: N

Example: DRAINED=Y

This specification indicates that this printer should be initialized in DRAINED status.

DSBATCH
in PRINTER DEFINITION MEMBER

DSBATCH= Specifies, via three positional parameters, whether or not VPS should print all datasets for the current job/started task/TSO user before requesting work for a different job/started task/TSO user.

Valid Values: Each of the three positional values can be Y or N

The first value indicates the action to be taken for output from batch jobs. The second value indicates the action to be taken for output from started tasks. The third value indicates the action to be taken for output from TSO users.

Default: (Y,Y,Y)

Example: DSBATCH=(Y,N,N)

This specification specifies to VPS that it should print all datasets found for a batch job in succession, but that after it prints a dataset from a started task or a TSO user, it should request the next dataset of highest priority from the JES spool, regardless of job name.

Note: Normally, once VPS has printed a dataset for a particular job, started task, or TSO user, it will continue to print datasets for that same job until all are removed from the JES spool. This parameter can be used to prevent a job, started task, or TSO user which generates many SYSOUT datasets from monopolizing a printer. This will treat each dataset as if it were a job, meaning that separators will be printed around it, an SMF record will be written, a null RU with the “end bracket” indicator will be sent after the dataset, etc.

VPS is not able to distinguish between batch jobs, started tasks, and TSO users on JES3 systems using PSO. Therefore, all output on JES3 systems using PSO will be considered as batch output.

DSPACE
in PRINTER DEFINITION MEMBER

DSPACE= Specifies, via three positional parameters, the amount of DASD space to be allocated to the DASD dataset. Note that this keyword is applicable only to VPS/CONNECT:Direct printers (i.e., printers with COMMTYPE=(DUMMY,CDI)), printers with CONVTYPE=MODCA specified, printers with CONVTYPE=PDF specified, or printers with PIMSG=Y and either CONVTYPE=IPDS or CONVTYPE=PCL specified.

Positional parameter 1 specifies whether the DASD dataset should be allocated in cylinders (C) or tracks (T).

Valid Values: C or T

Default: T

Positional parameter 2 specifies the primary allocation amount.

Valid Values: 1 - 9999

Default: 30

Positional parameter 3 specifies the secondary allocation amount.

Valid Values: 1 - 9999

Default: 15

Example: DSPACE=(C,10,5)

This specification indicates that the DASD dataset should be allocated in cylinders, with a primary allocation amount of 10 cylinders and a secondary allocation amount of 5 cylinders. Note that VPS will release unused space when unallocating the DASD dataset.

DUNIT
in PRINTER DEFINITION MEMBER

DUNIT= Specifies the unit type of device on which the DASD dataset is to be allocated and how many devices to assign. Note that this keyword is applicable only to VPS/CONNECT:Direct printers (i.e., printers with COMMTYPE=(DUMMY,CDI)), printers with CONVTYPE=MODCA specified, printers with CONVTYPE=PDF specified, or printers with PIMSG=Y and either CONVTYPE=IPDS or CONVTYPE=PCL specified.

Positional parameter 1 specifies the unit type.

Valid Values: Any valid DASD unit name

Default: SYSDA

Positional parameter 2 specifies the unit count.

Valid Values: 1 to 59

Default: 1

Example: DUNIT=(3380,2)

This specification indicates that two 3380 devices should be assigned to the VPS/CDI or VPS MODCA DASD dataset.

DUPLEX
in PRINTER DEFINITION MEMBER

DUPLEX= Specifies whether the VPS/IPDS or VPS/PCL document should print simplex, normal duplex, or tumble duplex. This option will override the duplex specification in the FORMDEF, but will be overridden by the value specified on the OUTPUT JCL statement.

Valid Values: NO, NORMAL, or TUMBLE

Default: None.

Example: DUPLEX=TUMBLE

This specification indicates that all VPS/AFP output for this printer be tumble duplex (unless overridden on the OUTPUT JCL statement).

Note: This keyword is used only for printers with CONVTYPE=IPDS or PCL.

DVOLUME
in PRINTER DEFINITION MEMBER

DVOLUME= Specifies the volume on which the DASD dataset is to be allocated. Note that this keyword is applicable only to VPS/CONNECT:Direct printers (i.e., printers with COMMTYPE=(DUMMY,CDI)), printers with CONVTYPE=MODCA specified, printers with CONVTYPE=PDF specified, or printers with PIMSG=Y and either CONVTYPE=IPDS or CONVTYPE=PCL specified.

Valid Values: Any valid DASD volume name.

Default: None.

Example: DVOLUME=WRK001

This specification indicates that the VPS/CDI DASD dataset should be allocated on the DASD volume WRK001.

EKEY
in PRINTER DEFINITION MEMBER

EKEY= Specifies the encryption key to be used if ENCRYPT=Y is specified for this printer. This field contains 32, 48 or 64 bytes that represent the 16, 24 or 32 bytes of hexadecimal data to be used as the encryption key. This key must match the decryption key used by the receiving device.

Valid Values: Any valid hexadecimal string.

Default: None.

Example: EKEY=0102030405060708090A0B0C0D0E0F

This specifies that a key with the above value should be used when encrypting the outbound data.

Notes: The length of this field should be compatible with the encryption type specified as the second parameter on the ENCRYPT= printer keyword.

AES16 - 32 bytes (16 hex bytes)

AES24 - 48 bytes (24 hex bytes)

AES32 - 64 bytes (32 hex bytes)

If the length of the EKEY= value specified is longer than what is required based on the second parameter of the ENCRYPT= keyword, the remaining EKEY value will be ignored. If the length of the EKEY= value is insufficient based on the second parameter of the ENCRYPT= keyword, the field will be padded with binary zeros.

If positional parameter 4 of the ENCRYPT keyword is set to “Y” to indicate that VPS should generate a dynamic session key for every connection, the value specified for the EKEY keyword is ignored.

ENCRYPT
in PRINTER DEFINITION MEMBER

ENCRYPT= Specifies, via 4 positional parameters, whether encryption should be performed for this printer, the type of encryption, the type of device that will do the decryption, and whether the encryption key should be dynamically created for each connection.

Positional parameter 1 specifies if encryption should be done for this printer.

Valid Values: Y or N

Default: N

Positional parameter 2 specifies the type of encryption.

Valid Values: AES16 - AES with 16-byte key

AES24 - AES with 24-byte key

AES32 - AES with 32-byte key

Default: None.

Positional parameter 3 specifies the type of device that will decrypt the data.

Valid Values: HP - Hewlett-Packard printer.

ISPP - Intermate Secure Printing Protocol.

LEXMARK - Lexmark printer.

LRSQUEUE - LRS software, such as AnyQueue.

Default: None.

Positional parameter 4 specifies if a dynamic (session) key should be created for each connection.

Valid Values: Y or N

Default: N

Example 1: ENCRYPT=(Y,AES16,HP)

This specifies that VPS should use AES encryption with a 16-byte key to send the data to a printer which has the HP decryption card.

Example 2: ENCRYPT=(Y,AES32,LRSQUEUE)

This specifies that VPS should use AES encryption with a 32-byte key to send the print file to an LRS product, such as AnyQueue.

Example 3: ENCRYPT=(Y,AES16,LEXMARK,Y)

This specifies that VPS should encrypt all outbound data for a Lexmark printer using AES encryption with a 16-byte key and that the key should be dynamically generated for each connection to the printer.

ENCRYPT
in PRINTER DEFINITION MEMBER

Notes: ENCRYPT=Y requires a valid value for the KEYVSECR= keyword in the VPS system initialization member.

The key to be used to do the encryption must be specified as the EKEY= keyword, unless the positional parameter 4 of the ENCRYPT= keyword indicates the key should be dynamically generated. If the key is not dynamically generated, then the EKEY= keyword value must match the key used for decryption at the receiving device.

If positional parameter 3 specifies HP, ISPP, or LEXMARK, the printer must be defined with all the following:

COMMTYPE=(TCPIP,SOK)

PJLCMDS=(Y,JOB)

PJLUSTAT=(,JOBON,PAGEON)

If positional parameter 3 specifies LEXMARK and positional parameter 4 specifies N, TCPRPORT=9151 must be specified.

If positional parameter 3 specifies LEXMARK and positional parameter 4 specifies Y to use dynamic encryption keys, TCPRPORT=9152 must be specified.

If positional parameter 3 specifies ISPP, TCPRPORT should be set to match the port at the printer that expects encrypted data. This port defaults to be 9111.

If positional parameter 3 specifies LRSQUEUE, the printer must be defined with one of the following:

COMMTYPE=(TCPIP,ANYQUEUE)

COMMTYPE=(TCPIP,DRSQ)

COMMTYPE=(TCPIP,RMTQUEUE)

ERRACTN
in PRINTER DEFINITION MEMBER

ERRACTN= Specifies, via four positional parameters, the action to be performed by VPS when an error occurs.

Positional parameter 1 specifies the type of action to be performed when a retriable error occurs while VPS is printing a dataset on this printer.

Valid Values STD, BUF, RST or EDR

STD = VPS uses its "standard" repositioning.

BUF = VPS sends again the buffer than failed.

RST = VPS restarts the dataset.

EDR = VPS EDRAINs the printer.

Default: STD

Positional parameter 2 specifies whether messages pertaining to the action performed above should be printed on the printer.

Valid Values: Y or N

Default: Y

Positional parameter 3 specifies the action to be taken if an error occurs while VPS is converting a file from one print formatting language to another. For example, this parameter is used if errors are encountered when converting line data to AFP (MODCA), when converting AFP or line data to IPDS using VPS/IPDS, when converting AFP or line data to PCL using VPS/PCL or when converting line data to PDF.

Valid Values: EDR or REQ

EDR = VPS EDRAINs the printer.

REQ = VPS requeues the SYSOUT using requeue options.

Default: EDR

Positional parameter 4 specifies the action to be taken if an error occurs before the SYSOUT file can be delivered for the following cases. For printers with DEST=<IP>, this parameter is used if an error occurs when VPS/TCPIP attempts to connect using the IP address in the DEST field on the OUTPUT JCL statement. For email printers, this parameter is used if an error occurs when VPS/Email attempts to connect to the mail server to send the message. For email printers, this parameter is used if an unknown or invalid email or PDF keyword is specified in the OUTPUT JCL statement values to be searched based on MAILKWDS or PDFKWDS.

Valid Values: EDR or REQ

EDR = VPS EDRAINs the printer

REQ = VPS requeues the SYSOUT using requeue options

Default: EDR

ERRACTN
in PRINTER DEFINITION MEMBER

Example 1: ERRACTN=(RST,N,)

This indicates that after a retriable error on this printer, VPS should restart the dataset and should not print any repositioning messages on the printer.

Example 2: ERRACTN=(,,REQ,REQ)

If this printer is converting line data or AFP to IPDS, MODCA, PCL, or PDF when an error occurs, the dataset should be requeued. If this is a TCP/IP printer with DEST=<IP> and the IP address is invalid, the dataset should be requeued. If this is a VPS/Email printer and an error occurs during the connection to the mail server, the dataset should be requeued. If this is a VPS/Email printer and any invalid email or PDF keywords are located in the OUTPUT JCL statement values, the dataset should be requeued.

FCB
in PRINTER DEFINITION MEMBER

FCB= Specifies how VPS is to handle FCBs for this printer.

Positional parameter 1 specifies whether FCB support is to be active for this printer. If FCB=Y or FCB=FORM is specified, the FCB image will be retrieved from SYS1.IMAGELIB for each SYSOUT dataset and simulated on the VPS printer. It is recommended that FCB support be specified even if no special FCB images are used, because the standard default FCB contains all standard channel skips and their print line positions.

A value of FORM specifies that VPS should use the value of the SYSOUT dataset's form name field as the name of the FCB to be retrieved from SYS1.IMAGELIB. A value of FORM can be used in an environment where JES does not supply the name of the FCB to VPS (as in some older versions of JES3), or when the FCBs have names identical to form names, and the users are accustomed to specifying FORM but not FCB.

Valid Values: Y, N or FORM

Default: Y

Positional parameter 2 specifies the name of the default FCB to be used by this printer when no FCB is specified in the JCL for a dataset to be printed by this printer.

Valid Values: 1 to 4 alphanumeric characters. (The FCB image must reside in SYS1.IMAGELIB).

Default: 6

Positional parameter 3 specifies what action should be taken by VPS when the FCB specified on a SYSOUT dataset cannot be found in SYS1.IMAGELIB.

Valid Values: E (EDRAIN the printer) or D (use the default FCB)

Default: E

Example: FCB=(Y,8,E)

This specification indicates that FCB support should be used for this printer, that a default FCB named FCB28 (or FCB48) should be used, and that the printer should be EDRAINED when a SYSOUT dataset refers to an FCB that is not found in SYS1.IMAGELIB.

See "FCB Support" on page 6.8 for a more complete discussion of FCB support.

FDEFDD
in PRINTER DEFINITION MEMBER

FDEFDD= Specifies the DD statement in the VPS execution JCL that contains the form definition libraries to be used for VPS/IPDS, VPS/PCL, or VPS/PDF conversion.

This keyword only applies to the processing of AFP data. For more information on how VPS processes AFP data, see "AFP" on page 8.1.

Valid Values: 1 to 8 alphabetic characters.

Default: FDEFLIB

Example: FDEFDD=FDEF1

This specifies that VPS/IPDS, VPS/PCL, or VPS/PDF should refer to the FDEF1 DD statement in the VPS execution JCL for the form definition libraries.

FFSEQ
in PRINTER DEFINITION MEMBER

FFSEQ= Specifies a special form feed sequence to be used for this printer.

Valid Values: Any string of 2, 4 or 6 characters, representing 1, 2 or 3 bytes of hex data to be used as a form feed sequence

Default: 0D0C0D (carriage restore - form feed - carriage restore)

Example: FFSEQ=0C

This specification indicates that only the form feed character (X'0C') is to be used as a form feed sequence for this printer.

Note: Some page printers (such as the IBM 5210) do not consider the X'0D' (carriage restore) character to be a control character. Use of the default form feed sequence results in blank pages. For these printers, a form feed sequence of '0C' should be used.

Some older, non-SCS printers also do not support the X'0D' control character. For these printers, a form feed sequence of '150C15' should be used.

FMHCLASS
in PRINTER DEFINITION MEMBER

FMHCLASS= Specifies, via three positional parameters, the SYSOUT classes which will contain FMH datasets, the begin dataset FMH to be used for those datasets, and the end dataset FMH to be used for those datasets.

Valid Values: The first positional parameter value can be from 1 to 8 valid SYSOUT classes; the second positional parameter value can be from 2 to 24 hex characters representing from 1 to 12 bytes of FMH data to be used as the begin dataset FMH; the third positional parameter value can be from 2 to 24 hex characters representing from 1 to 12 bytes of FMH data to be used as the end dataset FMH.

Default: None.

Example: FMHCLASS=(F,0601300D4000,0601300D2000)

This specification indicates that datasets in SYSOUT class F should have begin dataset and end dataset FMH of the values given in the second and third parameter values.

Note: This parameter applies only to SCS devices. The BIND used for the device must allow FMH.

If COMPRESS=S is specified, VPS will use the FMHCLASS keyword values for any dataset which is in one of the FMHCLASS SYSOUT classes. If COMPRESS=S is specified, but no FMHCLASS keyword is present or if the dataset is not in one of the SYSOUT classes specified in the FMHCLASS keyword, VPS will send its own internal FMH information, because an FMH specifying compression is required for SCB compression.

FMHJOB
in PRINTER DEFINITION MEMBER

FMHJOB= Specifies the begin job and end job FMH to be used for this printer.

Valid Values: The first positional parameter value can be from 2 to 24 hex characters representing from 1 to 12 bytes of FMH data to be used as the begin job FMH; the second positional parameter value can be from 2 to 24 hex characters representing from 1 to 12 bytes of FMH data to be used as the end job FMH.

Default: None.

Example: FMHJOB=(060130004000,0601300D0000)

This specification indicates that an FMH containing the first value specified should be sent at the beginning of each job, and an FMH containing the second value specified should be sent at the end of each job.

Note: This parameter applies only to SCS devices. The BIND used for the device must allow FMH.

FONTDD
in PRINTER DEFINITION MEMBER

FONTDD= Specifies the DD statement in the VPS execution JCL that contains the font libraries to be used for VPS/IPDS, VPS/PCL, or VPS/PDF conversion.

This keyword only applies to the processing of AFP data. For more information on how VPS processes AFP data, see "AFP" on page 8.1.

Valid Values: 1 to 8 alphanumeric characters

Default: FONTLIB (default for a 240-dpi VPS/IPDS printer and for VPS/PDF).

FONT300 (default for a 300-dpi VPS/IPDS printer and for a VPS/PCL printer).

Example: FONTDD=FONT1

This specifies that VPS/IPDS, VPS/PCL, or VPS/PDF should refer to the FONT1 DD statement in the VPS execution JCL for the font libraries.

FORM
in PRINTER DEFINITION MEMBER

FORM= This parameter has two possible functions, depending on the format and values chosen.

OPTION 1: Specifies, via two positional parameters, the form name(s) (if any) that should be used for primary and secondary SYSOUT selection for this printer.

In this option, FORM is one of the four fields which are used to define the "selection criteria" for a printer. (See "How VPS Selects Work for a Printer" on page 6.2.)

Positional parameter 1 specifies the form name (if any) to be used for the printer's primary selection criteria.

Valid Values: Any alphanumeric specification from one to four characters in length.

Default: None.

Positional parameter 2 specifies the form name (if any) to be used for the printer's secondary selection criteria.

Valid Values: Any alphanumeric specification from one to four characters in length.

Default: None.

Example 1: FORM=CHK1

This specification indicates that SYSOUT with a form name of CHK1 should be selected by this printer. In this example, form name is not a part of the secondary selection criteria. (See the "caution" below).

Example 2: FORM=(CHK1,CHK1)

This specification indicates that SYSOUT with a form name of CHK1 should be selected by this printer as part both the primary and secondary selection criteria.

CAUTION: If you specify a different form name for the secondary selection criteria than for the primary selection criteria, or if you specify form name for primary but not secondary, or for secondary but not primary, all of the output will print continuously, without giving the operator time to change forms. You should either select all or none of the work by form name, or use Option 2 to control changing forms.

OPTION 2: Specifies that the printer is to be operated in automatic forms control mode and, optionally, specifies when form mount messages should be communicated to the printer operator.

See "FORM=AUTO Keyword" on page 6.6 for a complete explanation of automatic forms control mode.

FORM
in PRINTER DEFINITION MEMBER

Valid Values: AUTO

(AUTO,form,CLSDCHG|CLSDNCHG)

where: form = Any alphanumeric specification from one to four characters in length.

Default: None.

Example: FORM=(AUTO,STD,CLSDNCHG)

When "FORM=AUTO" is specified, VPS will operate this printer in automatic forms control mode. In this mode, form is not considered to be a selection criterion; instead, VPS will notify the operator to mount the requested form each time a different form is encountered.

When "FORM=(AUTO,form,CLSDCHG| CLSDNCHG)" is specified, the "form" field is a positional value indicating the name of the form assumed to be in the printer when the printer is activated. Coding this value prevents VPS from issuing a form mount message for the first dataset to be printed after printer activation if the form requested for that dataset matches this value.

If FORM=AUTO is specified, but no form name is supplied for the second positional parameter value, VPS will assume that a form mount message should be issued for the first dataset printed after printer activation.

The CLSDCHG|CLSDNCHG positional parameter specifies whether or not a form change should be assumed after CLSDST processing. CLSDST processing occurs when VPS terminates its VTAM session with a printer.

If the value CLSDCHG is coded, VPS will assume that another application which established a session with the printer may have used a different form than the last one used by VPS. In this case, when VPS establishes a new session with the printer, a form mount message will be issued for the form requested by the first dataset printed in the session.

When the value CLSDNCHG is coded, VPS will assume that any other application which established a session with the printer used the same form as that last used by VPS. When VPS establishes a new session with the printer, no form mount message will be issued if the first dataset to be printed in the session requests the same form as that last used by VPS in its previous session with the printer.

CLSDCHG is the default for the third positional parameter value.

FORMDEF
in PRINTER DEFINITION MEMBER

FORMDEF= Specifies the default form definition to be used for a VPS AFP printer. This keyword will be overridden by the value specified in the OUTPUT JCL statement.

If this keyword is specified, all datasets sent to this printer will be printed using VPS AFP.

Valid Values: 1 - 6 alphanumeric characters.

Default: A10110

Example: FORMDEF=A10111

This specifies that the default FORMDEF for this VPS AFP printer is F1A10111.

Note: The value specified for FORMDEF, either obtained from this keyword or from the user's JCL, will be prefixed by the characters "F1" before being used as a member name for retrieval from the library specified on the FDEFLIB DD statement in the VPS execution JCL.

FORMFEED
in PRINTER DEFINITION MEMBER

FORMFEED= Specifies whether the printer being defined has form feed support. This parameter should always be specified as or allowed to default to FORMFEED=Y unless the printer does not support form feed orders (X'0C'). If FORMFEED=N is coded, VPS will simulate form feeds by inserting the appropriate number of new line characters in the print buffer when FCB=Y is also specified. (This parameter is ignored for SCS printers. All SCS printers support the form feed order).

Valid Values: Y or N

Default: Y

Example: FORMFEED=N

This specification indicates that this printer does not support form feed orders and VPS must therefore simulate form feed by inserting the appropriate number of new line characters.

Note: This parameter can be used to "simulate" FCB page length support for non-SCS printers. If FCB=Y and FORMFEED=N are specified, VPS will read the appropriate FCB image from SYS1.IMAGELIB and use its page length value to determine how many new line characters must be inserted to reach the top of the next page. This can override the page length setting in the printer itself. However, VPS cannot override the printer hardware setting of lines per vertical inch (6 LPI or 8 LPI) on a non-SCS device, no matter what the FCB specifies.

To prevent VPS from sending form feeds at the beginning of the data or within the data for a printer with COMMTYPE=(TCPIP,EMAIL), specify FORMFEED=N and AUTOEJCT=(N,N,N,N). Some mail systems do not understand a form feed (X'0C') or a form feed in combination with a carriage return (X'0D'). They can correctly interpret only a new line sequence (X'0D0A'). When viewing e-mail through one of these systems, the form feed sequence may appear as "garbage" characters.

GDMAPPL
in PRINTER DEFINITION MEMBER

GDMAPPL= Specifies the name of the applid to be used for the VTAM session which GDDM will establish to process GDDM datasets for this printer.

Valid Values: An application ID that has been defined and activated to VTAM, or a “generic” application ID representing one of a pool of application IDs that have been defined and activated to VTAM.

Default: None.

Example: GDMAPPL=GDPRT01

This specification indicates that an applid of GDPRT01 is to be used for any VTAM session which GDDM establishes to process GDDM datasets for this printer.

Note A “pool” of VTAM application IDs can be specified by coding one or more characters followed by a pound sign (#) in the GDMAPPL parameter. For example, coding GDMAPPL=GDM# indicates that one of a “pool” of VTAM application IDs which start with the characters “GDM” should be used by VPS to process GDDM datasets for this printer. For a full explanation of this process, see “GDDM Processing” on page 6.35.

GDMCLASS
in PRINTER DEFINITION MEMBER

GDMCLASS= Specifies the SYSOUT class(es) of datasets that should be processed by VPS as GDDM datasets.

Valid Values: From 1 to 8 valid SYSOUT classes.

Default: None.

Example: GDMCLASS=G

This specification indicates that any class “G” dataset printed by VPS on this printer should be processed as a GDDM dataset.

Note: The class(es) specified in this keyword must be among the classes normally processed by the printer. This keyword does **not** add to the list of classes selected by the printer. For a full explanation of this process, see “GDDM Processing” on page 6.35.

This keyword is only supported if COMMTYPE=(VTAM,) is specified for the same printer.

GRPNAME
in PRINTER DEFINITION MEMBER

GRPNAME= This parameter allows VPS printers to be assigned to a user-specified group name. VPS commands such as START, STOP and DISPLAY can be issued to a printer group name. The command would then apply to all printers belonging to the specified group. For example, if three different VPS printers were defined with GRPNAME=GRP1 specified in their respective printer definitions, a VPS command issued to a group name of GRP1 would automatically be issued to all three printers.

Valid Values: Any alphanumeric name, 8 characters maximum, starting with an alphabetic or national character.

Default: None.

Example: GRPNAME=PRGROUP1

This specification assigns a group name of PRGROUP1 to this printer.

Note: This parameter is used only for command processing.

INTRAY
in PRINTER DEFINITION MEMBER

INTRAY= Specifies the input tray number for the VPS/AFP output. This option will override the FORMDEF bin specification, but will be overridden by the value specified on the OUTPUT JCL statement.

Valid Values: 0 - 255

Default: None.

Example: INTRAY=2

This specification indicates that the paper source for all VPS/AFP output for this printer is input tray #2 (unless overridden on the OUTPUT JCL statement).

IPDCLASS
in PRINTER DEFINITION MEMBER

IPDCLASS= Specifies the SYSOUT class(es) of datasets that should be treated as containing IPDS (Intelligent Printer Datastream) data.

Valid Values: 1 to 8 valid SYSOUT classes or '*'.

Default: None.

Example: IPDCLASS=I

This specification indicates that any class "I" dataset is already in IPDS format when VPS retrieves it from the JES spool, and VPS should treat it as an IPDS dataset.

Notes: Repositioning after an error condition will always be to the beginning of the dataset for IPDS datasets. No messages will appear on the printer for a request to restart a dataset, interrupt the printer, or cancel a job. When FORM=AUTO is specified for the printer, no form mount message will appear for IPDS datasets.

The class(es) specified in this keyword must be among the classes normally processed by the printer. This keyword does **not** add to the list of classes selected by the printer.

"IPDS (Intelligent Printer Data Stream) Support" on page 6.48 gives more information about VPS' processing of IPDS datasets.

If the VPS/IPDS batch program is used to put output onto the JES spool for printing by VPS, that output must be in the class specified in the IPDCLASS keyword. However, if using CONVTYPE=IPDS, do not use the SYSOUT class(es) specified in this keyword. For more information, see "AFP" on page 8.1.

If specifying IPDCLASS for a printer with COMMTYPE=TCPIP, the IPDCLASS keyword value must be specified as '*' to process all classes as IPDS data or CONVTYPE=IPDS must be specified. This is because all data sent to the IPDS printer using a TCP/IP connection must be IPDS.

IPDOPTS
in PRINTER DEFINITION MEMBER

IPDOPTS= A four-byte hex representation that specifies special user options to be used for a VPS/IPDS printer. The user option bit specifications are as follows:

80000000	=	4224 repositioning required
40000000	=	Don't load 42xx printer font table
20000000	=	Printer supports both 240 and 300 dpi fonts.
10000000	=	Don’t use IOCA replicate-and-trim
08000000	=	Undefined
04000000	=	Undefined
02000000	=	Undefined
01000000	=	Undefined
00800000	=	Undefined
00400000	=	Undefined
00200000	=	Undefined
00100000	=	Undefined
00080000	=	Undefined
00040000	=	Undefined
00020000	=	Undefined
00010000	=	Undefined
00008000	=	Undefined
00004000	=	Undefined
00002000	=	Undefined
00001000	=	Undefined
00000800	=	Undefined
00000400	=	Undefined
00000200	=	Undefined
00000100	=	Undefined
00000080	=	Undefined
00000040	=	Undefined
00000020	=	Undefined
00000010	=	Undefined
00000008	=	Undefined
00000004	=	Undefined
00000002	=	Undefined
00000001	=	Undefined

Valid Values: 00000000 to FFFFFFFF

Default: 00000000

Example: IPDOPTS=80000000

This specifies that 4224 repositioning is required for this printer.

JESQUEUE
in PRINTER DEFINITION MEMBER

JESQUEUE= Specifies, via 6 positional parameters, which JES queues should be used to select SYSOUT files for this printer when VPS is using the SAPI JES interface.

Positional parameter 1 specifies whether or not VPS should obtain SYSOUT files from the WTR queue (JES3) or OUTPUT queue (JES2) for the primary selection criteria.

Valid Values: Y or N

Default: Y JES3

Y JES2

Positional parameter 2 specifies whether or not VPS should obtain SYSOUT files from the HOLD queue (JES3) for the primary selection criteria.

Valid Values: Y or N

Default: Y JES3

N JES2

Positional parameter 3 specifies whether or not VPS should obtain SYSOUT files from the "hold for external writer" queue (JES3) for the primary selection criteria.

Valid Values: Y or N

Default: Y JES3

N JES2

Positional parameter 4 specifies whether or not VPS should obtain SYSOUT files from the WTR queue (JES3) or OUTPUT queue (JES2) for the secondary selection criteria.

Valid Values: Y or N

Default: Y JES3

Y JES2

Positional parameter 5 specifies whether or not VPS should obtain SYSOUT files from the HOLD queue (JES3) for the secondary selection criteria.

Valid Values: Y or N

Default: Y JES3

N JES2

JESQUEUE
in PRINTER DEFINITION MEMBER

Positional parameter 6 specifies whether or not VPS should obtain SYSOUT files from the "hold for external writer" queue (JES3) for the secondary selection criteria.

Valid Values: Y or N

Default: Y JES3

N JES2

Example 1: JESQUEUE=(Y,N,N,Y,N,N)

This indicates that VPS should only select SYSOUT from the JES3 WTR queue or JES2 OUTPUT queue for both the primary and secondary selection criteria this printer.

Example 2: JESQUEUE=(N,Y,Y,N,Y,Y)

This indicates that VPS should only select SYSOUT from the JES3 HOLD queue and JES3 "hold for external writer" queue for both primary and secondary selection criteria for this printer.

Notes: For JES2, the only valid value is the default, which is JESQUEUE=(Y,N,N,Y,N,N).

Turning off all values for either the primary or secondary fields is not allowed. For example, any of the following would be refused during printer activation:

JESQUEUE=(Y,N,N,N,N,N)- all secondary fields = N

JESQUEUE=(N,N,N,Y,N,N)- all primary fields = N

JESQUEUE=(N,N,N,N,N,N)- all fields = N

LOGDATA
in PRINTER DEFINITION MEMBER

LOGDATA= Specifies that VPS should accept and store the session logon data. This data can then be used to dynamically change the printer selection criteria. A specification of LOGDATA=D or LOGDATA=W requires the printer be in a drained status at the time of the logon. This can be accomplished with the DIAL=Y parameter.

Valid Values: N, D or W

Default: N

Example 1: LOGDATA=D

This specification indicates that VPS should use the logon data as a destination selection change upon successful session initiation. If LOGDATA=D is specified, logon data is required.

Example 2: LOGDATA=W

This specification indicates that VPS should use the logon data as a writer name selection change upon successful session initiation. If LOGDATA=W is specified, logon data is required.

Example 3: LOGDATA=N

This specification indicates that VPS should ignore any logon data if it exists.

LUNAME
in PRINTER DEFINITION MEMBER

LUNAME= Specifies the VTAM network name of the primary printer that VPS is to use.

Valid Values: VTAM network name of the printer

Default: The member name of this printer definition member

Example: LUNAME=VTAMPR01

This specification indicates that the network name of the printer to be driven is VTAMPR01.

MAILBOOK
in PRINTER DEFINITION MEMBER

MAILBOOK= A 1 to 8 character value that specifies the name of the VPS/Email address book for this printer. See "Generating a VPS/Email Address Book" on page 11.18 for more information on how to create and use the address book.

If this keyword is specified, VPS will attempt to load a module with the specified name when the printer is activated. If a module of that name cannot be found in a library accessible to VPS, or if the module found fails validity checking, the printer will not be activated.

Valid Values: Any valid VPS/Email address book name.

Default: None.

Example: MAILBOOK=VPSSBOOK

This indicates that VPS should use the VPSSBOOK module for email name and/or address substitution.

MAILCSET
in PRINTER DEFINITION MEMBER

MAILCSET= Specifies the character set name to be sent in the email commands if the dataset is sent as message text.

Valid Values: A 1 to 60-character name of the character set.

Default: US-ASCII

Example: MAILCSET=ISO-8859-1

Note: This keyword is only used for VPS/Email printer definitions. It is ignored if the SYSOUT dataset is sent as an attachment.

MAILFNAM
in PRINTER DEFINITION MEMBER

MAILFNAM= Specifies, via three positional parameters, the default file name to be used if no FILENAME: value is located in the OUTPUT statement JCL associated with the SYSOUT file. This keyword is only used for VPS/Email printers when VPS is sending the SYSOUT file as an attachment.

Positional parameter 1 specifies the file name prefix.

Valid Values: 1 - 6 characters. Both upper and lower case values are allowed, as well as some punctuation characters, such as the dash, slash or underscore characters.

Default: vps

Note: This prefix value will be followed by a 2 to 5-digit number and a period. The number will be incremented each time a file is sent as an attachment to an email address. The total length of the prefix value, including the number, will not exceed 8 bytes.

Positional parameter 2 specifies the file name suffix for normal print files.

Valid Values: 1 - 6 characters. Both upper and lower case values are allowed, as well as some punctuation characters, such as the dash, slash or underscore characters.

Default: txt

Positional parameter 3 specifies the file name suffix for transparent (binary) print files.

Valid Values: 1 - 6 characters. Both upper and lower case values are allowed, as well as some punctuation characters, such as the dash, slash or underscore characters.

Default: bin

Example: MAILFNAM=(ACCTG,rtf,xcc)

This indicates that VPS should set the default file name to ACCTG001.rtf when sending a normal print file as an email attachment, or to ACCTG001.xcc when sending a transparent (binary) file.

MAILKWDS
in PRINTER DEFINITION MEMBER

MAILKWDS= A 4-byte hex representation that specifies which OUTPUT JCL statement keywords will be searched for email parameters. The bit specifications are as follows:

80000000 = Search the 1st USERDATA field
40000000 = Search the 2nd USERDATA field
20000000 = Search the 3rd USERDATA field
10000000 = Search the 4th USERDATA field
08000000 = Search the 5th USERDATA field
04000000 = Search the 6th USERDATA field
02000000 = Search the 7th USERDATA field
01000000 = Search the 8th USERDATA field
00800000 = Search the 9th USERDATA field
00400000 = Search the 10th USERDATA field
00200000 = Search the 11th USERDATA field
00100000 = Search the 12th USERDATA field
00080000 = Search the 13th USERDATA field
00040000 = Search the 14th USERDATA field
00020000 = Search the 15th USERDATA field
00010000 = Search the 16th USERDATA field
00008000 = Search the 1st ADDRESS field
00004000 = Search the 2nd ADDRESS field
00002000 = Search the 3rd ADDRESS field
00001000 = Search the 4th ADDRESS field
00000800 = Search the BUILDING field
00000400 = Search the DEPT field
00000200 = Search the DEST field for primary recipient (TO: value) only.
00000100 = Search the NAME field
00000080 = Search the PRTQUEUE field
00000040 = Search the ROOM field
00000020 = Search the TITLE field
00000010 = Search the WRITER field for primary recipient (TO: value) only.
00000008 = Undefined
00000004 = Undefined
00000002 = Undefined
00000001 = Undefined

Valid Values: 00000000 to FFFFFFFF

Default: FFFF0000

Example: MAILKWDS=0000F000

This indicates that VPS should search the four ADDRESS fields for email parameters.

Note: The DEST and WRITER fields are used for the primary recipient only. The “TO:” prefix is optional. Since the DEST on the DD statement and the WRITER name can only be 8 characters, a MAILBOOK module may be used to convert the JCL keyword value to an email address. If the DEST is specified on the OUTPUT statement, VPS will use up to 60 bytes of the value. If the DEST contains “IP:”, VPS will use up to 60 bytes which follow the “IP:” value.

MAILOPTS
in PRINTER DEFINITION MEMBER

MAILOPTS= A 4-byte hex representation that specifies special user options to be used for a VPS/Email printer. The user option bit specifications are as follows:

80000000 = Send MIME version command.
40000000 = Send SYSOUT dataset as attachment.
20000000 = Always encode dataset using BASE64 encoding.
10000000 = Send the Content-Type record for text messages.
08000000 = Send the first FILEDESC record as the Content-Description.
04000000 = Undefined.
02000000 = Encode dataset using BASE64 encoding if sent as attachment.
01000000 = Undefined.
00800000 = Bypass sending multiple copies.
00400000 = Do not use TCPPRTR value as default TO: value if no TO: value is specified in JCL. Instead, use ERRACTN to EDRAIN printer or requeue output.
00200000 = Undefined.
00100000 = Undefined.
00080000 = Ignore unknown keywords on the output JCL statement. (Caution: Misspelled VPS email keywords will also be ignored which can result in unexpected results).
00040000 = Undefined.
00020000 = Undefined.
00010000 = Undefined.
00008000 = Undefined.
00004000 = Undefined.
00002000 = Undefined.
00001000 = Undefined.
00000800 = Undefined.
00000400 = Undefined.
00000200 = Undefined.
00000100 = Undefined.
00000080 = Undefined.
00000040 = Undefined.
00000020 = Undefined.
00000010 = Undefined.
00000008 = Undefined.
00000004 = Send alternate boundary value.
00000002 = Reserved for internal testing.
00000001 = Display all returned messages from mail server.

Valid Values: 00000000 to FFFFFFFF

Default: 00000000

Example: MAILOPTS=C0000000
This indicates that VPS should send the SYSOUT dataset as an attachment and that the MIME version command should be sent as part of the message header.

Note: This keyword is ignored unless COMMTYPE=(TCPIP,EMAIL) is specified.

MAILSTAT
in PRINTER DEFINITION MEMBER

MAILSTAT= Specifies, via four positional parameters, whether VPS should request delivery status notification for the SYSOUT file which is being sent to an email user. This keyword is only used for VPS/Email printers (COMMTYPE=(TCPIP,EMAIL).

Using delivery status notification requires that every server in the path between VPS and the recipient supports the Simple Mail Transfer Protocol Extensions (SMTPE) for Delivery Status Notification (DSN). If any server in the path does not support SMTPE/DSN, the sender may not receive the notification response.

Positional parameter 1 specifies if VPS should ask for delivery status notification and, if so, whether the full message (RET=FULL) or headers (RET=HDRS) should be returned.

Valid Values: NONE - Do not request status.

FULL - Ask for RET=FUll status.

HDRS - Ask for RET=HDRS status.

Default: NONE

Positional parameter 2 specifies whether the sender would like to be notified for any delay in delivery of the email message.

Valid Values: DELAY - Notify sender if there is delay.

NDELAY - Do not notify if there is delay.

Default: NDELAY

Positional parameter 3 specifies whether the sender would like to be notified for any failure in delivery of the email message.

Valid Values: FAILURE - Notify sender if delivery fails.

NFAILURE - Do not notify if delivery fails.

Default: NFAILURE

Positional parameter 4 specifies whether the sender would like to be notified if delivery of the email message is successful.

Valid Values: SUCCESS - Notify sender upon delivery.

NSUCCESS - Do not notify upon delivery.

Default: NSUCCESS

Example: MAILSTAT=(HDRS,NDELAY,FAILURE,SUCCESS)

This indicates that VPS should ask the mail server for delivery status with headers only (not the full message), and that the sender would like to be notified when the message is successfully delivered to the recipient(s) or if the delivery fails.

Note: If the first positional parameter is specified as NONE, the remaining parameters are ignored.

MAXLPG
in PRINTER DEFINITION MEMBER

MAXLPG= Specifies, via three positional parameters, the maximum lines per page that should be printed before VPS will automatically perform a form feed.

Positional parameter 1 specifies the number of lines to print before VPS will insert a form feed for datasets that do not have carriage control characters, and also for datasets that have RECFM=A|M, but do not have a form feed on the first line.

Valid Values: 000 - 256

Default: 0 (No automatic form feeds are performed by VPS while printing this dataset.)

Positional parameter 2 indicates if the first subparameter value is applied to all datasets (with or without carriage control characters).

Valid Values: ALL

Default: None.

Positional parameter 3 specifies that VPS should use the LINECT value supplied by JES (SAPI) or VPSSUE15 (PSO) instead of the value specified in the first subparameter. Note that if JES is specified and the value returned is 0, VPS will use the value specified in the first subparameter.

Valid Values: JES

Default: None.

Note: The above processing differs slightly from prior releases. VPS will no longer apply MAXLPG processing to datasets with RECFM=A|M that have only a single form feed as the first line of the dataset. Note that the new MAXLPG processing is the same for both the SAPI and PSO interfaces.

See page A.10 for more information.

MERGE
in PRINTER DEFINITION MEMBER

MERGE= Specifies what action VPS is to take when a suppress space is issued to a printer that cannot perform this function at the given time. This parameter is ignored if CRCHAR=0D and AUTONL=N. Some printers such as the IBM 3287 cannot perform a suppress space write when the data line is a full 132 characters and it is running in DSC mode. The printer will automatically perform a new line function once column 132 is printed, which prohibits the desired overprint.

Valid Values: Y or N

Default: Y

Example 1: MERGE=Y

This specification indicates to VPS to merge the second line of the overprint into the first line. This allows overprinting for highlighting purposes to print properly. However, the highlighting will not be done.

Example 2: MERGE=N

This specification indicates to VPS to alter the carriage control of the second line of an overprint to a single space. Thus, no overprinting will occur.

Note: This parameter is ignored for SCS (LU-1) printers.

MPP
in PRINTER DEFINITION MEMBER

MPP= Specifies the maximum print position as defined by the IBM 3270 information display system. VPS will use the SCS "set horizontal format" control code to set the MPP specification in the printer. (The SHF is also used by VPS if COMPRESS=Y is specified.) VPS will send the 'width' control record in the LPR/LPD control file if the device is defined as a TCP/IP LPD printer.

This parameter applies only to SCS (LU-1) printers or TCP/IP LPD printers.

Valid Values: 1-3 digit numeric value between 0 and 255. The value given must be supported by the printer.

Default: MPP=0 or MPP=132 (see description below).

Example: MPP=220

This specification requests that VPS load a maximum print position of 220 into the printer.

If the maximum print position is not specified or is specified as 0, VPS will set a default value based upon the CPI= keyword and the COMPRESS= keyword. The following table indicates the default settings:

CPI setting	MPP default	Applicable IBM printers
0	(Note)	all
10	132	3268, 4224, 4234
12	158	4224
15	198	4224, 4234
16	220	3268
other	132	?

Note: If COMPRESS=N or S, MPP default is 0. If COMPRESS=Y, MPP default is 132.

3270-family printers require certain CPI= settings prior to allowing an MPP greater than 132. For example:

- the 3268 requires CPI=16 for an MPP greater than 132
- the 4224 requires CPI=12 for an MPP greater than 132
- the 4224 requires CPI=15 for an MPP greater than 158
- the 4234 requires CPI=15 for an MPP greater than 132

3270-family printers will cause print lines longer than the MPP value to "wrap" around and continue printing on the next physical line of the printed page. Print line length would not include trailing blanks unless TRAILBLK=Y is specifically coded.

The wrapping of print lines should be avoided, as this cannot be accounted for by VPS. VPS does not expect or look for this situation, and incorrect spacing can result from "wrapped" lines. The user is responsible for proper page alignment if print lines are allowed to wrap.

Printers supporting the set horizontal format control code, but not the specific value, will cause the following message to be issued:

```
VPS332E prtrid SEND DATA FAILED RC=04 F2=04 SNS=1005
```

"SCS Command Usage by VPS" on page 6.50 gives more information about the SCS commands that VPS sends to devices.

NCCSPACE
in PRINTER DEFINITION MEMBER

NCCSPACE= Specifies the spacing desired on datasets that have no carriage control characters. (0=no spacing performed, 1=single space, 2=double space, 3=triple space)

Valid Values: 0, 1, 2 or 3

Default: 1

Example: NCCSPACE=2

This specification indicates that datasets that have no carriage control characters should be printed with double spacing.

Note: NCCSPACE=0 is not allowed for VPS/Email printers. Normal print files should have CLF added for each print record. NCCSPACE=1 will be set for any VPS/Email printer which has NCCSPACE=0 in the printer definition and a message will be issued at printer activation.

NLSEQ
in PRINTER DEFINITION MEMBER

NLSEQ= Specifies a special new-line sequence to be used for this printer.

Valid Values: Any string of 2, 4 or 6 characters, representing 1, 2 or 3 bytes of hex data to be used as a new-line sequence.

Default: 15

Example: NLSEQ=0D25

This specification indicates that VPS should use the carriage restore/line feed sequence as the line delimiter for this printer.

Note: Some printers attached via protocol converters or x.25 networks require the carriage restore/line feed sequence rather than the new line character.

NLSEQ=0D0A is recommended for TCP/IP printers.

NLSEQ=0D0A is required for VPS/Email printers. Any other value will be changed and a message issued at printer activation.

NOTIFY
in PRINTER DEFINITION MEMBER

NOTIFY= Specifies, via four positional parameters, whether VPS should notify user(s) when a dataset print is complete or when a printer is drained due to an error.

Positional parameter 1 specifies whether or not VPS should notify the user(s) that the dataset has been printed.

Valid Values: Y or N

Default: N

Positional parameter 2 specifies whether or not VPS should notify the user(s) that the dataset has been requeued.

Valid Values: Y or N

Default: N

Positional parameter 3 specifies whether or not VPS should notify the user(s) that the dataset has been canceled.

Valid Values: Y or N

Default: N

Positional parameter 4 specifies whether or not VPS should notify the user(s) that the printer has been drained due to an error (EDRAINED).

Valid Values: Y or N

Default: N

Example: NOTIFY=(N,Y,Y,Y)

This example indicates that VPS should notify specified users when a dataset is requeued or canceled or if the printer is EDRAINED.

Note: The NOTIFY keyword replaces PRTROPTS=00080000 from previous releases of VPS.

The users to be notified can include users specified on the NOTIFY keyword on the OUTPUT JCL statement, users specified in the NOTMAIL and NOTTSO keywords in the VPS printer definition member, and users specified via the NOTIFY: value in OUTPUT JCL statement parameters referenced via the MAILKWDS keyword in the VPS printer definition member.

Also refer to "Sending Notifications to Email or TSO Users" on page 6.81 for further information.

NOTMAIL
in PRINTER DEFINITION MEMBER

NOTMAIL= Specifies the email address of a user that should be notified when the print is complete or when the printer is EDRAINED.

Valid Values: 1 to 60 character email address.

Default: None.

Example: NOTMAIL=brubble@bedrock.com

Notes: This value will be ignored unless the NOTIFY= printer keyword has at least one value of 'Y'.

This value will be ignored unless the MAILHOST= system initialization keyword was specified and VPS/TCPIP and VPS/Email are installed and enabled.

Also refer to "Sending Notifications to Email or TSO Users" on page 6.81 for further information.

NOTTSO
in PRINTER DEFINITION MEMBER

NOTTSO= Specifies the TSO ID of a user that should be notified when the print is complete or when the printer is EDRAINED.

Valid Values: 1 to 17 character TSO userid (in the format 'NODE.USERID' or 'USERID').

Default: None.

Example: NOTTSO=LRS7.LRS0000

Notes: This value will be ignored unless the NOTIFY= printer keyword (see page 3.170) has at least one value of 'Y'.

Also refer to "Sending Notifications to Email or TSO Users" on page 6.81 for further information.

OUTBIN
in PRINTER DEFINITION MEMBER

OUTBIN= Specifies the default output bin to be used for a VPS/IPDS or VPS/PCL printer. This parameter overrides the FORMDEF outbin specification, but is overriden by an outbin value specified on the OUTPUT JCL statement.

Valid Values: 1 - 65535

Default: None.

Example: OUTBIN=2

This specification indicates that any files that are converted by VPS/IPDS or VPS/PCL should be delivered to the printer's output bin 2.

OVERLAYB
in PRINTER DEFINITION MEMBER

OVERLAYB= Specifies the name of the OVERLAY to be printed on the back sides of the pages of all duplexed VPS/AFP documents. This OVERLAY will print in addition to any OVERLAYs specified in the FORMDEF or on the OUTPUT JCL statement.

Valid Values: 1 to 8 alphanumeric characters.

Default: None.

Example: OVERLAYB=O1TEST

This specification indicates that OVERLAY O1TEST be placed on the back sides of the pages of all duplexed VPS/AFP documents for this printer.

OVERLAYF
in PRINTER DEFINITION MEMBER

OVERLAYF= Specifies the name of an OVERLAY to be printed on the front sides of the pages of all VPS/AFP documents. This OVERLAY will print in addition to any OVERLAYs specified in the FORMDEF or on the OUTPUT JCL statement.

Valid Values: 1 to 8 alphanumeric characters.

Default: None.

Example: OVERLAYF=O1TEST

This specification indicates that OVERLAY O1TEST be placed on the front sides of the pages of all VPS/AFP documents for this printer.

OVLYDD
in PRINTER DEFINITION MEMBER

OVLYDD= Specifies the DD statement in the VPS execution JCL that contains the overlay libraries to be used for VPS/IPDS, VPS/PCL, or VPS/PDF conversion.

This keyword only applies to the processing of AFP data. For more information on how VPS processes AFP data, see "AFP" on page 8.1.

Valid Values: 1 to 8 alphanumeric characters.

Default: OVLYLIB

Example: OVLYDD=OVLY1

This specifies that VPS/IPDS, VPS/PCL, or VPS/PDF should refer to the OVLY1 DD statement in the VPS execution JCL for the overlay libraries.

PAGEDEF
in PRINTER DEFINITION MEMBER

PAGEDEF= Specifies the default page definition to be used for a VPS AFP printer. This keyword will be overridden by the value specified in the OUTPUT JCL statement.

If this keyword is specified, all datasets sent to this printer will be printed using VPS AFP.

Valid Values: 1 - 6 alphanumeric characters.

Default: A06462

Example: PAGEDEF=W240F3

This specifies that the default PAGEDEF for this VPS AFP printer is P1W240F3.

Note: The value specified for PAGEDEF, either obtained from this keyword or from the user's JCL, will be prefixed by the characters "P1" before being used as a member name for retrieval from the library specified on the PDEFLIB DD statement in the VPS execution JCL.

PCLOPMEM
in PRINTER DEFINITION MEMBER

PCLOPMEM= Specifies a member within the VPSLIB PDS that identifies to VPS/PCL the PJL commands for FORMDEF finishing operations for the printer. If no PCLOPMEM table is defined, then VPS/PCL will not request any finishing operations from the printer.

Valid Values: Name of a member that exists in the VPSLIB PDS.

Default: None.

Example: PCLOPMEM=FINOPS

This specification indicates that member FINOPS in the VPSLIB PDS contains PJL commands for various FORMDEF finishing operations. See "Creating and Using the VPS/PCL PCLOPMEM Table" on page 8.61 for more information about the PCLOPMEM table.

PCLOPTS
in PRINTER DEFINITION MEMBER

PCLOPTS= A four-byte hex representation that specifies special user options to be used for a VPS/PCL printer. The user option bit specifications are as follows:

80000000 = Printer cannot duplex.

40000000 = Logical page offset commands are not supported.

20000000 = Do not optimize downloaded fonts. Normally, VPS/PCL will download a font character only when it is needed for printing. When this flag is on, VPS/PCL will download the font and all its 256 characters at once. This will result in a much larger output PCL dataset, but some printers may require that fonts be handled in this manner.

10000000 = Use printer resident fonts only if both the code page table and font character set resources are mapped in the AFP resource table (AFPRTAB) – normally, only the font character set mapping is required for VPS/PCL to select a printer resident font.

08000000 = Support the '203mm A4 page width' option that is set on the printer.

04000000 = Do not wrap text in the PCL 'transparent data' command if it will be printed using a printer resident font (should be set if output will be sent through a Rightfax LPD server).

02000000 = Support the 'whole page' option that is set on the printer

01000000 = Printer only supports a unit of measure of 720.

00800000 = Use IBM 3916 envelope processing.

00400000 = Use the implicit raster data size for images.

00200000 = End processing if a printer overflow is detected.

00100000 = Do not convert color to grayscale for non-color printer (does not apply to GOCA; GOCA color specifications are always converted to grayscale for non-color printers).

00080000 = Use the printer default shading patterns for grayscale and highlight color shading (instead of downloading user-defined shading patterns).

00040000 = Use the 12-byte header for user-defined patterns (refer to the printer documentation for information on what user-defined pattern header is supported).

00020000 = Undefined

00010000 = Undefined

00008000 = Undefined

00004000 = Undefined

00002000 = Undefined

00001000 = Undefined

00000800 = Undefined

00000400 = Undefined

00000200 = Undefined

PCLOPTS
in PRINTER DEFINITION MEMBER

00000100 = Undefined
00000080 = Undefined
00000040 = Undefined
00000020 = Undefined
00000010 = Undefined
00000008 = Undefined
00000004 = Undefined
00000002 = Undefined
00000001 = Undefined

Default: 00000000

Example: PCLOPTS=C0000000

This specifies that this printer does not support duplex printing or logical page offset commands.

PCMDACTN
in PRINTER DEFINITION MEMBER

PCMDACTN= Specifies, via two positional parameters, the action VPS should take when processing the printer commands to be sent at the start and end of each dataset and/or separator.

Positional parameter 1 specifies whether VPS should add transparency to the printer command data. VPS will use the TRNCLASS keyword values to decide what kind of transparency should be added to the output buffers.

Valid Values: TRN - VPS should add transparency.

NOTRN - VPS should not add transparency.

Default: NOTRN

Positional parameter 2 specifies the action for VPS to take if a printer command module cannot be loaded. This may happen if VPS attempts to dynamically load a module whose name is based on a SYSOUT keyword and the module cannot be found.

Valid Values: DEF - Use the default command data.

EDR - EDRAIN the printer.

IGN - Ignore the error; send no commands.

Default: DEF

Example: PCMDACTN=(TRN,EDR)

This specifies that VPS should add transparency to the printer commands and that the printer should be EDRAINED if a module cannot be found when attempting to dynamically load a module based on the SYSOUT characteristics.

PCMDDSNE
in PRINTER DEFINITION MEMBER

PCMDDSNE= Specifies the default printer command data that should be sent to the printer at the end of each print dataset. This field contains 2 to 60 bytes that represent 1 to 30 bytes of hexadecimal data to be delivered to the printer after the print dataset. This keyword is ignored unless the second positional parameter of the PCMDEND keyword is %STRING.

Valid Values: Any valid hexadecimal string.

Default: None.

Example: PCMDDSNE=1B45

This specifies that VPS should send a buffer with X'1B45' to the printer after the dataset.

PCMDDSNS
in PRINTER DEFINITION MEMBER

PCMDDSNS= Specifies the default printer command data that should be sent to the printer at the start of each print dataset. This field contains 2 to 60 bytes that represent 1 to 30 bytes of hexadecimal data to be delivered to the printer before the print dataset. This keyword is ignored unless the second positional parameter of the PCMDSTRT keyword is %STRING.

Valid Values: Any valid hexadecimal string.

Default: None.

Example: PCMDDSNS=1B451B26613147

This specifies that VPS should send a buffer with X'1B451B26613147' to the printer before the dataset.

PCMDEND
in PRINTER DEFINITION MEMBER

PCMDEND= Specifies, via two positional parameters, what special printer commands VPS should send at the end of a separator or print dataset. No commands will be sent after the print dataset if it is any of the following:

AFPDS/IPDS conversion dataset

AFPDS/PCL conversion dataset

AFPDS/PDF conversion dataset

GDMCLASS dataset

IPDCLASS dataset

SASCLASS dataset

TRNCLASS dataset

XESCLASS dataset

Positional parameter 1 specifies the default printer commands to be sent at the end of the separator. If the value of this parameter is %STRING, the PCMDSEPE keyword must contain a hexadecimal string of command data. Otherwise, this parameter must be the name of a load module which contains the default printer command data to be sent after the separator. If this value is null, no commands will be sent to the printer after the separator.

Valid Values:

%STRING	PCMDSEPE specifies a string of default command data to be sent at the end of the separator.
modname	A valid load module name must be specified. If the default printer command module cannot be loaded, printer activation will fail.

Default: None.

Note: VPS only loads default modules one time. The load module is saved in the VPS address space the first time **any** printer specifies that module name. After any default module has been loaded, changes made to that module will not take effect until VPS has been restarted.

Positional parameter 2 specifies the default printer commands to be sent at the end of the print dataset. If the value of this parameter is %STRING, the PCMDDSNE keyword must contain a hexadecimal string of command data. Otherwise, this parameter will be the name of a load module which contains the default printer command data to be sent after the print dataset. If this value is null, no commands will be sent to the printer after the dataset.

Valid Values:

%STRING	PCMDDSNE specifies a string of default command data to be sent at the end of the print dataset.
modname	A valid load module name must be specified. If the default printer command module cannot be loaded, printer activation will fail.

Default: None.

Note: VPS only loads default modules one time. The load module is saved in the VPS address space the first time **any** printer specifies that module name. After any default module has been loaded, changes made to that module will not take effect until VPS has been restarted.

Example: PCMDEND=(%STRING,PCLEND)

This specifies that the default printer command text to be sent after the separator should be the value of the PCMDSEPE keyword and that the default printer command data to be sent after the normal print file should be obtained from a load module named PCLEND.

PCMDOPTS
in PRINTER DEFINITION MEMBER

PCMDOPTS= A four byte hex representation of special printer command options to be in effect for this printer when processing the PCMDACTN, PCMDEND, PCMDDSNE, PCMDDSNS, PCMDSEPE, PCMDSEPS, or PCMDSTRT keywords.

The value is specified as eight digits, representing 4 hex bytes (32 option bits). The printer command option bit specifications are:

80000000 = Translate from HEX to character the start separator module.
40000000 = Translate from HEX to character the end separator module.
20000000 = Translate from HEX to character the start dataset module.
10000000 = Translate from HEX to character the end dataset module.
08000000 = Translate from HEX to character the start separator string.
04000000 = Translate from HEX to character the end separator string.
02000000 = Translate from HEX to character the start dataset string.
01000000 = Translate from HEX to character the end dataset string.

00800000 = Bypass adding 2-byte length field for data added by PCMDSTRT, PCMDEND or exit 14 if COMMTYPE=(,,LCDS) or (,,RECORD).
00400000 = Honor printer command (PCMD) keywords for datasets in the transparency class.
00200000 = Undefined
00100000 = Undefined
00080000 = Undefined
00040000 = Undefined
00020000 = Undefined
00010000 = Undefined

00008000 = Undefined
00004000 = Undefined
00002000 = Undefined
00001000 = Undefined
00000800 = Undefined
00000400 = Undefined
00000200 = Undefined
00000100 = Undefined

00000080 = Undefined
00000040 = Undefined
00000020 = Undefined
00000010 = Undefined
00000008 = Undefined
00000004 = Undefined
00000002 = Undefined
00000001 = Undefined

Valid Values: 00000000 - FFFFFFFF

Default: 00000000

Example: PCMDOPTS=80000000

This specifies that the start separator module should be translated from hex to character.

PCMDSEPE
in PRINTER DEFINITION MEMBER

PCMDSEPE= Specifies the default printer command data that should be sent to the printer at the end of the separator. This field contains 2 to 60 bytes that represent 1 to 30 bytes of hexadecimal data to be delivered to the printer after the separator. This keyword is ignored unless the first positional parameter of the PCMDEND keyword is %STRING.

Valid Values: Any valid hexadecimal string.

Default: None.

Example: PCMDSEPE=1B45

This specifies that VPS should send a buffer with X'1B45' to the printer after the separator.

PCMDSEPS
in PRINTER DEFINITION MEMBER

PCMDSEPS= Specifies the default printer command data that should be sent to the printer at the start of the separator. This field contains 2 to 60 bytes that represent 1 to 30 bytes of hexadecimal data to be delivered to the printer before the separator. This keyword is ignored unless the first positional parameter of the PCMDSTRT keyword is %STRING.

Valid Values: Any valid hexadecimal string.

Default: None.

Example: PCMDSEPS=1B26613147

This specifies that VPS should send a buffer with X'1B26613147' to the printer before the separator.

PCMDSTRT
in PRINTER DEFINITION MEMBER

PCMDSTRT= Specifies, via three positional parameters, what special printer commands VPS should send at the start of each separator or print dataset. No commands will be sent before the print dataset if it is any of the following:

AFPDS/IPDS conversion dataset

AFPDS/PCL conversion dataset

AFPDS/PDF conversion dataset

GDMCLASS dataset

IPDCLASS dataset

SASCLASS dataset

TRNCLASS dataset

XESCLASS dataset

Positional parameter 1 specifies the default printer commands to be sent at the start of the separator. If the value of this parameter is %STRING, the PCMDSEPS keyword must contain a hexadecimal string of command data. Otherwise, this parameter will be the name of a load module which contains the default printer command data to be sent before the separator. If this value is null, no commands will be sent to the printer before the separator.

Valid Values:	%STRING	PCMDSEPS specifies a string of default command data to be sent at the start of the separator.
	modname	A valid load module name must be specified. If the default printer command module cannot be loaded, printer activation will fail.

Default: None.

Note: VPS only loads default modules one time. The load module is saved in the VPS address space the first time **any** printer specifies that module name. After any default module has been loaded, changes made to that module will not take effect until VPS has been restarted.

PCMDSTRT
in PRINTER DEFINITION MEMBER

Positional parameter 2 specifies the default printer commands to be sent at the start of each print dataset. If the value of this parameter is %STRING, the PCMDDSNS keyword must contain a hexadecimal string of command data. Otherwise, this parameter will be the name of a load module which contains the default printer command data to be sent before the print dataset. If this value is null, no commands will be sent to the printer before the dataset.

Valid Values:

%STRING	PCMDDSNS specifies a string of default command data to be sent at the start of the print dataset.
modname	A valid load module name must be specified. If the default printer command module cannot be loaded, printer activation will fail.

Default: None.

Note: VPS only loads default modules one time. The load module is saved in the VPS address space the first time **any** printer specifies that module name. After any default module has been loaded, changes made to that module will not take effect until VPS has been restarted.

Positional parameter 3 specifies a symbolic value which will be used to determine the name for a load module when command data is to be loaded dynamically and sent to the printer at the start of the print dataset.

Valid Values: Up to 20 characters including constants, symbolic parameters and delimiters (.).

Constants can include any alphanumeric or national character. If the first byte of this parameter is a constant, it may not be numeric.

A period (.) should be used to terminate any symbolic parameter that is followed by a constant and may be used to terminate any value.

Symbolic parameters must begin with an ampersand (&) and may be any of the following values:

&CLASS	Use CLASS	value (1 byte).
&DEST	Use DEST	value (8 bytes).
&FCB	Use FCB	value (4 bytes).
&FLASH	Use FLASH	value (4 bytes).
&FORMDEF	Use FORMDEF	value (6 bytes).
&FORM4	Use FORM	value (4 bytes).
&FORM8	Use FORM	value (8 bytes).
&PAGEDEF	Use PAGEDEF	value (6 bytes).
&UCS	Use UCS	value (4 bytes).
&WRITER	Use WRITER	value (8 bytes).

Default: None.

Notes:

If this parameter is not specified, VPS will send the default command data specified by the second positional parameter, if any default was specified.

If the name is blank or null after all symbolic substitution is complete, VPS will send the default command data specified by the second positional parameter, if any default was specified.

If no load module can be located to match the name when the symbolic substitution is complete, VPS will take the action described in the second positional parameter of the PCMDACTN keyword.

If the length of the module name exceeds 8 when the symbolic substitution is complete, VPS will EDRAIN the printer.

Example 1: PCMDSTRT=(%STRING,SSTD,&WRITER)

This specifies that the default printer command text to be sent before the separator should be the value of the PCMDSEPS keyword, that the default printer command data to be sent before the normal print file should be obtained from a load module named SSTD, and that the WRITER name should be used to dynamically load a module with print commands to be sent at the start of each dataset.

Example 2: PCMDSTRT=(SSTD,FPS13266,V&CLASS&WRITER.12)

This specifies that the default printer commands to be sent before the separator should be obtained from a load module named SSTD, that the default printer command data to be sent before the normal print file should be obtained from a load module named FPS13266, and that the CLASS and WRITER values should be combined with constant values to obtain the name of a module to be loaded dynamically to locate the start commands.

If the SYSOUT class is 'A' and the WRITER name is 'WTR' for the dataset, the name of the module that should be dynamically loaded will be VAWTR12. If no module can be found using that name, VPS will continue based upon the 2nd subfield of the PCMDACTN keyword.

PDEFDD
in PRINTER DEFINITION MEMBER

PDEFDD= Specifies the DD statement in the VPS execution JCL that contains the page definition libraries to be used for VPS/IPDS, VPS/PCL, or VPS/PDF conversion.

This keyword only applies to the processing of AFP data. For more information on how VPS processes AFP data, see "AFP" on page 8.1.

Valid Values: 1 to 8 alphanumeric characters.

Default: PDEFLIB

Example: PDEFDD=PDEF1

This specifies that VPS/IPDS, VPS/PCL, or VPS/PDF should refer to the PDEF1 DD statement in the VPS execution JCL for the page definition libraries.

PDFDBCS
in PRINTER DEFINITION MEMBER

PDFDBCS= Specifies, via 3 positional parameters, the DBCS font name, CMAP name and size for VPS to use when converting a print file to PDF format. This keyword only applies to PDF conversions, not AFP to PDF conversions.

Positional parameter 1 specifies the DBCS font name.

Valid Values: A 1 to 32-character name of the font to be used. The following font names are supported:

Japanese Font	Korean Font	Traditional Chinese Font	Simplified Chinese Font
HeiseiKakuGo-W5	HYGoThic-Medium	MHei-Medium	STSong-Light
HeiseiMin-W3	HYSMyeongJo-Medium	MSung-Light	

Default: None.

Positional parameter 2 specifies the DBCS CMAP name.

Valid Values: A 1 to 20-character name of the CMAP to be used. The following font names are supported:

Japanese	Korean	Traditional Chinese	Simplified Chinese
83pv-RKSJ-H	KSC-EUC-H	B5pc-H	GB-EUC-H
90ms-RKSJ-H	KSC-EUC-V	B5pc-V	GB-EUC-V
90ms-RKSJ-V	KSCms-UHC-H	CNS-EUC-H	GBpc-EUC-H
90msp-RKSJ-H	KSCms-UHC-V	CNS-EUC-V	GBpc-EUC-V
90msp-RKSJ-V	KSCms-UHC-HW-H	ETen-B5-H	GBK-EUC-H
90pv-RKSJ-H	KSCms-UHC-HW-V	ETen-B5-V	GBK-EUC-V
Add-RKSJ-H	KSCpc-EUC-H	ETenms-B5-H	UniGB-UCS2-H
Add-RKSJ-V	UniKS-UCS2-H	ETenms-B5-V	UniGB-UCS2-V
EUC-H	UniKS-UCS2-V	UniCNS-UCS2-H	
EUC-V		UniCNS-UCS2-V	
Ext-RKSJ-H			
Ext-RKSJ-V			
H			
V			
UniJIS-UCS2-H			
UniJIS-UCS2-V			
UniJIS-UCS2-HW-H			
UniJIS-UCS2-HW-V			

Default: None.

PDFDBCS
in PRINTER DEFINITION MEMBER

Positional parameter 3 specifies the font size.

Valid Values: 1 - 500

Default: None.

Example: PDFDBCS=(HYGoThic-Medium,KSCms-UHC-V,10)

This indicates that VPS should use the DBCS font named “HYGoThic-Medium”, a CMAP name of “KSCms-UHC-V”, and that the size should be 10.

Note: The font and CMAP names are not case sensitive.

For example, STSong-Light, stsong-light and STSONG-LIGHT are equivalent names.

This parameter can be overridden by the PDFDBCS keyword on the OUTPUT JCL statement for the SYSOUT dataset.

PDFENCD
in PRINTER DEFINITION MEMBER

PDFENCD= A 1 to 8 character value that specifies the name of the AFP-to-PDF encoding table to be used for this printer. This keyword is applicable only to printers with CONVTYPE=PDF. If this keyword is specified, VPS will attempt to load a module with the specified name when the printer is activated. If a module of that name cannot be found in a library accessible to VPS, or if the module is found but fails validity checking, the printer will not be activated.

Valid Values: Any valid AFP-to-PDF table name.

Default: VPSSENCD

Example: PDFRTAB=VPSENCD2

This specification indicates to VPS that this printer should use the PDF encoding table named VPSENCD2.

Note: This parameter is ignored unless CONVTYPE=PDF. See "Using the VPS/PDF Character Encoding Table (PDFENCD)" on page 8.75 for more information about the PDF encoding table.

PDFENCPY
in PRINTER DEFINITION MEMBER

PDFENCPY= Specifies, via 2 positional parameters, whether the recipient has permission to copy data from the encrypted PDF file after it has been delivered.

Positional parameter 1 specifies whether the recipient can copy the PDF file. COPY and NOCOPY control the selection and extraction of text or graphics by a program (text editors, for example).

Valid Values: COPY Text or graphics may be copied.

NOCOPY No text or graphics may be copied.

Default: COPY

Positional parameter 2 specifies whether the recipient can extract text or graphics from the PDF file. ACCESSIBLE and NOACCESSIBLE control the extraction of document content for applications that provide accessibility support (screen readers, for example).

Valid Values: ACCESSIBLE Text or graphics may be extracted.

NOACCESSIBLE No text or graphics may be extracted.

Default: ACCESSIBLE

Example: PDFENCPY=(NOCOPY,NOACCESSIBLE)

This indicates that the recipient is not allowed to copy the file and may not extract text or graphics from the file.

Note: NOACCESSIBLE will be ignored if PDFENTYP=PDF40 is specified because that option is not supported for 40-bit PDF encryption.

This parameter can be overridden by the PDFENCPY keyword on the OUTPUT JCL statement for the SYSOUT dataset.

PDFENMOD
in PRINTER DEFINITION MEMBER

PDFENMOD= Specifies, via 4 positional parameters, whether the recipient has permission to perform specific content modifications to the encrypted PDF file after it has been delivered.

Positional parameter 1 specifies whether the recipient can create articles, add hyperlinks, crop pages, add interactive form elements, and attach movie/sound files. Setting the NOASSEMBLE parameter enforces NOMODIFY automatically.

Valid Values:	MODIFY	The PDF content may be modified.
	NOMODIFY	The PDF content may not be modified.
Default:	MODIFY	

Positional parameter 2 specifies whether the recipient can add or change the comments or form fields , highlight/underline/strikeout text in the file. Setting the NOFORMFILL parameter enforces NOANNOTATE automatically.

Valid Values:	ANNOTATE	Comments or form fields may be changed or added.
	NOANNOTATE	Comments or form fields may not be changed or added.
Default:	ANNOTATE	

Positional parameter 3 specifies whether the recipient can fill form fields in the file. Setting this parameter to NOFORMFILL enforces NOANNOTATE automatically.

Valid Values:	FORMFILL	Form fields may be filled.
	NOFORMFILL	Form fields may not be filled.
Default:	FORMFILL	

Positional parameter 4 specifies whether the recipient can insert, delete, or rotate pages or create bookmarks and thumbnails in the file. Setting this parameter to NOASSEMBLE enforces NOMODIFY automatically.

Valid Values:	ASSEMBLE	Pages may be inserted, deleted or rotated and bookmarks or thumbnails may be added.
	NOASSEMBLE	Pages may not be inserted, deleted or rotated and bookmarks or thumbnails may not be added.
Default:	ASSEMBLE	

Example: PDFENMOD=(NOMODIFY,NOANNOTATE, NOFORMFILL, NOASSEMBLE)

This indicates that the recipient is not allowed to modify the file in any manner.

Note: NOFORMFILL and NOASSEMBLE will be ignored if PDFENTYP=PDF40 is specified because those options are not supported for 40-bit PDF encryption.

This parameter can be overridden by the PDFENMOD keyword on the OUTPUT JCL statement for the SYSOUT dataset.

PDFENMPW
in PRINTER DEFINITION MEMBER

PDFENMPW= Specifies the master password that will be required to modify the permissions and other characteristics of the encrypted PDF file after it has been delivered.

Valid Values: 1 - 32 character password value; numbers and upper and lower case alphabetic values are allowed, as well as special characters.

Default: None.

Example: PDFENMPW=OwnerPW1234

This specifies that the recipient must know and supply the master password of 'OwnerPW1234' in order to open the file and modify the file characteristics, including file permissions.

Note: This parameter can be overridden by the PDFENMPW keyword on the OUTPUT JCL statement for the SYSOUT dataset.

The user password and the master password cannot be identical.

PDFENPRT
in PRINTER DEFINITION MEMBER

PDFENPRT= Specifies, via 2 positional parameters, whether the recipient has permission to print data from the encrypted PDF file after it has been delivered.

Positional parameter 1 specifies whether the recipient can print the file.

Valid Values:	PRINT	The file may be printed.
	NOPRINT	The file may not be printed.
Default:	PRINT	

Positional parameter 2 specifies whether the recipient can print the file using high-resolution printing.

Valid Values:	HIRESPRINT	High-resolution printing is allowed.
	NOHIRESPRINT	High-resolution printing is not allowed.
Default:	HIRESPRINT	

Example: PDFENPRT=(PRINT,NOHIRESPRINT)

This indicates that the recipient is allowed to print the file, but is not allowed to use high-resolution printing.

Note: NOHIRESPRINT will be ignored if PDFENTYP=PDF40 is specified because that option is not supported for 40-bit PDF encryption.

This parameter can be overridden by the PDFENPRT keyword on the OUTPUT JCL statement for the SYSOUT dataset.

PDFENTYP
in PRINTER DEFINITION MEMBER

PDFENTYP= Specifies the type of encryption that will be used for a PDF file.

Valid Values: PDF40 Use 40-bit encryption.

PDF128 Use 128-bit encryption.

Default: PDF40

Example: PDFENTYP=PDF128

This specifies that the PDF file should be encrypted using 128-bit encryption.

Note: Encryption will only be performed if VPS is converting a text or AFP file to PDF format and at least one of the following is specified to indicate that some permission(s) should be denied for some users:

PDFENCPY=(NOCOPY)

PDFENCPY=(,NOACCESSIBLE) and PDFENTYP=128

PDFENMOD=(NOMODIFY)

PDFENMOD=(,NOANNOTATE)

PDFENMOD=(,,NOFORMFILL) and PDFENTYP=128

PDFENMOD=(,,,NOASSEMBLE) and PDFENTYP=128

PDFENMPW= (Valid master password)

PDFENPRT=(NOPRINT)

PDFENPRT=(,NOHIRESPRINT) and PDFENTYP=128

PDFENUPW= (Valid user password)

This parameter can be overridden by the PDFENTYP keyword on the OUTPUT JCL statement for the SYSOUT dataset.

PDFENUPW
in PRINTER DEFINITION MEMBER

PDFENUPW= Specifies the user password that will be required to open the encrypted PDF file after it has been delivered.

Valid Values: 1 - 32 character password value; numbers and upper and lower case alphabetic values are allowed, as well as special characters.

Default: None.

Example: PDFENUPW=AccountingUser001

This specifies that the recipient must know and supply the user password of 'AccountingUser001' in order to open the file.

Note: This parameter can be overridden by the PDFENUPW keyword on the OUTPUT JCL statement for the SYSOUT dataset.

The user password and the master password cannot be identical.

PDFFONT
in PRINTER DEFINITION MEMBER

PDFFONT= Specifies, via 2 positional parameters, the font name and size for VPS to use when converting a print file to PDF format. This keyword only applies to PDF conversions, not AFP to PDF conversions.

Positional parameter 1 specifies the font name.

Valid Values: A 1 to 32-character name of the font to be used. The following font names are supported:

Courier
Courier-Bold
Courier-Oblique
Courier-BoldOblique
Helvetica
Helvetica-Bold
Helvetica-Oblique
Helvetica-BoldOblique
Times-Roman
Times-Bold
Times-Italic
Times-BoldItalic

Default: COURIER

Positional parameter 2 specifies the font size.

Valid Values: 1 - 500

Default: 12

Example: PDFFONT=(TIMES-ROMAN,10)

This indicates that VPS should use the TIMESROMAN font and that the size should be 10.

Note: The font name is not case sensitive. Courier and COURIER are equivalent font names.

This parameter can be overridden by the PDFFONT keyword on the OUTPUT JCL statement for the SYSOUT dataset.

PDFKWDS
in PRINTER DEFINITION MEMBER

PDFKWDS= A 4-byte hex representation that specifies which OUTPUT JCL statement keywords will be searched for VPS/PDF conversion parameters. The bit specifications are as follows: This keyword only applies to PDF conversions, not AFP to PDF conversions.

80000000 = Search the 1st USERDATA field
40000000 = Search the 2nd USERDATA field
20000000 = Search the 3rd USERDATA field
10000000 = Search the 4th USERDATA field
08000000 = Search the 5th USERDATA field
08000000 = Search the 6th USERDATA field
02000000 = Search the 7th USERDATA field
01000000 = Search the 8th USERDATA field
00800000 = Search the 9th USERDATA field
00400000 = Search the 10th USERDATA field
00200000 = Search the 11th USERDATA field
00100000 = Search the 12th USERDATA field
00080000 = Search the 13th USERDATA field
00040000 = Search the 14th USERDATA field
00020000 = Search the 15th USERDATA field
00010000 = Search the 16th USERDATA field
00008000 = Search the 1st ADDRESS field
00004000 = Search the 2nd ADDRESS field
00002000 = Search the 3rd ADDRESS field
00001000 = Search the 4th ADDRESS field
00000800 = Search the BUILDING field
00000400 = Search the DEPT field
00000200 = Reserved
00000100 = Search the NAME field
00000080 = Search the PRTQUEUE field
00000040 = Search the ROOM field
00000020 = Search the TITLE field
00000010 = Undefined
00000008 = Undefined
00000004 = Undefined
00000002 = Undefined
00000001 = Undefined

Valid Values: 00000000 to FFFFFFFF

Default: FF000000

Example: MAILKWDS=00F00000

This indicates that VPS should search the 4 ADDRESS fields for VPS/PDF conversion parameters.

PDFOPTS
in PRINTER DEFINITION MEMBER

PDFOPTS= A 4-byte hex representation that specifies special user options to be used for VPS/PDF conversion. The user option bit specifications are as follows:

80000000 = Pass G4-MMR compressed IOCA to Acrobat. If this option is not set, VPS/PDF will decompress the G4-MMR IOCA and pass the uncompressed raster data to Acrobat. Setting this option can greatly reduce the AFP to PDF conversion time and the PDF file size, but Acrobat cannot process G4 MMR objects as transparent images, causing previously-placed data to be overlaid.

40000000 = Add the Adobe core font demo pages to the end of the documents. These demo pages are provided to assist in determining the point sizes of fonts used in the document, and can be helpful in setting up the PDFRTAB. (See page 3.207 for more information about the PDFRTAB.)

20000000 = Ignore requests for missing resources. VPS/PDF processing will continue even if OVERLAYs of PAGESEGs are not found in the resource file.

10000000 = Enforce blank pages. By default, VPS/PDF will suppress blank pages that would be generated for duplex print jobs. Setting this flag will ensure that blank pages will be built in the output PDF file when at least part of the file is duplexed and conversion forces an ‘eject to front facing’ action (such as invoking a new medium map).

08000000 = Display Page Grid on each output page.

04000000 = Do not interpolate Type-3 characters. Interpolation will provide additional smoothing to the edges of characters which may cause characters to appear blurred. (See page 8.41 for more information.)

02000000 = Convert all datasets to PDF (requires CONVTYPE=PDF).

01000000 = Undefined.

00800000 = Undefined.

00400000 = Undefined.

00200000 = Undefined.

00100000 = Undefined.

00080000 = Undefined.

00040000 = Undefined.

00020000 = Undefined.

00010000 = Undefined.

00008000 = Undefined.

00004000 = Undefined.

00002000 = Undefined.

00001000 = Undefined.

00000800 = Undefined.
00000400 = Undefined.
00000200 = Undefined.
00000100 = Undefined.
00000080 = Undefined.
00000040 = Undefined.
00000020 = Undefined.
00000010 = Undefined.
00000008 = Undefined.
00000004 = Undefined.
00000002 = Undefined.
00000001 = Reserved for internal use.

Valid Values: 00000000 to FFFFFFFF

Default: 00000000

PDFPGSIZ
in PRINTER DEFINITION MEMBER

PDFPGSIZ= Specifies, via 2 positional parameters, the height and width of the page to be used when converting the print file to PDF format. This keyword only applies to PDF conversions, not AFP to PDF conversions.

Positional parameter 1 specifies the page height in hundredths of an inch.

Valid Values: 100 to 20000 (1 to 200 inches)

Default: 1100 (11 inches)

Positional parameter 2 specifies the page width in hundredths of an inch.

Valid Values: 100 to 20000 (1 to 200 inches)

Default: 850 (8.5 inches)

Example: PDFPGSIZ=(1100,1400)

This indicates that VPS should use a page height of 11 inches and page width of 14 inches when converting a print file to PDF format.

Note: This parameter can be overridden by the PDFPGSIZ keyword on the OUTPUT JCL statement for the SYSOUT dataset.

PDFRTAB
in PRINTER DEFINITION MEMBER

PDFRTAB= A 1 to 8 character value that specifies the name of the AFP-to-PDF resource mapping table to be used for this printer. This keyword is applicable only to printers with CONVTYPE=PDF. If this keyword is specified, VPS will attempt to load a module with the specified name when the printer is activated. If a module of that name cannot be found in a library accessible to VPS, or if the module is found but fails validity checking, the printer will not be activated.

Valid Values: Any valid AFP resource mapping table name.

Default: VPSSPTAB

Example: PDFRTAB=VPSPTAB2

This specification indicates to VPS that this printer should use the resource mapping table named VPSPTAB2.

Note: This parameter is ignored unless CONVTYPE=PDF. See "Creating the PDF Resource Table" on page 8.68 for more information about the PDF resource table.

PIMSG
in PRINTER DEFINITION MEMBER

PIMSG= Specifies whether the VPS/AFP conversion messages and VPS/IPDS NACK messages should be printed following the document, and specifies how many recoverable NACKs VPS/IPDS should ignore before terminating the printing of the document. The high level qualifier of the dataset created to hold the AFP messages will be defined by the DDSNPFX keyword. The rest of the dataset consists of the printer member name followed by the constant "VAFPMSGS".

Positional parameter 1 specifies whether or not the VPS/AFP conversion messages and VPS/IPDS NACK messages should be printed following the document.

Valid Values: Y or N

Default: Y

Positional parameter 2 specifies how many recoverable NACKs should be ignored before VPS/IPDS terminates the printing of the document.

Valid Values: 0 - 999

Default: 16

Example: PIMSG=(Y,5)

This specification indicates that the VPS/AFP conversion messages and VPS/IPDS NACK messages should be printed, and VPS/IPDS should terminate the printing of the document after the 5th recoverable NACK is received.

PJLCMDS
in PRINTER DEFINITION MEMBER

PJLCMDS= Specifies, via 3 positional parameters, whether VPS should send printer job language (PJL) commands to the printer.

Positional parameter 1 specifies whether any PJL commands should be sent to the printer.

Valid Values: Y or N

Default: N

Positional parameter 2 specifies whether VPS should send the JOB and EOJ printer job language commands.

Valid Values:

JOB	-	Send PJL JOB/EOJ commands.
NOJOB	-	Do not send PJL JOB/EOJ commands.

Default: JOB

Positional parameter 3 specifies whether VPS should send the ENTER LANGUAGE PJL commands.

Valid Values:

LANG	-	Send PJL ENTER LANGUAGE command.
NOLANG	-	Do not send PJL ENTER LANGUAGE command.

Default: LANG

Example 1: PJLCMDS=Y

This indicates that VPS should send PJL commands to the printer. The JOB, EOJ or ENTER LANGUAGE commands would be sent, along with any INFO or USTATUS commands specified by the PJLINFO and PJLUSTAT keywords.

Example 2: PJLCMDS=(Y,JOB,LANG)

This indicates that VPS should send PJL commands to the printer, including the JOB, EOJ and ENTER LANGUAGE commands.

Notes: If COMMTYPE=(TCPIP,SOK) is not specified, this keyword is ignored.

If the first positional parameter of this keyword is “N”, the remaining parameters are ignored.

If the first positional parameter of this keyword is “N”, the PJLINFO, PJLOPTS and PJLUSTAT keywords are ignored.

For more information on how PJL commands are used by VPS, see “Using PJL Commands” on page 6.83.

PJLINFO
in PRINTER DEFINITION MEMBER

PJLINFO= Specifies, via 6 positional parameters, whether VPS should send printer job language (PJL) INFO commands to the printer to obtain information about the printer.

Positional parameter 1 specifies if the PJL INFO CONFIG command should be sent to the printer.

Valid Values: CONFIG - Send PJL INFO CONFIG command.

NOCONFIG - Do not send PJL INFO CONFIG command.

Default: CONFIG

Positional parameter 2 specifies if the PJL INFO FILESYS command should be sent to the printer.

Valid Values: FILES - Send PJL INFO FILESYS command.

NOFILES - Do not send PJL INFO FILESYS command.

Default: NOFILES

Positional parameter 3 specifies if the PJL INFO ID command should be sent to the printer.

Valid Values: ID - Send PJL INFO ID command.

NOID - Do not send PJL INFO ID command.

Default: ID

Positional parameter 4 specifies if the PJL INFO MEMORY command should be sent to the printer.

Valid Values: MEMORY - Send PJL INFO MEMORY command.

NOMEMORY- Do not send PJL INFO MEMORY command.

Default: NOMEMORY

Positional parameter 5 specifies if the PJL INFO PAGECOUNT command should be sent to the printer.

Valid Values: PAGECT - Send PJL INFO PAGECOUNT command.

NOPAGECT - Do not send PJL INFO PAGECOUNT command.

Default: NOPAGECT

Positional parameter 6 specifies if the PJL INFO VARIABLES command should be sent to the printer.

Valid Values: VARB - Send PJL INFO VARIABLES command.

NOVARB - Do not send PJL INFO VARIABLES command.

Default: VARB

PJLINFO
in PRINTER DEFINITION MEMBER

Example: PJLINFO=(CONFIG,,ID,,,VARB)

This indicates that VPS should send PJL INFO commands to obtain information about configuration, ID and variables, but that the information about the file system, memory and page count should not be requested.

Notes: If COMMTYPE=(TCPIP,SOK) is not specified, this keyword is ignored.

If PJLCMDS=N is specified, this keyword is ignored.

If PJLCMDS=Y is specified, certain PJL INFO commands are sent to the printer before each print file, including the PJL INFO STATUS command to request the current printer status information.

For more information on how PJL commands are used by VPS, see "Using PJL Commands" on page 6.83.

PJLOPTS
in PRINTER DEFINITION MEMBER

PJLOPTS= A 4-byte hex representation that specifies special user options to be used when VPS is sending PJL commands. The user option bit specifications are as follows:

80000000 = Issue the VPS277I message with response data if the PJL command in the response data is unknown to VPS.

40000000 = Issue the VPS277I message with response data if the PJL category in the response data is unknown to VPS.

20000000 = Issue the VPS277I message with response data if the PJL variable in the response data is unknown to VPS.

10000000 = Issue the VPS277I message with response data if the PJL command or variable requested by VPS is not supported by the printer.

08000000 = Issue the VPS277I message with response data for JOB START.

04000000 = Issue the VPS277I message with response data for PAGE status returned.

02000000 = Issue the VPS277I message with response data for normal status codes. If the normal status code is the same as that previously reported, the VPS277I message will not be issued.

01000000 = Issue the VPS277I message with response data for unexpected status codes, even when the code is the same as that previously reported. If this option is not specified, VPS will only report the unexpected status code when it is different than that previously reported.

00800000 = Send PJL INFO commands to obtain printer information each time a connection is made. If this option is not specified, VPS will send the PJL INFO commands for the first connection after the printer is activated.

00400000 = Send the JOB NAME used on the PJL JOB START command as the DISPLAY= value. The printer will display a portion of this value based on the size of the display screen.

00200000 = Send the USTATUS TIMED command after the PJL EOJ command. This option is ignored if the 4th positional parameter of the PJLUSTAT is zero. If this option is not specified and the 4th positional parameter of the PJLUSTAT is non-zero, the PJL USTATUS TIMED command will be sent before the first buffer of the print dataset.

00100000 = Send PJL JOB START when the connection is established to the printer and the PJL EOJ before the connection is terminated.

00080000 = Bypass wait for the response to the PJL EOJ command for the start separator.

00040000 = Search for status codes in the alternate table. This option will display better status code text for paper jam errors for Lexmark printers.

00020000 = Bypass sending the PJL SET JOBID=ON command. This option is ignored at level VPS V1R8.0.112 or later.

00010000 = Send the PJL SET JOBID=ON command. This option was introduced at level VPS V1R8.0.112.

00008000 = Issue the VPS277I message with response data if the PJL JOB or EOJ name is unexpected by VPS.

00004000 = Terminate PJL commands with carriage restore (CR) and line feed (LF), rather than line feed (LF) only.

00002000 = Bypass sending ending UEL sequence after each PJL EOJ.

00001000 = Bypass Job/EOJ command for AFP reset and AFP messages.

00000800 = Undefined.

00000400 = Undefined.

00000200 = Undefined.

00000100 = Undefined.

00000080 = Undefined.

00000040 = Undefined.

00000020 = Undefined.

00000010 = Undefined.

00000008 = Undefined.

00000004 = Undefined.

00000002 = Undefined.

00000001 = Reserved for encryption testing.

Valid Values: 00000000 to FFFFFFFF

Default: 00000000

Example: PJLOPTS=02400000

This indicates that VPS should issue the VPS277I message with the status message data received from the printer when a normal status code is received and that the JOB name should be sent to be displayed at the printer when the PJL JOB command is sent.

Notes: If COMMTYPE=(TCPIP,SOK) is not specified, this keyword is ignored.

If PJLCMDS=N is specified, this keyword is ignored.

For more information on how PJL commands are used by VPS, see "Using PJL Commands" on page 6.83.

PJLUSTAT
in PRINTER DEFINITION MEMBER

PJLUSTAT= Specifies, via 4 positional parameters, whether VPS should send printer job language (PJL) USTATUS commands to the printer to obtain unsolicited status from the printer.

Positional parameter 1 specifies if the PJL USTATUS DEVICE command should be sent to the printer.

Valid Values:
- DEVOFF - Do not send PJL USTATUS DEVICE.
- DEVON - Send PJL USTATUS DEVICE ON to indicate changes in printer status should be returned to VPS.
- DEVVERB - Send PJL USTATUS DEVICE VERBOSE to request verbose device status, which includes messages about PJL command syntax errors in addition to changes in printer status.

Default: DEVVERB

Positional parameter 2 specifies if the PJL USTATUS JOB command should be sent to the printer.

Valid Values:
- JOBOFF - Do not send PJL USTATUS JOB.
- JOBON - Send PJL USTATUS JOB ON to indicate that changes in job status should be returned to VPS. The printer will return a status message when the JOB start command is received and also when the last page of the job has printed. VPS will wait for the end of job status response and not delete the print dataset from the JES spool until it is received.

Default: JOBON

Positional parameter 3 specifies if the PJL USTATUS PAGE command should be sent to the printer.

Valid Values:
- PAGEOFF - Do not send PJL USTATUS PAGE.
- PAGEON - Send PJL USTATUS PAGE ON to indicate that changes in page status should be returned to VPS. The printer will return a status message when each physical page is placed in the output bin.

Default: PAGEON

PJLUSTAT
in PRINTER DEFINITION MEMBER

Positional parameter 4 specifies if the PJL USTATUS TIMED command should be sent to the printer.

Valid Values:

0	-	Do not send PJL USTATUS TIMED.
5 - 300	-	Send PJL USTATUS PAGE TIMED, using the value of this parameter as the number of seconds to wait between responses. The printer will send status messages to VPS based upon this interval.

Default: 60

Example: PJLUSTAT=(DEVVERB,JOBON,PAGEOFF,60)

This indicates that VPS should send PJL USTATUS commands to ask for unsolicited status about the device and the job, as well as printer status on a timed interval. The job unsolicited status will be returned for the job start and when the last page of the job is printed. No unsolicited status is requested for each page printed. VPS will request that the printer return status information every 60 seconds.

Notes: If COMMTYPE=(TCPIP,SOK) is not specified, this keyword is ignored.

If PJLCMDS=N is specified, this keyword is ignored.

If JOBON is specified, the PJLCMDS=(Y,JOB), must be specified to indicate that VPS should send the JOB and EOJ PJL commands. If not, printer activation will fail.

If PAGEON is specified, JOBON must also be specified. If not, printer activation will fail.

For more information on how PJL commands are used by VPS, see "Using PJL Commands" on page 6.83 in the Special Topics section.

POOL
in PRINTER DEFINITION MEMBER

POOL= Specifies whether or not this printer is a pooled printer. A printer is considered a pooled printer when its selection criteria are the same as or overlap the selection criteria of one or more other VPS printers.

Valid Values: Y or N

Default: N

Example: POOL=Y

This specification indicates that this printer is pooled.

Note: If SAPI=N is specified in the VPS System Initialization member, the pooling exit (VPS user exit 16) must be enabled or pooling will not be in effect and printers with POOL=Y will not print any work.

If SAPI=Y is specified in the VPS System Initialization member, the pooling exit (VPS user exit 16) is ignored.

"Printer Pooling" on page 6.5 gives more information about the effect of using pooling.

PPM
in PRINTER DEFINITION MEMBER

PPM= A ten byte hex representation of the SCS Page Presentation Media command to be used for this printer. The value is specified as twenty characters, representing ten hex bytes.

Valid Values: 00 - FF for each hex byte

Default: 00000000000000000000 (do not send PPM to the printer)

Example: PPM=00000200000000000000

Select envelope feeder as input source.

Note: Each byte within the PPM command has a different function. The first two bytes and last two bytes are unused at this time, but printer vendors may implement them in the future. The third through eighth bytes have functions as described below. All printers do not support all functions. The documentation for the specific model of printer should indicate which, if any, functions are supported.

The bytes within the PPM command are defined as follows:

Byte	Symbol	Definition
1		
2		
3	FC	Media Select (input source)
4	SD	Source Drawer
5	DDO	Destination Drawer Offset
6	DD	Destination drawer
7	QQ	Print Quality
8	DX	Duplexing
9		
10		

A description of how the values work is shown below. Please note that different models of printers may implement these functions differently, and that all printers do not support all functions.

Byte	Value	Action
FC	00	No change from previous media
	01	Use the SD byte value for media selection
	02	Select envelope feeder
	03	Select manual feeder
	04	Select manual envelope feeder
	XX	Any other value...use the SD byte
SD	00	No change from previous drawer
	01	Use primary drawer
	02	Use alternate drawer
	03	Use auxiliary drawer
	04 - FE	Use default drawer
DDO	00	No change
	Not 00	Jog the output tray

PPM
in PRINTER DEFINITION MEMBER

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Byte	Value	Action
QQ	00	No change
	01	DP quality
	02	DP text quality
	03	Near letter quality
	FF	Use printer default
DX	00	No change from current mode
	01	Enter simplex mode
	02	Enter duplex mode
	03	Enter tumble duplex mode

This parameter applies only to SCS devices which support the SCS "PagePresentation Media" control code and the specific value given. Printers not supporting the PPM control code will cause the following message to be issued:

```
VPS332E prtrid SEND DATA FAILED RC=04 F2=04 SNS=1003
```

Printers which support PPM control code, but not the specific value, will cause the following message to be issued:

```
VPS332E prtrid SEND DATA FAILED RC=04 F2=04 SNS=1005
```

PRTRMSGS
in PRINTER DEFINITION MEMBER

PRTRMSGS= Specifies whether form mount messages, requeue messages, and reposition/restart/cancel/interrupt messages generated due to operator commands should be printed for this printer.

Valid Values: Y or N

Default: Y

Example: PRTRMSGS=N

This specification indicates that form mount messages, requeue messages, and operator generated reposition/restart/cancel/interrupt messages should not be printed for this printer.

Note: Form mount messages are generated when FORM=AUTO is specified in the printer definition and a dataset requires a form different from that of the previous dataset printed by VPS.

The requeue messages which can be controlled by this parameter are those which would be printed on the printers from which a dataset is requeued and to which a dataset is requeued when a dataset exceeds the REQLIMIT.

The reposition/restart/cancel/interrupt messages which can be controlled by this keyword are those due to an operator request for repositioning, restarting, interrupting, or canceling a dataset or job, whether via a command or a PA-1, PA-2 or CANCEL print key.

If PRTRMSGS=Y is set for a VPS/Email printer, requeue messages will be delivered to the sender of the email messages, rather than the intended recipients. Reposition, restart, cancel and interrupt are not allowed for VPS/Email definitions.

PRTROPTS
in PRINTER DEFINITION MEMBER

PRTROPTS= A four byte hex representation of special printer options to be in effect for this printer. The value is specified as eight digits, representing four hex bytes (32 option bits). The printer option bit specifications are:

80000000 = Do not batch forms within a job
40000000 = Build line stack with 500 byte lines (like VPS 5.0)
20000000 = Treat carriage control as data
10000000 = Reserved for special system modification
08000000 = Bypass new line elimination for 7171
04000000 = Send all SCS commands for every dataset
02000000 = Split large print lines into multiple VTAM buffers
01000000 = Bypass form mount for non-LU1 devices

00800000 = Use default FCB for VPS separator pages
00400000 = Requeue all datasets for this printer
00200000 = Enforce RECFM for carriage control processing
00100000 = Eliminate DRS/PC separators for VPS/PC
00080000 = Replaced by NOTIFY keyword
00040000 = Insert SCS transparency before CR/NL
00020000 = Do not reposition after intervention required
00010000 = Reserved for special system modification

00008000 = Use begin and end FMH from FMHCLASS keyword for RJE
00004000 = VPS will inform JES to NOT return any datasets that exceed the requeue line/page limits.
00002000 = Retain original job name/job ID (REQROUTE=N).
00001000 = Undefined

00000800 = Undefined
00000400 = For VPS/PC using APPC, set TPNAME to LUNAME
00000200 = For VPS/PC, process multiple copies by sending the dataset multiple times
00000100 = Bypass staging for VPS/PC and AnyQueue with SAPI.

00000080 = VPS299I information message for ACIF MODCA conversion
00000040 = Send font objects during ACIF conversion.
00000020 = Send index object during ACIF MODCA conversion.
00000010 = Continue after RC=04 from ACIF.
00000008 = Send length field in little endian format for LCDS.
00000004 = Undefined
00000002 = Undefined
00000001 = Undefined

Valid Values: 00000000 - FFFFFFFF

Default: 00000000

Example: PRTROPTS=80000000

This specification indicates that forms should not be batched within a job for this printer.

Note: Specifying PRTROPTS=40000000 ensures that the internal line area length passed to user exits is at least 500 bytes in length. Some prior releases of VPS required an optional user zap.

PRTXDBCS
in PRINTER DEFINITION MEMBER

PRTXDBCS= Specifies, via six positional parameters, the type of translation to be applied to double-byte character set (DBCS) data and the handling of SOSI (shift-out, shift-in) codes before it is sent to the VPS printer.

Positional parameter 1 specifies whether or not VPS should scan for SOSI codes and perform DBCS translation of data for this printer.

Valid Values: Y or N

Default: N

Positional parameter 2 specifies the DBCS translate table name.

Valid Values: Name of a valid DBCS translate table. This table must be created using the LRDBCS macro supplied in LRS.V1R12.MACLIB. See "Creating a User Translation Table" on page 6.27 for more information on translation.

Default: None.

Positional parameter 3 specifies the treatment of SOSI characters during translation.

Valid Values: KEEP, DELT, REPL

KEEP maintains the SOSI characters in the print line.

DELT removes the SOSI characters from the print line.

REPL replaces the SO and SI characters with the replacement SO and SI characters specified in the fourth and fifth positional parameter of the PRTXDBCS keyword respectively.

Default: KEEP

Positional parameter 4 specifies the shift-out (SO) replacement character.

Valid Values: Any 1-3 byte hex value

Default: X'0E'

Note: If parameter 3 is not REPL, this value is ignored.

Positional parameter 5 specifies the shift-in (SI) replacement character.

Valid Values: Any 1-3 byte hex value

Default: X'0F'

Note: If parameter 3 is not REPL, this value is ignored.

PRTXDBCS
in PRINTER DEFINITION MEMBER

Positional parameter 6 specifies the action VPS should take when there are invalid DBCS strings within the file.

Valid Values: EDR - VPS EDRAINs the printer.

REQ - VPS requeues the SYSOUT using requeue options.

Default: EDR

Example: PRTXDBCS=(Y,VXTABLE,REPL,2A,2B,REQ)

This specifies that VPS should translate DBCS data using the translation table named VXTABLE, that the SO option character should be replaced with X'2A', that the SI option character should be replaced with X'2B', and that any file with invalid DBCS data should be requeued.

Note: For more information on using DBCS with VPS, see "Creating a User Translation Table" on page 6.27.

PRTXLATE
in PRINTER DEFINITION MEMBER

PRTXLATE= Specifies, via five positional parameters, the type of translation to be applied to single-byte character set (SBCS) data before it is sent to the VPS printer.

Positional parameter 1 specifies whether or not any translation of SBCS data should take place for this printer.

Valid Values: Y or N

Default: Y

Positional parameter 2 specifies the load module name of the SBCS translate table to be used for non-APL datasets.

Valid Values: Any valid translate table name that exists in the VPS load module library.

Default: VPSSXLTE

Positional parameter 3 specifies the load module name of the SBCS translate table to be used for APL datasets.

Valid Values: Any valid translate table name that exists in the VPS load module library.

Default: VPSSXAPL

Positional parameter 4 specifies the load module name of the translate table to be used to translate outbound VPS/Email commands. This table is only used if the printer is a VPS/Email printer or if NOTIFY keywords indicate that VPS/Email notification is requested.

Valid Values: Any valid translate table name that exists in the VPS load module library.

Default: VPSSXASC

Positional parameter 5 specifies the load module name of the translate table to be used to translate outbound EBCDIC data that must be translated to ASCII. This table is not used for normal print line data, but is used for certain printer commands such as:

JIF buffer if TCPOPTS=00000080.

LPD commands if COMMTYPE=(TCPIP,LPD).

LPD control file if COMMTYPE=(TCPIP,LPD).

PCL ECHO if COMMTYPE=(TCPIP,SOK).

PostScript commands if COMMTYPE=(TCPIP,SOK).

PJL commands if PJLCMDS=Y.

PJL commands for VPS/PCL finishing options.

Printer commands obtained from modules specified by PCMDSTRT= or PCMDEND= if the module header indicates EBCDIC to ASCII translation is required.

Valid Values: Any valid translate table name that exists in the VPS load module library.

Default: VPSSXASC

PRTXLATE
in PRINTER DEFINITION MEMBER

Example: PRTXLATE=(Y,OURXLTE,OURXAPL)

This specification indicates that VPS should translate data characters in print lines in non-APL datasets by using a translate table named OURXLTE, and that it should translate data characters in APL datasets by using a translate table named OURXAPL.

Note: Print translation is bypassed for SAS, DCA, GDDM, IPDS, and FMH datasets. See "Creating a User Translation Table" on page 6.27 for more information on translation.

TCP/IP printers should use VPSSXASC for EBCDIC to ASCII translation.

PSEGDD
in PRINTER DEFINITION MEMBER

PSEGDD= Specifies the DD statement in the VPS execution JCL that contains the page segment libraries to be used for VPS/IPDS, VPS/PCL, or VPS/PDF conversion.

This keyword only applies to the processing of AFP data. For more information on how VPS processes AFP data, see "AFP" on page 8.1.

Valid Values: 1 to 8 alphanumeric characters

Default: PSEGLIB

Example: PSEGDD=PSEG

This specifies that VPS/IPDS, VPS/PCL, or VPS/PDF should refer to the PSEG DD statement in the VPS execution JCL for the page segment libraries.

QALLDYN
in PRINTER DEFINITION MEMBER

QALLDYN= Specifies when the staging dataset should be dynamically allocated. If dynamic allocation/deallocation is requested (QALLDYN=Y), the staging dataset is allocated when needed and unallocated when no longer needed. Substantially less DASD space will be allocated at any given point in time. However, the overhead of allocation and deallocation will be incurred much more frequently. If dynamic allocation/deallocation is not requested (QALLDYN=N), the staging dataset is allocated when the VPS printer is activated and remains allocated until the printer is inactivated or VPS is terminated.

Valid Values: Y or N

Default: Y

Example: QALLDYN=Y

This specification indicates that the staging dataset should be allocated and deallocated as required.

Note: If QALLDYN=Y is specified, the QBUFSIZE parameter must not be specified as zero or allowed to default to the maximum allowable device block size.

If QALLDYN=N is specified, either explicitly or by default, VPS will attach a subtask to unallocate the staging dataset when the printer is inactivated or when VPS terminates. This can result in increased shutdown time.

See "Staging Methods in VPS" on page 6.22 for allowable staging options.

In previous releases of VPS, the default value for this keyword was QALLDYN=N. The default is now QALLDYN=Y, which **requires** a non-zero value for the QBUFSIZE keyword.

QBUFSIZE
in PRINTER DEFINITION MEMBER

QBUFSIZE= Specifies the buffer size that VPS will use when writing to and reading from the staging dataset. This parameter can have a significant impact on printer performance and VPS virtual storage requirements, as described in "Staging Performance" on page 4.4.

Valid Values: 0 or 1024 - maximum allowable device block size

Default: Maximum allowable device block size

Example: QBUFSIZE=4096

This specification indicates that a 4096 byte buffer should be used for building SYSOUT dataset staging buffers.

Note: If QALLDYN=Y is specified, the QBUFSIZE parameter must not be specified as zero or allowed to default to the maximum allowable device block size.

The value of this parameter must be at least as large as the largest record to be read by VPS for the printer, or VPS will truncate records which exceed the QBUFSIZE value.

See "Staging Performance" on page 4.4 for allowable staging options.

QDSNAME
in PRINTER DEFINITION MEMBER

QDSNAME= Specifies the dataset name of a preallocated dataset that is to be used for staging and should be specified only if a preallocated staging dataset is to be used.

Valid Values: Any valid preallocated dataset name

Default: None.

Example: QDSNAME=MY.STAGING.DSET.PR1

This specification would signify that a dataset named MY.STAGING.DSET.PR1 is already defined and is to be used for staging output for this printer.

See "Staging Methods in VPS" on page 6.22 for allowable staging options.

QSPACE
in PRINTER DEFINITION MEMBER

QSPACE= Specifies, via three positional parameters, the amount of DASD space to be allocated to the staging dataset.

Positional parameter 1 specifies whether the staging dataset should be allocated in cylinders (C) or tracks (T).

Valid Values: C or T

Default: T

Positional parameter 2 specifies the primary allocation amount.

Valid Values: 1 - 9999

Default: 30

Positional parameter 3 specifies the secondary allocation amount.

Valid Values: 1 - 9999

Default: 15

Example: QSPACE=(C,10,5)

This specification would signify that the staging dataset should be allocated in cylinders, with a primary allocation amount of 10 cylinders and a secondary allocation amount of 5 cylinders.

See "Staging Methods in VPS" on page 6.22 for allowable staging options. See "DASD Space Requirements" on page 2.6 for further information on determining the values for this keyword.

QUNIT
in PRINTER DEFINITION MEMBER

QUNIT= Specifies the unit type of the device on which the staging dataset is to be allocated and how many devices to assign.

Positional parameter 1 specifies the unit type.

Valid Values: Any valid DASD unit name

Default: SYSDA

Positional parameter 2 specifies the unit count.

Valid Values: 1 to 59

Default: 1

Example: QUNIT=(3380,2)

This specification indicates that 2 3380 devices should be assigned to the staging dataset.

See "Staging Methods in VPS" on page 6.22 for allowable staging options.

QVOLUME
in PRINTER DEFINITION MEMBER

QVOLUME= Specifies the volume on which the staging dataset is to be placed. If this parameter is not specified, VPS will allocate the staging dataset on any available public or storage volume.

Valid Values: Any valid DASD volume name.

Default: None.

Example: QVOLUME=WRK001

This specification would signify that the staging dataset should be allocated on the DASD volume WRK001.

See "Staging Methods in VPS" on page 6.22 for allowable staging options.

RELREQ
in PRINTER DEFINITION MEMBER

RELREQ= Specifies when VPS should release the printer.

Valid Values:

- **N** = Never
- **A** = Automatically at the end of each job
- **E** = End-of-job, if requested by another VTAM application
- **I** = Automatically when waiting-for-work
- **W** = Waiting-for-work, if requested by another VTAM application

Default: W

Example: RELREQ=E

This specification indicates that, if requested by another VTAM application, VPS should release the printer after printing the current job or immediately if it is not currently printing.

Note: Specifying RELREQ=A or RELREQ=I when DIAL=Y is also specified may cause VPS to prematurely release the printer.

Specifying RELREQ=E or RELREQ=W indicates that once VPS establishes a session with the device, it should stay in session until some other VTAM application requests the device, or until VPS terminates. When VPS terminates, it will attach a subtask for each printer with which it still has a session, so it can terminate the session. This increases VPS shutdown time and the amount of storage needed at shutdown.

VPS AFP manages the resources within a printer. When the VTAM session with a printer ends, VPS AFP deletes its tables which track the various resources within the printer. When the printer is acquired again, all downloaded resources must be sent again. In this case, it is more efficient to keep the printer in session with VPS as much as possible. RELREQ values of “A” and “I” should be avoided with VPS AFP.

RELREQ is ignored for TCP/IP devices using LPR/LPD protocols, and the connection will be closed after the spool dataset is delivered to the printer, because Line Printer Daemon (LPD) implementations require that the connection be closed after each print file is sent. TCPOPTS=04000000 can be specified to force VPS to use the RELREQ option to determine when to terminate a TCP/IP LPD connection.

REQDELT
in PRINTER DEFINITION MEMBER

REQDELT= Specifies whether or not a dataset which exceeds the line limit should be deleted rather than requeued.

Note that the requeuing process differs when using the SAPI interface. Refer to "Requeuing Options" on page 6.13 for a detailed description of the requeuing process when using both the PSO and SAPI interfaces.

Valid Values: Y or N

Default: N

Example: REQDELT=Y

This specification indicates that datasets which exceed the line limit for this printer should not be requeued, but should be deleted from the JES spool.

REQHOLD
in PRINTER DEFINITION MEMBER

REQHOLD= Specifies whether requeued SYSOUT datasets should be held. If REQHOLD=Y is specified to indicate that the requeued SYSOUT should be held, an appropriate operator command will need to be issued to JES to make the SYSOUT available for printing.

Note that the requeuing process differs when using the SAPI interface. Refer to "Requeuing Options" on page 6.13 for a detailed description of the requeuing process when using both the PSO and SAPI interfaces.

Valid Values: Y or N

Default: N

Example: REQHOLD=Y

This specification indicates that any SYSOUT dataset that is requeued because the line exceeded the specified value should be held.

REQLIMIT
in PRINTER DEFINITION MEMBER

REQLIMIT= Specifies the SYSOUT dataset line limit (for non-AFP datasets) and page limit (for AFP datasets) that can be printed on this printer. If the limit is exceeded, the SYSOUT dataset, in its entirety, will be requeued to an alternate location, held, or deleted, depending on the values of the other requeue parameters.

Note that the requeuing process differs when using the SAPI interface. Refer to "Requeuing Options" on page 6.13 for a detailed description of the requeuing process when using both the PSO and SAPI interfaces.

Positional parameter 1 specifies the line limit, in hundreds, for non-AFP datasets. A value of zero for this parameter signifies to VPS that there is to be no line limit for this printer.

Valid Values: 0 - 65535

Default: None.

Positional parameter 2, applicable only with the SAPI interface, specifies the page limit, in tens, for AFP datasets. A value of zero for this parameter signifies to VPS that there is to be no page limit for this printer.

Valid Values: 0-9999

Default: None.

Example: REQLIMIT=(50,10)

This specification indicates that any line data SYSOUT dataset routed to this printer that exceeds 5000 lines should be requeued, and that any AFP SYSOUT dataset routed to this printer that exceeds 100 pages should be requeued.

Note: REQLIMIT=0 is not allowed for VPS/Email printers. If the requeue line limit is set to 0, VPS will modify the requeue limit to 5 (500 lines maximum), and a message will be issued at printer activation. REQLIMIT should be specified as a non-zero value to prevent flooding the remote mail server with large amounts of data.

REQOUTP
in PRINTER DEFINITION MEMBER

REQOUTP= Specifies, via five positional parameters, the characteristics to be assigned to a SYSOUT dataset that exceeds the specified line limit.

Note that the requeuing process differs when using the SAPI interface. Refer to "Requeuing Options" on page 6.13 for a detailed description of the requeuing process when using both the PSO and SAPI interfaces.

Positional parameter 1 specifies the SYSOUT class to which SYSOUT datasets that exceed the specified line limit should be requeued.

Valid Values: Any valid SYSOUT class or *.

Default: A

Note: A value of * in this field indicates that the requeued dataset should retain its original SYSOUT class value.

Positional parameter 2 specifies the destination to which SYSOUT datasets that exceed the specified line limit should be requeued.

Valid Values: Any valid JES destination or *.

Default: LOCAL for JES2 systems and ANYLOCAL for JES3 systems.

Note: A value of * in this field indicates that the requeued dataset should retain its original destination.

Positional parameter 3 specifies the form number to be used on SYSOUT datasets which exceed the line limit.

Valid Values: Any 1 through 4 character form number or *.

Default: None.

Note: A value of * in this field indicates that the requeued dataset should retain its original form. A value of **** in this field will remove the form name.

Positional parameter 4 specifies the special writer program name to be used on SYSOUT datasets which exceed the line limit.

Valid Values: Any 1 through 8 character writer name or *.

Default: None.

Note: A value of * in this field indicates that the requeued dataset should retain its original writer name. A value of **** in this field removes the writer name.

REQOUTP
in PRINTER DEFINITION MEMBER

Positional parameter 5 specifies the name of an OUTPUT JCL statement which is to be used to determine the characteristics of SYSOUT datasets which exceed the line limit.

Valid Values: The name of an OUTPUT JCL statement that exists in the VPS started task JCL.

Default: None.

Note: An OUTPUT JCL statement can be referenced only if REQROUTE=N is specified. When REQROUTE=Y is specified, this positional parameter value is ignored, and the values of the other positional parameters are used in the JES command issued by VPS.

If you specify the name of an OUTPUT JCL statement that does not exist in the VPS started task JCL, message VPS133E will be issued (REQUEUE DATASET ALLOCATION FAILURE), with RC=04 and EC=04CC, and the printer will be placed in EDRAINED status.

Example: REQOUTP=(B,U100,****)

This specification indicates that a SYSOUT dataset that exceeds the line limit should be requeued to SYSOUT class B and destination U100. Any form name on the output should be removed.

REQROUTE
in PRINTER DEFINITION MEMBER

REQROUTE= Specifies whether VPS should reroute the dataset by issuing the appropriate JES command (REQROUTE=Y) or by creating a spin-off dataset (REQROUTE=N).

If REQROUTE=Y is specified, the rerouted output will retain its original job name and job ID.

See "Requeuing Options" on page 6.13 for more information.

Valid Values: Y or N

Default: N

Example: REQROUTE=Y

This specification indicates that VPS should issue the appropriate JES command if a dataset exceeds the VPS line limit.

Note: The Requeue Exit can change which datasets are requeued and the values of the requeue parameters at execution time. If the Requeue Exit is in effect at your site, read the description of the Requeue Exit in "Exit 13: Requeue Exit" on page 5.36 for an explanation of possible user modifications to requeue processing.

The sample Requeue Exit on the VPS distribution cartridge ignores the REQLIMIT for datasets in the APL, DCA, GDDM, SAS, and IPDS classes. For JES2 sites that are not using SAPI, it also retrieves the JES2 output group name and output group ID(s) and returns to VPS with RC=00.

RETAIN
in PRINTER DEFINITION MEMBER

RETAIN: Specifies, via 2 positional parameters, whether SYSOUT files should be retained on the JES spool after VPS has delivered them to the printer and the number of hours that the file should be retained.

Positional parameter 1 specifies whether VPS should retain the SYSOUT file on the JES spool after it has been successfully delivered.

Valid Values: Y or N

Default: N

Positional parameter 2 specifies the default time period in hours that a file should be retained on the JES spool after it has been successfully delivered. This value will be overridden by any RETAINS value from the JCL which created the SYSOUT file.

Valid Values: 0 to 9999

Default: 0

Example: RETAIN=(Y,1)

This specification indicates that VPS should retain the SYSOUT file and that the default retention period should be one hour.

Notes: Specification of Y for the first positional parameter requires a non-zero value for the second positional parameter of the INTERVAL keyword in the VPS system initialization member.

In addition, the RETHOLD and/or RETOUTP keywords can be specified to indicate the SYSOUT characteristics of the file that will be retained on the JES spool.

If the second parameter is specified as zero and RETAINS is not specified in the JCL, the file will not be retained on the JES spool.

Specifying a large value for the second parameter may cause numerous SYSOUT files to be retained on the JES spool. To recover spool file space, the retained SYSOUT files can be purged using the VPS EXPIRE command.

RETHOLD
in PRINTER DEFINITION MEMBER

RETHOLD: Specifies whether SYSOUT files that are retained on the JES spool should be held.

Valid Values:	N	Do not hold	(JES2 or JES3)
	Y	HOLD	(JES2 or JES3)
	S	SYSTEM HOLD	(JES3 only)
Default:	Y	JES2	
	S	JES3	

Example: RETHOLD=N

This indicates that VPS should not HOLD the retained SYSOUT file.

Note: When RETHOLD=N is specified, the RETOUTP keyword must specify SYSOUT parameters which do not match those used by the printer for selection criteria (CLASS, DEST, FORM, and WRITER).

Specifying RETHOLD=Y in a JES3 Environment will move the dataset to the JES3 HOLD queue. This is only valid if the JESQUEUE keyword specifies that VPS will not select work from the HOLD queue or if the RETOUTP keyword specifies attributes that do not match the printer selection criteria.

RETOUTP
in PRINTER DEFINITION MEMBER

RETOUTP: Specifies, via 4 positional parameters, the characteristics to be assigned to a SYSOUT file that is retained on the JES spool after it has been successfully delivered. These values will be ignored if RETAIN=Y is not specified.

Positional parameter 1 specifies the class for SYSOUT files that are retained.

Valid Values: Any valid SYSOUT class or *.

Default: * (Retain original class)

Positional parameter 2 specifies the destination for SYSOUT files that are retained.

Valid Values: Any valid JES destination or *.

Default: * (Retain original destination)

Positional parameter 3 specifies the form name for SYSOUT files that are retained.

Valid Values: Any valid 1 to 8 character form name or *.

Default: * (Retain original form name)

Positional parameter 4 specifies the special writer program name for SYSOUT files that are retained.

Valid Values: Any 1 to 8 character writer name, * or ********.

Default: * (Retain original writer name)

Example: RETOUTP=(Z,*,*,PRINTED)

This indicates that VPS should retain the SYSOUT file with same destination, and form name, but that the SYSOUT class should be changed to Z and the WRITER name to 'PRINTED'.

Notes: Specifying one asterisk in any of the positional parameters indicates to retain the original SYSOUT attribute.

Specifying 4 – 8 asterisks in the WRITER field indicates that the writer name should be removed from the SYSOUT attributes when the file is retained.

RETRIES
in PRINTER DEFINITION MEMBER

RETRIES= Specifies the number of times per dataset VPS should retry failing VTAM SENDS before it places the printer in an “EDRAINED” status.

Valid Values: 0 - 9

Default: 3

Example: RETRIES=5

This specification indicates that five retry attempts should be made if a send failure is encountered.

RJE
in PRINTER DEFINITION MEMBER

RJE= Specifies, via four positional parameters, whether the printer will emulate an SNA RJE station when communicating with VPS, and, if so, the types of functions to be supported.

Positional parameter 1 specifies whether or not the printer is to emulate an SNA RJE station when communicating with VPS. If this value is N, the other three values are ignored.

Valid Values: Y or N

Default: N

Positional parameter 2 specifies whether or not Peripheral Data Information Records (PDIRs) will be sent. If requested, PDIRs are sent preceding a dataset, and include such information as form name, FCB, creation time, etc. This function could be compared to the JES2 SETUPHDR parameter.

Valid Values: Y or N

Default: N

Positional parameter 3 specifies whether or not READER support should be enabled. If set to Y, VPS will accept an inbound READER datastream from the printer, and pass the data received to the JES internal reader.

Valid Values: Y or N

Default: N

Positional parameter 4 specifies CONSOLE support, and is not implemented at this time.

Valid Values: Y or N

Default: N

Example: RJE=(Y,Y,Y,N)

This specification indicates that VPS should emulate an SNA RJE station when communicating with the printer, that PDIRs should be sent, and that READER support should be enabled.

Note: RJE is possible only in SNA mode. No 3780 emulation is possible.

This emulation is performed in Single Logical Unit (SLU) mode.

RJE emulation requires the use of Function Management Headers (FMH). The SCS (LU-1) BIND used for the printer must include FMH support. This is usually indicated by a value of 7080 in the common protocol section of the BIND.

Only Begin Destination Selection (BDS) and End Destination Selection (EDS) are supported. Suspend and Resume are not supported.

PUNCH, CONSOLE, and EXCHANGE are not supported.

If COMPRESS=S is specified, VPS will use String Control Byte (SCB) data compression.

Data received which is not included in the READER stream will be ignored.

RUSIZE
in PRINTER DEFINITION MEMBER

RUSIZE= Specifies the maximum size of the buffer that VPS is to send to this printer. (See "Printing Performance" on page 4.5 for more information about the impact of this keyword for both VTAM and TCP/IP printers.)

Valid Values: 0 - 9999

Default: 768

Example: RUSIZE=1536

This specification indicates that buffers no larger than 1536 bytes should be sent to this printer.

Note: For VTAM devices, a value of 0 signifies that VPS should get the RUSIZE from the session parameters (bind image). Values other than 0 or 256 through 3584 for VTAM devices might cause the device to reject the bind.

For TCP/IP devices, a value of 0 signifies that VPS should use the default value (RUSIZE=768).

SAF
in PRINTER DEFINITION MEMBER

SAF= Specifies whether VPS should make SAF requests to verify a user's authority to direct output to the printer and the action to be taken when the security validation fails.

Positional parameter 1 specifies whether VPS should make SAF requests to verify a user's authority to direct output to the printer.

Valid Values: Y or N

Default: N

Positional parameter 2 specifies the action to be taken if the security validation fails.

Valid Values: EDR or REQ

EDR = EDRAIN the printer.

REQ = Requeue the SYSOUT dataset using the requeue options.

Default: EDR

Example: SAF=(Y,REQ)

This specification indicates that VPS should make SAF requests to verify a user's authority to direct output to the printer and, if the security validation fails, the SYSOUT dataset should be requeued.

Note: **PSO Interface** - If security validation is enabled for the printer (SAF=(Y,xxx)) and VPS User Exit 15 is not enabled, or is enabled but did not obtain a security token for the SYSOUT dataset, the printer is always EDRAINed, regardless of the setting of the second positional parameter.

SAPI Interface - Exit15 is not required. The security token is returned by SAPI.

For more information about implementing External Security using RACF, CA-ACF2 or CA-TOPSECRET, see "External Security" on page 6.65.

SASCLASS
in PRINTER DEFINITION MEMBER

SASCLASS= Specifies the SYSOUT class of datasets that were created using SAS/GRAPH. If VPS encounters a SYSOUT dataset for this printer with this SYSOUT class, VPS will build the appropriate data streams required to print the graph on the VPS printer.

Valid Values: From 1 to 8 valid SYSOUT classes.

Default: None.

Example: SASCLASS=S

This specification indicates that any class "S" dataset printed by VPS on this printer should be processed as a SAS dataset.

Note: Only SAS/GRAPH output can be put in the specified class. Other datasets in this class will cause the printer to be EDRAINED.

The class(es) specified in this keyword must be among the classes normally processed by the printer. This keyword does not add to the list of classes selected by the printer.

"SAS/GRAPH Processing" on page 6.32 gives more information about VPS' processing of SAS/GRAPH datasets.

SASOPTD
in PRINTER DEFINITION MEMBER

SASOPTD= Specifies what modifications VPS should make to the SAS/GRAPH data stream prior to sending it to the VPS printer. These modifications are independent of the restructuring done for improved print speed. Specify 2 digits that represent a single hex byte of 8 option bits. The effect of having each bit on is:

80 = Specifies that VPS should verify that the form is at the top margin prior to sending the graph. The SAS/GRAPH data stream has no provision for this. VPS will then add a form feed to the data stream.

40 = Specifies that VPS should eliminate the form feed from the end of the SAS/GRAPH data stream. This form feed can cause extra blank pages between output datasets.

20 = Specifies that VPS should attempt to identify and eliminate the SAS/GRAPH header page from the data stream. VPS separators can then be used if so desired.

10 = Undefined

08 = Undefined

04 = Undefined

02 = Undefined

01 = Undefined

Valid Values: 00 - FF

Default: 00

Example: SASOPTD=A0 (recommended value)

This specification indicates to VPS that it should guarantee proper forms alignment prior to printing the graph and eliminate the SAS/GRAPH header.

SASOPTP
in PRINTER DEFINITION MEMBER

SASOPTP= Specifies how the printer is to operate when printing a SAS/GRAPH dataset. Specify 2 digits that represent a single hex byte of 8 option bits. The effect of having each bit on is:

80 = Specifies that a READ PARTITION QUERY should be done prior to sending the output. The results of the RPQ are then checked against the requirements of the graph to verify the printer has the capabilities needed to correctly print this graph. VPS will EDRAIN the printer if the check fails.

40 = Specifies that VPS should verify that the NODENAME specified on the SAS/GRAPH DEVADDR parameter matches the LUNAME of this VPS printer. This option can be used to protect secured data from being routed via JES commands to some other printer. However, not doing the verification allows graphs to be redirected to a different printer after the primary printer has failed. VPS will EDRAIN the printer if the name does not match.

20 = Specifies that VPS should restructure the graph data stream to allow it to print faster. The restructuring does not alter the graph in any way. This option is given primarily because of known microcode problems in IBM equipment that will fail if the data is sent in a high speed data stream.

10 = Specifies that VPS should automatically switch an SCS (LU-1) printer to 8 lines per inch and SASPLEN lines prior to sending the graph. FCB=Y must be specified as a prerequisite. This is required for SAS/GRAPH output.

08 = Undefined.

04 = Undefined.

02 = Undefined.

01 = Indicates that any SYSOUT dataset which has a writer name of SASWTR should be processed as a SAS dataset, even if the SYSOUT class of the dataset is not one of those specified as a SASCLASS.

Valid Values: 00 - FF

Default: 00

Example: SASOPTP=B0 (recommended value)

This specification indicates to VPS that it should query the printer, use the restructured data stream and switch the printer to 8 LPI and “SASPLEN” lines per page. It also indicates that VPS should not verify the NODENAME.

SASPLEN
in PRINTER DEFINITION MEMBER

SASPLEN= Specifies the number of lines (at 8 LPI) on a page for SAS graphs.

Valid Values: 00 - 102 for IBM-3287 and IBM-3287 look-alike printers

00 - 127 for other printers

Default: 88

Example: SASPLEN=68

This specification indicates to VPS that the number of lines on a page for SAS graphs is 68.

Note: FCB=Y must be specified, and the first positional value of the SVFACTN keyword must be “Y”.

SEPAR
in PRINTER DEFINITION MEMBER

SEPAR= Specifies, via 6 positional parameters, the characteristics of separator pages, if any, that should be printed.

Positional parameter 1 indicates when separator pages should be printed.

Valid Values: S = Start separators only.

E = End separators only.

B = Both start and end separators.

N = No separators.

Default: B

Positional parameter 2 specifies the name of the separator load modules to be used for formatting the separators for this printer.

Valid Values: Any valid 1 to 8 character member name of a separator load module in the VPS load module library.

Default: VPSSSEPR

Positional parameter 3 indicates whether separator pages, if any, should be printed for each job, each output group, each dataset, or each copy of the dataset.

Valid Values: JOB

OUTGRP

DATASET

COPYDS

Default: JOB

Note: VPS defines an output group as one or more datasets with the same SYSOUT characteristics (i.e., jobname, job ID, class, destination, form name, writer name, FCB, UCS, output group name and output group ID).

When using PSO (SAPI=N or SAPI unavailable), output group name and output group ID are only considered when VPS is executing on a JES2 system with VPS User Exit 24 enabled.

JOB and OUTGRP separators are ignored for TCP/IP printers using LPR/LPD or Email protocols.

Positional parameter 4 indicates the WRITER name associated with the "news" SYSOUT dataset to be printed at the end of the separator pages.

Valid Values: Any 1 to 8 character name.

Default: None.

Positional parameter 5 indicates the JOB name associated with the "news" SYSOUT dataset to be printed at the end of the separator pages. Specifying a JOB name requires specifying the "news" writer name. The JOB name associated with the "news" must be unique.

Valid Values: Any 1 to 8 character name.

Default: None.

SEPAR
in PRINTER DEFINITION MEMBER

Positional parameter 6 specifies the tracing options in effect for the separator. This parameter is specified as a two-digit number, representing one hex byte. The trace bit specifications are as follows:

80 = Normal separator routine tracing (results in a trace entry created before the separator routine is invoked and a trace entry after the separator routine returns).

40 = Undefined.

20 = Undefined.

10 = Undefined.

08 = Undefined.

04 = Trace all control blocks passed to the separator routine.

02 = Undefined.

01 = Tracing active (tracing entries will be created for GTF).

Valid Values: 00 - FF

Default: 00

Example 1: SEPAR=(B,VPSSSEP2,DATASET,VPSNEWS,NEWSJOB,80)

This specification indicates that VPS should print separators on this printer before and after every SYSOUT dataset, that the separator routine to be used is named VPSSSEP2, that the news SYSOUT dataset located on the JES spool with a WRITER name of VPSNEWS and a JOB name of NEWSJOB should be appended to each separator page, that normal and trace entries should be created, and that all control blocks passed to the separator routine will be GTF traced.

Example 2: SEPAR=N

This specification indicates that VPS should not print separator pages on this printer.

Notes: Specifying GTF tracing as active does not create additional trace entries; it indicates that any system trace entries being created should also be recorded in the GTF file.

For any SEPAR tracing to occur for a printer, the first parameter of the printer definition TRACE keyword must be set to 'Y'.

If COPYDS is specified in any of the following circumstances, the separator routine will be called at the beginning and/or end of each dataset, but will not be called for each copy of the dataset:

- SYSOUT files sent to PageCenter (only one copy is sent).
- SYSOUT files which are converted to IPDS, MODCA, PCL, or PDF.
- SYSOUT files which are in a class specified as IPDCLASS.

SEPINFO
in PRINTER DEFINITION MEMBER

SEPINFO= This parameter allows the specification of up to eight characters of data that will be passed to the VPS separator routines and to printer related VPS exits. If you code your own separator routines or printer exits, or modify the ones supplied with VPS, this parameter provides the ability to pass meaningful data to those routines.

Valid Values: Any character string from 1 to 8 characters in length.

Default: None.

Example: SEPINFO=XEROX

This specification would cause the character string of "XEROX" to be passed to the separator routines and printer related VPS exits. (Those routines could be coded to take some action, depending upon the value of the SEPINFO field).

Note: This release of VPS also supports a 60-character field named UDATA and a 16-character field named DEVTYPE, both of which can also be used to pass information to printer-related exits.

SEPTYPE
in PRINTER DEFINITION MEMBER

SEPTYPE= Specifies whether separator pages should be converted and printed by VPS/IPDS or VPS/PCL and whether separator page conversion errors should cause the printer to be EDRAINed or should just be ignored (and the separator page not printed).

Positional parameter 1 specifies whether separator pages should be converted and printed by VPS/IPDS or VPS/PCL.

Valid Values: STD specifies that the separator pages should not be converted to IPDS or PCL.

AFP specifies that the separator pages should be converted to IPDS or PCL. All separator pages will be converted when this option is set, even if the current print dataset does not require AFP conversion.

Default: STD

Positional paramter 2 specifies whether the printer should be EDRAINed when a separator page conversion error occurs, or whether the error should just be ignored and the separator page not printed.

Valid Values: EDR specifies that the printer should be EDRAINed following a separator page conversion error.

IGN specifies that separator page conversion errors should be ignored. The separator page will not be printed.

Default: EDR

Example: SEPTYPE=(AFP,IGN)

This specification indicates that separator pages should be converted and printed by VPS/IPDS or VPS/PCL, and that separator page conversion errors should be ignored.

Notes: SEPTYPE=AFP can only be specified if CONVTYPE=IPDS or CONVTYPE=PCL is also specified.

SEPTYPE=AFP cannot be specified if COMMTYPE=(,EMAIL) is specified.

SEPTYPE=AFP must be specified for TCP/IP IPDS printers (CONVTYPE=IPDS and COMMTYPE=(TCPIP,SOK)) when separators are active.

SERVER
in PRINTER DEFINITION MEMBER

SERVER= Specifies the name of the LRS/MVS Server started task that the printer is to be connected to. This keyword is required for all PageCenter printers and for all other printers that are to be controlled using VMCF. The LRS/MVS Server started task is not required to be active in order to activate a printer that names the started task using this keyword. However, the printer cannot be controlled using VMCF while the LRS/MVS Server is inactive, and output destined to a PageCenter printer will not be selected from the JES spool until the LRS/MVS Server started task is active. See "Client/Server Architecture" on page 1.10 for an overview of the LRS/MVS Server and its functions. For additional information about the LRS/MVS Server, see the VMCF Installation and Operation Manual.

Valid Values: The name of an LRS/MVS Server started task.

Default: None.

Example: SERVER=VSV01

This specification indicates that the printer will be attached to the LRS/MVS Server VSV01.

SMF
in PRINTER DEFINITION MEMBER

SMF= Specifies whether VPS should write SMF type 6 records reflecting the SYSOUT that it prints.

Valid Values: Y or N

Default: Y

Example: SMF=N

This specification indicates that SMF type 6 records should not be written for this printer.

Note: This release of VPS writes an SMF type 6 record every time VPS encounters a dataset which has a job name, job ID, destination, class, form, or writer name which differs from the dataset just processed. This emulates JES' method of writing an SMF record for each output group.

VPS writes SMF type 6 records as follows:

- Change in SYSOUT characteristics.
- End of Job.
- Job interrupted or error printing dataset.
- Each AFP dataset processed.

SNAP
in PRINTER DEFINITION MEMBER

SNAP= Specifies whether VPS should automatically take a snap dump when this printer encounters an unrecoverable error situation.

Valid Values: Y or N

Default: Y

Example: SNAP=N

This specification would signify that VPS should not automatically generate snap dumps.

STGCLASS
in PRINTER DEFINITION MEMBER

STGCLASS= Specifies the SYSOUT class(es) of datasets that should always be staged to the VPS staging dataset, regardless of size.

Valid Values: From 1 to 8 valid SYSOUT classes or *.

Default: None.

Example 1: STGCLASS=S

This specification would signify that VPS should always stage any dataset for this printer which is in SYSOUT class “S”.

Example 2: STGCLASS=*

This specification would signify that VPS should always stage any dataset for this printer, regardless of SYSOUT class.

Note: The class(es) specified in this keyword must be among the classes normally processed by the printer. This keyword does not add to the list of classes selected by the printer.

Only datasets in the STGCLASS class(es) will be passed to VPS User Exit 22. See “Exit 22: Staging Exit” on page 5.55 for more information.

SVFACTN
in PRINTER DEFINITION MEMBER

SVFACTN= Specifies, via three positional parameters, actions pertaining to setting formats for an SCS (LU-1) printer.

Positional parameter 1 specifies whether or not the "Set Vertical Format" (SVF) and "Set Line Density" (SLD) commands are to be sent to this printer when FCB support is in effect.

Valid Values: Y or N

Default: Y

Positional parameter 2 indicates whether or not a form feed should be sent prior to the SVF command.

Valid Values: Y or N

Default: Y

Positional parameter 3 indicates the type of action to be taken at the end of a VTAM session (CLSDST).

Valid Values:
- Y = Reset SVF and SLD to machine defaults prior to CLSDST.
- N = Do not reset SVF and SLD prior to CLSDST.
- F = Reset vertical format, based on default FCB.

Default: Y

Example: SVFACTN=(Y,Y,N)

This specification indicates that the SVF and SLD commands should be sent to the printer, that a formfeed should be inserted before the initial SVF, and that the vertical format should not be reset before CLSDST.

Note: The IBM 3287 printer resets the page length to 1 rather than to the value in the operator panel. For these devices, we recommend that the third positional parameter be set to "N" or "F".

TCPDISC
in PRINTER DEFINITION MEMBER

TCPDISC= Specifies, via three positional parameters, what steps VPS/TCPIP should take when releasing the connection to a remote device.

Positional parameter 1 specifies whether or not VPS/TCPIP should issue the SHUTDOWN call before terminating the TCP/IP connection for this printer.

Valid Values: Y or N

Default: N

Positional parameter 2 specifies whether or not VPS/TCPIP should issue the CLOSE call to terminate the TCP/IP connection for this printer. Bypassing the CLOSE call causes an abnormal termination of the connection.

Valid Values: Y or N

Default: Y

Positional parameter 3 specifies the time in minutes and seconds that VPS/TCPIP should wait after a TCP/IP connection has been terminated before attempting to reconnect to deliver another print file.

Valid Values: 0000 to 5959

Default: 0000 (VPS should not wait after disconnect.)

Example: TCPDISC=(Y,Y,0005)

This example indicates that VPS should use the SHUTDOWN call to notify the remote host that VPS will not send any more data, that VPS should end the connection normally with the CLOSE call, and that after the connection is terminated, VPS will wait 5 seconds before attempting to reconnect to deliver another print file.

Note: TCPDISC=(Y) replaces TCPOPTS=00004000.

TCPDISC=(,N) replaces TCPOPTS=01000000.

TCPDISC=(,,0010) replaces TCPOPTS=02000000.

TCPHOST
in PRINTER DEFINITION MEMBER

TCPHOST= Specifies the host name or Internet address of a remote TCP/IP host. The name can be specified if using MVS TCP/IP from Interlink Computer Sciences (TCPTYPE=ICS), IBM TCP/IP at V3R1 (TCPTYPE=IBM310), IBM TCP/IP at V3R2 (TCPTYPE=IBM320), or IBM TCP/IP at V3R4 (TCPTYPE=IBM340).

Valid Values: One of the following must be specified:

- A 1 to 15 character IP address, in "dotted decimal" format. The IP address of the host is specified as a series of 4 numbers, separated by periods. Each number must be in the range of 0 to 255. (This format can be used regardless of the value of the TCPTYPE= keyword.)
- For TCPTYPE=ICS, a 1 to 60 character host name.
- For TCPTYPE=IBM310, a 1 to 24 character host name.*
- For TCPTYPE=IBM320, a 1 to 24 character host name.*
- For TCPTYPE=IBM340, a 1 to 24 character host name.*

Default: None.

Example 1: TCPHOST=192.5.250.50

Example 2: TCPHOST=LRS1.BXL.LRS.COM

Note: This keyword is required if VPS/TCPIP is installed and the printer is defined with COMMTYPE=(TCPIP,xxx).

* With USEROPTS=0400, the TCPHOST name is allowed to be up to 60 characters in length.

TCPLPORT
in PRINTER DEFINITION MEMBER

TCPLPORT= Specifies a range or multiple ranges of ports to attempt to use as the LOCAL port number for the TCP/IP connection. The port number, along with the IP address of the local MVS host, will become the local address of VPS during the connection. See "How VPS/TCPIP Uses TCP/IP Ports" on page 10.19 for more information about VPS/TCPIP's use of ports.

Valid Values: 1 to 6 positional parameters; each value can be between 1 and 65535 or a range of numbers from 1 to 65535.

Default: 721-731

Example 1: TCPLPORT=(722,724)

This specifies that VPS should attempt to connect to the TCP/IP address space using port 722. If that is not successful, VPS should attempt to connect using port 724.

Example 2: TCPLPORT=(725-727,731)

This specifies that VPS should attempt to connect to the TCP/IP address space using ports 725 through 727. If none of those ports are available, 731 should be tried.

Note: This keyword is used only if VPS/TCPIP is installed and the KEYTCP and TCPIPID keywords are specified.

If ports or ranges of ports are specified, it is recommended that they be in the range of 721 to 731. A remote TCP/IP Line Printer Daemon (LPD) may reject print requests made from ports that are not in the range of 721 to 731.

If the port number is specified and the IBM TCP/IP product for MVS is used (TCPTYPE=IBM310, IBM320, or IBM340) a port number can be reserved in the MVS TCP/IP configuration file. See "Adding System Keywords for VPS/TCPIP" on page 10.5 for more information.

TCPMRD
in PRINTER DEFINITION MEMBER

TCPMRD= A two-byte field which represents the time interval in minutes for VPS to wait for a TCP/IP request to complete. If the request does not complete within this interval, the connection will be terminated and the printer will be EDRAINED.

Valid Values: 00 to 59 (minutes)

Default: 00 (never time out)

Example: TCPMRD=05

This specification indicates to terminate the connection to the remote TCP/IP host and EDRAIN the printer if any TCP/IP request does not complete within 5 minutes.

Note: This keyword requires a 2-digit value; for example, TCPMRD=5 would not be valid.

TCPOPTS
in PRINTER DEFINITION MEMBER

TCPOPTS= A four byte hex representation of special printer options to be in effect for this TCP/IP printer. The value is specified as eight digits, representing four hex bytes (32 option bits). The TCP/IP printer option bit specifications are:

80000000 = Print banner (burst) page at remote printer.

VPS will send the "L" record in the control file which requests that the remote host add a banner or burst page when printing the file. When the "L" record is sent, a job record ("J") and a class record ("C") are also sent. In addition to this banner page, VPS can add separators before or after each dataset, based on the SEPAR keyword. This value is ignored unless the printer is using LPR/LPD protocols.

40000000= Do not wait for final acknowledgement.

VPS will not wait for the "last" acknowledgement that confirms the dataset has been successfully processed, but will consider the file complete when the acknowledgement is received for the end of the file. This value is used for the following:

COMMTYPE=(TCPIP,LPD)

COMMTYPE=(TCPIP,ANYQUEUE)

WARNING: This option should not be specified unless the receiving device will never send the "final" acknowledgement or file confirmation.

20000000 = Send data file before control file.

Normally, VPS will send the control file, followed by the data file. However, some remote LPD implementations require the control file to follow the data file. This option allows the files to be sent in the same order as the TSO LPR command. This value is ignored unless the printer is using LPR/LPD protocols.

10000000 = Send mail control command record.

VPS will send the mail control record ("M") in the control file. If the mail request is supported by the remote host, a notification will be sent by that host to the user named on the mail record when the dataset has been printed. This value is ignored unless the printer is using LPR/LPD protocols.

The name in the mail record is set to the first of the following fields that is available:

1. NOTIFY from the OUTPUT statement.

2. TPUTUSER name from the VPS printer definition.

If neither is available, the mail control record name will indicate "SAMPUSER".

TCPOPTS
in PRINTER DEFINITION MEMBER

The mail record can be modified by VPS User Exit 25. A special exit is available that sets the MAIL record to one of the following:

1. PROGRAMMER NAME from the JOB JCL statement.
2. TSO NOTIFY value from the JCL.
3. JOB name.

VPS User Exit 25 can also remove the "bypass" flag to allow VPS to send the mail record, regardless of the TCPOPTS value.

08000000 = Send form feed sequence at end of dataset.

Since VPS does not perform normal end-of-job processing for TCP/IP printers, but considers each dataset as a separate job, specifying an end-of-job formfeed in the AUTOEJCT keyword has no effect. If the printer needs a form feed at the end of the dataset, this option allows inserting that form feed. This final form feed will be added after end separators and/or exit 14 data. This value is ignored unless the printer is using LPR/LPD protocols.

04000000 = Use RELREQ to close connection.

This forces VPS to use the RELREQ option in the printer definition to decide when to terminate a connection. Normally, VPS closes the connection after each dataset is sent to the remote host.

Most or all TCP/IP LPD implementations require the connection to be closed in order to print the report. If the connection is kept open and another control file is delivered, the remote LPD may refuse to print. Specifying TCPOPTS=04000000 is not recommended. This value is ignored unless the printer is using LPR/LPD protocols.

02000000 = Replaced by TCPDISC keyword.

01000000 = Replaced by TCPDISC keyword.

00800000 = Bypass EDRAIN for TCPMRD interval expiration.

Normally, VPS would EDRAIN a printer if the TCPMRD interval had expired while VPS was waiting for a request to complete. However, if acknowledgments were received for the data file and for the control file, and VPS is merely waiting for the "last" acknowledgment that confirms the dataset has been printed or queued, this option will cause VPS to continue as if the "last" acknowledgment had been received.

WARNING: This option could cause loss of data if the remote LPD had received both the data file and the control file, but had not yet printed them. VPS will consider the file printed successfully and delete it from the JES spool. This value is ignored unless the printer is using LPR/LPD protocols.

00400000 = Eliminate form feed sequence at beginning of dataset.

If the TCP/IP Line Printer Daemon (LPD) forces a page eject (form feed) after a file has been sent to the printer, VPS is not aware that the printer is now at top of form. If the next dataset that VPS prints has a carriage control byte that requests a skip to top of page (a "1" in column 1, for example), VPS will send the form feed sequence to the printer. This option allows VPS to set the current line count to 1 after a dataset is printed. If the second and third AUTOEJCT parameters are set to "N", VPS will remember across sessions and jobs that the printer is at top of form, and will not send a form feed sequence when the next dataset is delivered. This value is ignored unless the printer is using LPR/LPD protocols.

00200000 = Send "l" filter, not "f" filter.

Some TCP/IP LPD devices require the "l" control filter to allow passing printer control sequences to the printer. If this option is specified, VPS will substitute the "l" filter instead of the "f" filter. VPS will process the printer file in the same way as when the "f" filter is sent. This value is ignored unless the printer is using LPR/LPD protocols.

00100000 = Process multiple copies by sending the dataset multiple times. (By default, VPS/TCPIP sends the dataset one time, and sends multiple filter records for the multiple copies.) This value is ignored unless the printer is using LPR/LPD protocols.

00080000 = Do not use leading zeroes in byte count fields in data file, control file, or subcommand records. This value is ignored unless the printer is using LPR/LPD protocols.

00040000 = Clear TCPHOST address for each connection.

00020000 = Never send control file.

For devices using LPR/LPD protocol, VPS will bypass sending the control file. This option is ignored unless COMMTYPE=(TCPIP,LPD).

00010000 = Send -O records in LPD control file.

00008000 = Request ACK before disconnection.

VPS will send an ACK before the connection is closed. Some TCP/IP devices require a notification that the connection will be released. VPS will then wait for the ACK to return from the remote host, unless TCPOPTS=40000000 is set.

00004000 = Replaced by TCPDISC keyword.

TCPOPTS
in PRINTER DEFINITION MEMBER

00002000 = Use printer job numbers, not system.

The jobs numbers used to identify the control file and the data file to be printed at the remote host are normally set on a system-wide basis. The first number is selected at random, and the following numbers are incremented by 1. If this option is set, the job numbers will be set for each printer, and will be sequential for that VPS printer definition. This value is ignored unless the printer is using LPR/LPD protocols.

00001000 = Do not attempt to use system port first.

This option allows trying ports in a specific order without attempting to use the system port first.

VPS uses the TCPPORT system keyword to select a port to connect to the MVS TCP/IP address space during VPS initialization. Without TCPOPTS=00001000, the system port can be used for all printer connections, if that port is in the range defined for this printer in the TCPLPORT keyword.

If an "ADDRESS IN USE" error occurs, all ports in the range defined for this printer will be attempted, regardless of the specification of this option.

00000800 = Always bump to next available local port in table.

VPS normally attempts to use the local ports available from the TCPLPORT keyword, beginning with the first port in the table. This option indicates to VPS to remember the last port used in the table and always bump to the next available port in the table.

00000400 = Bump to next available local port if printer was EDRAINED.

VPS normally attempts to use the local ports available from the TCPLPORT keyword, beginning with the first port in the table. This option indicates to VPS to remember the last port used in the table if the printer encounters an error and is EDRAINED. When the printer is restarted, VPS will bump to the next available port in the table.

00000200 = Ignore the PORTNO keyword on the OUTPUT statement when processing print files with DEST=<IP>.

VPS normally uses the PORTNO specified on the OUTPUT statement to replace the TCPRPORT value specified in the printer definition when processing files with an IP address in the DEST field. This option indicates that VPS should ignore the PORTNO from the OUTPUT statement and always use the port specified by the TCPRPORT keyword.

00000100 = Ignore the PRTQUEUE keyword on the OUTPUT statement when processing print files with DEST=<IP>.

VPS normally uses the PRTQUEUE specified on the OUTPUT statement to replace the TCPRPRTR value specified in the printer definition when processing files with an IP address in the DEST field. This option indicates that VPS should ignore the PRTQUEUE from the OUTPUT statement and always use the printer name specified by the TCPRPRTR keyword.

00000080 = Transmit data buffer to remote printer to identify sender.

This option requests that VPS send a special buffer to the printer when the printer is connected to VPS and before any data is delivered. This buffer contains fields with information to identify the sender of the job; the fields can be modified by VPS User Exit 25. This special buffer should only be used with TCPRPORT=9400, and is only supported with COMMTYPE=(TCPIP,SOK). For more information about sending this buffer when using COMMTYPE=(TCPIP,SOK), see "TCP/IP Printers Using Port 9400" on page 10.11.

00000040 = Send PCL memory status command to printer.

This option causes VPS to send a PCL command to the printer to request memory status each time that a definite response is requested from the printer. The available memory value returned from the printer is saved for debugging purposes. This option is only supported if COMMTYPE=(TCPIP,SOK).

00000020 = Bypass the ECHO/STATUS command when using the direct sockets interface.

This option is provided to allow the direct sockets interface to be used with devices that do not support the ECHO/STATUS command. If the remote device supports these commands, LRS does NOT recommend the use of this option.

VPS uses the ECHO/STATUS command to obtain confirmation from the remote device that the output has been successfully delivered to the device. If this option is enabled, no request for confirmation is obtained and VPS cannot guarantee the successful delivery of the output. Consequently, this option should be enabled only when absolutely necessary.

TCPOPTS
in PRINTER DEFINITION MEMBER

00000010 = Send PCL “FLUSH ALL PAGES” command.

VPS normally sends the PCL “ECHO” command to a printer to request acknowledgement when COMMTYPE=(TCPIP,SOK) is specified. This option indicates that VPS should send the PCL “FLUSH ALL PAGES” command to the printer before the “ECHO” command. This option is ignored unless COMMTYPE=(TCPIP,SOK) was specified for the printer.

CAUTION: Because the printer will not respond to the PCL “ECHO” command until all pages sent up to that time have been printed, and VPS is waiting for the “ECHO” response before sending more data, setting CKPTPAGE to a small number to require acknowledgments during the delivery of the document and using this option to send the “FLUSH ALL PAGES” command may increase significantly the time required to deliver print data to the printer.

00000008 = Specify KEEPALIVE for TCP/IP connection.

When VPS connects to the remote printer, this option will indicate to the MVS TCP/IP product that the KEEPALIVE function should be active for this connection.

00000004 = Undefined.

00000002 = Send FORM name in JIF sender’s user name field.

00000001 = Undefined.

Valid Values: 00000000-FFFFFFFF

Default: 00000000

Example: TCPOPTS=90000000

This specification indicates that VPS should send the special control command record which requests that the remote host add a banner or burst page when printing the document and the control record which requests that mail be sent when the report is printed.

Note: This keyword requires that the VPS/TCPIP product be installed, and should only be specified for printers with COMMTYPE=(TCPIP,xxxxx).

TCPPRTR
in PRINTER DEFINITION MEMBER

TCPPRTR= Specifies the name of the printer at the remote TCP/IP host for LPD protocol or the email address of a default recipient for VPS/Email definitions.

Valid Values: Any alphanumeric specification from one to 60 characters in length. Both upper and lower case letters are allowed as well as most punctuation characters, such as the dash, slash, and underscore.

Default: The member name of this printer definition member.

Example: TCPPRTR=main_prtr

Note: For COMMTYPE=(TCPIP,LPD), the TCPPRTR value should match the print queue name, which is normally case-sensitive. The name specified in the VPS printer definition as the value of TCPPRTR must be in lower case if the name is specified in lower case at the remote TCP/IP device.

For COMMTYPE=(TCPIP,EMAIL), the TCPPRTR value should be the email address of someone who should receive 'lost mail', and mail will be sent to this email address if no primary recipient is specified in the JCL. If MAILOPTS=00400000 is specified, the TCPPRTR value is ignored and the printer will be EDRAINED or the SYSOUT file will be requeued based on the 4th parameter of the ERRACTN keyword when no primary recipient is specified in the JCL.

This keyword is ignored unless COMMTYPE=(TCPIP,LPD) or COMMTYPE=(TCPIP,EMAIL) is specified.

TCPRPORT
in PRINTER DEFINITION MEMBER

TCPRPORT= Specifies the port number to connect to at the remote TCP/IP host.

Valid Values: 0 - 65535

Default: 515

Example: TCPRPORT=1234

This specification indicates to connect to port 1234 at the remote host named in the TCPHOST keyword.

Note: For a TCP/IP Line Printer Daemon (LPD), the port should always be 515.

For COMMTYPE=(TCPIP,SOK), the remote port number should be set based on the type of printer installed. For many devices, the remote port for a direct TCP/IP connection is 9100. For Lexmark printers using encryption, the remote port should be specified as 9151 when using the persistent key and 9152 when using a dynamic key. For printers using ISPP encryption, the remote port should be specified as 9111 unless the configuration at the printer has been modified to define a different port. (See the ENCRYPT printer keyword on page 3.135 for more information.)

For VPS/PC for Windows running TCP/IP, the TCPRPORT should match the value specified at the Windows PC.

For VPS/Email, the TCPRPORT should be specified as 25.

This keyword is only used if the VPS/TCPIP product is installed, and should only be specified for printers with COMMTYPE=(TCPIP,xxxxx).

TPUTUSER
in PRINTER DEFINITION MEMBER

TPUTUSER= Specifies a TSO userid that will receive all VPS console messages related to this printer, as well as all VPS system related console messages. This specification does not preclude the messages from being displayed on the MVS console, but rather signifies to VPS that messages should be sent to the Time Sharing User in addition to being displayed on the console.

Valid Values: Any valid TSO Userid.

Default: None.

Example: TPUTUSER=LRS001

This specification indicates that all console messages related to this printer should be sent to this TSO Userid in addition to being displayed on the MVS console.

TRACE
in PRINTER DEFINITION MEMBER

TRACE= Specifies, via three positional parameters, if tracing is to be active for this printer, the type of tracing to be performed when tracing is active, and additional tracing options for VPS/PDF.

Positional parameter 1 specifies whether or not the VPS internal trace facility should be active for this printer. This parameter should generally be specified as Y, so that the required trace information will be available if needed for problem diagnosis. VPS internal tracing requires minimal system overhead.

Valid Values: Y or N

Default: Y

Positional parameter 2 is a one byte hex representation that specifies the types of printer events, in addition to those that are always traced, to be traced by VPS. The trace type bit specifications are as follows:

- **80** = Normal printer tracing.
- **40** = Detail printer tracing.
- **20** = Undefined.
- **10** = Exit tracing (printer related).
- **08** = VTAM entry/exit.
- **04** = GTF trace buffers sent to printer.
- **02** = Storage management.
- **01** = GTF tracing active.

Valid Values: 00 - FF

Default: 00

Example 1: TRACE=(Y,09)

This specification indicates that tracing should be on for this printer, that VTAM entry and exit should be traced, and that printer trace entries should be recorded in the GTF file.

Example 2: TRACE=N

This specification indicates that internal tracing of VPS events should not be performed for this printer.

Note: See "Trace Options in VPS" on page 6.42, "Internal Trace Table" on page 15.6, and "External Trace Recording in GTF Trace Files" on page 15.7 for information about tracing in VPS. Specifying GTF tracing as active does not create additional trace entries; it indicates that any trace entries being created should also be recorded in the GTF file.

Positional parameter 3 is a four byte hex representation that specifies additional tracing options for VPS/PDF. The trace type bit specifications are as follows:

80000000 = Pre-processing.

40000000 = Text processing.

20000000 = Font processing.

10000000 = Image processing.

08000000 = Barcode processing.

04000000 = Graphics processing.

02000000 = Page processing.

Default: 00000000

Example 3: TRACE=(Y,05,20000000)

This specification indicates that tracing should be on for this printer, that buffers should be traced, and that printer trace entries should be recorded in the GTF trace file. It also indicates that AFP to PDF font conversion trace entries should be created.

TRAILBLK
in PRINTER DEFINITION MEMBER

TRAILBLK= Specifies whether VPS should retain trailing blanks on print lines.

Valid Values: Y or N

Default: N

Example: TRAILBLK=Y

This specification indicates to VPS to keep trailing blanks on print lines.

Note: There are some special instances where trailing blanks should not be truncated, but in normal circumstances, this parameter should be allowed to default to TRAILBLK=N.

TRNCLASS
in PRINTER DEFINITION MEMBER

TRNCLASS= Specifies, via 5 positional parameters, when transparency should be used for this printer.

Positional parameter 1 specifies from 1 to 8 SYSOUT classes to indicate when transparency is to be used for this printer. When VPS is processing datasets in one of these SYSOUT classes, transparency will be inserted into the output as specified by the other parameter values.

Valid Values: From 1 to 8 valid SYSOUT classes or * (all classes).

Default: None.

Positional parameter 2 specifies the method of transparency to be used for this printer.

Valid Values: C, B, S, or T

- C = Character transparency. Use a transparency character and a one-byte length field.
- B = Buffer transparency. Start each VTAM buffer with the transparency character string.
- S = Start/stop transparency. Start each line with a transparency character string and end each line with a second character string.
- T = TCP/IP transparency. No characters will be inserted into the data to indicate transparency, no line control characters will be inserted, and no translation will be performed on the data.

Default: C

Positional parameter 3 is a 1 to 8 byte hex representation that specifies the character(s) to use to begin transparency.

Valid Values: 00 - FF for each byte

Default: None if second parameter value is “B” or “S”

35 if second parameter value is “C”

Positional parameter 4 is a 1 to 8 byte hex representation that specifies the character(s) to use to end transparency.

Valid Values: 00 - FF for each byte.

Default: Same as third parameter value if second parameter value is “S”.

Not allowed if second parameter value is “B” or “C”.

Positional parameter 5 indicates whether SYSOUT files with PRMODE=BINARY should be processed as transparent.

Valid Values: Y or N.

Default: Y

TRNCLASS
in PRINTER DEFINITION MEMBER

Example 1: TRNCLASS=(*,C)

This specification would signify that for all SYSOUT datasets, VPS should start each line with the transparency character X'35' and a one-byte length field. The transparency character and length will be inserted multiple times by VPS if the data line is longer than 255 bytes.

Example 2: TRNCLASS=(T,C,36)

This specification would signify that for all SYSOUT datasets in class "T", VPS should start each line with the transparency character X'36' and a one-byte length field. The transparency character and length will be inserted multiple times by VPS if the data line is longer than 255 bytes.

Example 3: TRNCLASS=(Z,B,05C5D399)

This specification would signify that for all SYSOUT datasets in class "Z", VPS should start each VTAM buffer with the transparency characters X'05C5D399'.

Example 4: TRNCLASS=(PQR,S,7777,7878)

This specification would signify that for all SYSOUT datasets in classes "P", "Q", and "R", VPS should start each line with the transparency characters X'7777'. At the end of each line, VPS should add the transparency characters X'7878'.

Example 5: TRNCLASS=(XY,T,,,N)

This specifies that all SYSOUT datasets in classes "X" or "Y" should be considered as transparent, but that files with PRMODE=BINARY should not be considered as transparent.

Notes: If you specify the second positional parameter value as "C", the third parameter value can be only one byte in length, and the fourth parameter value is not allowed.

If you specify the second positional parameter value as "B", the third parameter value can be 1 to 8 bytes in length, and the fourth parameter value is not allowed.

If you specify the second positional parameter value as "S", the third and fourth parameter values can each be from 1 to 8 bytes in length.

If you specify the second positional parameter value as "T", the third and fourth parameter values are not allowed.

If PRTROPTS=00040000 is specified for a printer, the third positional parameter value (or its default value, if not specified) will be inserted before the CR,LF.

The VPS/PCL product uses the second, third, and/or fourth positional parameter values of the TRNCLASS keyword to apply transparency to PCL created by that product.

The only type of transparency supported for VPS/Email devices is TCP/IP transparency. If the second positional parameter is specified as 'B', 'C', or 'S' for VPS/Email printer definitions, VPS will modify the transparency type to 'T' during printer activation, and a message will be issued.

TRUNCATE
in PRINTER DEFINITION MEMBER

TRUNCATE= Specifies the maximum print line length that VPS should allow to be printed on the printer. This parameter applies to data characters only. Carriage control and APL graphic escape characters are not counted. Any data in columns higher than the truncate column are discarded. A specification of zero (0) indicates no truncation.

Valid Values: 0 - 32760

Default: 0

Example: TRUNCATE=132

This specification indicates that VPS should discard all data characters beyond column 132.

Note: TRUNCATE=0 is not allowed for VPS/Email printers. For SMTP email message text, no line may exceed 1000 bytes, including the new line sequence. VPS will set TRUNCATE=998 if TRUNCATE=0 is specified, and a message will be issued at printer activation.

UDATA
in PRINTER DEFINITION MEMBER

UDATA= Specifies from 1 to 60 bytes of user data that are passed to all printer-related exits. Examples of the type of data you may wish to specify in this parameter are the model of printer, the location of the printer, or any other characteristic that is meaningful to you.

Valid Values: Any combination of alphanumeric and national characters.

Default: None.

Example: UDATA='HP LASER ON THIRD FLOOR EAST'

This specification gives some special information related to the printer's location.

Note: If the value contains imbedded blanks or commas, it must be enclosed in single quotes, as in the example shown above.

Because the address of this keyword's value is passed to all printer-related exits, you can use it to trigger special actions in those exits. In prior releases of VPS, the SEPINFO keyword was frequently used for this purpose. You can continue to use SEPINFO, but UDATA allows much more data to be passed to the exits.

Also, this release of VPS supports a 16-character field named DEVTYPE which can also be used to pass information to printer-related exits and separator routines.

USERBIND
in PRINTER DEFINITION MEMBER

USERBIND= Specifies user data to be sent when issuing a BIND request for this printer. Up to thirty characters of data can be specified.

The USERBIND keyword can be used to pass control information via the VTAM BIND to network attached devices. For example, the Brown's Box, a device that emulates a remote 3174 that can communicate via asynchronous telecommunications links (PSTN) can use the USERBIND keyword to identify the telephone number that the Brown's Box will dial when VPS acquires a session with an LU controlled by it.

Valid Values: Any valid BIND user data.

Default: None.

Example: USERBIND=0D0D

This specification indicates that the user data X'0D0D' should be sent to this printer when requesting a session.

Note: This keyword is only valid if the printer is defined with COMMTYPE=(VTAM,xxxxx).

WFWACTN
in PRINTER DEFINITION MEMBER

WFWACTN= Specifies which action VPS is to take when there is no more work for a VPS printer.

Valid Values:
- D = VPS should drain the printer.
- I = VPS should inactivate the printer.
- N = VPS should not take any special action (the printer will return to IDLE status).

Default: N

Example: WFWACTN=D

This specification indicates that VPS should drain the printer when there is no more work.

WRITER
in PRINTER DEFINITION MEMBER

WRITER= Specifies, via two positional parameters, the special writer program names that should be used for primary and secondary SYSOUT selection for this printer.

WRITER is one of the four fields which are used to define the "selection criteria" for a printer. (See "How VPS Selects Work for a Printer" on page 6.2.)

Positional parameter 1 specifies the writer name (if any) to be used for the printer's primary selection criteria.

Valid Values: Any alphanumeric specification from one to eight characters in length or * or *BLANKS*.

Default: None.

Positional parameter 2 specifies the writer name (if any) to be used for the printer's secondary selection criteria.

Valid Values: Any alphanumeric specification from one to eight characters in length or * or *BLANKS*.

Default: None.

Example 1: WRITER=MYWTR

This specification indicates that SYSOUT that requested a special writer name of MYWTR should be selected by this printer.

Example 2: WRITER=(,AWTR)

This specification indicates that writer name is not a part of the primary selection criteria. SYSOUT with a writer name of AWTR should be selected by this printer as part of the secondary selection criteria.

Note: Coding WRITER=* indicates that the member name of this printer definition member should be used as the writer name for SYSOUT selection.

Coding WRITER=*BLANKS* indicates that only work with a blank writer name field should be selected.

XESCLASS
in PRINTER DEFINITION MEMBER

XESCLASS= Specifies the SYSOUT class(es) of datasets that should be processed by VPS/XES to AFP.

Valid Values: From 1 to 8 valid SYSOUT classes.

Default: None.

Example: XESCLASS=X

This specification indicates that any class ‘X’ dataset printed by VPS on this printer should be converted by VPS/XES to AFP.

XESOPTS
in PRINTER DEFINITION MEMBER

XESOPTS= A four-byte hex representation that specifies special user options to be used for a VPS/XES to AFP printer.

80000000 = Bypass lines containing invalid XES commands.

This option instructs VPS/XESAFP to bypass any data following an invalid XES command and continue with the next line. Normally when an invalid command is processed the UDK sequence is bypassed and the remaining text and commands on the line are processed which can result in the invalid XES command data appearing in the print out.

Note: Processing of the remainder of the line is bypassed so any text or XES commands following the invalid command will not be processed.

XESRTAB
in PRINTER DEFINITION MEMBER

XESRTAB= Specifies, via two positional parameters, the name and entry in the XES to AFP control table to be used for this printer. This table is used for XES to AFP conversion and is only applicable to printers that specify the XESCLASS keyword. See "VPS/XES to AFP" on page 9.1 for more information about this control table.

Positional parameter 1 specifies the name of the XES to AFP control table. If this value is specified, VPS will attempt to load a module with this name when the printer is activated. If a module of that name cannot be found in a library accessible to VPS, or if the module fails validity checking, the printer will not be activated.

Valid values: Any valid VPS/XES to AFP control table name.

Default: VPSSXTAB

Positional parameter 2 specifies the entry name within the control table to be used as a setup definition for this printer.

Valid values: A 1 to 8 character name of an entry in the XES to AFP control table.

Default: None. (The first setup entry in the table will be used.)

Example: XESRTAB=(COUXTACT,ENTNAME)

This indicates to VPS that this printer should use the VPS/XES to AFP control table named COUXTACT and that the ENTNAME setup definition should be used.

Installing VPS/PC, AnyQueue® or VPS/RemoteQueue

VPS/PC, AnyQueue and VPS/RemoteQueue can be installed to communicate with VPS using either TCP/IP or VTAM/APPC. If VPS/PC, AnyQueue or VPS/RemoteQueue will be using TCP/IP to communicate see "Installing VPS/PC, AnyQueue or VPS/RemoteQueue Using TCP/IP" on page 3.287. If VPS/PC, AnyQueue or VPS/RemoteQueue will be using VTAM/APPC to communicate, the following steps should be performed:

- Install VPS/PC, AnyQueue or VPS/RemoteQueue as described in their manuals. Installation will include defining the VPS/PC, AnyQueue or VPS/RemoteQueue device to VTAM. A VTAM logon mode table with an entry for APPC (LU6.2) sessions must be added. The following example shows the logon mode table parameters which are recommended:

```
LRSMODE  MODETAB
LRSAPPC  MODEENT LOGMODE=LRSAPPC,                                X
           TYPE=0,             Negotiable Bind                   X
           FMPROF=X'13',       Required for LU6                  X
           TSPROF=X'07',       Required for LU6                  X
           PRIPROT=X'B0',      Required for LU6                  X
           SECPROT=X'B0',      Required for LU6                  X
           COMPROT=X'D0B1',    Required for LU6                  X
           RUSIZES=X'8787',    1024/1024                         X
           SSNDPAC=X'3F',      Non-zero forces use of VPACING    X
           PSNDPAC=X'3F',      Can be overridden by VPS/PC,      X
                               AnyQueue or VPS/RemoteQueue       X
           SRCVPAC=X'3F',      Can be overridden by VPS/PC,      X
                               AnyQueue or VPS/RemoteQueue       X
           PSERVIC=X'060200000000000000000000'
         MODEEND
         END
```

- Change the VTAM application definition (APPL) for VPS to add APPC keywords as follows:

```
   APPC=YES,     Allow VPS to issue APPCCMD macros
   PARSESS=YES,  Must be YES, even though Session Limit Is 1
   DMINWNL=1,    VPS will win if session contention
   DMINWNR=0,    VPS/PC, AnyQueue or VPS/RemoteQueue will lose
                 if session contention
   DSESLIM=1     Session Limit of 1
```

For more information on VTAM definitions, see "VTAM Definition Requirements" on page 2.7.

- Add a VPS printer definition for the VPS/PC, AnyQueue or VPS/RemoteQueue product. For example:

```
ALOGMODE=aaaaaaa,          Note 1
COMMTYPE=(APPC,VPSPC),     Note 2
LUNAME=luname,             Note 3
CLASS=c,                   Note 4
DEST=ddddd,                Note 4
FORM=ffff,                 Note 4
WRITER=wwwwwwww            Note 4
```

Note 1: ALOGMODE is required and must specify the name of a valid VTAM logon mode entry which is located in the logon mode table (MODETAB) associated with the device by VTAM. The parameters in the logon mode entry must be those required for APPC/LU6.2.

The sample logon mode table entry above creates a logon mode table entry named LRSAPPC. If you use the example, then code ALOGMODE=LRSAPPC in your VPS printer definition. The source for this sample is also supplied as member LRSMODE in file LRS.VPS.V1R80.ASM, and the load module for this sample is supplied as member LRSMODE in file LRS.VPS.V1R80.LOAD.

For more information, see the VPS/PC or AnyQueue installation manual.

Note 2: COMMTYPE=(APPC,VPSPC) is required if using VPS/PC.

COMMTYPE=(APPC,ANYQUEUE) is required if using AnyQueue.

COMMTYPE=(APPC,RMTQUEUE) is required if using VPS/RemoteQueue.

Note 3: LUNAME is required and must specify the VTAM name which was defined for the VPS/PC, AnyQueue or VPS/RemoteQueue product.

For more information, see the VPS/PC, AnyQueue or VPS/RemoteQueue installation manual.

Note 4: Selection criteria must be specified in order for VPS to obtain output from JES and deliver it to the VPS/PC, AnyQueue or VPS/RemoteQueue product. The selection criteria must include at least one of the following:

CLASS
DEST
FORM
WRITER

Any of the values of CLASS, DESTINATION, FORM, WRITER and JOBNAME may be used to direct the output to a specific location on the LAN by VPS/PC, AnyQueue or VPS/RemoteQueue. For more information on defining the table which routes output to network locations, see the VPS/PC, AnyQueue or VPS/RemoteQueue installation manual.

For more information on VPS printer definition keywords, see "Building the Printer Definition Members" on page 3.80.

Installing VPS/PC, AnyQueue or VPS/RemoteQueue Using TCP/IP

If VPS/PC, AnyQueue or VPS/RemoteQueue will be communicating with VPS via TCP/IP, the following steps should be performed:

- Install VPS/TCPIP. The VPS/TCPIP product is required to run VPS/PC, AnyQueue or VPS/RemoteQueue with TCP/IP.
- Install VPS/PC, AnyQueue or VPS/RemoteQueue. The installation steps will include setting a PORT number and the IP address for the TCP/IP software on the PC where VPS/PC, AnyQueue or VPS/RemoteQueue is running. These values must be specified as the TCPHOST and TCPRPORT values in the VPS printer definition.
- To verify that communications routing is correct and the network is available, the PING command could be issued from the MVS host and/or from the PC.
- Add a VPS printer definition for VPS/PC, AnyQueue or VPS/RemoteQueue; for example:

```
COMMTYPE=(TCPIP,VPSPC),          Note 1
CLASS=c,                         Note 2
DEST=dddd,                       Note 2
FORM=ffff,                       Note 2
WRITER=wwwwwwww,                 Note 2
TCPHOST=192.5.252.7,             Note 3
TCPRPORT=1234                    Note 4
```

Note 1: COMMTYPE=(TCPIP,VPSPC) is required if running VPS/PC.

COMMTYPE=(TCPIP,ANYQUEUE) is required if running AnyQueue.

COMMTYPE=(TCPIP,RMTQUEUE) is required if running VPS/RemoteQueue.

Note 2: Selection criteria must be specified so VPS can obtain output from JES and deliver it to VPS/PC, AnyQueue or VPS/RemoteQueue. The selection criteria must include at least one of the following:

CLASS
DEST
FORM
WRITER

Note 3: TCPHOST must match the IP address set for the TCP/IP software running on the PC where VPS/PC, AnyQueue or VPS/RemoteQueue is running.

Note 4: TCPRPORT must match the port number set for the TCP/IP software for VPS/PC, AnyQueue or VPS/RemoteQueue.

Section 4
Performance

VPS® System Performance

To attain optimum VPS system performance, the following items should be taken into consideration:

1) MVS dispatching priority

2) VPS swappability

3) SAPI vs. PSO

4) Staging performance

Because VPS uses relatively little CPU resource, it should be dispatched at a higher priority than normal TSO and batch address spaces. This can be accomplished by specifying an appropriate DPRTY on the VPS EXEC JCL statement. The effect will not be measurable to TSO or batch users, but can have a significant impact on both printer speed and access to SYSOUT datasets.

The VPS address space should also run as non-swapable. This can be accomplished by specifying "SWAPABLE=N" in the VPS system initialization member and can be dynamically changed via the SSET command.

SAPI vs. PSO

The method by which VPS obtains SYSOUT datasets for processing can also have a significant impact on VPS system performance. VPS retrieves SYSOUT datasets from the JES spool using either the SYSOUT Application Program Interface (SAPI) or the Process SYSOUT Interface (PSO). Both interfaces provide a release independent means of accessing SYSOUT datasets that are available for printing. Note that while both interfaces provide access to SYSOUT datasets, there are several important differences in how the two interfaces operate that affect VPS' system performance.

SAPI Work Flow

The SAPI interface was introduced in OS/390 Release 1.3 and provides enhanced functionality and performance over the older PSO interface. One of the primary benefits of using the SAPI interface is that VPS no longer needs to poll JES to determine whether any SYSOUT datasets are available for printing. When using the SAPI interface, VPS registers a separate SAPI thread for both the primary and secondary selection criteria of each idle printer. As work becomes available, JES posts VPS and VPS then attaches a separate MVS subtask to process the SYSOUT dataset. Another important feature available with SAPI is the ability to multitask dataset selection and processing. VPS exploits this feature extensively by having each individual printer subtask perform its own dataset selection and processing while work is available for the printer. When JES indicates that no more work is available, the printer subtask is detached and VPS waits for JES to inform it that new work is again available. The last significant benefit in using SAPI is that SAPI provides a greater number of SYSOUT dataset characteristics. This feature eliminates the need to use the JES-related VPS user exits to obtain this information (i.e. user exits 15 and 24).

Prior to using the SAPI interface, VPS would poll JES at user specified intervals (INTERVAL= keyword) to determine if any work was available. This polling consisted of making a separate PSO request for both the primary and secondary selection criteria of each idle printer. Since polling is no longer required when using SAPI, the INTERVAL= keyword value may need to be adjusted to optimize VPS performance. The following list describes the actions taken at each interval expiration when using the SAPI interface:

1) Invokes user exit 00 (Pre-Selection exit) (only required for dynamic activation or dynamic definition).

2) Invokes user exit 08 (Error Retry exit) for each EDRAINED printer

3) Ensures a SAPI thread is registered for each idle VPS printer

4) Ensures VPS/TCPIP has an active connection to the TCP/IP address space

Also, due to the enhanced features provided by SAPI, it is no longer necessary to run most, if not all, of the JES-related VPS user exits. The following list summarizes each of the JES-related VPS user exits and their applicability when using SAPI:

1) VPSSUE00 (Pre-Selection) - the VPS Pre-Selection exit is no longer necessary when using the SAPI interface unless you require either the dynamic activation or dynamic definition features. VPS will still invoke the Pre-Selection exit, if installed and enabled, and will issue SAPI requests only for those printers identified by the exit as having available SYSOUT datasets to process. Unless you are using the dynamic activation or dynamic definition features of this exit, LRS recommends that you not use it when using SAPI.

2) VPSSUE13 (Requeuing) - the JES2 version of the Requeuing exit contains code to obtain the JES2 Output Group Name and Ids associated with the current SYSOUT dataset. This portion of the code will be bypassed when using the SAPI interface because this information is now supplied via SAPI.

5) VPSSUE15 (JES Xmemory) - the JES Xmemory exit (JES2 and JES3) contains code to obtain additional characteristics associated with the current SYSOUT dataset. This portion of the code will be bypassed when using the SAPI interface because this information is now supplied via SAPI. Note that the VPS XMAT and ORAT control blocks will be initialized with the SYSOUT dataset's characteristics on entry to the exit. The exit still has the opportunity to modify this information prior to returning to VPS.

6) VPSSUE16 (Pooling) - the Pooling exit (JES2 and JES3) is no longer invoked when using the SAPI interface. SAPI processing ensures that the same dataset will not be returned to multiple VPS printers.

7) VPSSUE24 (Subsystem Request) - the Subsystem request exit is no longer invoked when using the SAPI interface. The information returned from the exit is now available via SAPI.

PSO Work Flow

The PSO interface, also commonly known as the external writer interface, has been available in every release of VPS. Until VPS V1R8.0, it was the only interface used by VPS to obtain SYSOUT datasets from the JES spool. When using the PSO interface, VPS polls JES at user specified intervals (INTERVAL= keyword) for each idle printer to determine if any work is available. As work becomes available for a printer, VPS stages (i.e. copies) the dataset and then attaches an MVS subtask to process it. This process is repeated for each idle printer until all of the printers have been serviced at which time VPS will wait for the next interval expiration. This polling process is required due to the architectural limitations of the PSO interface and can become a bottleneck on systems with the following characteristics:

1) VPS is servicing a large number of printers (300+)

2) JES is unable to service the PSO requests in a timely manner (e.g., .01 seconds)

3) Small INTERVAL= value (e.g. INTERVAL=0015 or less)

Specifying too small a value for the INTERVAL= keyword can cause VPS to continuously poll JES looking for available work. Higher INTERVAL= values will decrease the amount of polling but will increase the amount of time it takes VPS to locate work for idle printers. The following list describes the actions taken at each interval expiration when using the PSO interface:

1) Invokes user exit 00 (Pre-Selection exit)

2) Invokes user exit 16 (Pooling exit)

3) Invokes user exit 08 (EDRAINED printers only)

4) Polls JES for each idle printer. If work is available, the SYSOUT dataset is staged and an MVS subtask is attached to process it.

5) Ensures VPS/TCPIP has an active connection to the TCP/IP address space

As indicated in item #1 above, a good solution to the polling problem is to install the VPS Pre-Selection user exit. The Pre-Selection user exit is invoked at each interval expiration and performs a look-ahead function to determine which idle VPS printers have available work. The results of the exit are then used to limit the number of queries VPS will make to JES. Use of this exit has dramatic effects on VPS performance and is highly recommended when using the PSO interface. See "Pre-selection of SYSOUT Datasets" on page 6.4 for a more detailed description of the effects of this exit.

VPS Printer Performance

As VPS retrieves SYSOUT datasets from JES, the data is compressed and then staged before it is actually printed. Note that the staging process is always performed when using the PSO interface. When using the SAPI interface, VPS stages the dataset in the following situations:

1) The dataset SYSOUT class is within the STGCLASS= class list

2) The dataset SYSOUT class is within the GDMCLASS= class list

3) Dataset destined for VPS/PC or AnyQueue and PRTROPTS is not set to 00000100

4) Dataset requires conversion (VPS/IPDS, VPS/PCL or VPS/XES2AFP)

There are two parameters that affect VPS staging performance (QBUFSIZE and QALLDYN) and three parameters which affect actual printer performance (RUSIZE, CHNSIZE and COMPRESS).

Staging Performance

QBUFSIZE Printer Parameter

The QBUFSIZE printer keyword parameter specifies the size of buffer to be used for the staging DASD device. Large QBUFSIZE specifications will minimize and, in many cases, virtually eliminate I/O to the VPS staging device but will increase VPS virtual storage requirements. Smaller QBUFSIZE specifications will adversely affect VPS staging performance by resulting in increased staging I/O, but will decrease the VPS virtual storage requirements.

The ideal (and default) QBUFSIZE specification for optimum DASD utilization and minimum staging I/O is the largest block size supported by the staging device. However, if the number of printers that is to be supported within a given VPS region results in unacceptable virtual storage requirements, this parameter will need to be adjusted downward accordingly. Refer to “Storage Requirements” on page 2.4.

QALLDYN Printer Parameter

The QALLDYN printer keyword parameter specifies whether the staging dataset should be allocated and deallocated as required (QALLDYN=Y) or allocated when the printer is activated and deallocated when the printer is inactivated (QALLDYN=N). When QALLDYN=Y is in effect, the DASD space requirements at any point in time will be less, but the overhead of DASD allocation/deallocation will be incurred more frequently.

VPS AFP Performance

See “Performance for VPS AFP” on page 8.37 for information about VPS AFP and its impact on VPS performance.

Printing Performance

RUSIZE Printer Parameter

For VTAM printers, the RUSIZE printer keyword parameter specifies the maximum size VTAM buffer (request unit) that should be sent to the printer. Larger RUSIZE specifications result in reducing the number of VTAM SENDs required to print a given SYSOUT dataset. However, the maximum allowable RUSIZE value is dependent on the specific printer type and control unit to which it is attached.

Experience has shown that an RUSIZE of 768 gives good results for SCS (LU-1) printers. (This is the default value for the RUSIZE parameter). However, some VPS users have reported good performance on SCS devices with an RUSIZE of 1024.

For TCP/IP printers, the RUSIZE printer keyword parameter specifies the maximum size of the TCP/IP SEND buffer that VPS will use when sending data to the TCP/IP address space. The SEND buffer size used by VPS may not match the SEND buffer size selected by the network. However, larger RUSIZE specifications result in reducing the number of TCP/IP SEND requests required to print a given SYSOUT dataset.

The default value for RUSIZE is 768; RUSIZE can be set to any value from 256 to 4096. RUSIZE=4096 is recommended for TCP/IP devices.

CHNSIZE Printer Parameter

For VTAM printers, the CHNSIZE printer parameter specifies how many elements (RUs) per chain should be sent. If the printer is not being run in SCS (LU-1) mode, this value is forced to 1 by VPS, regardless of the parameter specification. If the printer is being run in SCS mode, the value should normally be set to 0, signifying full dataset chaining, which achieves optimum printer performance. (There are some devices which will run in SCS mode, but cannot handle full dataset chaining. For these devices, a CHNSIZE of 1, 2, or 3 might be needed).

CHNSIZE is ignored for TCP/IP printers when IBM TCP/IP is used (TCPTYPE=IBM310, TCPTYPE=IBM320, or TCPTYPE=IBM340).

For Interlink Computer Sciences (TCPTYPE=ICS), the CHNSIZE printer keyword is used to determine how many SEND buffers can be outstanding before VPS must stop and wait for a SEND to complete.

If CHNSIZE is set to 0, VPS will use the default SEND number obtained with the TOPTION macro. If CHNSIZE is set to a non-zero value, VPS will attempt to set the maximum number of SEND requests to the CHNSIZE value. The maximum number of SEND requests may be negotiated downward when the TOPTION macro is issued. When the printer is connected and printing, the CHNSIZE value displayed will be the maximum number of SEND requests that can be outstanding (as negotiated).

Setting CHNSIZE to a non-zero value can improve or degrade performance, depending on the default and maximum SEND numbers (DFQSEND and MXQSEND) in the TCP/IP configuration. For more information on setting the default and maximum send numbers, see “SNS/TCPaccess Installation Guide” from Interlink Computer Sciences.

COMPRESS Printer Parameter

For VTAM printers, the COMPRESS printer parameter specifies whether SYSOUT data should be compressed before it is sent to the printer. (See "Compression Methods Used by VPS" on page 6.26 for a description of VPS' compression techniques). This parameter should be specified as "Y" or "S" whenever possible, because it reduces the number of VTAM SENDS required, enhances printer speed, and reduces line traffic.

For AnyQueue and VPS/RemoteQueue connections, the COMPRESS keyword can indicate to VPS to compress the outbound data. If COMPRESS=Y, VPS will use a special LRS compression technique to compress the data and the receiving device can decompress the buffers as they are received.

Data compression is not supported for TCP/IP devices that use LPR/LPD protocol, a direct TCP/IP (sockets) connection or VPS/Email (SMTP) protocol.

Section 5
User Exits

Introduction

This section describes the VPS® modules which you can modify to fit the needs of your installation or to activate particular functions of VPS.

The VPS Separator Routine is described first. Although it is not really an "exit," it can be modified to suit your needs, so it is included in this section. Several versions of the separator (banner) page are supplied to you on the distribution cartridge in both source and load module format. You can also create your own separator modules.

The User Exits allow you to write specialized code for your installation which will be invoked at certain key points in VPS processing. The distribution cartridge will contain sample source code for these exits.

Separator Routine

Function: The VPS separator page routine is responsible for printing both start and end separator pages. You can, if desired, modify the distributed separator routines or totally rewrite them according to your needs. The user separator routines should be linked into the VPS load module library along with the other VPS modules. The SEPAR= printer keyword determines the load module name of the separator routine that will be used for each VPS printer. Since the separator load module name can be specified for each printer, different printers can use different separator page routines.

Supplied Separator Routines: Six separator routines (both source and load modules) are supplied with VPS (see "VPS® Separators" on page E.1 for examples of the separators). They are:

Source Name	Load Name	Description	Width
VPSSSEPR	VPSSSEPR	Block letters	132 characters wide
VPSSSEP2	VPSSSEP2	Block letters	80 characters wide
VPSSSEP3	VPSSSEP3	No block letters	132 characters wide
VPSSSEP4	VPSSSEP4	No block letters	80 characters wide
VPSSSEP5	VPSSSEP5	JES2 4.1 style	132 characters wide
VPSSSEP6	VPSSSEP6	Email	132 characters wide

Table 5-1: Supplied Separator Routines

Language: The separator routine must be written in Assembler Language.

Reentrancy Considerations: The separator page routine must be reentrant.

Execution Environment: The separator routine is given control in problem state, storage protect key 8, and is authorized.

Linkage Conventions: When the separator page routine receives control, register 15 contains the entry point of the separator page routine, register 14 contains the address to which the separator page routine must return control, and register 13 points to an 18-word save area. When a separator page routine receives control, it must save the caller's registers according to standard MVS linkage conventions.

When the separator page routine returns control, it must restore the caller's registers, except register 15, which must be set to an appropriate return code.

Point of Processing: If the printer keyword SEPAR=S or SEPAR=B is specified, the separator routine is given control for start separators prior to printing the first dataset of a job or output group. If SEPAR=N or SEPAR=E is specified, the separator routine will not be given control for start separator processing.

If the printer keyword SEPAR=E or SEPAR=B is specified, the separator routine is given control for end separators after printing the last dataset of a job or output group. If SEPAR=N or SEPAR=S is specified, the separator routine will not be given control for end separator processing.

Recovery:

- If the separator page routine abends, the printer will be placed in an EDRAINED status.

Register Contents on Entry:

R0 Request code
00 - Call is for a start separator request
04 - Call is for an end separator request
08 - Call is for a cleanup request (The separator routine will be called with this request code only if an event has occurred that will prevent further calls to the separator routine)

R1 Address of parameter list in the following format:
Word 0 (+00) Address of VPS System Attributes (VPSSSYAT)
Word 1 (+04) Address of 2-Word User Work Area
Word 2 (+08) Address of Printer Attributes (VPSSPRAT)
Word 3 (+12) Address of Job Statistics (VPSSJSTA)
Word 4 (+16) Address of 2-Word Separator Work Area
Word 5 (+20) Address of Print Line (VPSSLINE)
Word 6 (+24) Address of Separator Information (VPSSSEPI)
Word 7 (+28) Address of Output Group Statistics (VPSSJSTA)
Word 8 (+32) Address of Dataset Statistics (VPSSJSTA)
The high-order bit of the last parameter will be set to 1.

R2-R12 N/A

R13 Address of register save area

R14 Return Address

R15 Entry Address

Register Contents on Exit:

R0-R14 Same as upon entry

R15 Return code

Return Codes:

00 Print the line in the VPSSLINE DSECT and return control

04 There is no line to print and do not return control

08 Reserved

12 Reserved

16 Disastrous error - EDRAIN the printer and do not return control

Programming Considerations:

1. If the separator routine is being called for a cleanup request (request code = 08), no more print lines can be added. The only purpose of this type of call is to give the separator routine an opportunity to do any necessary cleanup processing. For example, if your separator routine had issued a GETMAIN during start separator processing and intended to issue a FREEMAIN during end separator processing, the FREEMAIN would need to be issued when the cleanup call is made.
2. If the separator routine is called for a start or end separator request (i.e., other than a cleanup request), and you do not wish to print any separator lines at all, set the return code to 04 on the initial call and exit.

   If the separator routine is called for a start or end separator request (i.e., other than a cleanup request), and you do desire to print separator lines:

   - Move the separator print line and ASA carriage control character to the VPSSLINE DSECT and set the return code to 00, indicating that there is data to be printed and you want to receive control again. Continue performing this step until all separator page print lines have been printed.
   - After all separator lines have been printed, set the return code to 04, indicating there is no more data to be printed and you do not want to receive control again for this separator page.
3. The print lines passed from the separator routine are considered to have ASA control characters. Therefore, this routine should move an appropriate ASA carriage control character to the carriage control field (LINELNC) and move the print data to the data line field (LINELND). The line length including carriage control must be stored in the halfword field (LINELNL). The line length, including carriage control, must not exceed the value in field LINELNLM, which contains the length of the area available for building the separator print line.
4. The two word area pointed to by Word-4 of the parameter list is set to binary zeros on the initial call to the separator routine for a given start or end separator page. This area would be a good place for the separator routine to keep track of which line of the separator page it is currently processing.
5. The separator page information DSECT (mapping macro VPSSSEPI) contains the Class, Dest, Form, Writer, FCB and UCS Images of the first (or only) dataset when processing a start separator. This same information is for the last (or only) dataset when processing an end job or end output group separator.
6. The separator page information DSECT (mapping macro VPSSSEPI) will contain a pointer (SEPXMA) to the JES Cross-memory control block (mapping macro VPSSXMAT), if the JES Cross-memory Exit (Exit 15) is installed. If this pointer is available (non-zero), data from the JES Cross-memory Control Block, such as programmer name and room number, could be printed on the separator pages.
7. It is possible to add a news SYSOUT dataset at the end of each separator page. Two positional parameters on the SEPAR keyword will be used to locate the news SYSOUT dataset on the JES spool.

   - Positional parameter 4 indicates the WRITER name associated with the news SYSOUT dataset to be printed at the end of the separator pages.
   - Positional parameter 5 indicates the JOB name associated with the news SYSOUT dataset to be printed at the end of the separator pages. Specifying a JOB name requires specifying the news WRITER name.
   - The JOB name associated with the news SYSOUT dataset must be unique. Otherwise, VPS will receive an error when attempting to locate the news SYSOUT dataset on the JES spool.

- A separate news SYSOUT dataset can be defined for each VPS printer, or multiple VPS printers can reference the same news.
- The REFRESH,NEWS command can be entered to refresh news for all printers. VPS will obtain each SYSOUT news dataset from the JES spool. Any printer currently printing will continue to use the previous news SYSOUT dataset until the printer becomes IDLE. At that time, the current news SYSOUT dataset will be associated with the printer.

8. Print lines passed from the separator routine do not go through any type of VPS translation. The sample separators provided will translate separator lines to ASCII for TCP/IP devices.

For more information on the specifying the NEWS writer name and JOB name on the SEPAR printer keyword, see "Building the Printer Definition Members" on page 3.80. For more information on the REFRESH,NEWS command, see "Operation" on page 7.1.

Introduction to User Exits

There are several exit points defined within VPS that allow you to write code to perform specialized functions unique to your environment. You can choose to code any number of these exits, as deemed appropriate for the requirements of the installation. VPS is distributed with source code samples for all of the exits.

VPS issues a BLDL at initialization time to determine which exits, if any, are available to be used during VPS processing. Therefore, exits must be linked into the appropriate library with the correct name prior to starting VPS. Unless the member name(s) are overridden by the EXITnn keyword in the VPS System Initialization (VPSSTART) Member, VPS issues BLDLs for module name VPSSUEnn, where "nn" is the exit number.

Once VPS has been initialized, any exit can be enabled or disabled by the SSET command. However, an exit cannot be replaced nor can a new exit be added after VPS initialization. To implement a new exit or a new version of an existing exit after VPS has been initialized, you must terminate VPS and start it again.

Member EXITASMH in the distribution library LRS.VPS.V1R80.CNTL is an example of JCL to assemble and linkedit a VPS user exit. EXITASMH executes assembler program ASMA90.

Exit Types: There are two types of VPS exits, printer and system. Printer exits do processing related to a specific printer, while system exits do processing related to the VPS system rather than for a specific printer. The exit type of each exit is documented in the detailed description for the exit.

Exit TCBs: Some printer type exits run under a VPS system TCB, while others run under the TCB of the printer for which they are doing their processing. All system type exits run under a VPS system TCB. The exit TCB type for each exit is documented in the detailed description of the exit.

Language: All exits must be written in Assembler Language.

Reentrancy Considerations: All exits must be reentrant.

Execution Environment: All exits are given control in problem state, storage protect key 8, and are authorized. If running under MVS/ESA, the exits are invoked in 31-bit mode. It is the responsibility of the code in the exit to switch to 24-bit mode when necessary.

Linkage Conventions: When an exit routine receives control, register 15 contains the entry point of the exit routine, register 14 contains the address to which the exit must return control, and register 13 points to an 18-word save area. When an exit receives control, it must save the caller's registers according to standard MVS linkage conventions.

When an exit routine returns control, it must restore the caller's registers, with the exception of register 15, which must be set to an appropriate return code.

Parameters Passed: When control is passed to a VPS exit routine, register 0 contains a request code and register 1 points to a parameter list. The request code and parameter list are exit dependent and are documented in the detailed description for each exit.

Return Codes: When an exit returns control, it must set an appropriate return code in register 15. The return codes are exit dependent and are documented in the detailed description for each exit.

Recovery Considerations: Recovery can be specified as on (RECOV) or off (NORECOV) in the EXITnn keyword in the VPS System Initialization (VPSSTART) Member. If not specified, the default is recovery on (RECOV). If recovery is on, VPS establishes an ESTAE around each call of the exit routine. The following will result if an exit abnormally terminates (abends):

System TCB exit and recovery off:	the VPS address space will be terminated.
System TCB exit and recovery on:	the exit will be disabled and a storage dump will be taken.
Printer TCB exit and recovery off:	the printer will be placed in an EDRAINED (drained due to error) status.
Printer TCB exit and recovery on:	the exit will be disabled and a storage dump will be taken.

Exit-to-Exit Communications: The System Attributes DSECT (mapping macro VPSSSYAT), which is passed as the first parameter to all exit routines, contains a two word field (SYAUSRWD) which can be used to pass information between exit routines. This storage area is never modified by VPS, so one exit can place a value in it, or perhaps a pointer to some GETMAINed storage, and other exit routines will have that information available to them.

Additionally, all exit routines that do processing on behalf of a printer have a pointer to a two word work area passed to them (no mapping macro or field name) as the second parameter. Like the SYAUSRWD field described above, this work area is never modified by VPS. Therefore, one exit can place a value in it, or perhaps a pointer to some GETMAINed storage, and other exit routines which have this work area address passed to them will have that information available to them as well.

No user exits will be called before the VPS system startup exit (VPS user exit 9) has been called. No user exits will be called after the VPS shutdown exit (VPS user exit 10) has been called.

Exit Status: An exit can have a status of ENAbled or DISabled. The initial status is determined by the EXITnn keyword in the VPS System Initialization (VPSSTART) Member, or by the default of DISabled, if no EXITnn is specified. After VPS initialization, this status can be changed by the SSET command, or it can be automatically changed to DISabled by VPS if the exit abnormally terminates and VPS intercepts the abend.

Exit Tracing: VPS can trace entry to and exit from a user exit if you have specified such in the fourth positional parameter of the EXITnn keyword in the System Initialization member. For more information on specifying tracing, see "EXITnn" on page 3.23.

The general format of each trace entry is as follows:

BYTES

00-03	Trace Type (UnnE=exit entry, UnnX=exit exit, nn=exit number)
04-07	Timestamp (Format=HHMMSSTH)
08-11	Request Code (Exit entry) / Return Code (Exit exit)
12-13	Reserved
14-15	Printer type trace entries - Printer sequence number System type trace entries - X'FFFF'
16-31	Exit Dependent Data (documented with individual exit)

The trace table can be printed by issuing a VPS SNAP command.

Exit Selection Table

Exit	Default Name	Exit Title	Exit Type	Exit TCB	Sample Exit JES-Dependent?
00	VPSSUE00	Pre-selection	System	System	Yes
01	VPSSUE01	Print Line	Printer	Printer	No
02	VPSSUE02	Start Dataset	Printer	Printer	No
03	VPSSUE03	End Dataset	Printer	Printer	No
04	VPSSUE04	Command	System	System	No
05	VPSSUE05	WTO	System	System & Printer	No
06	VPSSUE06	TPUT	System	System & Printer	No
07	VPSSUE07	SMF	Printer	Printer	No
08	VPSSUE08	Error Retry	Printer	System	No
09	VPSSUE09	VPS Startup	System	System	No
10	VPSSUE10	VPS Shutdown	System	System	No
11	VPSSUE11	Printer Activation	Printer	System	No
12	VPSSUE12	Printer Inactivation	Printer	System	No
13	VPSSUE13	Requeue Limit	Printer	System for PSO, Printer for SAPI	Yes
14	VPSSUE14	Dataset Add	Printer	Printer	No
15	VPSSUE15	JES Xmemory	Printer	Printer	Yes
16	VPSSUE16	Pooling	System	System	Yes
17	VPSSUE17	Session Start	Printer	Printer	No
18	VPSSUE18	Session End	Printer	Printer	No
19	VPSSUE19	Session Error	Printer	Printer	No
20	VPSSUE20	SVC34	System	System	No
21	VPSSUE21	Internal Reader	Printer	Printer	No
22	VPSSUE22	Staging	Printer	Printer	No
23	VPSSUE23	IPDS	Printer	Printer	No
24	VPSSUE24	Subsystem Request	Printer	System	Yes
25	VPSSUE25	TCP/IP Control File	Printer	Printer	No
26	VPSSUE26	AFP Resource	Printer	Printer	No
27	VPSSUE27	ACIF Parameter File	Printer	Printer	No
28	VPSSUE28	Email Parameter	Printer	Printer	No

Table 5-2: Exit Selection Table

If you use the sample version of a JES-dependent exit, the exit should be reassembled and linkedited whenever maintenance is applied to JES. The SYSLIB DD statement on the assembly step must refer to the correct JES source and maintenance libraries.

Exit 00: Pre-Selection Exit

Function: This exit is called prior to attempting to locate work for idle printers. The two primary reasons for implementing this exit are **performance improvement** and **storage relief**.

This exit improves performance by decreasing the number of subsystem requests that VPS must issue to JES when using the PSO interface. When using the SAPI interface, it is no longer necessary to use this exit unless you are using either the dynamic activation (PSACTIVE=Y) or dynamic definition (PSACTIVE=(,Y)) features. Most installations will no longer need to use this exit when using the SAPI interface.

This exit provides storage relief if both the printer keyword WFWACTN=I and the system keyword PSACTIVE=Y are specified. The WFWACTN=I keyword causes VPS to automatically inactivate a printer whenever there is no more work for it to process, which frees all virtual storage and control blocks associated with the printer. With PSACTIVE=Y coded, VPS dynamically activates a printer for which there is work. The name of the printer that is to be dynamically activated can be the destination name, the form name, or the writer name of the work to be processed, based on the value of the PSSELECT keyword in the System Initialization member. Using this method, an infinite number of printers can be driven by one VPS address space.

Primary input to this exit are the PSAT (Pre-selection Attributes) and SLAT (Pre-Selection Selection Criteria Attributes) control blocks. The PSAT consists of two sections, the PSAT prefix and the PSAT table entries. The PSAT prefix contains the installation specified pre-selection criteria (i.e., PSCLASS, PSDEST, PSFORM, and PSWRITER) and control information that describes the PSAT table. The PSAT prefix is initialized by VPS prior to entry to this exit. The SLAT is primarily a table describing the primary and secondary selection criteria of each VPS printer.

The type of actions performed by the exit are determined by the values specified for the PSACTIVE, PSCLASS, PSDEST, PSFORM, and PSWRITER keywords. The exit will always initialize the PSAT whenever one or more of the following keywords are specified in the VPS system initialization member:

PSCLASS

PSDEST

PSFORM

PSWRITER

These keywords should be used in the following situations:

- An installation wishes to dynamically activate printers to the VPS network as work becomes available.
- The selection criteria of all VPS printers are covered by the values specified for the keywords shown above. For example, specifying PSDEST=U100-U500 would imply that every VPS printer selects by a destination in the range of U100 through U500.

Specifying these keywords can significantly enhance the performance of the exit. This is because the exit is only scanning the JES queues for output that matches the PS keywords. NOTE: To gain this performance enhancement, you must also specify a “Y” for the third subparameter value of the PSACTIVE keyword. The default value is “N”.

Based upon the information returned in the PSAT table, VPS performs the following actions:

- If VPS can associate a PSAT table entry with the selection criteria of a printer that is already activated to VPS, VPS will make a subsystem request to JES, so that JES will make a SYSOUT dataset available to VPS.
- If VPS cannot associate a PSAT table entry with the selection criteria of a printer that is already activated to VPS, and PSACTIVE=Y is specified, VPS will attempt to dynamically activate a printer from the VPSLIB dataset. The name of the printer to be activated is obtained from the PSAT table destination field (PSADESTN), writer name (PSAWTRNM), or form name (PSAFORM), depending on the value of the PSSELECT keyword. If VPS successfully activates the printer, it will then make a subsystem request to JES, so that JES will make a SYSOUT dataset available to VPS.
- If VPS' attempt to dynamically activate a printer fails because VPS cannot locate the member name in the VPSLIB dataset and PSACTIVE=(Y,Y) is specified, VPS will dynamically create a printer definition in the VPS address space, using the information contained in the VPS master default member. If desired, a Printer Activation Exit (User exit 11) can be coded to customize the printer entry using the $$CBSET macro. VPS will then make a subsystem request to JES, so that JES will make a SYSOUT dataset available to VPS.

Processing of the SLAT control block is also controlled by the third subparameter of the PSACTIVE keyword. The SLAT control block is processed whenever the third subparameter value is specified as "N". The SLAT contains both the primary and secondary selection criteria of each activated VPS printer. This control block enables installations whose printers' selection criteria cannot be specified by the PS keywords to use the Pre-selection Exit. The exit should attempt to locate work on the JES spool for each entry. When the exit locates work for a SLAT entry, it should reset bit $SLANWRK to indicate to VPS that work is available for this printer.

The differences in the two methods used by the pre-selection exit to locate work are as follows:

- processing the PSAT control block uses less CPU resources, but requires that the selection criteria of all VPS printers be included in the PS keyword values.
- processing the SLAT control block uses more CPU resources, but allows any values to be specified for the selection criteria of the VPS printers.

Exit Type: System

Exit TCB: System

Point of Processing: This exit is taken whenever the dispatcher attempts to locate the next job for a printer. This can occur when the INTERVAL value expires (idle printers) and also when a printer subtask requests additional work for a printer (active printer).

Related Exits: The Printer Activation Exit (EXIT 11), if PSACTIVE=Y is specified.

Recovery:

- If recovery is off and this exit abends, the VPS address space will be terminated.
- If recovery is on and this exit abends, the exit will automatically be disabled and a storage dump will be taken.

Since the VPS address space will be terminated if this exit abends and recovery is off, it is recommended that recovery always be on for this exit.

Register Contents on Entry:

R0 Request Code (always 00)
R1 Address of parameter list in the following format:
Word 0 (+00) Address of VPS System Attributes (VPSSSYAT)
Word 1 (+04) Address of Pre-selection Attributes (VPSSPSAT)
Word 2 (+08) Address of Selection Criteria Attributes (VPSSSLAT)
The high-order bit of the last parameter will be set to 1.
R2-R12 N/A
R13 Address of register save area
R14 Return Address
R15 Entry Address

Register Contents on Exit:

R0-R14 Same as upon entry
R15 Return code

Return Codes:

00 Successful completion
04 An error occurred - PSAERROR will contain the error code. (Copy member VPSSGBL, supplied in file LRS.VPS.V1R80.MACLIB, defines all the possible PSAERROR error codes).

Exit Dependent Trace Data:

On Entry

- 4 byte - PSAPSMAX - Maximum number of PSAT entries
- 4 byte - (unused)
- 2 byte - SLAJMAX - Maximum number of SLAT entries
- 2 byte - (unused)
- 1 byte - PSAFLG1 - 1st pre-selection flag
- 3 byte - (unused)

On Exit

- 4 byte - PSAPSMAX - Maximum number of PSAT entries
- 4 byte - PSAPSNUM - Number of active PSAT entries
- 2 byte - SLAJMAX - Maximum number of SLAT entries
- 2 byte - SLAJNUM - Number of active SLAT entries
- 1 byte - PSAFLG1 - 1st pre-selection flag
- 1 byte - PSAFLG2 - 2nd pre-selection flag
- 2 byte - PSAERROR - Pre-selection error code

Programming Considerations:

1. This exit is invoked with Authorization Index (AX) = 1. This value must not be changed.
2. This exit is loaded into CSA at VPS initialization.

Sample Program:

Members VPSSUE00 (for JES2 sites) and VPSSU300 (for JES3 sites) in VPS distribution file LRS.VPS.V1R80.ASM are examples of the Pre-selection Exit. These examples contain all of the code necessary to support VPS' pre-selection of SYSOUT datasets. You can use the version appropriate to your JES as is, without alteration, if you wish to implement pre-selection.

Note: Specifying PSACTIVE=(,,N) or allowing positional parameter 3 of the PSACTIVE keyword to default to "N" allows the flexibility of using any selection criteria (CLASS, DEST, FORM or WRITER) for VPS printers. The pre-selection exit will locate SYSOUT datasets on the JES spool for any active VPS printer.

However, performance of the pre-selection exit can be improved by specifying PSACTIVE=(,,Y) and PSCLASS, PSDEST, PSFORM and/or PSWRITER, because the extent of the search for SYSOUT datasets can be restricted. The pre-selection exit will only locate SYSOUT datasets on the JES spool which match the pre-selection criteria specified with PSCLASS, PSDEST, PSFORM and/or PSWRITER when the third parameter value of the PSACTIVE keyword is Y.

THIS EXIT MUST BE REASSEMBLED AND LINKEDITED WHENEVER MAINTENANCE IS APPLIED TO JES. The SYSLIB DD statement on the assembly step must refer to the correct JES source and maintenance libraries.

Exit 01: Print Line Exit

Function: This exit is called prior to printing each line of a dataset. It can modify or delete the line.

Exit Type: Printer

Exit TCB: Printer

Point of Processing: This exit is taken as each line of a dataset is about to be printed. It is called prior to translation, truncation or carriage control validation.

Related Exits: N/A

Recovery:

- If recovery is off and this exit abends, the printer will be placed in an EDRAINED status.
- If recovery is on and this exit abends, the exit will automatically be disabled and a storage dump will be taken.
- Since this exit is called for every print line processed, recovery should be turned off once the exit has been thoroughly tested. This will make it unnecessary for VPS to set up a recovery environment each time this exit is called.

Register Contents on Entry:

R0	Request Code (always 00)
R1	Address of parameter list in the following format: Word 0 (+00) Address of VPS System Attributes (VPSSSYAT) Word 1 (+04) Address of 2-Word User Work Area Word 2 (+08) Address of Printer Attributes (VPSSPRAT) Word 3 (+12) Address of Dataset Attributes (VPSSDSAT) Word 4 (+16) Address of Print Line (VPSSLINE) Word 5 (+20) Address of Xmemory Attributes (VPSSXMAT) The high-order bit of the last parameter will be set to 1.
R2-R12	N/A
R13	Address of register save area
R14	Return Address
R15	Entry Address

Register Contents on Exit:

R0-R14	Same as upon entry
R15	Return code

Return Codes:

00	Print the data in the line area and do not call the exit again
04	Do not print the data in the line area
08	Print the data in the line area and call the exit again

Exit Dependent Trace Data:

On Entry

- 1 byte - LINELNF - First line flag
- 1 byte - LINELNF2 - Second line flag
- 2 byte - LINELNL - Line length
- 12 byte - 1st 12 bytes of LINELIN

On Exit

- 1 byte - LINELNF - First line flag
- 1 byte - LINELNF2 - Second line flag
- 2 byte - LINELNL - Line length
- 12 byte - 1st 12 bytes of LINELIN

Programming Considerations:

1. This exit is not called for separator page lines.
2. This exit is not called for GDDM, SAS/GRAPH, or VPS/AFP converted datasets.
3. The data length, carriage control (if present) and the data can be altered.
4. If the line length is altered, the LINELNL field must be adjusted accordingly. The line length, including carriage control, must not exceed the value in field LINELNLM, which contains the length of the area available for building the print line.

   If the carriage control is altered, it should be altered to a valid control character based upon the dataset type (i.e., machine or ASA). The control character type is in the DSARECFM field in the Dataset Attributes DSECT (VPSSDSAT).
5. The bits $LINECCP (bypass carriage control processing) can be set in flag byte LINELNF, indicating that VPS should bypass carriage control processing for the print line. If this bit is set, VPS will move the data directly to the VTAM buffer without moving in any printer control characters for printer spacing.
6. The bits $LINEDAP (bypass data processing) can be set in flag byte LINELNF, indicating that VPS should bypass data processing for the print line. If this bit is set, VPS will process the carriage control character, but will not move the data to the VTAM buffer.
7. A line can be deleted from the dataset by setting the return code to 04.
8. When a return code of 08 is used to allow the data in the line area to be printed before invoking the exit again, the data in the line area will no longer be available when the exit is invoked again.

Sample Program:

Member VPSSUE01 in VPS distribution file LRS.VPS.V1R80.ASM is an example of the Print Line Exit. This example contains code to support the Xerox transparency feature of the Xerox laser printer, as described in comments in the source member itself. You may wish to investigate whether these functions are applicable to your environment.

Exit 02: Start Dataset Exit

Function: This exit is called prior to processing of each SYSOUT dataset and printing of each VPS start or end separator. It can request that the dataset be deleted or that the separator be omitted. It can also dynamically change the values of certain printer keywords via the $$CBSET macro.

This exit is also called prior to each dataset if destination authority verification is enabled for the printer (SAF=Y in the printer definition).

Exit Type: Printer

Exit TCB: Printer

Point of Processing: This exit is taken before each SYSOUT dataset is to be processed and before each VPS start or end separator.

Recovery:

- If recovery is off and this exit abends, the printer will be placed in EDRAINED status.
- If recovery is on and this exit abends, the exit will automatically be disabled and a storage dump will be taken.

Register Contents on Entry:

R0	Request code 00 - Call is prior to dataset or separator 04 - Call is prior to dataset for destination authority verification
R1	Address of parameter list in the following format: Word 0 (+00) Address of VPS System Attributes (VPSSSYAT) Word 1 (+04) Address of 2-word User Work Area Word 2 (+08) Address of Printer Attributes (VPSSPRAT) Word 3 (+12) Address of Dataset Attributes (VPSSDSAT) Word 4 (+16) Address of Xmemory Attributes (VPSSXMAT)
R2-R12	N/A
R13	Address of register save area
R14	Return Address
R15	Entry Address

Register Contents on Exit:

R0-R14	Same as upon entry
R15	Return code

Return codes:

For request code 00:

00	Process the SYSOUT dataset, or if for a VPS separator, print the separator
04	Do not process the SYSOUT dataset (delete it), or if for a VPS separator, do not print the separator.

For request code 04:

00	Honor the results of the RACROUTE macro to determine access rights
04	Ignore the results of the RACROUTE macro and allow access to the output destination
08	Ignore the results of the RACROUTE macro and disallow access to the output destination

Exit Dependent Trace Data:

On entry

- 4 byte - First 4 bytes of dataset name
- 1 byte - First byte of job ID (J, T, or S)
- 5 byte - Packed job ID digits
- 6 byte - Bytes 3 - 8 of dataset key

On Exit

- 4 byte - First 4 bytes of dataset name
- 1 byte - First byte of job ID (J, T, or S)
- 5 byte - Packed job ID digits
- 6 byte - Bytes 3 - 8 of dataset key

Programming Considerations:

1. This exit is called prior to loading of FCB information.
2. This exit is call prior to any form mount message.
3. If this exit sets a return code of 04, the End Dataset Exit will not be called for this dataset.

Sample Program:

Member VPSSUE02 in VPS distribution file LRS.VPS.V1R80.ASM is an example of the Start Dataset Exit.

This sample exit issues a WTO to show the type of dataset and the request code. It also issues a WTO similar to $HASP150 issued by JES2 that gives the jobname, the printer name, the number of lines in the dataset, and the number of pages in the dataset.

When called with request code 00, this exit modifies the value of the CPI and MPP printer keywords, based on certain characteristics of the printer definition and the dataset to be printed. Some printers, such as the IBM 3812, can determine whether they should print in portrait or landscape mode, based on the CPI and MPP values they receive.

When called with request code 04, it directs VPS to honor the RACROUTE macro results to determine access rights to the output destination, unless the SAF/RACF return codes indicate no RACF decision (no profile protecting the resource). For this special case, the sample exit directs VPS to allow access to the output destination. When access rights to the output destination are disallowed, the second value in the SAF= keyword in the printer definition determines whether the dataset should be deleted or requeued.

Exit 03: End Dataset Exit

Function: This exit is called at the completion of processing of each SYSOUT dataset.

Exit Type: Printer

Exit TCB: Printer

Point of Processing: This exit is taken after each SYSOUT dataset has been processed.

Related Exits: The Start Dataset Exit, if present, must have set a return code of 00 for this exit to be called.

Recovery:

- If recovery is off and this exit abends, the printer will be placed in an EDRAINED status.
- If recovery is on and this exit abends, the exit will automatically be disabled and a storage dump will be taken.

Register Contents on Entry:

R0 Request Code
- 00 - Dataset was printed successfully
- 04 - Recoverable Losterm occurred during processing
- 08 - Stop Immediate/Force was issued during processing
- 12 - Reserved
- 16 - Printer EDRAINED during processing

R1 Address of parameter list in the following format:
- Word 0 (+00) Address of VPS System Attributes (VPSSSYAT)
- Word 1 (+04) Address of 2-Word User Work Area
- Word 2 (+08) Address of Printer Attributes (VPSSPRAT)
- Word 3 (+12) Address of Dataset Attributes (VPSSDSAT)
- Word 4 (+16) Address of Xmemory Attributes (VPSSXMAT)

The high-order bit of the last parameter will be set to 1.

R2-R12 N/A

R13 Address of register save area

R14 Return Address

R15 Entry Address

Register Contents on Exit:

R0-R14 Same as upon entry

R15 Return code

Return Codes:

00 Must be zero

Exit Dependent Trace Data:

On Entry

- 4 byte - First 4 bytes of dataset name
- 1 byte - First byte of job ID (J, T, or S)
- 5 byte - Packed job ID digits
- 6 byte - Bytes 3 - 8 of dataset key

On Exit

- 4 byte - First 4 bytes of dataset name
- 1 byte - First byte of job ID (J, T, or S)
- 5 byte - Packed job ID digits
- 6 byte - Bytes 3 - 8 of dataset key

Programming Considerations:

1. This exit is not called if the Start Dataset Exit set a return code of 04.
2. The request code passed to this exit indicates the success or non-success of the attempt to print the dataset.

Sample Program:

Member VPSSUE03 in VPS distribution file LRS.VPS.V1R80.ASM is an example of the End Dataset Exit. This example merely issues a message via WTO which displays information about the dataset just processed.

Exit 04: Command Exit

Function: This exit is called prior to processing each command sent to VPS. It can modify the command, or it can request that the command be ignored.

Exit Type: System

Exit TCB: System

Point of Processing: This exit is taken prior to processing of every command that is being sent to VPS.

Related Exits: N/A

Recovery:

- If recovery is off and this exit abends, the VPS address space will be terminated.
- If recovery is on and this exit abends, the exit will automatically be disabled and a storage dump will be taken.

Since the VPS address space will be terminated if this exit abends and recovery is off, it is recommended that recovery always be on for this exit.

Register Contents on Entry:

R0	Request Code (always 00)
R1	Address of parameter list in the following format: Word 0 (+00) Address of VPS System Attributes (VPSSSYAT) Word 1 (+04) Address of Command Buffer (see Programming Considerations for format) The high-order bit of the last parameter will be set to 1.
R2-R12	N/A
R13	Address of register save area
R14	Return Address
R15	Entry Address

Register Contents on Exit:

R0-R14	Same as upon entry
R15	Return code

Return Codes:

00	Process the command
04	Ignore the command

Exit Dependent Trace Data:

On Entry

- First 16 bytes of the command buffer

On Exit

- First 16 bytes of the command buffer

Programming Considerations:

1. The second word of the input parameter list will contain the address of the command buffer for all commands except “P VPS”. If the command is “P VPS”, the second word will contain binary zeroes, except that the high-order (X’80’) bit will be set.
2. The command buffer format is:

   2 byte length (does not include length of length field itself).

   120 bytes command text
3. Both the command buffer length and data fields can be altered.

Sample Program:

Member VPSSUE04 in VPS distribution file LRS.VPS.V1R80.ASM is an example of the Command Exit. This example indicates that VPS should ignore a VPS ABEND command.

Exit 05: WTO Exit

Function: This exit is called prior to the issuing of all WTOs. The exit can modify the WTO, or it can request that the WTO not be issued.

Exit Type: System

Exit TCB: System

Point of Processing: This exit is taken prior to issuing every WTO.

Related Exits: N/A

Recovery:

- If recovery is off and this exit abends, the VPS address space will be terminated.
- If recovery is on and this exit abends, the exit will automatically be disabled and a storage dump will be taken.

Since the VPS address space will be terminated if this exit abends and recovery is off, it is recommended that recovery always be on for this exit.

Register Contents on Entry:

R0	Request Code (always 00)
R1	Address of parameter list in the following format: Word 0 (+00) Address of VPS System Attributes (VPSSSYAT) Word 1 (+04) Address of WTO Attributes (VPSSWTAT) The high-order bit of the last parameter will be set to 1.
R2-R12	N/A
R13	Address of register save area
R14	Return Address
R15	Entry Address

Register Contents on Exit:

R0-R14	Same as upon entry
R15	Return code

Return Codes:

00	Proceed with the WTO.
04	Do not issue the WTO.
08	Do not issue the WTO and do not log the WTO.
12	Do not issue WTO, do not write to SYSLOG, but write to VPSLOG.

Exit Dependent Trace Data:

On Entry

- First 16 bytes of the WTO DSECT (VPSSWTAT format)

On Exit

- First 16 bytes of the WTO DSECT (VPSSWTAT format)

Programming Considerations:

1. The WTO Attributes can be altered.
2. The WTO text and length can be altered.
3. The WTO exit will not be called for messages issued by the $$VPSERV macro.
4. The WTO exit will not be called for messages issued before the VPS startup exit is called or after the VPS shutdown exit is called. For example, the WTO exit will not be called for VPS001, VPS017, VPS099 messages.

Sample Program:

Member VPSSUE05 in VPS distribution file LRS.VPS.V1R80.ASM is an example of the WTO Exit. This example moves the VPS STC name ahead of the message identifier, so that the messages look similar to those issued by VPS R5.0 and before. This example should be used only if you wish to retain that format, and only if the first positional parameter value of the WTO parameter in the VPS System Initialization member is set to a value of “Y”.

Exit 06: TPUT Exit

Function: This exit is called prior to the issuing of all TPUTs. The exit can modify the TPUT, or it can request that the TPUT not be issued.

Exit Type: System

Exit TCB: System

Point of Processing: This exit is taken prior to issuing every TPUT.

Related Exits: N/A

Recovery:

- If recovery is off and this exit abends, the VPS address space will be terminated.
- If recovery is on and this exit abends, the exit will automatically be disabled and a storage dump will be taken.

Since the VPS address space will be terminated if this exit abends and recovery is off, it is recommended that recovery always be on for this exit.

Register Contents on Entry:

R0	Request Code (always 00)
R1	Address of parameter list in the following format: Word 0 (+00) Address of VPS System Attributes (VPSSSYAT) Word 1 (+04) Address of TPUT Message Buffer (see Programming Considerations for format) Word 2 (+08) Address of TSO Userid (8 bytes, blank padded) Word 3 (+12) Address of WTO Attributes (VPSSWTAT) The high-order bit of the last parameter will be set to 1.
R2-R12	N/A
R13	Address of register save area
R14	Return Address
R15	Entry Address

Register Contents on Exit:

R0-R14	Same as upon entry
R15	Return code

Return Codes:

00	Proceed with the TPUT.
04	Do not issue the TPUT.

Exit Dependent Trace Data:

On Entry

- First 16 bytes of the TPUT message buffer

On Exit

- First 16 bytes of the TPUT message buffer

Programming Considerations:

1. The TPUT buffer format is:

   2 byte length (does not include length of length field itself).

   96 bytes TPUT message text
2. Word-2 points to the TSO Userid that is about to receive the TPUT.
3. The TPUT text and length can be altered.

Sample Program:

Member VPSSUE06 in VPS distribution file LRS.VPS.V1R80.ASM is an example of the TPUT Exit. This example requests that all messages which are not printer-related be canceled (not issued to the TPUT user).

Exit 07: SMF Exit

Function: This exit is called prior to writing each SMF Type-6 record. It can modify the record, or it can request that the record not be written.

Exit Type: Printer

Exit TCB: Printer

Point of Processing: This exit is taken prior to writing each SMF Type-6 record.

Related Exits: N/A

Recovery:

- If recovery is off and this exit abends, the printer will be placed in an EDRAINED status.
- If recovery is on and this exit abends, the exit will automatically be disabled and a storage dump will be taken.

Register Contents on Entry:

R0 Request Code
- 00 - Change in SYSOUT characteristics.
- 04 - End of job.
- 08 - Job interrupted or error printing dataset.
- 12 - AFP dataset (VPSSIPDS and VPSSPPCL).

R1 Address of parameter list in the following format:
- Word 0 (+00) Address of VPS System Attributes (VPSSSYAT)
- Word 1 (+04) Address of 2-Word User Work Area
- Word 2 (+08) Address of Printer Attributes (VPSSPRAT)
- Word 3 (+12) Address of Job Statistics (VPSSJSTA)
- Word 4 (+16) Address of SMF Type-6 Record (IFASMFR)
- Word 5 (+20) Address of Xmemory Attributes (VPSSXMAT)
- Word 6 (+24) Address of Output Group Statistics (VPSSJSTA)
- Word 7 (+28) Address of Dataset Statistics (VPSSJSTA)

The high-order bit of the last parameter will be set to 1.

R2-R12 N/A
R13 Address of register save area
R14 Return Address
R15 Entry Address

Register Contents on Exit:

R0-R14 Same as upon entry
R15 Return code

Return Codes:

00 Do write the SMF Record
04 Do not write the SMF Record

Exit Dependent Trace Data:

On Entry
- First 16 bytes of the SMF Type-6 Record

On Exit
- First 16 bytes of the SMF Type-6 Record

Programming Considerations:

1. This exit is not called if SMF recording is not active for this printer.
2. This exit can modify the SMF Type-6 record as desired. If the length of the record is changed, the SMF6LEN field should be adjusted accordingly. The length cannot exceed 1024 bytes, since that is the size of the area acquired by VPS for the record.

Sample Program:

Member VPSSUE07 in VPS distribution file LRS.VPS.V1R80.ASM is an example of the SMF Exit. This example simply issues a WTO for any SMF record with a line count less than 100.

Exit 08: Error Retry Exit

Function: This exit is called for printers in an EDRAINED status each time the interval specified in the INTERVAL keyword in the VPS initialization member expires. This exit can request that VPS clear the EDRAINED status and begin selecting work.

Exit Type: Printer

Exit TCB: System

Even though this exit is called on behalf of a printer, it is considered a System related exit because it runs under a VPS system TCB.

Point of Processing: This exit is taken for printers in an EDRAINED status prior to searching for new work.

Related Exits: N/A

Recovery:

- If recovery is off and this exit abends, the VPS address space will be terminated.
- If recovery is on and this exit abends, the exit will automatically be disabled and a storage dump will be taken.

Since the VPS address space will be terminated if this exit abends and recovery is off, it is recommended that recovery always be on for this exit.

Register Contents on Entry:

R0	Request Code (Always 00)
R1	Address of parameter list in the following format: Word 0 (+00) Address of VPS System Attributes (VPSSSYAT) Word 1 (+04) Address of 2-Word User Work Area Word 2 (+08) Address of Printer Attributes (VPSSPRAT) Word 3 (+12) Address of Printer Error Info (VPSSPRER) The high-order bit of the last parameter will be set to 1.
R2-R12	N/A
R13	Address of register save area
R14	Return Address
R15	Entry Address

Register Contents on Exit:

R0-R14	Same as upon entry
R15	Return code

Return Codes:

00	Retry the error
04	Do not retry the error
08	Do not retry the error and do not make any more calls to this exit for this error.
12	Inactivate the printer (remove it from the VPS System)
16	Inactivate the printer (remove it from the VPS System) and purge its output from the JES spool.
20	Drain the printer (change its status from EDRAINED to DRAINED).

Exit Dependent Trace Data:

On Entry

- First 16 bytes of the Printer Error Information DSECT

On Exit

- First 16 bytes of the Printer Error Information DSECT

Programming Considerations:

1. Since this exit runs under a VPS system TCB, it should not perform any functions that would suspend the TCB.
2. The Error Retry Count field (PRECOUNT) of the Printer Error Information DSECT (VPSSPRER) is incremented by 1 each time this exit returns to VPS with a return code of 00. The count is set to zero after VPS has successfully completed printing a job. Therefore, the PRECOUNT field is the total number of errors that have occurred for the job currently being processed.

Sample Program:

Member VPSSUE08 in VPS distribution file LRS.VPS.V1R80.ASM is an example of the Error Retry Exit. This example indicates that VPS should retry printers which were EDRAINED for the following reasons:

- QPUT X37 DCB abend (not enough space to stage the dataset, so the primary allocation will be quadrupled and the secondary will be doubled).
- VTAM SIMLOGON failure with RC=14, F2=00, SNS=0000 (LU not active).
- VTAM SIMLOGON failure with RC=14, F2=53, SNS=0000 (LU not defined).
- VTAM OPNDST failure with RC=10, F2=01, SNS=080A (device powered off).
- VTAM lost terminal.
- VTAM session clean-up request.
- APPC CMD errors (allocation error, CNOS failed, resource failure, abnormal deallocation).
- TCP/IP request failures (address already in use, connection aborted by software, connection refused, broken pipe, connection reset by peer, connection timed out), TCP/IP connection failures, and TCPMRD interval expired.
- TCP/IP printer MRD interval expired.
- TCP/IP connection error.

Exit 09: VPS Startup Exit

Function: This exit is called during VPS initialization. When it is called, VPS has already allocated its printer control blocks and trace table, initialized the master default printer control block, initialized the Subsystem Interface, and loaded the user exits. After this exit is invoked, VPS will complete initialization, including activating any printers listed for automatic activation via an Inclusion List Member or Exclusion List Member, initializing VPS' VTAM connection (OPEN ACB and SETLOGON START), and attaching VPS' system subtasks.

Exit Type: System

Exit TCB: System

Point of Processing: This exit is taken during VPS initialization, before any printers have been activated.

Related Exits: N/A

Recovery:

- If recovery is off and this exit abends, the VPS address space will be terminated.
- If recovery is on and this exit abends, the exit will automatically be disabled and a storage dump will be taken.

Since the VPS address space will be terminated if this exit abends and recovery is off, it is recommended that recovery always be on for this exit.

Register Contents on Entry:

R0	Request Code (always 00)
R1	Address of parameter list in the following format: Word 0 (+00) Address of VPS System Attributes (VPSSSYAT) The high-order bit of the last parameter will be set to 1.
R2-R12	N/A
R13	Address of register save area
R14	Return Address
R15	Entry Address

Register Contents on Exit:

R0-R14	Same as upon entry
R15	Return code

Return Codes:

00	Must be zero

Exit Dependent Trace Data:

On Entry

- 8 byte - User words (SYAUSRWD) from System Attributes DSECT (VPSSSYAT)
- 8 byte - (unused)

On Exit

- 8 byte - User words (SYAUSRWD) from System Attributes DSECT (VPSSSYAT)
- 8 byte - (unused)

Programming Considerations:

1. This exit can store information in the user words of the System Attributes DSECT (VPSSSYAT). This information would then be available to all other VPS exits invoked after this point in processing. If the VPS WTO Exit is in effect (User Exit 05), the WTO Exit would be invoked before this exit for any VPS messages issued during earlier stages of initialization.

Sample Program:

Member VPSSUE09 in VPS distribution file LRS.VPS.V1R80.ASM is an example of the VPS Startup Exit. This example merely issues a message via WTO which includes the VPS STC name, the VPS VTAM application ID, the CPU version, ID number, and model, the SMF system ID, and the JES subsystem name.

Exit 10: VPS Shutdown Exit

Function: This exit is called after VPS termination processing has been completed.

Exit Type: System

Exit TCB: System

Point of Processing: This exit is taken after VPS termination processing has been completed.

Related Exits: N/A

Recovery:

- If recovery is off and this exit abends, the VPS address space will be terminated.
- If recovery is on and this exit abends, the exit will automatically be disabled and a storage dump will be taken.

Since the VPS address space will be terminated if this exit abends and recovery is off, it is recommended that recovery always be on for this exit.

Register Contents on Entry:

R0	Request Code (always 00)
R1	Address of parameter list in the following format: Word 0 (+00) Address of VPS System Attributes (VPSSSYAT) The high-order bit of the last parameter will be set to 1.
R2-R12	N/A
R13	Address of register save area
R14	Return Address
R15	Entry Address

Register Contents on Exit:

R0-R14	Same as upon entry
R15	Return code

Return Codes:

00	Must be zero

Exit Dependent Trace Data:

On Entry

- 8 byte - User words (SYAUSRWD) from System Attributes DSECT (VPSSSYAT)
- 8 byte - (unused)

On Exit

- 8 byte - User words (SYAUSRWD) from System Attributes DSECT (VPSSSYAT)
- 8 byte - (unused)

Programming Considerations:

Sample Program:

Member VPSSUE10 in VPS distribution file LRS.VPS.V1R80.ASM is an example of the VPS Shutdown Exit. This example issues a message via WTO which includes the VPS STC name, the highest number of active printers, the highest number of busy printers, the maximum virtual storage allocated, and the total number of lines, pages, datasets, and jobs printed.

Exit 11: Activate Exit

Function: This exit is called prior to activating a printer to the VPS System. The exit can inquire upon the value of any of the printer parameters by issuing the $$CBINQ macro and can change any of them by issuing the $$CBSET macro.

Exit Type: Printer

Exit TCB: System

Point of Processing: This exit is taken prior to activating a printer to the VPS System.

Related Exits: N/A

Recovery:

- If recovery is off and this exit abends, the VPS address space will be terminated.
- If recovery is on and this exit abends, the exit will automatically be disabled and a storage dump will be taken.

Since the VPS address space will be terminated if this exit abends and recovery is off, it is recommended that recovery always be on for this exit.

Register Contents on Entry:

R0	Request Code 00 - Activate request at VPS Startup 04 - Activate request by Command 08 - Activate request by Pre-selection Exit
R1	Address of parameter list in the following format: Word 0 (+00) Address of VPS System Attributes (VPSSSYAT) Word 1 (+04) Address of 2-Word User Work Area Word 2 (+08) Address of Printer Attributes (VPSSPRAT) The high-order bit of the last parameter will be set to 1.
R2-R12	N/A
R13	Address of register save area
R14	Return Address
R15	Entry Address

Register Contents on Exit:

R0-R14	Same as upon entry
R15	Return code

Return Codes:

00	Must be zero

Exit Dependent Trace Data:

On Entry

- 8 Byte - Member name
- 2 Byte - Printer sequence number
- 4 Byte - Printer option flags
- 1 Byte - Printer VTAM option flags
- 1 Byte - Printer user option flags

On Exit

- 8 Byte - Member name
- 2 Byte - Printer sequence number
- 4 Byte - Printer option flags
- 1 Byte - Printer VTAM option flags
- 1 Byte - Printer user option flags

Programming Considerations:

Sample Program:

Member VPSSUE11 in VPS distribution file LRS.VPS.V1R80.ASM is an example of the VPS Activate Exit. This example modifies the values of the ALOGMODE, CHNSIZE, and RUSIZE parameters, based on the value of the LUNAME parameter.

Exit 12: Inactivate Exit

Function: This exit is called prior to inactivating a printer (removing it from the VPS System).

Exit Type: Printer

Exit TCB: System

Point of Processing: This exit is taken prior to inactivating a printer (removing it from the VPS System).

Related Exits: N/A

Recovery:

- If recovery is off and this exit abends, the VPS address space will be terminated.
- If recovery is on and this exit abends, the exit will automatically be disabled and a storage dump will be taken.

Since the VPS address space will be terminated if this exit abends and recovery is off, it is recommended that recovery always be on for this exit.

Register Contents on Entry:

R0	Request Code (always 00)
R1	Address of parameter list in the following format: Word 0 (+00) Address of VPS System Attributes (VPSSSYAT) Word 1 (+04) Address of 2-Word User Work Area Word 2 (+08) Address of Printer Attributes (VPSSPRAT) The high-order bit of the last parameter will be set to 1.
R2-R12	N/A
R13	Address of register save area
R14	Return Address
R15	Entry Address

Register Contents on Exit:

R0-R14	Same as upon entry
R15	Return code

Return Codes:

00	Must be zero

Exit Dependent Trace Data:

On Entry

- 8 Byte - Member name
- 2 Byte - Printer sequence number
- 4 Byte - Printer option flags
- 1 Byte - Printer VTAM option flags
- 1 Byte - Printer user option flags

On Exit

- 8 Byte - Member name
- 2 Byte - Printer sequence number
- 4 Byte - Printer option flags
- 1 Byte - Printer VTAM option flags
- 1 Byte - Printer user option flags

Programming Considerations:

Sample Program:

Member VPSSUE12 in VPS distribution file LRS.VPS.V1R80.ASM is an example of the VPS Inactivate Exit. This example writes an SMF type-255 record each time a printer is inactivated. This SMF record contains information pertaining to staging and printing for a printer. "VPS Printer Staging and Printing Statistics" on page 6.46 refers to a program that you can use to print a report of the information in these records.

Exit 13: Requeue Exit

Function: This exit is called when a SYSOUT dataset is about to be requeued. The exit can request that the dataset be requeued to a different class, destination, form or writer than was specified in the requeue parameters for the printer, or it can request that the dataset be held or deleted. It also can request that the dataset be printed rather than being requeued.

Exit Type: Printer

Exit TCB: System

Point of Processing: This exit is taken after the SYSOUT limit for a SYSOUT dataset has been exceeded, when PRTROPTS=00400000 is specified for a printer, when a dataset has been requeued by Exit 22, and when a dataset has been requeued due to ERRACTN for an AFP error.

Related Exits: N/A

Recovery:

- If recovery is off and this exit abends, the VPS address space will be terminated.
- If recovery is on and this exit abends, the exit will automatically be disabled and a storage dump will be taken.

Since the VPS address space will be terminated if this exit abends and recovery is off, it is recommended that recovery always be on for this exit.

Register Contents on Entry:

R0	Request Code 00 - Requeued by exceeding REQLIMIT or by PRTROPTS=00400000 04 - Requeued by Exit 22 or by ERRACTN for AFP error or DEST=<IP> error
R1	Address of parameter list in the following format: Word 0 (+00) Address of VPS System Attributes (VPSSSYAT) Word 1 (+04) Address of 2-Word User Work Area Word 2 (+08) Address of Printer Attributes (VPSSPRAT) Word 3 (+12) Address of Dataset Attributes (VPSSDSAT) Word 4 (+16) Address of Requeue Attributes (VPSSRQAT) The high-order bit of the last parameter will be set to 1.
R2-R12	N/A
R13	Address of register save area
R14	Return Address
R15	Entry Address

Register Contents on Exit:

R0-R14	Same as upon entry
R15	Return code

Return Codes:

00	Requeue the dataset
04	Ignore the requeue limit for this dataset. This return code is ignored if the request code=04.

Exit Dependent Trace Data:

On Entry

- 2 Byte - RQALIMIT - Requeue Limit
- 1 Byte - RQAOPTS - Requeue Options
- 1 Byte - RQACLASS - Requeue Class
- 4 Byte - RQADESTN - Requeue Dest (1st 4 bytes)
- 4 Byte - RQAFRMNO - Requeue Form (1st 4 bytes)
- 4 Byte - RQAWTRNM - Requeue Writer (1st 4 bytes)

On Exit

- 1 Byte - RQAJ2LVL - JES2 Level Flag
- 1 Byte - (unused)
- 1 Byte - RQAOPTS - Requeue Options
- 1 Byte - RQACLASS - Requeue Class
- 4 Byte - RQADESTN - Requeue Dest (1st 4 bytes)
- 4 Byte - RQAFRMNO - Requeue Form (1st 4 bytes)
- 4 Byte - RQAWTRNM - Requeue Writer (1st 4 bytes)

Programming Considerations:

Sample Program:

Member VPSSUE13 in VPS distribution file LRS.VPS.V1R80.ASM is an example of the VPS Requeue Exit. This example indicates that VPS should ignore the requeue limit for all APL, DCA, GDDM, SAS, and IPDS datasets. For other datasets (PSO interface only), it retrieves the JES2 output group name and ID and makes that information available to VPS, so it can issue the $TOJ command which affects only one output group, rather than affecting all datasets for a job. Note that when using the SAPI interface, all of the JES dependent code within the exit is bypassed since SAPI returns the output group name and ID to VPS.

Refer to "Requeuing Options" on page 6.13 for a description of the requeuing process when using either the PSO or SAPI interfaces.

THIS EXIT MUST BE REASSEMBLED AND LINKEDITED WHENEVER MAINTENANCE IS APPLIED TO JES2. The SYSLIB DD statement on the assembly step must refer to the correct JES2 source and maintenance libraries.

Exit 14: Dataset Add Exit

Function: The function of this exit is to allow insertion of data (print or control) both before and after each dataset processed by VPS. Each time this exit is called, it can insert one line of data. Therefore, if you need to insert multiple lines, which would normally be the case, this exit would need to be called multiple times.

Exit Type: Printer

Exit TCB: Printer

Point of Processing: This exit is taken prior to and after each dataset.

Related Exits: N/A

Recovery:

- If recovery is off and this exit abends, the printer will be placed in an EDRAINED status.
- If recovery is on and this exit abends, the exit will automatically be disabled and a storage dump will be taken.

Register Contents on Entry:

R0	Request Code 00 - Call is prior to processing dataset 04 - Call is after processing dataset 08 - Call is for a cleanup request - an error has occurred (the exit will be called with this request code only if a disastrous error has occurred processing the dataset)
R1	Address of parameter list in the following format: Word 0 (+00) Address of VPS System Attributes (VPSSSYAT) Word 1 (+04) Address of 2-Word User Work Area Word 2 (+08) Address of Printer Attributes (VPSSPRAT) Word 3 (+12) Address of Dataset Attributes (VPSSDSAT) Word 4 (+16) Address of Print Line (VPSSLINE) Word 5 (+20) Address of Xmemory Attributes (VPSSXMAT) Word 6 (+24) Address of the Printer Command Work Area (VPSSPCMD) The high-order bit of the last parameter will be set to 1.
R2-R12	N/A
R13	Address of register save area
R14	Return Address
R15	Entry Address

Register Contents on Exit:

R0-R14	Same as upon entry
R15	Return code

Return Codes:

00	Output the data in the VPSSLINE DSECT and return control
04	There is no data to output; do not return control; send printer commands from the PCMDEND and PCMDSTRT keywords.
08	There is no data to output; do not return control; do not send printer commands from the PCMDEND and PCMDSTRT keywords.
12	Reserved
16	Disastrous error - EDRAIN the printer and do not return control

Exit Dependent Trace Data:

On Entry

- 1 byte - DSATYPE - Dataset type bits
- 1 byte - DSASCLS - Special class bits
- 1 byte - DSASEPTP - Separator type
- 1 byte - (unused)
- 2 bytes - LINELNLM - Maximum line length
- 6 bytes - (unused)
- 4 bytes - PCMDFLGS - printer command flags

On Exit

- 1 byte - LINELNF - First line flag
- 1 byte - LINELNF2 - Second line flag
- 2 byte - LINELNL - Line length
- 8 bytes - LINELIN - first 8 bytes of line returned from exit
- 4 bytes - PCMDFLGS - printer command flags

Programming Considerations:

1. When VPS AFP is involved, this exit is called after the PDL for a printer has been determined. Any data added must be consistent with the PDL. For example, if the printer has CONVTYPE=IPDS, then Exit 14 can only add IPDS data. This data must be valid IPDS commands and must not violate the IPDS architecture.

2. If this exit is called for a cleanup request (request code = 08), no data can be inserted. The only purpose of this type of call is to give the exit an opportunity to do any clean up processing, such as FREEMAINing storage areas.

3. If this exit is called for other than a cleanup request (request code = 00 or request code = 04) and you do not wish to insert any data at all, set the return code to 04 on the initial call and exit.

4. If this exit is called for other than a cleanup request (request code = 00 or request code = 04) and you do wish to insert data:

- Build the information to be inserted in the VPSSLINE DSECT and set a return code = 00, indicating that there is data to be inserted and this exit should be called again. Continue doing this step until all data has been inserted.
- Set a return code = 04, indicating there is no data to be inserted, and this exit should not be called again.

5. There are two kinds of data that the user might want to insert via this exit.

Print data

- A valid ASA carriage control character should be moved to the carriage control field (LINELNC).
- The print data should be moved to the data line field (LINELND).
- The line length field (LINELNL) should be set, indicating the total length of the data that was moved to LINELND plus one for the carriage control character. The line length, including carriage control, must not exceed the value in field LINELNLM, which contains the length of the area available for building the print line.

Control data

- Nothing needs to be moved to the carriage control field (LINELNC).
- The control data should be moved to the data line field (LINELND).
- The line length field (LINELNL) should be set, indicating the total length of the data plus one for the carriage control character (even though the carriage control character will not be processed). The line length, including carriage control, must not exceed the value in field LINELNLM, which contains the length of the area available for building the print line.
- The following bits normally would be set:

  LINELNF,$LINECCP - bypass carriage control processing

  LINELNF2,$LINEBXL - bypass translation

  LINELNF2,$LINEBTU - bypass standard truncation (TRUNCATE=)

  LINELNF2,$LINEBTB - bypass trailing blank truncation

6. A special carriage control value of X'FC' can be placed in the last print line added to a dataset by this exit. This special value tells VPS to ignore a "skip to top of form" carriage control character in the next print line. This can be used when you have loaded formats into a printer and do not want the first data line to cause another skip to top of form.

7. Any print lines that are added at the beginning or end of separator pages will not go through any type of VPS translation. The $LINEBXL bit setting of the LINELNF2 flag byte is ignored for lines added for separator pages. Any lines added by exit 14 for separator pages will have to be coded in the appropriate format - EBCDIC or ASCII.

Sample Program:

Member VPSSUE14 in VPS distribution file LRS.VPS.V1R80.ASM is an example of the VPS Dataset Add Exit. This example performs some special processing for formatting of output for HP Laser Jet printers, using PCL. It also contains special code for PostScript printers. For more information on using the printer command keywords (PCMDACTN, PCMDDSNE, PCMDDSNS, PCMDEND, PCMDOPTS, PCMDSEPE, PCMDSEPS, and PCMDSTRT) or VPS User Exit 14 to send formatting commands to printers, see "Using VPS Keywords and Exits to Send Printer Commands" on page 6.54.

Exit 15: JES Xmemory Exit

Function: This exit is called prior to processing each dataset within a job. It is used to extract job and dataset information that is not available through the PSO subsystem interface. The supplied JES Xmemory Exits retrieve the job and dataset information and build a cross-memory control block (mapping macro VPSSXMAT). This control block is then made available to the separator page routine by a pointer in the separator page information DSECT (mapping macro VPSSSEPI), and to all printer-related exits. With this information available, the separator routine can print information such as the programmer name on the separator pages, making them more JES-like.

This exit is NOT required if SAPI=Y is specified in the VPSSTART member. When using the SAPI interface, JES returns all of the job and dataset information to VPS (exceptions are noted below). On entry to this exit, VPS will have already built and initialized the XMAT and ORAT control blocks. All of the JES dependent code will be bypassed. The only reason VPS calls this exit when using the SAPI interface is give you the opportunity of rearranging certain fields within the XMAT and ORAT control blocks. For example, some customers initialize the PAGEDEF and FORMDEF fields based on the value of the FORM field whenever the sysout dataset does not specify PAGEDEF|FORMDEF values.

Note that the following XMAT fields are no longer available when using the SAPI interface:

XMADDEST DS	0F	DESTINATION CODE FROM PDDB.
XMADNODE DC	H'0'	NODE NUMBER.
XMADRMT DC	H'0'	REMOTE NUMBER.
XMAJCOPY DC	XL1'00'	JOB PRINT COPY COUNT.
XMAJLNCT DC	XL1'00'	LINES PER PAGE.
XMAJLINE DC	F'0'	GENERATED OUTPUT LINES.
XMAJPAGE DC	F'0'	GENERATED OUTPUT PAGES.

It is strongly recommended that VPS User Exit 15 be installed when running VPS AFP and if SAPI=N was specified at VPS initialization. See "Installing the VPS AFP Products Within VPS" on page 8.4 for more information.

Exit Type: Printer

Exit TCB: Printer

Point of Processing: This exit is taken prior to processing each dataset within a job.

Related Exits: N/A

Recovery:

- If recovery is off and this exit abends, the printer will be placed in an EDRAINED status.
- If recovery is on and this exit abends, the exit will automatically be disabled and a storage dump will be taken.

Register Contents on Entry:

R0	Request Code 00 - Extract job and dataset information 04 - Close the JES Spool dataset
R1	Address of parameter list in the following format: Word 0 (+00) Address of VPS System Attributes (VPSSSYAT) Word 1 (+04) Address of 2-Word User Work Area Word 2 (+08) Address of Printer Attributes (VPSSPRAT) Word 3 (+12) Address of Dataset Attributes (VPSSDSAT) Word 4 (+16) Address of Xmemory Attributes (VPSSXMAT) The high-order bit of the last parameter will be set to 1.
R2-R12	N/A
R13	Address of register save area
R14	Return Address
R15	Entry Address

Register Contents on Exit:

R0-R14	Same as upon entry
R15	Return code

Return Codes:

00	Successful completion
04	An error occurred - XMAERROR will contain the error code (Copy member VPSSGBL, supplied in file LRS.VPS.V1R80.MACLIB, defines all the possible XMAERROR error codes)

Exit Dependent Trace Data:

On Entry

- 8 byte - Job name
- 4 byte - Job number (binary)
- 1 byte - First XMAT flag byte
- 1 byte - JES level
- 2 byte - Exit 15 error code

On Exit

- 8 byte - Job name
- 4 byte - Job number (binary)
- 1 byte - First XMAT flag byte
- 1 byte - JES level
- 2 byte - Exit 15 error code

Programming Considerations:

Sample Program:

Members VPSSUE15 (for JES2 sites) and VPSSU315 (for JES3 sites) in VPS distribution file LRS.VPS.V1R80.ASM are examples of the JES Xmemory Exit.

The job-related information retrieved for JES2 sites includes the programmer name and room number and the four-byte job accounting number. The dataset-related information retrieved for JES2 sites includes the copy count, line count, and record count.

The job-related information retrieved for JES3 sites includes the programmer name and TSO userid for notify. No dataset-related information is retrieved for JES3 sites.

This exit reads the JES spool. If you have protected the JES spool with a security package, you will need to allow VPS read access to the JES spool when you implement this exit.

THIS EXIT MUST BE REASSEMBLED AND LINKEDITED WHENEVER MAINTENANCE IS APPLIED TO JES. The SYSLIB DD statement on the assembly step must refer to the correct JES source and maintenance libraries.

Exit 16: Printer Pooling Exit

Function: This exit is called prior to attempting to locate work, using the PSO interface, for pooled printers (POOL=Y) that are idle. The exit is used to return a unique Jobname/Jobid for each idle pooled printer. This will allow multiple printers to have the same selection criteria.

This exit is NOT CALLED if SAPI=Y is specified in the VPSSTART member. When using the SAPI interface, JES effectively performs this function for VPS. Note however that you must still specify POOL=Y in the printer definition member in order for VPS to allow overlapping selection criteria with other POOL=Y printers.

Exit Type: System

Exit TCB: System

Point of Processing: This exit is taken prior to searching for work for idle printers. It is only taken in behalf of printers that are pooled (POOL=Y).

Related Exits: N/A

Recovery:

- If recovery is off and this exit abends, the VPS address space will be terminated.
- If recovery is on and this exit abends, the exit will automatically be disabled and a storage dump will be taken.

Since the VPS address space will be terminated if this exit abends and recovery is off, it is recommended that recovery always be on for this exit.

Register Contents on Entry:

R0	Request Code (always 00)
R1	Address of parameter list in the following format: Word 0 (+00) Address of VPS System Attributes (VPSSSYAT) Word 1 (+04) Address of Pooling Attributes (VPSSPLAT) The high-order bit of the last parameter will be set to 1.
R2-R12	N/A
R13	Address of register save area
R14	Return Address
R15	Entry Address

Register Contents on Exit:

R0-R14	Same as upon entry
R15	Return code

Return Codes:

00	Successful completion
04	An error occurred - PLAERROR will contain the error code (Copy member VPSSGBL, supplied in file LRS.VPS.V1R80.MACLIB, defines all the possible PLAERROR error codes)

Exit Dependent Trace Data:

On Entry

- 4 byte - PLAPLMAX - Number of pooled printers
- 4 byte - PLABUSY - Number of busy pooled printers
- 4 byte - PLAIDLE - Number of idle pooled printers
- 4 byte - (unused)

On Exit

- 4 byte - PLAPLMAX - Number of pooled printers
- 4 byte - PLAACTIV - Number of active pooled printers
- 6 byte - (unused)
- 2 byte - PLAERROR - Pool error code

Programming Considerations:

1. A pooled printer (POOL=Y) will never select work unless this exit passes back a table entry signifying there is work to be printed. Therefore, it is mandatory that this exit work properly if your installation has any pooled printers.
2. This exit is loaded into CSA at VPS initialization.

Sample Program:

Members VPSSUE16 (for JES2 sites) and VPSSU316 (for JES3 sites) in VPS distribution file LRS.VPS.V1R80.ASM are examples of the Printer Pooling Exit. These examples contain all of the code necessary to support VPS' pooling. You can use the version appropriate to your JES as is, without alteration, if you wish to implement printer pooling.

THIS EXIT MUST BE REASSEMBLED AND LINKEDITED WHENEVER MAINTENANCE IS APPLIED TO JES. The SYSLIB DD statement on the assembly step must refer to the correct JES source and maintenance libraries.

Exit 17: Session Start Exit

Function: This exit is called after successfully starting a session between VPS and a printer. It provides a point for the user to take any action pertinent to modifying the VPS environment at the beginning of a session.

Exit Type: Printer

Exit TCB: Printer

Point of Processing: This exit is called after successfully starting a session between VPS and a printer.

Related Exits: N/A

Recovery:

- If recovery is off and this exit abends, the printer will be EDRAINED.
- If recovery is on and this exit abends, the exit will automatically be disabled and a storage dump will be taken.

Register Contents on Entry:

R0	Request Code (always 00)
R1	Address of parameter list in the following format: Word 0 (+00) Address of VPS System Attributes (VPSSSYAT) Word 1 (+04) Address of user work area (8 bytes) Word 2 (+08) Address of Printer Attributes (VPSSPRAT) The high-order bit of the last parameter will be set to 1.
R2-R12	N/A
R13	Address of register save area
R14	Return address
R15	Entry address

Register Contents on Exit:

R0-R14	Same as upon entry
R15	Return code

Return Codes:

00	Take no action for the printer or its output
16	Purge the printer's output if the printer has DIAL=Y

Exit Dependent Trace Data:

On Entry

- (No user data is recorded in the trace entry).

On Exit

- (No user data is recorded in the trace entry).

Programming Considerations:

Sample Program:

Member VPSSUE17 in VPS distribution file LRS.VPS.V1R80.ASM is an example of the Session Start Exit. This example returns to VPS with a return code of 16 if a session is being started for a dial-up (DIAL=Y) printer. This will cause VPS to purge all output on the JES spool for the printer.

Exit 18: Session End Exit

Function: This exit is called after ending a session between VPS and a printer. It provides a point for the user to take any action pertinent to modifying the VPS environment at the end of a session. The return code from this exit defines what action should be taken for the printer and the printer's output.

Exit Type: Printer

Exit TCB: Printer

Point of Processing: This exit is called after ending a session between VPS and a printer.

Related Exits: N/A

Recovery:

- If recovery is off and this exit abends, the printer will be EDRAINED.
- If recovery is on and this exit abends, the exit will automatically be disabled and a storage dump will be taken.

Register Contents on Entry:

R0	Request Code (always 00)
R1	Address of parameter list in the following format: Word 0 (+00) Address of VPS System Attributes (VPSSSYAT) Word 1 (+04) Address of user work area (8 bytes) Word 2 (+08) Address of Printer Attributes (VPSSPRAT) The high-order bit of the last parameter will be set to 1.
R2-R12	N/A
R13	Address of register save area
R14	Return address
R15	Entry address

Register Contents on Exit:

R0-R14	Same as upon entry
R15	Return code

Return Codes:

The return code is used to define what action should be taken for the printer and the printer's output. This action is taken in addition to any action that VPS might have taken if the session ended because of an error.

00	Take no action for the printer or for the printer's output
04	Drain the printer and take no action for the printer's output
08	Drain the printer immediately and take no action for the printer's output
12	Drain the printer with "force" and take no action for the printer's output
16	Take no action for the printer and purge the printer's output
20	Drain the printer and purge the printer's output
24	Drain the printer immediately and purge the printer's output
28	Drain the printer with "force" and purge the printer's output

Exit Dependent Trace Data:

On Entry

- (No user data is recorded in the trace entry).

On Exit

- (No user data is recorded in the trace entry).

Programming Considerations:

Sample Program:

Member VPSSUE18 in VPS distribution file LRS.VPS.V1R80.ASM is an example of the Session End Exit. This example merely issues a message via WTO which contains the VPS STC name, ID of the exit, and LUNAME with which a session was just ended.

Exit 19: Session Error Exit

Function: This exit is called when an error occurs in a session between VPS and a printer. It provides a point for the user to take any action pertinent to modifying the VPS environment when a session error has occurred. The return code from this exit defines what action should be taken for the printer and the printer's output.

Exit Type: Printer

Exit TCB: Printer

Point of Processing: This exit is called when an error occurs in a session between VPS and a printer.

Related Exits: N/A

Recovery:

- If recovery is off and this exit abends, the printer will be EDRAINED.
- If recovery is on and this exit abends, the exit will automatically be disabled and a storage dump will be taken.

Register Contents on Entry:

R0	Request Code (always 00)
R1	Address of parameter list in the following format: Word 0 (+00) Address of VPS System Attributes (VPSSSYAT) Word 1 (+04) Address of user work area (8 bytes) Word 2 (+08) Address of Printer Attributes (VPSSPRAT) Word 3 (+12) Address of VTAM work element (VPSSVWE) The high-order bit of the last parameter will be set to 1.
R2-R12	N/A
R13	Address of register save area
R14	Return address
R15	Entry address

Register Contents on Exit:

R0-R14	Same as upon entry
R15	Return code

Return Codes:

The return code is used to define what action should be taken for the printer and the printer's output. VPS will take the more severe action between its normal error recovery and what this exit requests via its return code. The return code is ignored when the work element passed to this exit is 0103 (LOSTERM) or 0104 (NSEXIT).

00	Take no action for the printer and take no action for the printer's output
04	Drain the printer and take no action for the printer's output
08	Drain the printer immediately and take no action for the printer's output
12	Drain the printer with "force" and take no action for the printer's output
24	Drain the printer immediately and purge the printer's output
28	Drain the printer with "force" and purge the printer's output
32	Issue a CLSDST and take no action for the printer's output
36	Issue a CLSDST and purge the printer's output

Exit Dependent Trace Data:

On Entry

- 1 byte - VWE Q ID
- 1 byte - VWE Element ID
- 14 byte - (unused)

On Exit

- 1 byte - VWE Q ID
- 1 byte - VWE Element ID
- 14 byte - (unused)

Programming Considerations:

Sample Program:

Member VPSSUE19 in VPS distribution file LRS.VPS.V1R80.ASM is an example of the Session Error Exit. This example requests that VPS should terminate its session with the printer and purge the printer's output when a printer with SEPINFO=DIALIN has a session error due to a sense code of 0831 (component disconnected) on a VTAM work element identified as a response, a normal request, or a send request.

Exit 20: SVC 34 Exit

Function: This exit is called prior to issuing a command via SVC 34. The exit can modify the command text or request that the command not be issued.

Exit Type: System

Exit TCB: System

Point of Processing: This exit is taken prior to issuing a command via SVC 34.

Related Exits: N/A

Recovery:

- If recovery is off and this exit abends, the VPS address space will be terminated.
- If recovery is on and this exit abends, the exit will automatically be disabled and a storage dump will be taken.

Since the VPS address space will be terminated if this exit abends and recovery is off, it is recommended that recovery always be on for this exit.

Register Contents on Entry:

R0	Request Code 00 - System related command 04 - Printer related command
R1	Address of parameter list in the following format: Word 0 (+00) Address of VPS System Attributes (VPSSSYAT) Word 1 (+04) Address of User work area or zeros Word 2 (+08) Address of Printer Attributes (VPSSPRAT) or zeros Word 3 (+12) Address of Dataset Attributes (VPSSDSAT) or zeros Word 4 (+16) Address of SVC 34 Attributes (VPSSSV34) The high-order bit of the last parameter will be set to 1.
R2-R12	N/A
R13	Address of register save area
R14	Return Address
R15	Entry Address

Register Contents on Exit:

R0-R14	Same as upon entry
R15	Return code

Return Codes:

00	Issue the command
04	Do not issue the command

Warning: If this exit returns to VPS with return code 04, then VPS will not issue the SVC34 command. Therefore, this exit must provide the same function that the command was intended to perform.

For example, if this exit indicates that VPS should not issue the JES command to change the SYSOUT attributes for a dataset that is to be requeued and this exit does not issue an equivalent command, the SYSOUT dataset will be obtained from JES again. VPS will then attempt to issue a JES command to requeue the output, and this exit will be called. This will cause a loop with VPS obtaining the same dataset from JES until some external command is issued to stop the printer or modify the attributes of the SYSOUT dataset.

Exit Dependent Trace Data:

On Entry

- 1 byte - Command type (MVS or JES)
- 1 byte - Command key ($TO, $RALL, *F,U,Q=WTR or *F,U,Q=HOLD)
- 2 byte - Command length
- 12 byte - First 12 bytes of command text

On Exit

- 1 byte - Command type (MVS or JES)
- 1 byte - Command key ($TO, $RALL, *F,U,Q=WTR or *F,U,Q=HOLD)
- 2 byte - Command length
- 12 byte - First 12 bytes of command text

Programming Considerations:

Sample Program:

Member VPSSU320 in VPS distribution file LRS.VPS.V1R80.ASM is an example of the SVC 34 Exit. This example passes the JES3 *F,U,Q=WTR and *F,U,Q=HOLD commands to JES3 via the JES3 SSISERV macro, and requests that VPS bypass issuing the JES3 commands via SVC34.

Exit 21: Internal Reader Exit

Function: VPS will allow a printer to emulate an SNA RJE station when the RJE printer parameter has a “Y” in the first positional parameter value. If the third positional parameter value is a “Y”, VPS will pass any inbound READER datastream to the JES internal reader.

This exit is called prior to writing each card image to the internal reader. It can modify the card image, request that the card image not be written, or request that the job being written to the internal reader be purged.

Exit Type: Printer

Exit TCB: Printer

Point of Processing: This exit is called prior to writing each card image to the internal reader.

Related Exits: N/A

Recovery:

- If recovery is off and this exit abends, the printer will be EDRAINED.
- If recovery is on and this exit abends, the exit will automatically be disabled and a storage dump will be taken.

Register Contents on Entry:

R0	Request Code (always 00)
R1	Address of parameter list in the following format: Word 0 (+00) Address of VPS System Attributes (VPSSSYAT) Word 1 (+04) Address of User work area Word 2 (+08) Address of Printer Attributes (VPSSPRAT) Word 3 (+12) Address of JCL card image The high-order bit of the last parameter will be set to 1.
R2-R12	N/A
R13	Address of register save area
R14	Return Address
R15	Entry Address

Register Contents on Exit:

R0-R14	Same as upon entry
R15	Return code

Return Codes:

00	Write the card image to the internal reader
04	Do not write the card image to the internal reader
08	Purge the job from the internal reader

Exit Dependent Trace Data:

On Entry

- 16 byte - First 16 bytes of JCL image

On Exit

- 16 byte - First 16 bytes of JCL image

Programming Considerations:

Sample Program:

Member VPSSUE21 in VPS distribution file LRS.VPS.V1R80.ASM is an example of the Internal Reader Exit. This example discards any card images that do not contain "//" or "/*" in columns 1-2. When a card image is discarded, a message is issued via WTO to display the card image. The exit will also purge any job from the internal reader that contains a card image with "//PURGE" in columns 1-7, and issues a messages signifying that the job has been purged.

Exit 22: Staging Exit

Function: This exit allows an installation to copy, modify, or replace an entire JES SYSOUT dataset prior to any VPS processing. This exit is used in conjunction with the printer keyword STGCLASS. The STGCLASS keyword specifies the SYSOUT class(es) of datasets that are always staged to the printer's staging dataset, regardless of size. Note that this exit is invoked **only** for those datasets whose class matches one of the class(es) in the STGCLASS keyword.

Exit Type: Printer

Exit TCB: Printer

Point of Processing: This exit is invoked prior to and after processing of each "STGCLASS"-type dataset. Specifically, when it is invoked prior to processing of the dataset, it will be called **after** Exit 15 and **before** Exits 02, 14, 01, and separators. When it is invoked after processing, it will be called **after** Exits 03 and 14 and **before** separators.

Related Exits: N/A

Recovery:

- If recovery is off and this exit abends, the printer will be EDRAINED.
- If recovery is on and this exit abends, the exit will automatically be disabled and a storage dump will be taken.

Register Contents on Entry:

R0 Request Code
00 - Call is prior to processing dataset
04 - Call is after processing dataset
08 - Call is for a cleanup request - an error has occurred. (The exit will be called with this request code only if a disastrous error has occurred processing the dataset).

R1 Address of parameter list in the following format:
Word 0 (+00) Address of VPS System Attributes (VPSSSYAT)
Word 1 (+04) Address of User work area
Word 2 (+08 Address of Printer Attributes (VPSSPRAT)
Word 3 (+12) Address of Dataset Attributes (VPSSDSAT)
Word 3 (+16) Address of Xmemory Attributes (VPSSXMAT)
The high-order bit of the last parameter will be set to 1.

R2-R12 N/A

R13 Address of register save area

R14 Return Address

R15 Entry Address

Register Contents on Exit:

R0-R14 Same as upon entry

R15 Return code

Return Codes:

When Request Code = 00:

00 Process “new” dataset as a standard SYSOUT dataset
04 Process “new” dataset as a graphics dataset
08 Process “old” dataset
12 Purge the dataset and continue with the next dataset
16 Drain the printer (immediate)
20 Requeue the dataset, process “new” dataset as standard
24 Requeue the dataset, process “new” dataset as graphics
28 Requeue the dataset, process “old” dataset
32 Requeue the dataset, do not process

When Request Code = 04 and 08:

16 Drain the printer (immediate)

All other return codes are ignored.

Exit Dependent Trace Data:

On Entry

- 8 byte - DSADDNAM
- 1 byte - DSARECFM
- 7 byte - (unused)

On Exit

- 8 byte - DSADDNAM
- 1 byte - DSARECFM
- 7 byte - (unused)

Programming Considerations:

1. The DDNAME of the staging dataset is contained in field DSADDNAM of the Dataset Attributes DSECT (VPSSDSAT macro). The exit can return a different dataset to VPS by returning a different DDNAME in field DSADDNAM. Note that the new DDNAME must **not** be the printer’s member name, as this is the name that VPS uses.

2. This exit can be used to archive SYSOUT datasets prior to or after printing.

3. This exit can be used to restructure the SYSOUT dataset into a “graphics” dataset. Graphics datasets are specified by returning to VPS with return code 04. Note that VPS’ processing of a “graphics” dataset differs from its “standard” processing as follows:

- Reposition commands are rejected
- PA-1 or PA-2 keys will cause the dataset to be restarted
- Compression is disabled
- Truncation is disabled

4. Request codes 04 and 08 provide the exit with the opportunity to release any resource (i.e., unallocating the “new” staging dataset) acquired during request code 00 processing. Note that the DSADDNAM field should be reset to binary zeroes after the “new” dataset has been unallocated.

5. This exit is not invoked for requeued datasets.

6. Reference the supplied sample Exit 22 (member VPSSUE22 in file LRS.VPS.V1R80.ASM) for a description of the attributes of the VPS staging dataset.

Sample Program:

Member VPSSUE22 in VPS distribution file LRS.VPS.V1R80.ASM is an example of the Staging Exit. The sample exit merely creates a copy of the VPS staging dataset and includes code to perform the following functions:

- Allocate and unallocate the “new” staging dataset
- Read from the “old” staging dataset
- Write to the “new” staging dataset

Exit 23: IPDS Exit

Function: This exit is called as each IPDS command is about to be placed into the VTAM buffer to be sent to the printer. It is also called each time an IPDS ACK or NACK is received from the printer.

Exit Type: Printer

Exit TCB: Printer

Point of Processing: This exit is invoked before each IPDS command is placed into the outbound buffer to be sent to the printer. The exit can modify the command, replace the command, or request that the command be deleted. The exit is also called after an IPDS ACK or NACK is received from the printer. The exit can request that VPS take action based on the return code from the exit.

Related Exits: N/A

Recovery:

- If recovery is off and this exit abends, the printer will be EDRAINED.
- If recovery is on and this exit abends, the exit will automatically be disabled and a storage dump will be taken.

Register Contents on Entry:

R0	Request Code 00 - IPDS command to be sent to printer 04 - IPDS ACK or NACK received from printer
R1	Address of parameter list in the following format: Word 0 (+00) Address of VPS System Attributes (VPSSSYAT) Word 1 (+04) Address of User work area Word 2 (+08 Address of Printer Attributes (VPSSPRAT) Word 3 (+12) Address of Dataset Attributes (VPSSDSAT) Word 4 (+16) Address of IPDS parameter list (VPSSIPDS) Word 5 (+20) Address of Xmemory Attributes (VPSSXMAT) The high-order bit of the last parameter will be set to 1.
R2-R12	N/A
R13	Address of register save area
R14	Return Address
R15	Entry Address

Register Contents on Exit:

R0-R14	Same as upon entry
R15	Return code

Return Codes:

When Request Code = 00:

00	Process the IPDS command
04	Delete the IPDS command

When Request Code = 04:

00	Continue processing
04	Cancel the IPDS dataset
08	Reserved (continue processing)
12	Skip to the next page in the IPDS dataset
16	EDRAIN the printer

All other return codes are ignored.

Exit Dependent Trace Data:

On Entry

- First 16 bytes of IPDS command

On Exit

- First 16 bytes of IPDS command

Programming Considerations:

1. The program is called for every IPDS command in the IPDS dataset. The exit is not called for separator routines or for any data added by VPS User Exit 14.
2. Both the length and content of the IPDS command can be altered; however, the length cannot be less than 5 bytes or greater than 32K bytes.

Sample Program:

Member VPSSUE23 in VPS distribution file LRS.VPS.V1R80.ASM is an example of the IPDS Exit. This sample exit removes all IPDS NOP commands found in the dataset and issues a WTO to indicate that a NOP was encountered. The sample also skips the remainder of the current page if an IPDS NACK 08C100 is received.

Exit 24: Subsystem Request Exit

Function: This exit is called each time VPS successfully retrieves a SYSOUT dataset from the JES spool using the PSO interface. This exit is NOT CALLED if SAPI=Y is specified in the VPSSTART member.

Exit Type: Printer

Exit TCB: System

Point of Processing: This exit is invoked immediately after successfully retrieving a SYSOUT dataset from the JES spool via the subsystem interface.

Related Exits: N/A

Recovery:

- If recovery is off and this exit abends, the VPS address space will be terminated.
- If recovery is on and this exit abends, the exit will automatically be disabled and a storage dump will be taken.

Register Contents on Entry:

R0	Request Code (always 00)
R1	Address of parameter list in the following format: Word 0 (+00) Address of VPS System Attributes (VPSSSYAT) Word 1 (+04) Address of User work area Word 2 (+08 Address of Printer Attributes (VPSSPRAT) Word 3 (+12) Address of Dataset Attributes (VPSSDSAT) Word 4 (+16) Address of Xmemory Attributes (VPSSXMAT) The high-order bit of the last parameter will be set to 1.
R2-R12	N/A
R13	Address of register save area
R14	Return Address
R15	Entry Address

Register Contents on Exit:

R0-R14	Same as upon entry
R15	Return code

Return Codes:

00	Successful completion
04	An error occurred. XMAERROR will be set to indicate the exact cause of the failure. These error codes are documented in macro VPSSGBL in file LRS.VPS.V1R80.MACLIB.

Exit Dependent Trace Data:

On Entry

- 8 byte - Job name for dataset requested
- 4 byte - Job number (binary)
- 1 byte - Subsystem request type

On Exit

- 8 byte - Output group name
- 4 byte - Output group ID
- 1 byte - (unused)
- 1 byte - JES level
- 2 byte - Error code from XMAERROR field

Programming Considerations:

1. This exit, if implemented and enabled, is taken immediately after successfully retrieving a SYSOUT dataset via the subsystem interface. This exit can be used to obtain dataset information that is not available through the subsystem interface (e.g. output group name). Information extracted in this exit should be placed into the Xmemory Attributes control block (XMAT). The XMAT control block is subsequently passed to the separator exit and all VPS printer related exits.
2. This exit differs from VPSSUE15 in that it is called earlier in the VPS processing of the SYSOUT dataset. This enables VPS to accomplish these tasks:
   - create separator pages between output groups.
   - uniquely identify SYSOUT datasets within a job that have the same JES2 dataset name and SYSOUT characteristics. This will occur whenever a SYSOUT dataset references multiple OUTPUT JCL statements.
   - obtain the writer name of SYSOUT datasets retrieved from the JES2 userid queue, when selecting by DEST.
   - the sample exit supplied by LRS is only applicable to JES2 systems.

Sample Program:

Member VPSSUE24 in VPS distribution file LRS.VPS.V1R80.ASM is an example of the Subsystem Request Exit for JES2 sites. This sample exit extracts the output group name, output group ID, and writer name associated with the current SYSOUT dataset.

THIS EXIT MUST BE REASSEMBLED AND LINKEDITED WHENEVER MAINTENANCE IS APPLIED TO JES. The SYSLIB DD statement on the assembly step must refer to the correct JES source and maintenance libraries.

Exit 25: TCP/IP Control File Exit

Function: This exit allows modification of control information that is passed to a TCP/IP device.

For COMMTYPE=(TCPIP,LPD), this exit allows an installation to modify the records in the control file which will be sent to a Line Printer Daemon (LPD) on a TCP/IP host. Records are built based on the VPS printer and system definitions and the characteristics of the dataset to be printed. The exit can modify the contents of each record, set flags to bypass or send an individual record or insert additional records.

For COMMTYPE=(TCPIP,SOK), a special buffer with job information fields is sent to the device at the beginning of each connection. The buffer is not printed, but is used by the printer to provide information about the job to any software which is monitoring the printer. This exit allows an installation to modify the values in the fields which will be sent to the TCP/IP printer. Fields are built based on the VPS printer and system definitions and the characteristics of the dataset to be printed. The exit can modify the contents of each field or set the number of fields to be sent.

Exit Type: Printer

Exit TCB: Printer

Point of Processing: This exit is invoked prior to processing a dataset to be delivered to a TCP/IP printer.

Related Exits: N/A

Recovery:

- If recovery is off and this exit abends, the printer will be EDRAINED.
- If recovery is on and this exit abends, the exit will automatically be disabled and a storage dump will be taken.

Register Contents on Entry:

R0	Request Code (always 00)
R1	Address of parameter list in the following format: Word 0 (+00) Address of VPS System Attributes (VPSSSYAT) Word 1 (+04) Address of User work area Word 2 (+08) Address of Printer Attributes (VPSSPRAT) Word 3 (+12) Address of Dataset Attributes (VPSSDSAT) Word 4 (+16) Address of Xmemory Attributes (VPSSXMAT) Word 5 (+20) Address of TCPIP Control Area (#LRTCCNT) or Address of TCPIP job information fields (#LRTCJIF) The high-order bit of the last parameter will be set to 1.
R2-12	N/A
R13	Address of register save area
R14	Return Address
R15	Entry Address

Register Contents on Exit:

R0-R14	Same as upon entry
R15	Return code

Return Codes:

00	Processing successful.
04	Processing error.

Exit Dependent Trace Data:

On Entry

- 2 byte - Length of TCP/IP control area
- 2 byte - Number of TCP/IP control entries (total)
- 2 byte - Number of TCP/IP control entries to send
- 2 byte - Number of copies of dataset to be printed

On Exit

- 2 byte - Length of TCP/IP control area
- 2 byte - Number of TCP/IP control entries (total)
- 2 byte - Number of TCP/IP control entries to send
- 2 byte - Number of copies of dataset to be printed

Programming Considerations:

1. The exit allows changing the LPD filter to be used to print the file at the remote TCP/IP host; for example, the exit may determine that the file is a PostScript file and change the filter value to ‘o’ to indicate to the receiving host that the file is in PostScript format.
2. This exit can be used to change any text sent in the records of the LPD control file. For example, the value of the user can be changed in the “mail” control record which begins with “M”; this would allow notification that the file has been printed.

Sample Program:

Member VPSSUE25 in VPS distribution file LRS.VPS.V1R80.ASM is an example of the TCP/IP Control File Exit. The sample exit changes user information to be sent to the remote TCP/IP device.

For LPR/LPD devices, the sample exit changes the user record (the “P” record) in the control file to one of the following fields from the VPSSXMAT control block:

- Programmer name field (if non-blank)
- TSO Notify field (if non-blank)
- Job name (if available)

For sockets devices using DEVTYPE=V.SOK and TCPOPTS=00000080, the sample exit changes the user name field (the sixth field) in the job information buffer work area to one of the following fields from the VPSSXMAT control block:

- Programmer name field (if non-blank)
- TSO Notify field (if non-blank)
- Job name (if available)

If SAPI=N then in order to make these fields available, VPS User Exit 15 should be installed and enabled.

See “Installing User Exit 25” on page 10.13 for more information about this exit.

Exit 26: AFP Resource Exit

Function: This exit is called to determine whether or not the current job is authorized to access a specified AFP resource or a specified USERLIB dataset, or to substitute AFP resource names.

When this exit is called to determine whether or not the current job is authorized to access a specified AFP resource, the exit can either allow or disallow access to the resource by returning to VPS with an appropriate return code. Return codes 00 and 04 both allow access to the resource. Return code 04 informs VPS that the specified resource should be considered secure and therefore must be deleted from the printer after printing the dataset. Return code 08 informs VPS that the job is not authorized to access the resource. VPS will then either EDRAIN the printer or requeue the SYSOUT dataset, based on the third positional parameter value in the ERRACTN printer keyword.

This exit can determine the resource type by examining the first two bytes of the resource name, as shown below:

Resource Name Prefix	Resource Type
P1	Page Definition
F1	Form Definition
S1	Page Segment
O1	Overlay
X0	Coded Font
C0	Font Character Set
T1	Code Page Table

This exit can also be used to determine whether or not the current user is authorized to access the specified USERLIB dataset(s). This exit can either allow access, disallow access, or direct VPS to use an external security product to determine access rights by returning to VPS with an appropriate return code. This exit is called by VPS both prior to and after issuing the RACROUTE macro for the USERLIB dataset(s).

When the exit is called prior to VPS issuing the RACROUTE macro for the USERLIB dataset(s), the exit is provided with the dataset name and volume serial for each of the libraries. Return code 00 is used to direct VPS to issue the RACROUTE macro to determine access rights. Return code 04 is used to direct VPS to bypass the RACROUTE macro for the USERLIB dataset(s) and to disallow access to the libraries. VPS will then either EDRAIN the printer or requeue the SYSOUT dataset, based on the third positional parameter value of the ERRACTN printer keyword.

When the exit is called after VPS has issued the RACROUTE macro for the USERLIB dataset(s), the exit is provided with the dataset name, volume serial, SAF return/reason codes, and RACF return/reason code for each of the USERLIB datasets. Return code 00 is used to direct VPS to honor the results of the RACROUTE macro to determine the access rights. Any SAF/RACF return code other than 0 will cause VPS to disallow access to the libraries, and the printer will be EDRAINED or the SYSOUT dataset will be requeued, based on the third positional parameter value of the ERRACTN printer keyword. Return code 04 is used to direct VPS to ignore the results of the RACROUTE macro for the USERLIB dataset(s) and to allow access to the libraries. Return code 08 is used to direct VPS to ignore the results of the RACROUTE macro for the USERLIB dataset(s) and to disallow access to the libraries. VPS will then either EDRAIN the printer or requeue the SYSOUT dataset, based on the third positional parameter value of the ERRACTN printer keyword.

When the exit is called to check for resource name substitution, the exit can replace the resource name with another resource name of the same type. Whether or not the resource name is substituted, the exit should return with return code 00.

Exit Type: Printer

Exit TCB: Printer

Point of Processing: This exit is invoked with a request code of 00 whenever an AFP resource is referenced and is not currently loaded in the printer. This exit is invoked with a request code of 04 before the RACROUTE library access request and with a request code of 08 after the RACROUTE library access request for the USERLIB datasets.

This exit is invoked with a request code of 12 before the resource is located (already loaded in the printer, in the production library, in the main input file, or in the USERLIB) and before any processing occurs to load the resource.

Related Exits: N/A

Recovery:

- If recovery is off and this exit abends, the printer will be EDRAINED.
- If recovery is on and this exit abends, the exit will automatically be disabled and a storage dump will be taken.

Register Contents on Entry:

R0 Request Code
00 - Resource access request
04 - Pre-RACROUTE library access request
08 - Post-RACROUTE library access request

R1 Address of parameter list in the following format:
(When request code = 00 or 12)
Word 0 (+00) Address of VPS System Attributes (VPSSSYAT)
Word 1 (+04) Address of User work area
Word 2 (+08) Address of Printer Attributes (VPSSPRAT)
Word 3 (+12) Address of Dataset Attributes (VPSSDSAT)
Word 4 (+16) Address of Xmemory Attributes (VPSSXMAT)
Word 5 (+20) Address of AFP Resource Attributes (VPSSAFAT)

(When request code = 04 or 08)
Word 0 (+00) Address of VPS System Attributes (VPSSSYAT)
Word 1 (+04) Address of User work area
Word 2 (+08) Address of Printer Attributes (VPSSPRAT)
Word 3 (+12) Address of Dataset Attributes (VPSSDSAT)
Word 4 (+16) Address of Xmemory Attributes (VPSSXMAT)
Word 5 (+20) Address of AFP Library Attributes (VPSSALAT)
The high-order bit of the last parameter will be set to 1.

R2-12 N/A
R13 Address of register save area
R14 Return Address
R15 Entry Address

Register Contents on Exit:

R0-R14 Same as upon entry
R15 Return code

Return Codes:

(When request code = 00)

00 Job is authorized to access the resource (not a secured resource)
04 Job is authorized to access the resource (secured resource)
08 Job is not authorized to access the resource

(When request code = 04)

00 Issue RACROUTE
04 Bypass RACROUTE - access allowed
08 Bypass RACROUTE - access disallowed

(When request code = 08)

00 Honor RACROUTE results
04 Ignore RACROUTE - access allowed
08 Ignore RACROUTE - access disallowed

(When request code = 12)

00 Resource substitution complete

Exit Dependent Trace Data:

On Entry

- 8 byte - AFP resource name

On Exit

- 8 byte - AFP resource name

Programming Considerations:

1. VPS will automatically delete secured resources at the end of the dataset. Resources are marked as secured whenever this exit is called with a request code of 00 and returns with a return code of 04.
2. VPS will automatically delete any USERLIB resources at the end of the dataset, unless the '0400' flag of the AFPOPTS printer keyword is set. This flag tells VPS to treat USERLIB datasets as production libraries rather than test libraries.
3. VPS maintains an internal table of the resources currently loaded in the printer. This exit is only called with a request code of 00 when VPS encounters a resource that is not currently loaded in the printer.
4. VPS uses the third positional parameter value of the ERRACTN keyword to determine which action is to be taken (EDRAIN or REQUEUE) whenever this exit returns with a return code of 08.

Sample Program:

Member VPSSUE26 in VPS distribution file LRS.VPS.V1R80.ASM is an example of the AFP Resource/Library Exit. For request code 00, the sample exit restricts access to AFP page segment resources to output from jobnames starting with "LRSAFP". For request code 04, the sample exit directs VPS to issue the RACROUTE macro to determine access rights to the USERLIB dataset(s). For request code 08, the sample exit directs VPS to honor the RACROUTE macro results to determine access rights to the USERLIB dataset(s). For request code 12, the sample exit will replace coded font resource name 'X0CR10' (IBM's 10 CPI courier font) with 'X00ER212' (LRS' 10 CPI courier font).

Exit 27: ACIF Parameter File Exit

Function: This exit allows an installation to modify the input parameters when VPS invokes the AFP Conversion and Indexing Facility (ACIF). If CONVTYPE=MODCA or CONVTYPE=PDF is specified in the VPS printer definition member and the file has AFPDS records or PAGEDEF/FORMDEF, VPS will call ACIF to convert the file to MODCA for viewing. Before VPS calls ACIF, an input parameter file work area is built. This exit allows modifying the records in the parameter file to control how ACIF will convert the file.

Exit Type: Printer

Exit TCB: Printer

Point of Processing: This exit is invoked prior to building the input parameter file for ACIF.

Related Exits: N/A

Recovery:

- If recovery is off and this exit abends, the printer will be EDRAINED.
- If recovery is on and this exit abends, the exit will automatically be disabled and a storage dump will be taken.

Register Contents on Entry:

R0	Request Code (always 00)
R1	Address of parameter list in the following format: Word 0 (+00) Address of VPS System Attributes (VPSSSYAT) Word 1 (+04) Address of User work area Word 2 (+08) Address of Printer Attributes (VPSSPRAT) Word 3 (+12) Address of Dataset Attributes (VPSSDSAT) Word 4 (+16) Address of Xmemory Attributes (VPSSXMAT) Word 5 (+20) Address of ACIF Parm Work area (VPSSACIF) The high-order bit of the last parameter will be set to 1.
R2-12	N/A
R13	Address of register save area
R14	Return Address
R15	Entry Address

Register Contents on Exit:

R0-R14	Same as upon entry
R15	Return code

Return Codes:

00	Processing successful
04	Processing error

Exit Dependent Trace Data:

On Entry

- 2 byte - length of parameter record work area
- 2 byte - total number of entries in work area
- 2 byte - number of entries used in work area

On Exit

- 2 byte - length of parameter record work area
- 2 byte - total number of entries in work area
- 2 byte - number of entries used in work area

Programming Considerations:

1. VPS builds the records in the parameter file which name the AFP resource libraries based on the libraries that were allocated to VPS at startup. Other ACIF input parameters are based on the attributes of the file obtained from JES (carriage control type, for example). For information on what keywords are valid, see the mapping macro VPSSACIP in distribution file LRS.VPS.V1R80.MACLIB.
2. The exit allows changing the parameters that will be used for input to IBM's ACIF program. The records that contain invalid keywords will be bypassed. Invalid values for keywords may cause processing errors in ACIF.
3. The exit can be used to add additional records with values for a particular keyword. If multiple records containing values for the same keyword are needed, a continuation flag should be set on each of those keywords except the last one. If a record for a keyword should not be sent, a flag can be set to bypass that record.
4. The exit can be used to add indexing records to the input file to cause ACIF to index the document. Adding index records implies a knowledge of the format of the records in the print file and must be determined within the exit using the printer attributes and the attributes associated with the file on the JES spool and stored by VPS in the VPSSDSAT, VPSSXMAT, and VPSSORAT control blocks.

Sample Program:

Member VPSSUE27 in VPS distribution file LRS.VPS.V1R80.ASM is an example of the ACIF Parameter File Exit. The sample exit reads the records in the parameter file work area and adds an additional font library to the concatenation that would be used to call ACIF.

Exit 28: VPS/Email Parameter Exit

Function: The function of this exit is to allow modification of the VPS/Email parameters before the SYSOUT dataset is sent to the mail server for delivery.

Exit Type: Printer

Exit TCB: Printer

Point of Processing: This exit is called prior to delivery of each VPS/Email print dataset.

Related Exits: N/A

Recovery:

- If recovery is off and this exit abends, the printer will be placed in an EDRAINED status.
- If recovery is on and this exit abends, the exit will automatically be disabled and a storage dump will be taken.

Register Contents on Entry:

R0 Request Code
00 - Print dataset request
04 - Notify message request

R1 Address of Parameter list in the following format:
Word 0 (+00) Address of VPS System Attributes (VPSSSYAT)
Word 1 (+04) Address of 2-word User Work Area
Word 2 (+08) Address of Printer Attributes (VPSSPRAT)
Word 3 (+12) Address of Dataset Attributes (VPSSDSAT)
Word 4 (+16) Address of Xmemory Attributes (VPSSXMAT)
Word 5 (+20) Address of VPS/Email Workarea (VPSSEMAL)

R2-R12 N/A
R13 Address of register save area
R14 Return Address
R15 Entry Address

Register Contents on Exit:

R0-R14 Same as upon entry.
R15 Return code

Return Codes:

(When request code = 00)

00 Successful completion – use values in VPS/Email Workarea
04 Error occurred during processing – EDRAIN printer
08 Error occurred during processing - requeue the dataset

(When request code = 04)

00 Successful completion - use values in VPS/Email Workarea
04 Error occurred during processing – EDRAIN printer
12 Error occurred during processing - ignore notify request

Exit Dependent Trace Data:

On Entry

- 4 bytes – EMALFLGS – VPS/Email processing flags
- 12 bytes – EMALRCAV – First 12 bytes of email address of first recipient

On Exit

- 4 bytes – EMALFLGS – VPS/Email processing flags
- 12 bytes – EMALRCAV – First 12 bytes of email address of first recipient

Programming Considerations:

1. The VPS/Email parameters may be modified. If the value of any field is modified, the corresponding length should be set to the length of the value excluding any trailing blanks.
2. VPS will translate the values in the fields to ASCII before they are sent to the remote device.
3. The length of the sender's email address, the length of the sender's name and the length of the date field must be greater than zero.
4. The sender's email address and/or name can be modified by this exit. If the name does not include the email address surrounded by the 'less than' (<) and 'greater than' (>) signs and if the remaining length is sufficient to do so, VPS will add the email address at the end of the name field.
5. The lengths of the recipient email address fields may be set to zero to avoid sending to that user. However, at least one of the recipient fields must have a valid address and length.
6. A flag may be set to indicate that VPS should send the message as an attached file. In this case the filename of that file may be specified or VPS will set the default file name using the MAILFNAM keyword values.

Sample Program:

Member VPSSUE28 in VPS distribution library LRS.VPS.V1R80.ASM is an example of the VPS/Email Parameter Exit. This example obtains the TSO ID of the owner of the job that created the print dataset on the JES spool and uses that ID to search a table to find the email address and name of the sender. Those fields are used to update the VPS/Email parameter workarea fields.

Addressing Mode Macros

The following macros are available to switch to 24-bit or 31-bit addressing mode.

MACRO NAME: $AMODE24

Description: Switch to 24-bit addressing mode.
Operands: None
Example: $AMODE24

MACRO NAME: $AMODE31

Description: Switch to 31-bit addressing mode.
Operands: None
Example: $AMODE31

Cross Memory Macros

This set of macros is used to perform cross memory access to the JES address space by some of the supplied sample user exits. These macros are available for use in coding your own exits if you need to perform cross memory access.

MACRO NAME: $$XC

Description: Xmemory Compare

(Register in operand-1 is compared to word at operand-2 and condition code is set accordingly)

Operand-1: Required

Register to be compared with second operand

(can be any register 0 through 15)

Operand-2: Required

One word storage location to be compared with operand-1.

(This operand resides in the secondary address space)

Example: $$XC R0,WORD

MACRO NAME: $$XCLC

Description: Xmemory Compare Logical Characters

(Operand-1 is compared to operand-2 and condition code is set accordingly)

Operand-1: Required

Storage location to be compared with operand-2

(This operand resides in the primary address space)

Operand-2: Required

Storage location to be compared with operand-1

(This operand resides in the secondary address space)

Operand-3: Optional - if not specified length of operand-1 is used

Length of the compare

(Must be decimal value between 1 and 8)

Note: The length of the compare must not exceed eight bytes.

Therefore, if the implicit length of the first operand is greater than eight, the third operand must be specified.

Example: $$XCLC FIELD1,FIELD2,4

MACRO NAME: $$XCLI

Description: Xmemory Compare Logical Immediate

(Operand-1 is compared to operand-2 and condition code is set accordingly)

Operand-1: Required

Storage location to be compared with operand-2

This operand resides in the secondary address space)

Operand-2: Required

Immediate value to be compared with operand-1

Example: $$XCLI FIELD1,X'40'

MACRO NAME: $$XCLM

Description: Xmemory Compare Logical Characters Under Mask

(The register specified by operand-1 is compared to operand-2 under control of a mask and the result is indicated in the condition code)

Operand-1: Required

Register to be compared with operand-3

(can be any register 0 through 15)

Operand-2: Required

Mask that governs the compare

Operand-3: Required

Storage location to be compared with operand-1

(This operand resides in the secondary address space)

Example: $$XCLM R0,B'1100',FIELD

MACRO NAME: $$XICM

Description: Xmemory Insert Characters Under Mask

Bytes specified by operand-3 are inserted into the register specified by operand-1 under the control of the mask specified by operand-2.

Operand-1: Required

Register into which operand-3 will be inserted

(can be any register 0 through 15)

Operand-2: Required

Mask that governs the insertion

Operand-3: Required

Storage location to be inserted into operand-1

(This operand resides in the secondary address space)

Example: $$XICM R0,B'1100',FIELD

MACRO NAME: $$XL

Description: Xmemory Load

(Register in operand-1 is loaded with word at operand-2)

Operand-1: Required

Register to be loaded from second operand

(can be any register 0 through 15)

Operand-2: Required

One word storage location to be loaded into operand-1.

(This operand resides in the secondary address space)

Example: $$XL R0,WORD

MACRO NAME: $$XLM

Description: Xmemory Load Multiple

(Register range specified by operand-1 and operand-2 is loaded with data at storage location specified by operand-3)

Operand-1: Required

Beginning register to be loaded from third operand

(can be any register 0 through 15)

Operand-2: Required

Ending register to be loaded from third operand

(can be any register 0 through 15)

Operand-3: Required

Storage location to be loaded into register range specified by operand-1 and operand-2.

(This operand resides in the secondary address space)

Example: $$XLM R0,R1,WORDS

MACRO NAME: $$XTM

Description: Xmemory Test Under Mask

(Operand-2 is used to test bits of operand-1 and the condition code is set accordingly)

Operand-1: Required

Storage location to be tested against operand-2 mask

(This operand resides in the secondary address space)

Operand-2: Required

Immediate mask bits to be tested against operand-1

Example: $$XTM FIELD1,X'40'

Invoking VPS Services from User Exits

The $$VPSERV macro can be used to invoke selected VPS services from user exits or separator routines. All LRS supplied sample exits and separator routines use $$VPSERV macros.

GETMAIN - Obtaining storage.

The GETMAIN service allows the caller to obtain storage using VPS services. The request will be for subpool 0 and will be an unconditional request. The amount of storage and the calling module will be traced by VPS. The net storage obtained by user requests will be maintained by VPS.

FREEMAIN - Releasing storage

The FREEMAIN service allows the caller to release storage using VPS services. The amount of storage and the calling module will be traced by VPS. The net storage obtained by user requests will be maintained by VPS.

TRACE - Adding entries to the VPS trace table

The TRACE service inserts the caller specified trace entry into the VPS trace table. The user exit trace entries are interspersed with the other VPS trace entries. The entries may be examined by either:

1. issuing the VPS SNAP command to obtain a copy of the VPS trace table
2. selecting option 'G' or 'T' from the VPS Printer Selection List in VMCF

The user exit is responsible for initializing both the TRCTYPE and TRCVARY fields prior to issuing the $$VPSERV macro. Note that the 1st byte of the TRCTYPE field (trace identifier) must contain either 'Z' or '0'-'9'. The 16 byte TRCVARY field may be initialized to any value by the user exit.

WTO - Issuing messages

The WTO service allows the user exit to issue messages via normal VPS message processing. The message type field, WTATYPE, contains the attribute(s) of the message as follows:

WTATACT action message

WTATINF informational message

WTATNOR normal message

WTATNOP nop,log message

WTATNLOG nop,nolog message

Note that the message will be written to the VPS log dataset, unless WTATNLOG is set.

Any information placed into the WTAUSER field (TPUT userid) is ignored.

The content of the message area, WTATEXT, is not examined or modified and must be suitable text for use in a single-line WTO message.

Programming Requirements:

AMODE: 24 or 31
Execution TCB: Same in which the user exit executes. Refer to the description of the appropriate user exit to determine the execution TCB.

Note that R13 must contain the address of a standard OS-style register save area, allocated by the user exit, prior to invoking the $$VPSERV macro.

SYAT=YES should always be specified for $$VPSERV if the linkage stack is used. Addressability to the System Attributes allows $$VPSERV to locate the services routine module.

Register Usage:

When control is returned to the user exit, the general purpose registers will contain:

R0-R1	volatile
R2-R13	same as entry
R14	volatile
R15	VPS service return code

Return Codes (REQUEST=GETMAIN):

00	Successful completion
04-28	Reserved
32	Invalid request code ($$VPSERV logic error)

Return Codes (REQUEST=FREEMAIN):

00	Successful completion
04-28	Reserved
32	Invalid request code ($$VPSERV logic error)

Return Codes (REQUEST=TRACE):

00	Successful completion
04	Invalid trace type
08-28	Reserved
32	Invalid request code ($$VPSERV logic error)

Return Codes (REQUEST=WTO):

00	Successful completion
04	Invalid message length
08-28	Reserved
32	Invalid request code ($$VPSERV logic error)

Syntax:

The $$VPSERV macro is written as follows:

```
---------------------------------------------------------------------------------------------------
name   $$VPSERV    REQUEST=GETMAIN|FREEMAIN|TRACE|WTO,
             A=address,                    RX-type address or register (2) - (12)
             LV=length,                    Symbol, decimal number or register (2) - (12)
             LOC=(ANY|BELOW|RES,ANY),
             TRACE=trace,                  RX-type address or register (2) - (12)
             WTOAREA=wtoarea,              RX-type address or register (2) - (12)
             SYAT=NO|YES,
             MF=L|E|S
---------------------------------------------------------------------------------------------------
```

REQUEST= Identifies the type of service request. Valid values are GETMAIN, FREEMAIN, TRACE or WTO.

SYAT= Indicates whether or not the VPS SYAT control block is addressable within the user exit. Default is NO. SYAT=YES must be specified if the linkage stack is used (BAKR and PR) within the exit.

A= Address of area to be released when REQUEST=FREEMAIN.

LV= Length of area to be obtained when REQUEST=GETMAIN or released when REQUEST=FREEMAIN.

LOC= Location of storage to be obtained.

LOC=BELOW	Virtual and real storage are to be located below the 16M line.
LOC=(BELOW,ANY)	Virtual is to be located below the 16M line and real can be located anywhere.
LOC=ANY	Virtual and real can be located anywhere.
LOC=(ANY,ANY)	Virtual and real can be located anywhere.
LOC=RES	If the caller resides below the 16M line, virtual and real are to be located below the 16M line. If the caller resides above the 16M line, virtual and real can be located anywhere.
LOC=(RES,ANY)	If the caller resides below the 16M line, virtual storage is to be located below the 16M line. If the caller resides above the 16M line, virtual storage can located anywhere. in either case, real storage can be located anywhere.

TRACE=trace Identifies the address of a 64-byte trace entry (mapped via the VPSSTRE macro).

WTOAREA=wtoarea Identifies the address of the WTO attributes control block (mapped via the VPSSWTAT macro).

MF= L - list form of macro

E - execute form of macro

S - standard form of macro

Examples:

Example 1 - Issue message USR001I as an action message.

```
       LA    R2,UXITWTAT                        LOAD WTAT BASE
                                                REGISTER.
       USING WTADSECT,R2                        ESTABLISH WTAT
                                                ADDRESSABILITY.
       XC    WTATYPE(WTADLGTH-L'WTATEXT),WTATYPE RESET PREFIX
                                                AREA.
       OI    WTATYPE,WTATINF                    SET INFO MESSAGE.
       MVI   WTATEXT,X'40'                      RESET MSG...
       MVC   WTATEXT+1(L'WTATEXT-1),WTATEXT     TEXT TO BLANKS.
       LA    R1,L'USR001I                       SET LENGTH...
       STCM  R1,B'0011',WTALGTH                 OF MESSAGE TEXT.
       MVC   WTATEXT(L'USR001I),USR001I         INSERT MESSAGE TEXT.
       $$VPSERV REQUEST=WTO,                                       *
             SYAT=YES,                                             *
             WTOAREA=(R2),                                         *
             MF=(E,UXITSWTO)
      DROP R2                       KILL WTAT ADDRESSABILITY.
      USR001IDC                     C'USR001I TEST MESSAGE FROM VPS
                                    USER EXIT'
*
* USER EXIT WORKAREA
*
UXITSWTO $$VPSERV REQUEST=WTO,MF=L
UXITWTATDC
```

Example 2 - Insert trace entry ZU01 into the VPS trace table.

```
     XC    UXITTRCE,UXITTRCE    INITIALIZE TRACE ENTRY.
     LA    R2,UXITTRCE          LOAD TRC BASE REGISTER.
     USING TRCDSECT,R2          ESTABLISH TRC ADDRESSABILITY.
     MVC   TRCTYPE,=CL4'ZU01'   SPECIFY TRACE TYPE.
     MVC   TRCVARY+00(4),UXITREQINSERT REQUEST CODE.
     MVC   TRCVARY+04(4),UXITRC INSERT RETURN CODE.
     $$VPSERV REQUEST=TRACE,                                    *
           SYAT=YES,                                            *
           TRACE=(R2),                                          *
           MF=(E,UXITSTRC)
     DROP  R2                   DROP TRC ADDRESSABILITY.

*
* USER EXIT WORKAREA
*
UXITRC    DC    A(0)                      RETURN CODE.
UXITREQ   DC    A(0)                      REQUEST CODE.
UXITTRCE  DC    XL64'00'                  TRACE ENTRY.
UXITSTRC  $$VPSERV REQUEST=TRACE,MF=L     $$VPSERV MACRO LIST.
```

Example 3 - Obtain storage for exit workarea.

```
  LA    R5,UXITDSLN            LOAD LENGTH OF EXIT WORKAREA.
  $$VPSERV REQUEST=GETMAIN,                                  *
        SYAT=YES,                                            *
        LV=(R5),                                             *
        MF=S
  LR    R13,R1                 LOAD WORKAREA ADDRESS IN R13.
*
* USER EXIT WORKAREA
*
UXITDSCT DSECT
*
UXITDSLN EQU   *-UXITDSCT
```

Example 4 - Release storage for exit workarea.

```
  LR    R1,R13                 LOAD WORKAREA ADDRESS IN R1.
  $$VPSERV REQUEST=FREEMAIN,                                 *
        SYAT=YES,                                            *
        A=(R1),                                              *
        LV=UXITDSLN,                                         *
        MF=S
*
* USER EXIT WORKAREA
*
UXITDSCT DSECT
*
UXITDSLN EQU   *-UXITDSCT
```

For more examples, see the LRS sample user exits and separator routines.

Control Block Inquire and Modification Macros

The following two macros provide the user with the ability to inquire ($$CBINQ) and modify ($$CBSET) any VPS printer parameter within a user exit. "$$CBINQ and $$CBSET Keyword Operand Table" on page 5.84 lists the number of parameters, length of parameters, and format of parameters for each printer keyword. It also lists the exits from which each keyword value can be modified.

An example of the use of the $$CBINQ and $$CBSET macros can be seen in member VPSSUE02 in distribution file LRS.VPS.V1R80.ASM. This exit dynamically changes the values of the CPI and/or MPP keywords, based on some characteristic of the SYSOUT dataset about to be printed and the current value of those keywords.

Macro Name: $$CBINQ

Description: Control Block Inquire - provides the user with the ability to retrieve any VPS printer parameter. A maximum of eight parameters can be retrieved per macro call.

The keyword value(s) are returned in the user specified keyword reply area(s). The length of the keyword reply is determined by the length of the keyword value within the VPS control block. It is the user's responsibility to ensure that the specified keyword reply area(s) are of the correct length.

Operands: All operands are keywords. From 1 to 8 of the keywords to be inquired upon must be coded (see "$$CBINQ and $$CBSET Keyword Operand Table" on page 5.84).

Code one of the following TYPE= values. (Default: TYPE=PRINTER)

- TYPE=PRINTER - to inquire upon a printer keyword values
- TYPE=PRTDEFLT - to inquire upon a printer's default keyword values
- TYPE=VPSDEFLT - to inquire upon a the VPS master default keyword values

Code one of the following SYAT= values. (Default: SYAT=NO)

- SYAT= Indicates whether or not the VPS SYAT control block is addressable within the user exit. SYAT=YES must be specified if the linkage stack is used (BAKR and PR) within the exit.

Code one of the following MF= values. (Default: MF=L)

- MF=L - to generate the macro list form
- MF=E - to generate the macro execute form

Return Codes: 00 - Successful Completion

04 - Invalid Keyword ID Detected (Inquire Request)

08 - Printer PCB or Default PCB does not exist

- The printer PCB will not exist if the inquire request was made from a system related exit.
- The default PCB will not exist if the inquire request was made from a system related exit or if the DEFLTMEM keyword was not specified in the printer's definition.

Example: $$CBINQ CPI=WRKCPI,TYPE=PRINTER,MF=(E,WRKCBM)

Macro Name: $$CBSET

Description: Control Block Set - provides the user with the capability of setting any of the VPS printer parameters. A maximum of eight parameters can be set per macro call.

All of the user supplied keyword values are validated to ensure that they contain valid data. If any of the keyword values fail the validity check, the entire request is rejected. If all the keyword values pass the validity check, then the appropriate keyword value(s) within the VPS printer control block will be modified.

If any selection criteria are being modified, the following additional checking will be performed by VPS:

- Ensure that resultant selection criteria is not null
- Check for conflict with requeue parameters
- Check for overlapping selection criteria

If any of the above checks fail, the entire request is rejected.

If any requeue parameters are being modified, the following additional checking will be performed by VPS:

- Ensure that a conflict does not exist with the printer's selection criteria
- Ensure that a conflict does not exist with the printer's scheduled selection criteria

If either of the above checks fail, the entire request is rejected.

Note: On any given $$CBSET macro, if selection criteria are being changed, no other printer keyword types (i.e., other than selection criteria) can be changed on the same issuance of the $$CBSET macro.

On any given $$CBSET macro, if requeue parameters are being changed, no other printer keyword types (i.e., other than requeue parameters) can be changed on the same issuance of the $$CBSET macro.

Operands: All operands are keywords. From 1 to 8 of the keywords to be modified must be coded. (See "$$CBINQ and $$CBSET Keyword Operand Table" on page 5.84).

Code one of the following SYAT= values. (Default: SYAT=NO)

- SYAT= Indicates whether or not the VPS SYAT control block is addressable within the user exit. SYAT=YES must be specified if the linkage stack is used (BAKR and PR) within the exit.

Code one of the following MF= values (Default MF=S)

- MF=S - to generate the macro standard form
- MF=L - to generate the macro list form
- MF=E - to generate the macro execute form

Return Codes: 00 - Successful Completion
04 - N/A
08 - Printer PCB does not exist

- The printer PCB will not exist if the set request was made from a system related exit.

12 - User exit is not allowed to modify keyword
16 - Mutually exclusive keywords specified
20 - Keyword failed validity check

Example: $$CBSET CPI=WRKCPI,MF=(E,WRKCBM)

$$CBINQ and $$CBSET Keyword Operand Table

The printer keywords which can be checked via $$CBINQ and/or changed via $$CBSET are listed in the table below. Under comments, you will see a description of the format of the data returned by the $$CBINQ macro and the format that must be supplied for the $$CBSET macro.

For example, CHNSIZE is a two-byte field, described as “halfword binary”. This means that a printer with a CHNSIZE=50 specified in its Printer Definition member would return two bytes, containing X’0032’, in the area provided to the $$CBINQ macro.

A field described as “alphanumeric” will return the actual value of the keyword, as will those described as “Y or N”. For example, if APLCLASS=ABC is specified in a Printer Definition member, eight bytes, containing “ABC”, followed by five spaces, will be returned in the area provided to the $$CBINQ macro.

A field described as “hex” will return the actual hexadecimal representation of the keyword value. For example, if FFSEQ=150C15 is specified in a Printer Definition member, three bytes, containing X’150C15’, will be returned in the area provided to the $$CBINQ macro.

Printer Keyword	Macro Keyword	Number of Parameters	Parameter Length	Exits that Can Change Keyword	Comments
AFPADJ	&AFPADJ	4	2	02,03,11,15	Halfword binary
			2	02,03,11,15	Halfword binary
			2	02,03,11,15	Halfword binary
			2	02,03,11,15	Halfword binary
AFPKEYWD	&AFPKEYW	1	4	02,11	Hex
AFPMSGS	&AFPMSGS	3	6	02,11	Alphanumeric
			6	02,11	Alphanumeric
			4	02,11	Alphanumeric
AFPOPTS	&AFPOPTS	1	4	02,11	Hex
AFPRTAB	&AFPRTAB	1	8	11	Alphanumeric
AFPSEPE	&AFPSEPE	3	6	2,3,11,15	Alphanumeric
			6		Alphanumeric
			4		Alphanumeric
AFPSEPS	&AFPSEPS	3	6	2,3,11,15	Alphanumeric
			6		Alphanumeric
			4		Alphanumeric
ALARM	&ALARTM	1	1	02,03,11	Y or N
ALOGMODE	&ALOGMOD	1	8	08,11	Alphanumeric
ALUNAME	&ALUNAME	1	8	11	Alphanumeric
APLCLASS	&APLCLAS	1	8	11	Alphanumeric
AUTOEJCT	&AUTOFF	4	1	02,03,11	Y or N
			1	02,03,11	Y or N
			1	02,03,11	Y or N
			1	02,03,11	Y or N
AUTONL	&AUTONL	1	1	11	Y or N

Printer Keyword	Macro Keyword	Number of Parameters	Parameter Length	Exits that Can Change Keyword	Comments
CDNETMAP	&CDNTMAP	1	44	11	Alphanumeric
CDPLIB	&CDPLIB	1	44	11	Alphanumeric
CDPMBR	&CDPMBR	1	8	11	Alphanumeric
CDSNODE	&CDSNODE	1	16	11	Alphanumeric
CHARS	&CHARS	4	4	02,11	Alphanumeric
			4	02,11	Alphanumeric
			4	02,11	Alphanumeric
			4	02,11	Alphanumeric
CHNSIZE	&CHNSIZE	1	2	11	Halfword binary
CKPTLINE	&CKPTLIN	1	2	02,03,11	Halfword binary
CKPTPAGE	&CKPTPAG	1	2	02,03,11	Halfword binary
CLASS	&CLASS	2	8	11	Primary selection criteria, alphanumeric
			8	11	Secondary selection criteria, alphanumeric
COMMTYPE	&COMMTYP	3	8	11	Alphanumeric
			8	11	Alphanumeric
			8	11	Alphanumeric
COMPRESS	&COMPRES	3	1	02,11	Alphanumeric (Y, N, or S)
			1	02,11	Y or N
			1	02,11	T or N
CONVTYPE	&CONVTYP	1	8	11,15	Alphanumeric
CPI	&CPI	1	2	02,11	Halfword binary
CRCHAR	&CRCHAR	1	1	11	Hex (0D or 15)
CROPTS	&CROPTS	1	4	11	Hex
DBCCLASS	&DBCCLAS	1	8	11	Alphanumeric
DCACLASS	&DCACLAS	1	8	11	Alphanumeric
DCKACTN	&DCKACTN	4	7	02,11	Alphanumeric
			7	02,11	Alphanumeric
			8	02,11	Alphanumeric
			8	02,11	Alphanumeric
DDSNPFX	&DDSNPFX	1	16	08,11	Alphanumeric
DEFLTMEM	&DFLTMEM	1	8	None	$$CBSET not allowed

Printer Keyword	Macro Keyword	Number of Parameters	Parameter Length	Exits that Can Change Keyword	Comments
DEST	&DEST	2	8	11	Primary selection criteria, alphanumeric
			8	11	Secondary selection criteria, alphanumeric
DEVTYPE	&DEVTYPE	1	16	11	Alphanumeric
DIAL	&DIAL	1	1	08,11,18	Y or N
DJDEIDEN	&DJDEIDE	4	2	11	Halfword binary
			16	11	Alphanumeric plus special characters
			2	11	Halfword binary
			16	11	Alphanumeric plus special characters
DRAINED	&DRAINED	1	1	11	Y or N
DSBATCH	&DSBATCH	3	1	11	Y or N
			1	11	Y or N
			1	11	Y or N
DSPACE	&DSPACE	3	1	8,11,15	C or T
			2	08,11,15	Halfword binary
			2	08,11,15	Halfword binary
DUNIT	&DUNIT	2	8	08,11	Alphanumeric
DUPLEX	&DUPLEX	1	6	02,11	Alphanumeric (NO, NORMAL, or TUMBLE)
DVOLUME	&DVOLUME	1	6	08,11	Alphanumeric
EKEY	&EKEY	1	32	11	Hex
ENCRYPT	&ENCRYPT	4	1	11	Y or N
			8	11	Alphanumeric
			8	11	Alphanumeric
			1	11	Y or N
ERRACTN	&ERRACTN	4	3	11	Alphanumeric (STD, BUF, RST, or EDR)
			1	11	Y or N
			3	11	Alphanumeric (EDR or REQ)
			3	11	Alphanumeric (EDR or REQ)

Printer Keyword	Macro Keyword	Number of Parameters	Parameter Length	Exits that Can Change Keyword	Comments
FCB	&FCB	3	4	02,03,11	Alphanumeric (Y, N, or FORM)
			4	02,03,11	Alphanumeric
			1	02,03,11	Alphanumeric (E or D)
FDEFDD	&FDEFDD	1	8	02,11	Alphanumeric
FFSEQ	&FFSEQ	1	3	02,03,11	Hex
FMHCLASS	&FMHCLAS	3	8	11	Alphanumeric
			12	11	Hex
			12	11	Hex
FMHJOB	&FMHJOB	2	12	11	Hex
			12	11	Hex
FONTDD	&FONTDD	1	8	02,11	Alphanumeric
FORM	&FORM	3	4	11	AUTO
			4	11	Alphanumeric
			8	11	Alphanumeric (CLSDCHG or CLSNDCHG)
FORM	&FORM	2	4	11	Primary selection criteria, alphanumeric
			4	11	Secondary selection criteria, alphanumeric
FORMDEF	&FORMDEF	1	6	02,11	Alphanumeric
FORMFEED	&FRMFEED	1	1	02,03,11	Y or N
GDMAPPL	&GDMAPPL	1	8	11	Alphanumeric
GDMCLASS	&GDMCLAS	1	8	11	Alphanumeric
GRPNAME	&GRPNAME	1	8	11	Alphanumeric
INTRAY	&INTRAY	1	1	02,11	Binary
IPDCLASS	&IPDCLAS	1	8	11	Alphanumeric
IPDOPTS	&IPDOPTS	1	4	02,11	Hex
JESQUEUE	&JESQUEU	6	1	11	Y or N
			1	11	Y or N
			1	11	Y or N
			1	11	Y or N
			1	11	Y or N
			1	11	Y or N
LOGDATA	&LOGDATA	1	1	11	Alphanumeric (W, D, or N)
LUNAME	&LUNAME	1	8	11	Alphanumeric

Printer Keyword	Macro Keyword	Number of Parameters	Parameter Length	Exits that Can Change Keyword	Comments
MAILBOOK	&MAILBOK	1	8	11	Alphanumeric
MAILKWDS	&MAILKWD	1	4	11	Hex
MAILOPTS	&MAILOPS	1	4	11	Hex
MAILCSET	&MAILCST	1	60	11	Alphanumeric plus special characters
MAILFNAM	&MAILFNM	3	6	11	Alphanumeric plus special characters
			6	11	Alphanumeric plus special characters
			6	11	Alphanumeric plus special characters
MAILSTAT	&MAILSTA	4	8	11	Alphanumeric
			8	11	Alphanumeric
			8	11	Alphanumeric
			8	11	Alphanumeric
MAXLPG	&MAXLPG	3	3	02,03,11,15	Halfword binary
			3		Alphanumeric (ALL)
			3		Alphanumeric (JES)
MERGE	&MERGE	1	1	02,03,11	Y or N
MPP	&MPP	1	2	02,03,11	Halfword binary
NCCSPACE	&NCCSPAC	1	2	02,03,11	Halfword binary
NLSEQ	&NLSEQ	1	3	11	Hex
NOTIFY	&NOTIFY	4	1	11	Y or N
			1	11	Y or N
			1	11	Y or N
			1	11	Y or N
NOTMAIL	&NOTMAIL	1	60		Alphanumeric
NOTTSO	&NOTTSO	1	17		Alphanumeric
OUTBIN	&OUTBIN	1	2	2,3,11,15	Halfword binary
OVERLAYB	&OVERLYB	1	8	02,11	Alphanumeric
OVERLAYF	&OVERLYF	1	8	02,11	Alphanumeric
OVLYDD	&OVLYDD	1	8	02,11	Alphanumeric
PAGEDEF	&PAGEDEF	1	6	02,11	Alphanumeric
PCLOPMEM	&PCLOPME	1	8	11	Alphanumeric
PCLOPTS	&PCLOPTS	1	4	02,11	Hex

Printer Keyword	Macro Keyword	Number of Parameters	Parameter Length	Exits that Can Change Keyword	Comments
PCMDACTN	&PCMDACT	2	8	11	Alphanumeric (TRN, NOTRN)
			8	11	Alphanumeric (DEF, EDR, IGN)
PCMDDSNE	&PCMDDSE	1	30	11	Hex
PCMDDSNS	&PCMDDSS	1	30	11	Hex
PCMDEND	&PCMDEND	2	8	11	Alphanumeric
			8	11	Alphanumeric
PCMDOPTS	&PCMDOPS	1	4	11	Hex
PCMDSEPE	&PCMDSPE	1	30	11	Hex
PCMDSEPS	&PCMDSPS	1	30	11	Hex
PCMDSTRT	&PCMDSTR	3	8	11	Alphanumeric
			8	11	Alphanumeric
			20	11	Alphanumeric
PDEFDD	&PDEFDD	1	8	02,11	Alphanumeric
PDFDBCS	&PDFDBCS	3	32	11	Alphanumeric plus special characters
			20	11	Alphanumeric plus special characters
			2	11	Halfword binary
PDFENCD	&PDFENCD	1	8	11	Alphanumeric
PDFENCPY	&PDFENCP	2	16	11	Alphanumeric
			16	11	Alphanumeric
PDFENMOD	&PDFENMO	4	16	11	Alphanumeric
			16	11	Alphanumeric
			16	11	Alphanumeric
			16	11	Alphanumeric
PDFENMPW	&PDFENMP	1	32	11	Alphanumeric plus special characters
PDFENPRT	&PDFENPR	2	16	11	Alphanumeric
			16	11	Alphanumeric
PDFENTYP	&PDFENTY	1	8	11	Alphanumeric
PDFENUPW	&PDFENUP	1	32	11	Alphanumeric plus special characters

Printer Keyword	Macro Keyword	Number of Parameters	Parameter Length	Exits that Can Change Keyword	Comments
PDFFONT	&PDFFONT	2	32	11	Alphanumeric plus special characters
			2	11	Halfword binary
PDFKWDS	&PDFKWDS	1	4	11	Hex
PDFOPTS	&PDFOPTS	1	4	11	Hex
PDFPGSIZ	&PDFPGSZ	2	2	11	Halfword binary
			2	11	Halfword binary
PDFRTAB	&PDFRTAB	1	8	11	Alphanumeric
PIMSG	&PIMSG	2	1	02,11	Y or N
			4	02,11	Fullword binary
PJLCMDS	&PJLCMDS	3	1	11	Y or N
			8	11	Alphanumeric
			8	11	Alphanumeric
PJLINFO	&PJLINFO	6	8	11	Alphanumeric
			8	11	Alphanumeric
			8	11	Alphanumeric
			8	11	Alphanumeric
			8	11	Alphanumeric
			8	11	Alphanumeric
PJLOPTS	&PJLOPTS	1	4	11	Hex
PJLUSTAT	&PJLUSTA	4	8	11	Alphanumeric
			8	11	Alphanumeric
			8	11	Alphanumeric
			8	11	Alphanumeric
POOL	&POOL	1	1	11	Y or N
PPM	&PPM	1	10	02,11,14	Hex
PRTRMSGS	&PRTMSGS	1	1	02,03,11	Y or N
PRTROPTS	&PRTOPTS	1	4	11	Hex
PRTXDBCS	&PRTXDBC	5	1	02,03,11	Y or N
			8	02,03,11	Alphanumeric
			4	02,03,11	Alphanumeric (KEEP, DELT, REPL)
			3	02,03,11	Hex
			3	02,03,11	Hex
PRTXLATE	&PRTXLAT	3	1	02,03,11	Y or N
			8	02,03,11	Alphanumeric
			8	02,03,11	Alphanumeric

Printer Keyword	Macro Keyword	Number of Parameters	Parameter Length	Exits that Can Change Keyword	Comments
PSEGDD	&PSEGDD	1	8	02,11	Alphanumeric
QALLDYN	&QALLDYN	1	1	11	Y or N
QBUFSIZE	&QBUFSIZ	1	2	11	Halfword binary
QDSNAME	&QDSNAME	1	44	11	Alphanumeric
QSPACE	&QSPACE	3	1	08,11	Alphanumeric (T or C)
			2	11	Halfword binary
			2	11	Halfword binary
QUNIT	&QUNIT	2	8	08,11	Alphanumeric
QVOLUME	&QVOLUME	1	6	08,11	Alphanumeric
RELREQ	&RELREQ	1	1	11	Alphanumeric (N, A, I, E, or W)
REQDELT	&REQDELT	1	1	11	Y or N
REQHOLD	&REQHOLD	1	1	11	Y or N
REQLIMIT	&REQLIM	2	2	11	Halfword binary
REQOUTP	&REQOUTP	5	1	11	Alphanumeric
			8	11	Alphanumeric
			4	11	Alphanumeric
			8	11	Alphanumeric
			8	11	Alphanumeric
REQROUTE	&REQROUT	1	1	11	Y or N
RETAIN	&RETAIN	2	1	11	Y or N
			2	11	Halfword binary
RETHOLD	&RETHOLD	1	1	11	Y, N or S
RETOUTP	&RETOUTP	4	1	11	Alphanumeric
			8	11	Alphanumeric
			8	11	Alphanumeric
			8	11	Alphanumeric
RETRIES	&RETRIES	1	2	02,03,11	Halfword binary
RJE	&RJE	4	1	11	Y or N
			1	11	Y or N
			1	11	Y or N
			1	11	Y or N
RUSIZE	&RUSIZE	1	2	11	Halfword binary
SAF	&SAF	2	1	11	Y or N
			3	11	Alphanumeric (REQ or EDR)
SASCLASS	&SASCLAS	1	8	11	Alphanumeric
SASOPTD	&SASOPTD	1	1	02,03,11	Hex

Printer Keyword	Macro Keyword	Number of Parameters	Parameter Length	Exits that Can Change Keyword	Comments
SASOPTP	&SASOPTP	1	1	02,03,11	Hex
SASPLEN	&SASPLEN	1	2	02,03,11	Halfword binary
SEPAR	&SEPAR	5	1	02,03,11	Alphanumeric (S, E, B, or N)
			8	02,03,11	Alphanumeric
			1	02,03,11	Alphanumeric
			8	02,03,11	Alphanumeric
			8	02,03,11	Alphanumeric
SEPINFO	&SEPINFO	1	8	02,03,08,11,14	Alphanumeric
SEPTYPE	&SEPTYPE	2	8	11,15	AFP or STD
			8		EDR or IGN
SERVER	&SERVER	1	8	11	Alphanumeric
SMF	&SMF	1	1	11	Y or N
SNAP	&SNAP	1	1	11	Y or N
STGCLASS	&STGCLAS	1	8	11	Alphanumeric
SVFACTN	&SVFACTN	3	1	02,03,11	Y or N
			1	02,03,11	Y or N
			1	02,03,11	Alphanumeric (Y, N, or F)
TCPDISC	&TCPDISC	3	1	11	Y or N
			1	11	Y or N
			4	11	Numeric display 0000-5959
TCPHOST	&TCPHOST	1	60	11,15	Four numbers, 0 - 255, separated by periods or name
TCPLPORT	&TCPLPRT	8	11	11,15	Alphanumeric
			11	11,15	Alphanumeric
			11	11,15	Alphanumeric
			11	11,15	Alphanumeric
			11	11,15	Alphanumeric
			11	11,15	Alphanumeric
			11	11,15	Alphanumeric
			11	11,15	Alphanumeric
TCPMRD	&TCPMRD	1	2	11	Numeric display 00 - 59
TCPOPTS	&TCPOPTS	1	4	02,11	Hex

Printer Keyword	Macro Keyword	Number of Parameters	Parameter Length	Exits that Can Change Keyword	Comments
TCPPRTR	&TCPPRTR	1	60	02,11,15	Alphanumeric plus special, such as underscore, dash, upper and lower case, etc.
TCPRPORT	&TCPRPRT	1	2	11,15	Halfword binary
TPUTUSER	&TPUTUSR	1	8	02,03,11	Alphanumeric
TRACE	&TRACE	3	1	11	Y or N
			1	11	Hex
			4	11	Hex
TRAILBLK	&TRAILBK	1	1	02,03,11	Y or N
TRNCLASS	&TRNCLS	4	8	11	Alphanumeric or '*'
			1	11	Alphanumeric (C, B, S or T)
			8	11	Hex
			8	11	Hex
TRUNCATE	&TRUNCAT	1	2	02,03,11	Halfword binary
UDATA	&UDATA	1	60	02,11	Alphanumeric
USERBIND	&USERBND	1	30	11	Hex
WFWACTN	&WFWACTN	1	1	11	Alphanumeric (N, D, or I)
WRITER	&WRITER	2	8	11	Primary selection criteria, alphanumeric
			8	11	Secondary selection criteria, alphanumeric
XESCLASS	&XESCLAS	1	1	11	Alphanumeric
XESOPTS	&XESOPTS	1	4	11	Hex
XESRTAB	&XESRTAB	1	8	11,15	Alphanumeric

Table 5-3: $$CBINQ and $$CBSET Keyword Operand Table

Section 6
Special Topics

Introduction

In this section, we hope to give you a better understanding of how VPS® works and of how the many VPS parameters, optional features, and user exits interact. We explain why you might want to use some of the optional features and what situations need special attention.

Because this section covers a wide range of topics, all of it may not be applicable to your environment. We hope that you will read this section when you first receive VPS, and that you will find it helpful any time you need to understand how VPS operates.

We will not attempt to cover error conditions here. That information is included in "Problem Determination" on page 10.15. Instead, we will attempt to give you enough information to decide which VPS functions you need to use to make a printer perform the way you want it to.

As always, feel free to call VPS Support any time you need information about VPS. We would also be interested in your suggestions for topics to be added to this section.

How VPS Selects Work for a Printer

Selection Criteria

The selection criteria for a VPS printer consist of the values in the CLASS, DEST, FORM and WRITER keywords. When VPS requests work for a printer from JES, it qualifies the request by the values in these keywords. This is how VPS "knows" which datasets out of all the datasets which may exist on the JES spool are to be printed on a specific printer.

If VPS detects an overlap between the selection criteria for two printers, it will not allow one of the two printers to be activated. (See "Printer Pooling" on page 6.5 for the exception to this). It may appear that the selection criteria for the two printers have nothing in common and could not possibly "overlap."

For example, printer A may be defined with selection criteria of:

DEST=U100

and printer B may be defined with selection criteria of:

WRITER=P06TAL

This does not appear to be a conflict. However, if a dataset on the JES spool were to have both a destination of U100 and a writer name of P06TAL, VPS would not be able to determine which printer was to receive the dataset. For this reason, VPS would not allow both printers to be activated in the VPS system at the same time.

Basically, it is best to use one type of selection for all printers. Many VPS installations use destination only, and simply assign a unique "U" number (JES2 special local destination) to each VPS printer. Other installations use writer name only, particularly when they are converting from a printing product which picked up the luname of the device from the writer name field. It is always possible to further qualify the selection by class and form, if necessary.

This release of VPS allows you to specify both primary and secondary selection criteria for a printer. While this is not something that you would want to do for every printer, it can help in a situation where a printer is out of service or is to be removed permanently. You can choose another printer to receive both its own output and the output originally destined for the defunct printer. For example, if you specify:

DEST=(U100,U175)

in a Printer Definition member, that printer will receive the output for both destinations. If output for both destinations appears on the JES spool at the same time, the output for destination U100 will be printed before the output for destination U175.

The primary and secondary selection criteria are completely separate from each other, and are not combined in any way. For example, if you specify:

DEST=(U100,U175),CLASS=(A,B)

the printer will print two categories of output:

1. Output with a destination of U100 and a SYSOUT class of A
2. Output with a destination of U175 and a SYSOUT class of B

The printer will not print output with a destination of U100 and a SYSOUT class of B, nor will it print output with a destination of U175 with an output class of A.

Another possible use for the secondary selection criteria could be in a situation where you want to select more than 8 but fewer than 17 SYSOUT classes for a printer. In this case, you could code:

DEST=(U100,U100),CLASS=(HGABCDEF,IJKLMNOP)

How VPS Gets Datasets from JES

VPS requests work for a printer from JES via the Process SYSOUT (PSO) function of the JES Subsystem Interface. This interface is not dependent on the release or maintenance level of JES.

The initial request for work for a printer is qualified by the primary selection criteria specified for the printer. The primary selection criteria consist of the first set of values specified in the CLASS, DEST, FORM and WRITER fields in the VPS printer definition. For example, if a printer has these values in its definition:

DEST=U100,CLASS=ABC

VPS' initial request for work for that printer will be for any JES dataset with a destination of U100 and a class of A, B, or C.

JES responds with a return code which indicates whether or not there is a dataset available which matches the request. If there is a dataset available, it also passes the job name, job ID and dataset name to VPS. VPS can then allocate the JES dataset, open it, and read it. VPS copies the dataset to its staging area and then prints it.

After VPS has completed printing a dataset, it requests that JES delete the dataset and then again requests work for the printer from JES. This time, the request is qualified by the job name, job ID and form name of the dataset just processed, as well as by the primary selection criteria. This allows VPS to keep all available datasets for a job together and to keep all datasets with the same form name within a job together. VPS will continue to request, process, and delete datasets for the same job until JES indicates that there are no more datasets for the job. When that occurs, VPS will perform end-of-job processing and will request work qualified only by the primary selection criteria. When there is no more work on the JES spool that matches the primary selection criteria, VPS will repeat the process for the secondary selection criteria (if any). When there is no more work for the printer on the JES spool, VPS will put the printer in IDLE or DRAINED status or will inactivate the printer, depending on the value of the WFWACTN keyword in the printer definition.

In this release of VPS, you can modify this sequence of events via the DSBATCH printer keyword parameter. This keyword is designed to prevent jobs, started tasks, or TSO users that generate many SYSOUT datasets from monopolizing a printer. The effect of entering an "N" in one of the three positional parameter values for this keyword is to make VPS abandon its usual technique of keeping all datasets for a particular job together. For example, if you specify:

DSBATCH=(Y,N,Y)

you are instructing VPS that when it gets done printing a dataset from a started task, it should qualify its request for the next dataset only by the selection criteria, and not include the job name, job ID, and form name of the dataset just processed. This means that JES will return the dataset of the highest priority from the JES spool, and will prevent any started task from printing continuously. This will also cause VPS to treat every dataset from a started task as if it were a separate job, meaning that separators will be printed around it (if requested by the SEPAR keyword), an SMF record will be created (if requested by the SMF keyword), and begin and end bracket indicators will be sent before and after the dataset.

VPS has no control over the order in which JES makes datasets available to it. The highest priority dataset which matches VPS' qualified request will be the one that JES gives to VPS. Also, VPS will not be passed any dataset which is in JES' "held" queue or which is flagged as non-selectable.

When VPS makes a subsystem request of JES, VPS must wait until it has received a response before it can issue a request for work for another printer. This is why slow response from JES can make it appear that VPS has stopped selecting work for VPS printers. (By using both primary and secondary selection criteria for a printer, you are

doubling the number of requests that VPS must make to JES to determine that there is no more work on the JES spool for the printer. You may want to restrict your use of secondary selection criteria to special cases).

When VPS Requests Work for a Printer

"Normal" Operation (Without Pre-selection or Pooling)

VPS keeps an internal "list" of active printers. When the interval of time specified by the INTERVAL keyword expires, VPS starts at the "top" of this printer list and requests work for each idle printer in the list. (See "How VPS Gets Datasets from JES" on page 6.3).

When VPS reaches the end of the list of printers, it waits until the interval has elapsed and then reinitiates the search for work.

Pre-selection of SYSOUT Datasets

If the Pre-selection Exit (User Exit 00) is enabled, VPS will invoke the Pre-selection Exit before beginning the process of requesting work for each idle printer. The Pre-selection Exit will directly access JES control blocks and will build a list of information about each output group which matches the selection criteria of a VPS printer.

After the Pre-selection Exit has finished its processing, VPS starts at the top of its printer list. Rather than automatically making a request of JES for work for a printer, it scans the list of work found by the Pre-selection Exit, looking for work which matches the selection criteria for the printer. If it finds something, it will issue a request for work from JES. If it does not find any work for the printer in that list, it skips that printer and goes on to the next printer.

This means that using the Pre-selection Exit can greatly decrease the number of requests which VPS makes of JES. In effect, VPS will only make a subsystem request of JES when it has already determined that there is some SYSOUT data on the spool for the printer. (However, if the printer is in the pool (POOL=Y), the Pooling Exit controls the printer, and pre-selection has no effect on the printer). This can improve performance when there is a large number of printers defined to VPS or in a multi-access spool environment, where contention for access to JES can have a serious impact on VPS performance. It would not be particularly efficient or helpful to use the Pre-selection Exit when VPS does not have a lot of printers or when there is a single-access spool environment.

If PSACTIVE=Y is specified when using the Pre-selection Exit, VPS will scan the list of active printers and, if it does not find a printer for which it has found work, issue an ACTIVATE command for the printer. (The PSSELECT keyword indicates whether VPS should use the destination, writer name, or form name of the SYSOUT dataset as the member name in the ACTIVATE command). This automatic activation of printers when work exists for them, in combination with WFWACTN=I (inactivate when done printing all available work), can greatly decrease the storage requirements for VPS, because only those printers which have work to be printed will be active to VPS at any point in time.

CAUTION: If you specify PSACTIVE=Y, you must code values for at least one of the pre-selection criteria fields (PSDEST, PSCLASS, PSFORM, and PSWRITER). Values that you code do not encompass the selection criteria for a non-pooled VPS printer, that printer will never print any work while the Pre-selection Exit is enabled. The pre-selection destination parameter (PSDEST) allows a range of destinations, the pre-selection form (PSFORM) and pre-selection writer (PSWRITER) parameters can have generic values, and the pre-selection class (PSCLASS) parameter can have up to eight SYSOUT classes specified, so it is possible to pre-select a wide range of SYSOUT data from the JES spool.

Printer Pooling

If the Pooling Exit (User Exit 16) is enabled, VPS will invoke the Pooling Exit before beginning the process of requesting work for each idle printer. The Pooling Exit will directly access JES control blocks and will attempt to find a unique job for each pooled printer (printers with POOL=Y specified in the Printer Definition Member).

After the Pooling Exit has finished its processing, VPS starts at the top of its printer list. Rather than automatically making a request of JES for work for a pooled printer, it will check to see if the Pooling Exit found a job for that printer. If it did, VPS will qualify its request for work for that printer with the job name and job ID which the Pooling Exit found. If the Pooling Exit did not find a job for a pooled printer, VPS will not request work from JES for that printer.

CAUTION: If the Pooling Exit is not in effect or is disabled, Pooled Printers will not print any work. Using the Pooling Exit will decrease the number of requests for work which VPS makes of JES, but that is not its primary purpose. The Pooling Exit allows two or more printers to pick up the same type of SYSOUT data from the spool. For example, two printers may be located in the same office. If the printers are not in the pool, each printer must have unique selection criteria, and the user must route work to a specific printer. With the Pooling Exit in effect and both printers in the pool, both printers can have the same selection criteria. VPS will distribute the available work over the two printers at the output group level (all datasets within a job with the same selection criteria go to the same printer). Two pooled printers can select output from the same job, so long as the printers' selection criteria do not overlap. The selection criteria for pooled printers can overlap within the pool, but cannot overlap with any printer which is not in the pool.

FORM=AUTO Keyword

The FORM keyword can be used to limit the datasets which a printer is to receive to those with a particular form name. However, the FORM keyword also has a special value of "AUTO". This value indicates that VPS can select any work which matches the other selection criteria specified, regardless of the form name, and that it will stop the printer and request that the form be mounted any time a dataset is received from JES which has a form name different than that of the previous dataset printed on that printer.

Using "AUTO" as the value of the FORM keyword rather than a specific form name can eliminate the need to modify the selection criteria while VPS is running. It can be especially useful if the majority of jobs on a printer print on stock paper, but an occasional job requires special forms. However, VPS prints all available datasets for a job consecutively. Unlike JES, it does not print all available datasets for a particular form name consecutively (unless they are in the same job). This could cause excessive "flip-flopping" between forms if most jobs destined for a particular printer use more than one form. In this case, it might be better to put the form name for stock paper in the FORM keyword and let VPS print the stock paper datasets as the "normal" function of the printer. When several datasets for a special form appear in the JES spool, the value of the FORM keyword can be changed to the special form name, which will allow VPS to receive those datasets from JES. In this case, VPS will not stop to print a form mount message. It will be the responsibility of the operator to have the correct form in the printer when VPS starts to print the first dataset requiring the special form.

The description of the FORM parameter on page 3.145 gives additional information about ways to control form mount messages when operating in automatic forms control mode.

Dynamic Addition/Removal of Printers

A new printer can be added to the VPS system while VPS is running by using the ACTIVATE command. This command causes VPS to search the VPSLIB library for a member name which matches the name given in the ACTIVATE command. If a member of that name is found, VPS validates the parameters specified for the printer and, if all are valid, adds that printer to its internal list of active printers.

A printer can be deleted from the VPS system while VPS is running by using the INACTIVATE command. This command removes the printer from VPS' internal list of active printers. If the printer is busy when the INACTIVATE command is issued, inactivation will be scheduled and completed when the job currently being printed is completed. (A printer can also be inactivated automatically by VPS when it has no more work to print, if WFWACTN=I is specified in the printer definition).

If you wish to permanently change the value of some keyword in a printer's definition while VPS is running, you can change the value in the VPSLIB member which describes the printer, save the member, and issue a REACTIVATE command. The REACTIVATE command has the same effect as an INACTIVATE followed by an ACTIVATE.

Certain of the printer keywords can be changed via the VPS SET command. Changes made via the SET command do not change the values in the printer definition in the VPSLIB library, but change them in internal VPS control blocks. Changes made this way will stay in effect until the printer is inactivated or until VPS terminates. This is one way to test changes to certain printer keywords without actually updating the VPSLIB member which defines the printer.

Users of the VPS Monitor and Control Facility (VMCF) can change many of the printer keyword values temporarily via VMCF screens. For a complete description of the keywords which can be changed via VMCF, see the VMCF Installation and Users Guide.

FCB Support

MVS JCL allows the user to specify an FCB to be used when printing a SYSOUT dataset. An FCB specifies the number of lines per vertical inch (6 or 8), the page length as total number of lines from the top of the form to the bottom of the form, and the line position of each channel on the page. When FCB support is specified for a VPS printer (FCB=Y or FCB=FORM), VPS will retrieve the FCB from SYS1.IMAGELIB and use it to control vertical spacing of the dataset. If FCB support is on but no FCB was specified when the dataset was created, VPS will use the FCB specified as the default FCB in the FCB keyword.

If the requested FCB does not exist in SYS1.IMAGELIB, you can control the action that VPS will take via the third positional parameter value on the FCB keyword. That value indicates whether VPS should EDRAIN the printer, or should use the default FCB named in the second positional parameter value.

When FCB support is not used, only single space, double space, triple space, suppress space and skip to channel one are supported. All other carriage control commands are treated as a single space. The lines per inch (LPI) and form length used are the printer "machine defaults." The printer operator establishes the machine defaults by using the printer control panel. (Reference the appropriate printer model operating instructions manual for information on setting machine defaults).

Whenever VPS attempts to retrieve an FCB, it will first prefix the 4-character FCB name with "FCB4"; if an FCB of that name is not found, it will then prefix the 4-character FCB name with "FCB2." For example, if a dataset is created with FCB=CHEK specified in the JCL, VPS will first attempt to retrieve a member with the name "FCB4CHEK" from SYS1.IMAGELIB. If a member of that name is found, it will use it. If a member of that name is not found, VPS will attempt to retrieve and use a member with the name "FCB2CHEK" from SYS1.IMAGELIB. (If neither member if found, VPS will either issue error message VPS251E and put the printer in EDRAINED status, or will use the default FCB named on the FCB keyword, depending on the third positional parameter value of the FCB keyword).

Problems with vertical spacing on SCS devices are usually caused by using an FCB which does not have the attributes assumed by the user. If you can, refer to the source code for the FCB to see how it was defined. You can also browse an FCB in SYS1.IMAGELIB. However, the FCBs are stored as load modules, so you will need to scroll down to the last record of the module and turn "hex on" to see the format of the FCB. In an FCB which has a prefix of FCB2, the second byte indicates how many bytes are defined in the rest of the FCB. Each of these bytes represents a line on the form. A value of X'01' indicates the position of channel 1, a value of X'02' indicates the position of channel 2, etc.

A value of X'00' indicates a line without a channel. The last line of the form is indicated by a value which has bit 3 on. For example, a value of X'1C' indicates that this is the last line and that channel 12 is on this line. (Some FCBs have an "index character" in the third byte, which is usually X'81'. This byte does not represent a line on the form, and should be ignored when determining the form length).

The lines per inch (6 or 8) is indicated by bit 3 of the byte which represents the first line. If this bit is off, the FCB is set up for 6 lines per inch. If this bit is on, the FCB is set up for 8 lines per inch. For example, a value of X'11' in the byte representing the first line of the form indicates that this FCB is set up for 8 lines per inch, and that channel 1 is on the first line.

SCS Device Support

FCB support for SCS (LU-1) VTAM devices is a joint effort by VPS and the printer hardware. VPS sends commands to the printer which program it with the LPI and form length information obtained from the FCB image. This programming overrides the values set in the printer control panel. Each time an FCB is retrieved which differs from the one last used on the printer, VPS sends new commands to the printer. "SCS Command Usage by VPS" on page 6.50 describes the SCS commands used for FCB processing.

VPS manages the channel stops internally by calculating the difference between the current line position and the position of the desired channel stop.

VPS can reset the printer back to the machine defaults prior to terminating a session between VPS and the printer. This leaves the printer in a suitable condition for its next user. Most printers reset back to the information set in the printer control panel. The IBM 3287 printer is an exception. See the SVFACTN parameter in "Installation" on page 3.1 for more information.

Non-SCS Device Support

FCB Support for LU-3 and LU-0 VTAM devices and TCP/IP devices is totally within VPS. These printers cannot be programmed with FCB information via SCS commands. The actual machine defaults, set by the printer operator via the printer control panel, control the lines per inch and form length for the printer.

VPS loads the FCB to get the channel stop information. VPS cannot use the LPI information, and uses the form length information only to calculate the difference between the current line position and a desired channel stop.

There are two methods that can be used to get FCB form length support on these devices:

- Specify FORMFEED=N with FCB support, which indicates to VPS that the printer does not understand a formfeed (X'0C') command. In this case, when VPS encounters a carriage control character that requests a skip to top-of-form, it will determine how many lines away from top-of-form it is currently positioned, and will insert the appropriate number of new-line sequences (usually X'15' or X'0D0A', from the NLSEQ keyword) rather than the formfeed character.
- Alternatively, the operator can set the form length and lines per inch on the printer control panel before an FCB for a form of a "non-standard" length is used. Using FCB support with FORM=AUTO informs the operator when a new form should be mounted. The operator can then set the machine defaults to match the form.

JES3 Considerations

Older versions of JES3 do not supply the FCB name to VPS. This situation can be overcome by specifying FCB=FORM to VPS. In this case, VPS will use the contents of the form name field on a SYSOUT dataset as the FCB image name. This does require that the user have an FCB in SYS1.IMAGELIB for each form name.

Repositioning SYSOUT Datasets

Repositioning After an INTERRUPT Command

When VPS receives a dataset from JES that was previously interrupted by a VPS INTERRUPT command, the point at which VPS starts printing the interrupted dataset is determined by the characteristics of the dataset and/or the value of the MAXLPG VPS printer keyword.

- If the dataset has carriage control, VPS will start printing at the top of the page that was interrupted.
- If the dataset does not have carriage control:
  - VPS will start printing at the top of the page that was interrupted if the first subparameter of the MAXLPG keyword has a non-zero value.
  - VPS will start printing from the beginning of the dataset if the first subparameter of the MAXLPG keyword has a zero value.

Repositioning After an Unrecoverable Error

There are some error conditions that can occur while VPS is printing a dataset that VPS categorizes as “unrecoverable” errors. These errors cause VPS to put the printer into EDRAINED status. An example of this type of error would be a failure caused by VTAM inactivation of a printer, which would result in VPS issuing message VPS354E SESSION CLEANUP REQUESTED and putting the printer into EDRAINED status. If CKPTPAGE and CKPTLINE values are specified in the Printer Definition member, VPS keeps a record of the dataset name and of the most recently checkpointed page or line at the time of the error.

When a VPS START command is issued for an EDRAINED printer, either by operator action or via the VPS Error Retry Exit (VPS User Exit 08), VPS will again consider that printer available for printing, and will request work for the printer from JES. When VPS receives the dataset that was printing when the unrecoverable error occurred, it will use the stored checkpointing values to determine where to resume printing. If no checkpointing values were specified, VPS will print the dataset in its entirety.

If the printer is inactivated (removed from VPS) after it is EDRAINED, the dataset checkpoint information is lost. When the printer is activated, VPS will have no way to determine that it was previously printing a SYSOUT dataset and was interrupted by an unrecoverable error. When VPS receives the dataset that was printing when the unrecoverable error occurred, it will print the dataset in its entirety.

Repositioning After a Retriable Error

There are some error conditions which can occur while VPS is printing a dataset that VPS categorizes as “retriable” errors. These errors will cause VPS to automatically reposition the dataset, or to EDRAIN the printer.

For SNA devices, retriable errors include:

- intervention required
- powered off
- send data failed, with a sense code of 081C

For non-SNA devices, retriable errors include:

- intervention required (includes the “powered off” status)
- send data failed, regardless of sense code

When VPS receives notification of one of these errors, it cannot determine how much (if any) of the last buffer sent was successfully printed before the error occurred. Because a buffer will usually contain a number of print lines and may overlap several pages, some sort of repositioning must occur to prevent loss of data at the printer.

The action which VPS takes when one of those conditions occurs is determined by the value of the ERRACTN parameter. (The ERRACTN parameter has three positional parameter values. The second of these merely indicates whether or not a message pertaining to the action taken should be printed on the printer. The third value specifies the action to be taken when VPS AFP encounters an error converting the SYSOUT dataset to a PDL.)

The four choices for action and their effects are:

STD This value requests “standard” VPS repositioning. The effect of this choice will depend upon the type of dataset being printed.

If the dataset contains carriage control characters representing skips to channel 1, VPS will reposition either to the beginning of the failing buffer (if it happens to start with a skip to channel 1) or to the last channel 1 in the previous buffer.

If the dataset does not contain channel 1 skips, VPS will re-send the buffer that failed.

BUF This value requests that VPS reposition by re-sending the buffer that failed.

RST This value requests that VPS reposition by starting over at the beginning of the dataset.

EDR This value requests that VPS EDRAIN the printer.

The values of “BUF” and “RST” would normally be used for specialty devices. For example, a value of “RST” (restart the dataset from the beginning) would probably be the best choice for a plotter.

Checkpointing and Its Effect on Repositioning

In VPS, the CKPTPAGE and CKPTLINE printer parameters are used to indicate how frequently VPS should update its checkpoint information. The major purpose for checkpointing is to allow VPS to restart printing a dataset interrupted by an unrecoverable error at some point other than the beginning. However, the use of checkpointing affects how much data VPS will send to a printer in a buffer.

Normally, VPS will fit as many print lines as possible into a buffer, regardless of whether the lines overlap the beginning or end of a page. (The size of the buffer is determined by the RUSIZE parameter). This allows the maximum amount of data to be transmitted in a single SEND.

However, when checkpointing is in effect for a printer, the CKPTPAGE value becomes the maximum amount of data which VPS will put into a buffer. For example, if CKPTPAGE=5 is specified, VPS will never send more than 5 pages of data to a printer in the same buffer. The first buffer will contain pages 1 through 5, the second buffer will contain pages 6 through 10, etc., even if that amount of data does not fill the buffer. (This can have a negative effect on performance for SCS devices).

If the buffer size specified via the RUSIZE parameter is smaller than the amount of data which VPS finds in five pages of data, it will take more than one buffer to send the 5 pages. For example, if the first four and a half pages fit in a single buffer, VPS will send that amount of output in one buffer and a half page of output in a second buffer.

These considerations may mean that you do not want to use checkpointing as a default for all of your printers. However, some users who have printers dedicated to printing specialized output, such as pre-numbered checks, may want to use standard repositioning in combination with checkpointing to control the amount of data which will be reprinted when an error occurs. For example, CKPTPAGE=1 would indicate that VPS should put a maximum of one page of data into a buffer before it sends that buffer to a printer. If each check begins with a skip to channel 1 and an entire check can fit in one buffer, standard VPS repositioning after a retriable error would re-send only the last check.

Requeuing Options

VPS allows the user to limit the size of datasets to be printed on a VPS printer via the REQLIMIT parameter. The other requeue parameters indicate a variety of options available for disposition of an offending dataset. When using the SAPI interface it is possible for VPS to avoid the requeueing process by specifying PRTROPTS=….40.. in the printer definition member. By specifying PRTROPTS=….40.., VPS will inform JES to **NOT** return any datasets that exceed the requeue line|page limits.

The REQDELT parameter indicates whether a dataset which exceeds the requeue limit specified for the printer should be deleted rather than requeued. If REQDELT=Y is specified and a dataset exceeds the requeue line|page limit, then the dataset will be deleted from the JES spool.

The REQROUTE parameter specifies whether a requeued dataset should be rerouted by issuing a JES command or by creating a spin-off dataset. This process differs depending on the type of interface you are using to retrieve SYSOUT datasets from JES (i.e. PSO or SAPI).

REQROUTE Using the PSO Interface

If REQROUTE=Y is specified, VPS will issue a JES command to reroute the output. In a JES2 environment, the $TO command will be issued. Note that unless you have VPS user exit 13 installed, the entire job will be rerouted. If you have VPS user exit 13 installed and enabled, then VPS will qualify the $TO command with the dataset's output group name and id. This will limit the datasets that are rerouted to a single JES2 output group. If REQHOLD=Y is also specified, the $TO command will include HOLD=OPER, which will retain the output's disposition of WRITE, and will change the status of the output to OPER (operator hold). In a JES3 environment, the *F,U command will be issued.

If REQROUTE=N is specified, VPS will dynamically allocate a JES dataset with the attributes specified in the other requeue parameters and copy the offending dataset into the new spin-off dataset. If REQROUTE=N and PRTROPTS=00002000 is specified, the spun-off dataset will retain the job name and job ID of the SYSOUT dataset. If the PRTROPTS value is not specified, the spun-off dataset will have the job name and job ID of the VPS started task.

REQROUTE Using the SAPI Interface

VPS will always attempt to reroute the dataset using the SAPI interface in order to retain the original jobname and jobid and only affect a single dataset. The only exception to this is if the VPS requeue parameters provide capability that is not available with the SAPI interface. The exceptions are as follows:

Requeue form = **** (remove form name) - 3rd subparameter of REQOUTP

Requeue OUTPUT JCL statement specified - 5th subparameter of REQOUTP

Note that if VPS is unable to reroute using the SAPI interface, then the dataset will be rerouted as described for PSO. However, JES2 installations using the SAPI interface will not be required to install and enable VPS user exit 13 to obtain the dataset's output group name and id since this information is supplied via SAPI.

When using the SAPI interface, if REQHOLD=Y is also specified, SAPI will change the output's disposition from WRITE to HOLD.

The VPS Requeue Exit can also be used to dynamically modify the action of the requeue parameters, based on a variety of conditions, such as the job name which created the dataset, the SYSOUT class or form of the dataset, etc. See the description of the VPS Requeue Exit in this manual for a more complete explanation of these options.

VPS-Supplied VTAM Log Modes

VPS contains five predefined logmode images which can be used to override the VTAM definition for a printer. These logmode images can be requested by coding the logmode name as the value in the ALOGMODE parameter in the VPS printer definition. The five images are:

VPSLU0 - DSC (Data Stream Compatible) for local non-SNA and Bisync

```
VPSLU0   DC    X'01020271402000'                  TS/FM/PRI/SEC/COMM PROT
         DC    X'000000000000'                    TSUSAGE
         DC    X'000000000000000000000200'        PSERVICES
```

VPSLU1 - SCS (SNA Character string)

```
VPSLU1   DC    X'010303B1903080'                  TS/FM/PRI/SEC/COMM PROT
         DC    X'0000C6C60000'                    TSUSAGE
         DC    X'01000000FB00000000000000'        PSERVICES
```

VPSLU3 - DSC (Data Stream Compatible) for SNA devices

```
VPSLU3   DC    X'010303B1903080'                  TS/FM/PRI/SEC/COMM PROT
         DC    X'0000C6F80000'                    TSUSAGE
         DC    X'0300000000000185018507E00'       PSERVICES
```

VPSCOL - SCS with FMH (Function Management Header) support enabled

```
VPSCOL   DC    X'010303B1907080'                  TS/FM/PRI/SEC/COMM PROT
         DC    X'0000C6C60000'                    TSUSAGE
         DC    X'01000001E100000000000000'        PSERVICES
```

VPSDCA - SCS with FMH support enabled and other formatting enabled for WP

```
VPSDCA   DC    X'010303B1907080'                  TS/FM/PRI/SEC/COMM PROT
         DC    X'0000C6C60000'                    TSUSAGE
         DC    X'01410001F900000000000000'        PSERVICES
```

SNA will not allow PACING to be specified within an application program such as VPS. Therefore, these logmodes do not include any PACING values. If your VTAM definitions do not include PACING values when you use one of these logmodes, the device might reject the bind.

Installing an Upgrade to VPS Version 1 R8.0

After you have been running VPS V1 R8.0 for some time, you may encounter some problem or request some function which requires a “fix” for the VPS product. Unless that fix is unique to your installation, you will receive a complete distribution cartridge. The files and format of this cartridge will be identical to the original installation cartridge. Most fixes will have been applied to the VPS load modules as “zaps”, so installing the new level of VPS requires that you restore the modules in file LRS.VPS.V1R80.LOAD and move them into the library from which you execute VPS (be sure to specify “replace”).

Some fixes may have been applied as source changes to members in the LRS.VPS.V1R80.ASM, LRS.VPS.V1R80.CNTL, and/or LRS.VPS.V1R80.MACLIB files. You should refresh the members in these libraries from the distribution cartridge, taking care not to overlay any changes which you have made that are unique to your installation.

As a rule, we do not send fixes out on an individual basis, because it would become difficult to monitor who has applied which fixes. Also, we will normally send you an up-to-date cartridge with all available fixes applied only when you request it or when you call in with a problem which has already been resolved by a fix which you have not yet received.

If you want to check on the current fix level or order a new cartridge, visit our web site at www.lrs.com or contact LRS technical support. Phone and fax numbers for LRS offices are listed in Appendix D of this manual. The U.S. office is on Central time, and someone will be available to answer your calls from 8:00 A.M. to 5:00 P.M., Monday through Friday, excluding holidays.

Effects of Migrating to a New Release or Maintenance Level of MVS

MVS/ESA 4.2.0 is the **minimum** level supported by VPS. VPS is not dependent upon the release or maintenance level of OS/390 that you are running at your installation.

Effects of Migrating to a New Release or Maintenance Level of JES2

When you plan to migrate to a new release of JES2, you may wish to contact VPS support to see if you need to upgrade to a higher fix level of VPS for that new environment. Generally, we will announce the need for such an upgrade via “The Print Line”, which is LRS’ technical newsletter.

Certain VPS optional user exits are dependent upon JES, and must be assembled and linked whenever you do any maintenance to JES. The Exit Selection Table on page 5.8 indicates whether the sample version of each exit is dependent upon JES. Note that the SAPI interface eliminates the need for all of the JES-related VPS user exits, except VPSSUE00 - Pre-Selection exit. Installations that are using either dynamic activation (PSACTIVE=Y) or dynamic definition (PSACTIVE=(,Y) will still require the use of the Pre-Selection exit.

Any user exit which accesses JES2 control blocks will have that dependency, and the sample JCL provided for assembling these exits will include a reference to your JES2 source or macro libraries. It may be necessary to concatenate the SMP/E MTS and STS libraries ahead of the JES libraries on the assembly step to pick up the correct JES information. If you do not assemble and link these modules at the time JES2 maintenance is put into effect, the results will be unpredictable. The exit may function but provide invalid information, or it may abend. If you are experiencing a problem with a user exit which has previously worked correctly and which has a JES2 dependency, you may wish to contact your JES support staff to see if any maintenance has been applied to JES2.

Users of the VPS Monitor and Control Facility (VMCF) should refer to the VMCF Installation and User’s Guide for information on JES dependencies within VMCF.

Effects of Migrating to a New Release or Maintenance Level of JES3

When you plan to migrate to a new release of JES3, you may wish to contact VPS support to see if you need to upgrade to a higher fix level of VPS for that new environment. Generally, we will announce the need for such an upgrade via “The Print Line”, which is LRS’ technical newsletter.

Certain VPS optional user exits are dependent upon JES, and must be assembled and linked whenever you do any maintenance to JES. The Exit Selection Table on page 5.8 indicates whether the sample version of each exit is dependent upon JES. Note that the SAPI interface eliminates the need for all of the JES-related VPS user exits, except VPSSUE00 - Pre-Selection exit. Installations that are using either dynamic activation (PSACTIVE=Y) or dynamic definition (PSACTIVE=(,Y) will still require the use of the Pre-Selection exit.

Any user exit which accesses JES3 control blocks will have that dependency, and the sample JCL provided for assembling these exits will include a reference to your JES3 macro library (SYS1.AJES3MAC). It may be necessary to concatenate the SMP/E MTS and STS libraries ahead of the JES macro library on the assembly step to pick up the correct JES information. If you do not assemble and link these modules at the time JES3 maintenance is put into effect, the results will be unpredictable. The exit may function but provide invalid information, or it may abend. If you are experiencing a problem with a user exit which has previously worked correctly and which has a JES3 dependency, you may wish to contact your JES support staff to see if any maintenance has been applied to JES3.

Users of the VPS Monitor and Control Facility (VMCF) should refer to the VMCF Installation and User’s Guide for information on JES dependencies within VMCF.

VPS Printer Status Definitions

IDLE A printer in IDLE status is available for work, but not currently processing any work. The next time the INTERVAL elapses and VPS' process of requesting work for each idle printer takes place, this will be one of the printers for which VPS requests work.

If you know that there is work on the spool for an idle printer, but it remains in idle status longer than the INTERVAL, there are two possible reasons. One is that the printer is in the pool, but the Pooling Exit is not enabled. Another is that the Pre-selection Exit is enabled, but the pre-selection criteria do not encompass the selection criteria for this printer.

QUEUEING A printer is in QUEUEING status while VPS retrieves a dataset from the JES spool and prepares it for printing.

PRINTING A printer is in PRINTING status while VPS is sending data to it. If the status is PRINTING-M, the MRD interval has been exceeded. (See "Missing Response Detector (MRD)" on page 15.5).

DRAINING A printer in DRAINING status has acknowledged a "STOP" command and is in the process of completing its current work before changing to DRAINED status.

DRAINED A printer is in DRAINED status when a "STOP" command for the printer has been processed, when the WFWACTN has indicated that the printer be drained when there is no more work for it, or when the "DRAIN" parameter has indicated that the printer should be activated in drained status. VPS will not request work from JES for a drained printer.

EDRAINED A printer in EDRAINED status has been drained due to an unrecoverable error. When VPS puts a printer in EDRAINED status, it issues a message indicating the type of error encountered.

ABENDED A printer is put into ABENDED status when the printer subtask for the printer has abended. If the problem which caused the abend has been corrected, the printer can be returned to service by issuing a REACTIVATE command.

BUSY A printer is in BUSY status when a scheduler subtask is active for the printer, but the function being performed by that subtask is something other than printing. An example of such a function would be releasing a printer to another VTAM application.

POWEROFF A printer is put into POWEROFF status when VPS receives notification of a POWEROFF condition from the printer. It will remain in this status until VPS receives notification that the POWEROFF condition has been cleared, or until a STOP FORCE command is issued for the printer.

INTVREQD A printer is put into INTVREQD (intervention required) status when VPS receives notification of an intervention required condition from the printer. It will remain in this status until VPS receives notification that the INTVREQD condition has been cleared, or until a STOP FORCE command is issued for the printer.

FORMWAIT A printer is in FORMWAIT status when VPS has issued a form mount message for the printer and VPS is waiting for the operator to indicate that the required form has been mounted. This condition can be cleared via the START command, or via the PA-1 or PA-2 keys.

The FORMWAIT status can only occur when a printer is operating in automatic forms control mode (FORM=AUTO).

WCONNECT A printer is in WCONNECT status while VPS is waiting for connection to the network printer. A complete discussion of this status can be found in "WCONNECT Status" on page 15.14.

When a printer status is followed by -M (for example, PRINTING-M), the Missing Response Detector facility has been activated for this printer. This means that VPS has been waiting for a response to a SEND for more than the amount of time specified in the MRDINTVL parameter. See "Missing Response Detector (MRD)" on page 15.5.

When a printer status is followed by -I (for example, PRINTING-I), an inactivate command for the printer has been acknowledged, and inactivation has been scheduled.

SNAP Dump Processing in VPS

The VPS snap dump is a service aid which can assist VPS Support in solving problems within VPS. You can request a snap dump by issuing the SNAP command. If SNAP=Y is specified in a VPS Printer Definition Member, VPS will automatically generate a snap dump for most conditions which cause the printer to be EDRAINED.

In addition to the snap dump, a formatted list of trace entries specific to the printer will be produced, as well as a page of formatted data displaying the values of the printer definition keywords.

The error conditions which will cause a printer to be EDRAINED but will not generate a snap dump when SNAP=Y is specified are:

VPS312E OPNDST FAILED RC:10 F2:10 SNS:080A

VPS354E SESSION CLEANUP REQUESTED

VPS310E SIMLOGON FAILED RC:14 F2:4B (undefined logmode)

VPS310E SIMLOGON FAILED RC:14 F2:53 (undefined luname)

VPS310E SIMLOGON FAILED RC:10 F2:00 (device inactive)

Using a Message Modification Member

A Message Modification Member allows you to change the “type” of a VPS message without invoking the WTO Exit (User Exit 05).

A Message Modification Member is a member in your VPSLIB library. VPS gets the name of this member (if any) from the MSMODMEM keyword. The member contains an entry for each VPS message which you wish to modify. The format of each entry is:

MSGnnn=x

where “nnn” is the message number and “x” is the “type” to which you wish to change the message.

The possible values for “x” are:

- **A** Action
- **I** Informational
- **N** Normal
- **L** Log the message in the VPS log and SYSLOG, but do not issue the WTO
- **X** Eliminate the WTO and eliminate the message from the VPS log and SYSLOG (effectively, no-op the message)

Action messages are highlighted when displayed, and do not automatically “roll” off the top of the operator console screen. All informational messages can be eliminated from the console by coding an “N” as the third positional parameter value in the WTO keyword in the VPS System Initialization Member.

If you wished to change message VPS012E from action to informational, eliminate message VPS225I from the console but allow it to be logged, and eliminate message VPS351N completely, you would code the following entries in your message modification member:

```
MSG012=I,
MSG225=L,
MSG351=X
```

The format is identical to that of the other VPS control library members. The values must start in columns 2 through 16, the end of the parameter is indicated by a comma, more than one parameter can occur on a line, etc.

Staging Methods in VPS

VPS now contains two different interfaces to retrieve SYSOUT datasets from the JES spool. The first and most familiar interface is the PSO interface and has been used in every release of VPS. Due to the limitations of the PSO interface, VPS is forced to stage every SYSOUT dataset prior to processing. The second interface is the SAPI interface and was introduced in VPS V1R8.0. The SAPI interface allows multiple VPS printer subtasks to access SYSOUT datasets directly from the JES spool and eliminates the need to stage the datasets prior to processing. However, even when using the SAPI interface, VPS will stage the following types of SYSOUT datasets:

- STGCLASS dataset
- GDMCLASS dataset
- VPS/PC or AnyQueue and PRTROPTS not equal to 00000100
- conversion required (VPS/IPDS or VPS/PCL)
- LPD dataset

The staging process is exactly the same for both interfaces and consists of retrieving the SYSOUT dataset from the JES spool, compressing the data and storing it in a “staging” area. Note that the compression of the SYSOUT data is always performed and is not controlled via the COMPRESS keyword.

The staging dataset can be allocated by any one of three methods:

Method 1

A DD statement defining the staging dataset can be included in the VPS job control language. If this method is used, the DDNAME of the DD statement must match the VPSLIB member name of the printer for which the staging dataset is to be used. If this method is used, the only staging parameter that applies is QBUFSIZE. This method is generally not recommended, since it is the least flexible and may require continual changes to the VPS job control language.

Method 2

A preallocated staging dataset can be used, in which case the applicable staging parameters are QDSNAME, QALLDYN, and QBUFSIZE.

Method 3

The most flexible and most commonly used method of staging dataset allocation is to specify the dynamic allocation criteria and let VPS dynamically allocate a temporary dataset. If this method is used, the staging parameters QALLDYN, QSPACE, QUNIT, QVOLUME, and QBUFSIZE are applicable.

If the compressed dataset fits into the amount of storage defined by the QBUFSIZE keyword, VPS will process the dataset in memory. This significantly improves the performance of a printer which prints many small datasets, because VPS will not have to write the data to a staging dataset when reading it from the spool or read a staging dataset when sending the data to the printer.

If the compressed dataset does not fit into the amount of storage defined by the QBUFSIZE keyword, VPS will copy it to a staging dataset.

The staging parameters (QBUFSIZE, QUNIT, QSPACE, etc.) govern the attributes of this staging dataset.

Of course, the number of lines which can be stored in a given amount of storage is dependent upon the characteristics of the dataset (length of the print lines, number of repetitive characters, etc.). We have found that an average of 800 to 1,000 compressed lines will fit in a QBUFSIZE of 23476 (half-track blocking for a 3380).

The QBUFSIZE parameter does have an impact on the virtual storage requirements of VPS, so you may wish to review that calculation to see what impact an increased QBUFSIZE would have on your overall VPS system. A larger QBUFSIZE cuts down on I/O, but increases virtual storage requirements for the printer while it is printing.

If QALLDYN=N is specified, VPS will allocate the staging dataset when the printer is activated and will not unallocate it until the printer is inactivated (or VPS terminates).

If QALLDYN=Y is specified, either explicitly or by default, VPS will allocate the staging dataset when it finds work for the printer, and will unallocate it when the printer returns to IDLE status.

If you wish to have fewer staging datasets allocated at one time, and do not want VPS to have to unallocate a large number of datasets at shutdown, you should use QALLDYN=Y.

Specifying QUNIT=VIO can require a much larger region size for VPS.

SMF Recording by VPS

When SMF=Y is specified in a VPS Printer Definition Member, either explicitly or by default, VPS will write an SMF type-6 record every time a dataset is encountered with a job name, job ID, class, destination, form, or writer name which differs from the previous dataset. The format of these records is described in the SPL System Management Facilities manual.

The UCS ID field (label SMF6UCS) will contain “VPS”. The SMF6INDC field will indicate that the record is at record level 1, and the output routing section will be present on every SMF record created by VPS.

Field SMF6DCI will have bits set to indicate if the record is for a job that was interrupted, or if the record is for the continuation of an interrupted job.

The SMF Exit (User Exit 07) allows you to intercept the SMF records before they are written. In this exit, you can modify fields in the record, including the record length, or indicate that you do not want the record to be written to the SMF recording dataset.

“VPS Printer Detail and Summary Reports” on page 6.45 describes a program supplied in the VPS distribution files which can be used to print reports from the SMF type-6 records.

The sample VPS User Exit 12 distributed as member VPSSUE12 in file LRS.VPS.V1R80.ASM can be used to write SMF records which contain information pertaining to staging and printing for a particular printer. “VPS Printer Staging and Printing Statistics” on page 6.46 gives more information about this process.

Blank Pages Between Jobs Printed by VPS

You may find that VPS leaves a blank page between jobs. In some cases, these blank pages may appear between every job; in other cases, they may only appear between the last job of one VPS VTAM session and the first job of the next VPS VTAM session.

In an environment where many short (one or two page) jobs are printed, this can seem wasteful. You can control the appearance of these blank pages via values on the AUTOEJCT printer parameter.

As VPS processes datasets, it keeps track of the current line position of the printer, relative to top-of-form. This allows VPS to know what type of control characters (new line characters, form feed characters, carriage return characters, etc.) should be inserted into the datastream to give the proper positioning for each print line in a dataset.

If VPS was restrictive and did not allow a VPS printer to be used for any other purpose, it could always depend on the accuracy of its own calculation of the line position of a printer. However, VPS is not always the sole owner of a printer. A printer can be shared with local copies and/or other VTAM applications. There are points in VPS' processing where VPS must assume that a local copy may have occurred (between jobs) or that another VTAM application may have printed something (between sessions). The "extra" blank pages can appear at those points.

You can indicate to VPS that it does not have to create blank pages to accommodate local copies or other VTAM applications by specifying AUTOEJCT=(Y,N,N,Y), which tells VPS that it is not necessary to perform an extra form feed at the beginning of a job or at the beginning of a session.

If you share a VPS printer with local copies and other VTAM applications and use the default settings of AUTOEJCT=(Y,Y,Y,Y), you will normally get a blank page between jobs. This is the only method you have of assuring that VPS output does not begin to print on the same page as a local copy or as some output from another VTAM application.

TCP/IP printers may have blank pages between jobs, even when all VPS parameters are set to eliminate them. Some LPD implementations automatically advance to a new page whenever the connection is closed. The TCPOPTS keyword allows you to eliminate a form feed at the beginning of each dataset, which can help eliminate blank pages caused by the LPD.

Compression Methods Used by VPS

By default, VPS will compress data in print lines before sending it to a VTAM printer. (The first positional parameter value of the COMPRESS keyword defaults to a value of “Y”, which indicates that VPS should perform compression). When compression is in effect for a printer, the only datasets for which VPS will not perform compression are those which are identified as SAS, APL, GDDM, DCA or IPDS format. The first positional parameter of the compress keyword is ignored for VPS/AFP converted datasets.

For SNA/SCS (LU-1) devices, compression is accomplished by sending a Set Horizontal Format (SHF) command to set tabs at every third position of the print line. When VPS encounters three consecutive spaces in a print line which can be represented by a tab, it replaces them with one tab character (X’05’).

Some protocol converters do not support the SCS tab character. Print lines sent to printers which run via these devices may appear to have characters which are skewed to the left, because the tab character has not been expanded to three spaces. You can eliminate this problem by specifying COMPRESS=N for those printers.

For SNA/DSC (LU-3) and non-SNA (LU-0) devices, compression is accomplished by using the “repeat character to buffer address” command. When VPS detects five or more consecutive identical characters in a print line, it replaces them with the four-byte command sequence. This sequence consists of the command character (X’3C’), the ending buffer address, and the character to be repeated.

For certain devices, including the IBM 4245, IBM 6262, and IBM SNA RJE stations, you can request that VPS use String Control Byte (SCB) compression by specifying COMPRESS=S. In this case, you must use an SNA/SCS (LU-1) BIND that allows Function Management Headers (FMH). If you have specified the FMHCLASS keyword in the Printer Definition member, and the dataset to be printed is in the SYSOUT class specified in that keyword, VPS will send the FMH information listed as the second and third parameters of that keyword. If an FMHCLASS keyword is not specified, or if the dataset to be printed is in some other SYSOUT class, VPS will send FMH information of its own.

The second and third positional parameter values of the COMPRESS keyword indicate the type of compression to be used for certain data created by VPS/IPDS and VPS/PCL.

For AnyQueue and VPS/RemoteQueue connections, the COMPRESS keyword can indicate to VPS to compress the outbound data. If COMPRESS=Y, VPS will use a special LRS compression technique to compress the data and the receiving device can decompress the buffers as they are received.

Data compression is not supported for TCP/IP devices that use LPR/LPD protocol, a direct TCP/IP (sockets) connection or VPS/Email (SMTP) protocol.

Creating a User Translation Table

Overview

VPS allows for the translation of both single-byte character sets (SBCS) and double-byte character sets (DBCS) in print lines before sending the data to the printer. The translation can be chosen to affect datasets containing only DBCS data, only SBCS data, or both.

The character mappings used for translation are contained in translation look-up tables. These tables are specified using the printer keyword PRTXLATE for SBCS and PRTXDBCS for DBCS. The translation tables are in two formats, one for SBCS and one for DBCS. The user can compile the DBCS table using macros supplied in LRS.VPS.V1R80.MACLIB, and several examples have been supplied in LRS.VPS.V1R80.ASM.

NOTE: VPS bypasses the translation process for separator page print lines.

NOTE: VPS performs SBCS and DBCS translation after invoking User Exit 01 (print line exit).

Definitions

A “single-byte character set” (SBCS) uses one byte to encode each character. EBCDIC and ASCII are both single-byte character sets.

A “double-byte character set” (DBCS) uses two bytes to encode each character. Double-byte character sets are necessary for those languages such as Japanese requiring more than the 256 code points (distinguishable characters) a single-byte character set can hold.

“Shift-out” (SO) and “shift-in” (SI) character codes signal the beginning and end of a run of DBCS data within a mixed SBCS/DBCS dataset. SO has the value of X'0E'; SI has the value of X'0F'.

A “pure SBCS dataset” contains no DBCS characters and no shift-out / shift-in codes.

A “pure DBCS” dataset contains only DBCS characters without shift-out / shift-in codes. Each print line of a pure DBCS dataset must contain an even number of bytes.

A “mixed SBCS/DBCS dataset” can contain both SBCS and DBCS data, with each run of DBCS data immediately preceded by a shift-out (SO) code and immediately followed by a shift-in (SI) code. The number of bytes between each pair of SO and SI codes must be even, and each print line must have an equal number of SO and SI codes. In other words, a run of DBCS data in a mixed dataset may not span successive print lines.

Translation of Single Byte Character Sets

An example of a useful SBCS translation is the removal of data characters not printable on a given printer. By default, VPS translates “non-printable” data characters found in print lines to spaces before sending the line to a printer. The first positional parameter value of the PRTXLATE keyword defaults to a value of “Y”, which indicates that VPS should perform this translation. If you do not wish to have any translation performed, but want all data characters in print lines to pass through VPS untouched, code PRTXLATE=N in the printer definition.

The translation table which VPS uses for the SBCS translation process is identified in the second and third positional parameter values of the PRTXLATE keyword. The default translation table name for non-APL datasets is VPSSXLTE. You receive the source code version of this translation table on the distribution cartridge as member VPSSXLTE in file LRS.VPS.V1R80.ASM and the load module version as member VPSSXLTE in file LRS.VPS.V1R80.LOAD. The default translation table name for APL datasets is VPSSXAPL. You receive the source code version of this translation table on the distribution cartridge as member VPSSXAPL in file LRS.VPS.V1R80.ASM and the load module version as member VPSSXAPL in file LRS.VPS.V1R80.LOAD.

To put your translation table into effect for a printer, enter its load module name as the second positional parameter value of the PRTXLATE keyword if it is to be used for non-APL datasets, and as the third positional parameter value of the PRTXLATE keyword for APL datasets. For example, if you linked the load module with a member name of VPLOUPXL and wished to use it for translation of non-APL datasets, you would code PRTXLATE=(Y,VPLOUPXL) in the printer definition for each printer which should use that translation table.

Translation of Double Byte Character Sets

DBCS translation tables are specified using the PRTXDBCS printer keyword, which takes five positional parameters.

The first positional parameter indicates whether any DBCS translation at all should be performed for the specified printer. The default is “N”, specifying no translation.

The second positional parameter identifies the DBCS translate table. Unlike the case for SBCS, there is no default DBCS translate table, and you must specify it explicitly in the PRTXDBCS parameter list. To put your translation table into effect for a printer, enter its load module name as the second positional parameter value of the PRTXDBCS keyword.

The third through fifth positional parameters specify the treatment of SOSI codes during translation of mixed SBCS/DBCS datasets. One of three possible behaviors can be specified using the third positional parameter. If this parameter value is “KEEP”, the SOSI codes are passed through unchanged. If the value is “DELT”, the SOSI codes are deleted. If the value is “REPL”, the codes are replaced with new values as follows: the SO and SI codes are replaced with the fourth and fifth positional parameter values respectively.

For example, to specify that a printer should translate DBCS data using the translate table DBTABLE, and that the SOSI codes in mixed SBCS/DBCS datasets should be passed through unchanged, you would code PRTXDBCS=(Y,DBTABLE,KEEP) in the printer definition for each printer which should use the translation table.

Specifying Pure DBCS Datasets and Mixed SBCS/DBCS Datasets

There are three different kinds of datasets: those containing only SBCS data, those containing only DBCS data, and those containing both SBCS and DBCS data separated with SOSI codes. To translate a dataset properly, VPS must know to which of these three types it belongs.

VPS will consider a dataset to be pure DBCS if its SYSOUT class has been specified in the DBCCLASS printer keyword. Such a dataset will be translated before printing using the DBCS translation table specified as the second parameter of the PRTXDBCS keyword. For example, if the statement DBCCLASS=Y appears in a printer definition, then VPS will assume that all datasets with SYSOUT attribute CLASS Y are pure DBCS and will translate them as specified by the PRTXDBCS printer keyword.

Note: If a dataset has a SYSOUT CLASS defined as pure DBCS according to the DBCCLASS keyword in a printer definition, but the dataset is mixed or contains any SOSI codes, the result of the translation is unpredictable.

If the first positional parameter of PRTXDBCS keyword is “Y”, VPS will scan each print line and perform DBCS translation as needed on any data delimited by the SOSI codes. This allows for the translation of mixed SBCS/DBCS datasets without affecting the printing of pure SBCS datasets.

Error Conditions

Detection of invalid DBCS data will result in the printer being EDRAINED. VPS will consider DBCS data invalid whenever an odd number of bytes are detected in a pure DBCS print line or between SO and SI characters in a mixed SBCS/DBCS print line, since each DBCS character must be represented by two bytes. VPS will also consider DBCS data to be invalid if it detects unpaired SOSI codes within a print line. This means that VPS does not allow DBCS strings to be split among multiple print lines in mixed SBCS/DBCS datasets.

Creating Translation Tables

When you have created the source code for your translation table, assemble it and link it into the same library as the other VPS load modules. **Be sure to link it as reentrant.**

There is one additional consideration when you create your own load module. Do not give it a name identical to any VPS load module which is already in existence. For VPS V1 R8.0, you should be very careful not to name one of your own load modules with a name that starts with “VP80” or “VPSS”. If you do so, you run the risk of replacing one of VPS’ primary load modules with your own module, and results will be unpredictable.

Creating a SBCS Translation Table

The source code for the non-APL translation table (minus comments) is reproduced here:

```
VPSSXLTE   CSECT
       DC   X'40404040404040404040404040404040'   (HEX00-0F)
       DC   X'40404040404040404040404040404040'   (HEX10-1F)
       DC   X'40404040404040404040404040404040'   (HEX20-2F)
       DC   X'40404040404040404040404040404040'   (HEX30-3F)
       DC   X'40404040404040404040A4B4C4D4E4F'   (HEX40-4F)
       DC   X'50404040404040404040A5B5C5D5E5F'   (HEX50-5F)
       DC   X'60614040404040404040A6B6C6D6E6F'   (HEX60-6F)
       DC   X'40404040404040404040797A7B7C7D7E7F'   (HEX70-7F)
       DC   X'40818283848586878889404040404040'   (HEX80-8F)
       DC   X'40919293949596979899404040404040'   (HEX90-9F)
       DC   X'40A1A2A3A4A5A6A7A8A9404040404040'   (HEXA0-AF)
       DC   X'40404040404040404040404040404040'   (HEXB0-BF)
       DC   X'C0C1C2C3C4C5C6C7C8C9404040404040'   (HEXC0-CF)
       DC   X'D0D1D2D3D4D5D6D7D8D9404040404040'   (HEXD0-DF)
       DC   X'E040E2E3E4E5E6E7E8E9404040404040'   (HEXE0-EF)
       DC   X'F0F1F2F3F4F5F6F7F8F9404040404040'   (HEXF0-FF)
       END
```

The translation table consists of 256 values, each of which represents a character which should be substituted for a character of the equivalent hexadecimal value. For example, if translation table VPSSXLTE shown above is used, print line characters with a value from X'00' through X'49' (among others) will be translated to X'40' by VPS.

You may have a need for a translation table that differs from either of the ones supplied to you. For example, you may have a printer which can print only uppercase characters, even though users send datasets to it which contain both lowercase and uppercase characters. To prevent the datasets from appearing as "garbage" on that printer, you could establish a translation table like this:

```
VPLOUPXL CSECT
       DC   X'40404040404040404040404040404040'   (HEX00-0F)
       DC   X'40404040404040404040404040404040'   (HEX10-1F)
       DC   X'40404040404040404040404040404040'   (HEX20-2F)
       DC   X'40404040404040404040404040404040'   (HEX30-3F)
       DC   X'40404040404040404040A4B4C4D4E4F'   (HEX40-4F)
       DC   X'50404040404040404040A5B5C5D5E5F'   (HEX50-5F)
       DC   X'60614040404040404040A6B6C6D6E6F'   (HEX60-6F)
       DC   X'40404040404040404040797A7B7C7D7E7F'   (HEX70-7F)
       DC   X'40C1C2C3C4C5C6C7C8C9404040404040'   (HEX80-8F)
       DC   X'40D1D2D3D4D5D6D7D8D9404040404040'   (HEX90-9F)
       DC   X'40A1E2E3E4E5E6E7E8E9404040404040'   (HEXA0-AF)
       DC   X'40404040404040404040404040404040'   (HEXB0-BF)
       DC   X'C0C1C2C3C4C5C6C7C8C9404040404040'   (HEXC0-CF)
       DC   X'D0D1D2D3D4D5D6D7D8D9404040404040'   (HEXD0-DF)
       DC   X'E040E2E3E4E5E6E7E8E9404040404040'   (HEXE0-EF)
       DC   X'F0F1F2F3F4F5F6F7F8F9404040404040'   (HEXF0-FF)
       END
```

This translation table indicates that hex values from X’81’ through X’89’, X’91’ through X’99’, and X’A2’ through X’A9’ (lowercase letters) should be translated to X’C1’ through X’C9’, X’D1’ through X’D9’, and X’E2’ through X’E9’, respectively (uppercase letters).

A translation table for translating EBCDIC to ASCII is supplied as member VPSSXASC in file LRS.VPS.V1R80.ASM and as member VPSSXASC in file LRS.VPS.V1R80.LOAD. This translation table is normally used for printers controlled by VPS/TCPIP.

Creating a DBCS Translation Table

DBCS translation tables are built using the macro LRDBCS in LRS.V1R12.MACLIB. The LRDBCS macro is written as follows:

```
LRDBCS   TYPE=INITIAL,
     DESC='table description',
     DEFAULT=0000

LRDBCS   TYPE=DBCS,XLATE=(in,out)
LRDBCS   TYPE=DBCS,XLATE=(in,out)
LRDBCS   TYPE=DBCS,XLATE=(in,out)

LRDBCS   TYPE=FINAL
```

TYPE=INITIAL must be the first LRDBCS macro coded, and TYPE=FINAL must be the last. DESC= specifies a 40-byte table description, and only applies to TYPE=INITIAL. DEFAULT= specifies a two-byte hex value to be used if an invalid DBCS character is encountered, and only applies to TYPE=INITIAL. Default value for DEFAULT= is 0000.

Each LRDBCS TYPE=DBCS macro within the table specifies an input value, and its corresponding translated output value. Both are two-byte hex values.

LRS has provided two sample DBCS translate tables, LRSDBCS1 and LRSDBCS2, that may be used as models in constructing additional DBCS translate tables. LRSDBCS1 translates from Japanese EBCDIC (code page 300) to Japanese ASCII (code page 301), and LRSDBCS2 translates from Japanese ASCII to Japanese EBCDIC. Both tables were generated from information contained in the IBM Character Data Representation Architecture Level 1 Registry (SC09-1391-00). These tables are supplied as members LRSDBCS1 and LRSDBCS2 of distribution file LRS.VPS.V1R80.ASM.

SAS/GRAPH Processing

Overview

VPS can select SAS/GRAPH output from the spool just as it does any other output. The advantages of using VPS to print SAS/GRAPH datasets include:

- Fewer external writers to run
- Fewer started tasks in the MVS System
- Multiple color printers can be driven by a single VPS
- Less operator interaction
- Full error recovery

Hardware Considerations

If the SAS/GRAPH output is to be printed on an IBM 3268 or IBM 3287 printer (or a printer that exactly emulates them), the SAS/GRAPH-related printer definition keywords (SASCLASS, SASOPTP, SASOPTD, and SASPLEN) can be used to invoke some special processing by VPS.

As of July, 1990, SAS release 6.06 supports the IBM 4224 printer. However, the output is in Intelligent Printer Data Stream (IPDS) format. In that case, the IPDCLASS keyword should be used in the VPS printer definition to allow it to print correctly. There are several different device drivers that can be used, depending upon the capabilities of the printer. Contact the SAS Institute, or refer to their newsletter of July, 1990, for more information.

If the SAS/GRAPH output is to be printed on any other type of printer, it should be processed as any other SYSOUT dataset. In this case, you should turn off compression and translation (COMPRESS=N and PRTXLATE=N), specify NCCSPACE=0 to prevent VPS from inserting new-line (X'15') characters between records, and omit the SAS/GRAPH-related printer definition keywords from the printer's definition member.

The remainder of this topic discusses VPS' processing when the output is destined for an IBM 3268 or IBM 3287 printer, and the SAS/GRAPH printer keywords are in use.

Processing of SAS/GRAPH for IBM 3268 and 3287

When you do specify the SAS/GRAPH-related printer definition keywords for an IBM 3268 or IBM 3287, VPS can use either of two methods to recognize which datasets are in SAS/GRAPH format: either because the output exists in one of the SYSOUT classes specified in the SASCLASS keyword, or because the output has a writer name of SASWTR, and the SASOPTP keyword indicates that any output with that writer name should be treated as SAS/GRAPH output. VPS will automatically switch the printer to color mode and print the output.

VPS will support multiple color printers along with non-color printers in a single MVS address space. This will eliminate the requirement for multiple external writers to drive multiple color printers. Additionally, each color printer defined to VPS can be printing concurrently, which will minimize waiting for color output.

VPS will restructure the SAS/GRAPH output data stream before it is sent to the printer, which can significantly reduce the time required to print the graph. VPS uses all available functions of the printer to improve performance.

VPS can guarantee the forms alignment of a printer prior to transmission of a dataset. This eliminates the need for the SAS/GRAPH user or printer operator to check the printer prior to printing the graph.

VPS will print color output along with the normal DP output. There are no operator commands required to control this function. As each graph becomes available on the spool, VPS will find it and print it, based upon normal JES priority schemes.

VPS has a complete error recovery system. If the printer becomes not ready or is powered off, VPS will wait for the situation to be resolved and resume printing automatically. If the error is not considered to be recoverable, VPS will issue a meaningful message to indicate the error.

SAS/GRAPH has options to put additional qualifiers on a graph being created. The options of interest here are GDEST, GCLASS, GFORM and GWRITER. These options are used by SAS/GRAPH when it dynamically allocates the dataset to contain the graph. The GCLASS must be specified and must match the SASCLASS VPS parameter. This is how VPS is able to distinguish between SAS output and normal printed output.

The other qualifiers on the SAS/GRAPH OPTIONS statement are used to route the graph to the appropriate VPS printer. For example, if your installation routes output to VPS based on destination, you might use a SAS/GRAPH OPTIONS statement as follows:

OPTIONS GDEST=U10 GCLASS=S

The corresponding VPS Printer Definition would contain the following parameters:

DEST=U10,SASCLASS=S

The GWRITER parameter defaults to SASWTR. If VPS and SASWTR will both be run at your installation, those graphs destined for a VPS printer should have some other value specified for GWRITER. This can be any value if VPS selects output based upon some criteria other than writer name. If VPS selects output based upon writer name, then use that writer name.

SAS/GRAPH requires a DEVADDR specification on the OPTIONS statement. The DEVADDR parameter specifies the APPLNAME, APPLPW and the NODENAME. The APPLNAME and APPLPW specifications will be totally ignored when VPS is used to print the output. The NODENAME value is used by SASWTR to identify the network printer. This value may also be ignored by VPS, depending on the SASOPTP parameter, which is described in "Installation" on page 3.1.

Operational Considerations

With a few exceptions, printers used for SAS/GRAPH output operate identically to other VPS printers. These exceptions, which are listed below, apply only while printing a SAS/GRAPH dataset:

1. Any repositioning command will be rejected. (A restart command will be accepted).
2. Any repositioning as a result of error recovery will restart the dataset from the beginning.
3. User Exit 01 (Print Line Exit) is not called for logical lines of a SAS dataset. All other exits are used as documented.

Special Options for the IBM 3268-2C

The IBM 3268-2C is a functional replacement for the IBM 3287-2C printer. There is one dip switch that must be set on the 3268 to make it compatible with a 3287 with PS-4A feature. The first dip switch in the operator area must be set to the "ON" position to emulate the PS-4A feature. See the table below.

PROGRAMMED SYMBOLS REQUIRED	3287-2C FEATURE	3268-2C FEATURE	
PS-2 2 SINGLE PLANE SETS	5781	STD	
PS-4 6 SINGLE PLANE SETS	5782	STD	(WITH DIP SWITCH 1 "OFF")
PS-4A 3 SINGLE PLANE SETS 1 TRIPLE PLANE SET	5783	STD	(WITH DIP SWITCH 1 "ON")

GDDM Processing

GDDM Processing for VTAM Printers

VPS identifies GDDM datasets as those datasets which are in a SYSOUT class specified in the GDMCLASS printer parameter. When VPS receives a dataset which is in one of the GDMCLASS classes, it invokes GDDM module ADMOPUJ. VPS passes the luname of the printer on which the output is to be printed (from the LUNAME printer parameter), the applid to be used for the VTAM session which the GDDM module will establish (from the GDMAPPL printer parameter), and the DD name of the SYSOUT dataset to that module.

Because the GDDM module establishes a VTAM session, each VPS printer which is to process GDDM datasets must have access to a valid VTAM application ID. VPS will terminate its own session with a printer to allow the GDDM module to process the dataset, and will re-establish its session when GDDM processing is complete.

The VTAM application ID to be used for GDDM processing is specified via the GDMAPPL printer parameter. You can either code a specific ID (for example, GDMAPPL=VPSG0001) or the identifier of a "pool" of VTAM application IDs which are available to be used by VPS for GDDM processing (for example, GDMAPPL=VPSG#). When you identify a "pool" of ids, VPS will keep an internal list of application IDs in use, and will use the next available ID, up to a maximum of 256 concurrent IDs. In the example where GDMAPPL=VPSG# is specified, the first VPS printer to initiate GDDM processing would use a VTAM application ID of VPSG0001, the second concurrent session would use an ID of VPSG0002, etc. (You could code a pool identifier in the GDMAPPL printer parameter in the Master Default Printer Definition, which would make it applicable to all VPS printers, except those where it is explicitly overridden.)

No matter whether you code a specific ID or the identifier of a pool of ids, each application ID must be known to VTAM. You should code these APPL statements in a member in SYS1.VTAMLST. For example, if you code GDMAPPL=VPSG#, and there is a possibility of 256 VPS printers processing GDDM output concurrently, you must have 256 APPL statements defined to VTAM. An example of the format of one of these entries is given below.

```
VPSG0001 APPL  AUTH=(ACQ,VPACE),ACBNAME=VPSG0001,EAS=1
```

Because VPS calls GDDM to print the graphs, options specified to GDDM are still applicable when VPS is controlling the printing. GDDM has the ability to allow an installation to specify defaults for that installation. There is one GDDM option that you may wish to set specifically for VPS. The FF3270P= keyword specifies whether or not GDDM should do form feeds before and/or after a graph. Specifying FF3270P=NO seems to remove the blank pages around a GDDM graph.

It is simplest to have a separate GDDM default file for VPS. Add an ADMDEFS DD statement to the VPS JCL, pointing to a dataset containing the following single statement:

```
DEFAULT FF3270P=NO
```

Refer to the GDDM Base Programming Reference, Volume 2 for more detail on specifying user defaults. (See "Defining the VPS Execution JCL" on page 3.14 for other DD statements which you may need to add to the VPS JCL for GDDM).

GDDM has some requirements pertaining to the page length, lines per inch, etc., set in the printer. Some devices, such as the IBM 4224, are shipped with default settings that are not compatible with GDDM. Be sure that these values are set correctly before attempting to print GDDM datasets.

GDDM must be at version 2 or higher to function properly via VPS, and GDDM modules must reside in an authorized library.

Routing GDDM Output to VPS

The easiest way to route output from GDDM or the Interactive Chart Utility (ICU) to VPS is to use a “nickname” for the output device. The following examples are illustrative of nicknames. (They can also be coded as part of the user default file ADMDEFS. Refer to the GDDM Base Programming Reference, Volume 2 for more detail on specifying user defaults).

```
ADMMNICK APPEND,NAME=VPS3268,FAM=2,PROCOPT=((PRINTDST,G,U501))
ADMMNICK APPEND,NAME=VPS4224,FAM=2,PROCOPT=((PRINTDST,G,U502)),
DEVTOK=S4224QE
```

In these nickname statements, the PRINTDST parameter on the PROCOPT keyword indicates that the output is to be routed to the JES spool. The FAM parameter must have a value of 2.

The first example (VPS3268) defines an IBM 3268-2C printer driven by VPS. The primary selection criterion specified in the VPS printer definition for this printer is DEST=U501; GDMCLASS=G is also specified in the VPS printer definition.

The second example (VPS4224) defines an IBM 4224 printer driven by VPS. The primary selection criterion specified in the VPS printer definition for this printer is DEST=U502; GDMCLASS=G is also specified in the VPS printer definition.

The name “VPS3268” or “VPS4224” is supplied to ICU in the “printer/plotter name” field on the print menu.

If the GDDM modules which actually print the output encounter an error condition, they will pass a non-zero return code back to VPS. VPS will issue an error message indicating that processing of a GDDM dataset failed (message VPS270E, VPS271E, or VPS272E), will format any additional information passed back from the GDDM modules and issue message VPS273E, and EDRAIN the printer. If the information in the VPS messages is not detailed enough to determine the cause of the problem, check SYSLOG for any messages issued by the GDDM modules. These messages have a prefix of “ADM”.

Routing GDDM Output to an IBM 6180 Plotter

Routing GDDM output to an IBM 6180 plotter attached to an IBM 3179-G terminal via VPS requires two nickname statements. The first nickname statement specifies the processing option PRINTDST, so that the output goes to the JES spool, and also refers to the second nickname statement in the STAGE2ID statement. An example of that nickname statement is shown here:

```
ADMMNICK NAME=IBM6180,
   PROCOPT=((PRINTDST,G,U100),(STAGE2ID,JESPLOT)),
   DEVTOK=L3179G
```

The second nickname statement refers to the plotter itself, and must have the NAME that was specified in the STAGE2ID parameter in the first nickname statement. For example:

```
ADMMNICK NAME=JESPLOT,
   FAM=1,TONAME=(*,ADMPLOT),
   PROCOPT=((PLTPAPSZ,A),
     (PLTAREA,0,100,0,100),
     (PLTROTAT,NO),
     (PLTPENW,3),
     (PLTPENV,0))
```

When the graph is created, the name of the first nickname statement should be used as the printer/plotter name. The output will then appear on the JES spool with the SYSOUT class and destination specified in the PRINTDST parameter. (In this example, the class will be G and the destination will be U100).

VPS would include a printer definition for the plotter. For example:

```
*-------------------------------------------------------------*
*PLOTTER - IBM 6180 PLOTTER ATTACHED TO 3179-G TERMINAL       *
*-------------------------------------------------------------*
*NOTE—THIS PLOTTER WILL PRINT ONLY GDDM OUTPUT.  ALL KEYWORDS  *
*HAVE BEEN SET TO ELIMINATE ANY NEED FOR VPS TO GO INTO SESSION*
*WITH THE DEVICE.                                            *
*-------------------------------------------------------------*
 LUNAME=L74403,      PRINTER LUNAME
 DEST=U100,          IBM 6180 PLOTTER
 CLASS=G,            GDDM OUTPUT ONLY
 GDMCLASS=G,         GDDM OUTPUT IN CLASS G
 GDMAPPL=VPSG#,      APPLID ID FOR GDDM
 FCB=N,              NO SVF OR SLD
 SEPAR=N,            NO SEPARATORS
 COMPRESS=N,         NO VTAM BUFFER COMPRESSION
 AUTOEJCT=(N,N,N,N), NO AUTO EJECTS
 SVFACTN=(N,N,N),    NO SVF AT ANY TIME
 CPI=0,              NO SPD
 MPP=0               NO SHF
```

When the output appears on the JES spool, VPS will pick it up and route it to the plotter.

There is one additional consideration with this method. The plotter must be in ready status and have paper loaded in it when the output begins to print. If it does not, the graph will simply be “flashed” on the screen of the IBM 3179-G terminal. The plotter has no way to notify the terminal that it is not ready. If you choose to use this method, you may want to specify DRAINED=Y in the VPS printer definition for the plotter, and issue a VPS START command for the printer when you know that the plotter is ready.

Printing GDDM output via the DRS/VPI

Create a GDDM nickname file that causes the output to be placed on the JES spool. This nickname must be a two stage definition that causes the first stage output to be placed on the spool and the second stage output to be processed by GDDM using a token that does not generate a query to the printer. The following sample nicknames should accomplish this.

```
ADMMNICK  APPEND,NAME=VPS1,TOFAM=2,TONAME=VPS1,DEVTOK=ADMK8710,
         PROCOPT=((PRINTDST,G,U100)),FAM=2
ADMMNICK  APPEND,NAME=VPS1,FAM=1,DEVTOK=ADMK8710
```

Please note the output must be placed on the spool with a class and destination that will be matched in a VPS printer definition. The following sample VPS printer definition is for a 'dummy' printer which will be matched up with a DRS virtual printer.

AUTOEJCT=(N,N,N,N),	**get rid of extra form feeds**
SEPAR=N,	**no separators**
LUNAME=VIRTUAL,	**must match DRS/VPI printer member name/VTAM appl name**
CLASS=G,	**must match GDDM nickname PROCOPT class**
DEST=U100,	**must match GDDM nickname PROCOPT destination.**
GDMCLASS=G,	**must match GDDM nickname PROCOPT class**
GDMAPPL=GDPRT#,	**must match VTAM appl defined for GDDM (see below)**
ALOGMODE=SCS	**force LU type 1**

Sample GDDM VTAM APPL definition.

```
GDPRT001   APPL    AUTH=(ACQ,VPACE),ACBNAME=GDPRT001,EAS=1
```

The following definition is for the DRS virtual printer. The DRSLIB member name must be the same as a VTAM APPL. In this sample case the member name is 'VIRTUAL'.

```
DEST=RMT999,  destination being serviced by 'real' VPS printer.
TERMRPT=CHAIN terminate report at end of chain.
```

Sample DRS/VPI virtual printer VTAM APPL definition.

```
VIRTUAL  APPL    AUTH=(ACQ,VPACE),EAS=1,DLOGMOD=SCS
```

Sample 'real' VPS printer definition that services the above examples.

```
DEST=RMT999,must match DEST placed on spool by DRS/VPI printer.
TCPHOST=192.5.252.11,
TCPPRTR=lpt1
```

The flow is as follows:

1. QMF creates GDDM output using the nickname that is placed on the JES spool with CLASS G and DEST U100.
2. The VPS 'dummy' printer definition retrieves the output from the JES spool. Since the output SYSOUT class of 'G' matches the printer definitions' GDMCLASS keyword VPS passes the dataset to GDDM for printing.
3. VPS has passed the LUNAME of 'VIRTUAL' to GDDM as the name of the LU it should acquire. GDDM acquires this virtual LU. GDDM then reformats the output file into an SCS datastream and sends it to the LU.
4. The LU 'VIRTUAL' is actually a DRS/VPI printer. It receives the output from GDDM and reformats it from the SCS datastream into ASA line data and places it on the JES spool with a destination of RMT999.
5. The 'real' VPS printer definition picks the output up from spool and sends it on to the printer via TCP/IP.

GDDM Printing via TCPIP

GDDM output may be printed via VPS/TCPIP to a PCL compatible printer by various methods.

VPS/PCL

The most comprehensive way to support GDDM printing via VPS/TCPIP is to use VPS/PCL. This is done by creating the output with an AFP token in GDDM and then allowing VPS/PCL to convert the AFP output to PCL. This method provides complete compatibility with the host based GDDM output. Output printed via this method should always look exactly like it was printed on a GDDM 3270 or system printer.

The following ADMDEFS nickname definition will cause the output to be placed on the JES spool in AFPDS format. VPS/PCL can then convert this data to PCL and send it to the printer.

```
ADMMNICK NAME=myprt,FAM=2,TOFAM=4,DEVTOK=A3820Q,
   PROCOPT=((PRINTDST,x,dest,wtrname),(PRTROT,90))
```

DEVTOK=	(any AFP family 4 device token)
myprt =	printer name
x =	spool class
dest =	destination
wtrname =	writer name
(PRTROT,90) =	rotates output 90 degrees (optional)

Text Only

GDDM is sometimes used to print output that consists only of text. This is particularly true with QMF. QMF uses GDDM as its printing vehicle. Most users create output with QMF that is pure text. If this is the case, then GDDM can be configured to create output that consists only of text, omitting all graphics. VPS/TCPIP can deliver this output like any other SYSOUT dataset. This requires the use of the DRS virtual printer and two VPS printer definitions. QMF will invoke GDDM to create output and place it on the JES spool. The first VPS printer selects this output and invokes GDDM to print it. GDDM will acquire the DRS/VPI printer. Using the ADM8710 token GDDM will print an SCS datastream to the printer. DRS will format this into print lines and place it back on the JES spool. The VPS/TCPIP printer can then select the output and send it to the TCPIP printer.

To accomplish this method, please review the topic entitled "Printing GDDM output via the DRS/VPI" on page 6.38.

HP-GL

GDDM V3 can also be configured to create an HP-GL datastream. HP-GL is HP's plotter language. All PCL5 printers support HP-GL. While many forms of GDDM output may be created in HP-GL it is not the most efficient datastream for printing output which is mostly text. The following example requires GDDM V3. These definitions have not been tested by LRS.

```
ADMNICK
NAME=HPGL,TOFAM=2,TONAME=(HPGL,IBMGL),DEVTOK=L3179G82,
PROCOPT=((TOFILE,YES,REP)),FAM=0
ADMNICK
NAME=HPGL,FAM=2,DEVTOK=L3179G82,PROCOPT=(PRINTDST,T,U100)
```

These definitions will send an IBM-GL datastream (functionally compatible with an HP-GL datastream) to the JES spool with a destination of U100 and a SYSOUT class of 'T'. The VPS printer must be selecting by destination U100 and have the TRNCLASS set to class 'T'.

Please note that this causes a pure HP-GL (or IBM-GL) file to be transferred directly to the printer. It may be necessary to place the printer into GL mode by sending some preparatory commands to the printer first.

VPS exit14 may be modified to send these commands.

Trace Options in VPS

While VPS is executing, it records information about certain processing events by making entries in an internal trace table. Each trace entry consists of 32 bytes of information, including an identifying trace type, a date and time stamp, and certain key information about the event.

The amount of storage dedicated to this internal table is determined by the value in the second positional parameter of the TRACE keyword in the VPS System Initialization member. The trace entries are recorded in "wrap-around" fashion; when the table is "full," recording starts again at the beginning of the table.

The events recorded in the trace table can be categorized as either "system" events (pertaining to the VPS environment as a whole), "printer" events (pertaining to a particular printer), "exit" events (pertaining to a particular user exit), or "separator" events (pertaining to a separator routine). Certain system events are always recorded in the trace table. Other system events are traced only when they are requested via the first positional parameter of the TRACE keyword in the System Initialization member. Certain printer events are always recorded in the trace table, unless TRACE=N is specified for the printer. (The default is TRACE=Y). Other printer events are traced only when they are requested via the second positional parameter of the TRACE keyword in the Printer Definition member. Exit events are traced only when they are requested via the 4th positional parameter of the EXITnn keyword in the System Initialization member. Separator events are traced only when they are requested via the 6th positional parameter of the SEPAR keyword in the Printer Definition member.

When VPS automatically creates or the user requests a snap dump for a printer, the trace entries are part of the dump. The entire trace table, including system, printer, exit, and separator trace entries, is dumped. The system, printer, exit, and separator trace entries which pertain to the printer for which the snap dump was issued are also formatted and printed in a separate section of the dump.

Trace entries in a snap dump are not something which you would reference on a regular basis. They are designed to be a debugging tool when a particular problem is encountered. The basic trace entries which are always recorded cover a variety of situations and will supply enough information to answer many questions. If these basic entries are not detailed enough, VPS Support may request that you specify certain trace types to aid in resolving a problem.

GTF Tracing from VPS

The EXITnn keyword in the System Initialization member, the TRACE keyword in the System Initialization member and in the Printer Definition member, and the SEPAR keyword in the Printer Definition member allows you to indicate that you want VPS to record its trace entries in your GTF trace dataset, in addition to entering them in the VPS trace table. VPS' internal trace table is in existence only while VPS is executing and leaves no permanent record of events. Also, each time the VPS trace table is filled, recording continues at the beginning of the trace table, effectively "covering up" previously recorded information. Depending on the size of the trace table, the trace types specified, and the number of printers active to VPS for which tracing is in effect, the trace table can fill up in a very short time. GTF tracing allows you to make a complete and permanent record of VPS events, which can then be investigated even when VPS is not executing.

GTF trace entries created by VPS will have a record ID of 80 (X'50'). When you request GTF tracing, you might want to specify a GTF format appendage ID (via the third positional parameter value on the TRACE keyword in the System Initialization member), unless the default value which VPS uses for this parameter is acceptable at your installation. A program for printing VPS' GTF trace entries is supplied as member LRSPRGTF in the LRS/OS/API load library (LRS.V1R12.LOAD) on file 5 of the distribution cartridge. Sample JCL for executing this program is supplied as member PRINTGTF in the VPS control file on the distribution cartridge.

You can also request that VPS record its VTAM or TCP/IP buffer contents in your GTF file via the TRACE keyword. This trace type is only effective if the TRACE keyword has a value that also indicates that GTF tracing is on for the printer, for example, TRACE=(Y,05).

For more details about using GTF tracing, see "External Trace Recording in GTF Trace Files" on page 15.7.

Statistical Information Available from VPS

Internal Statistics

VPS internally accumulates and logs statistics concerning the amount of time necessary to accomplish certain system tasks. The frequency with which these statistics are logged is dependent upon the value of the STAINTVL parameter in the System Initialization member.

When the amount of time indicated by the STAINTVL parameter expires, VPS messages VPS126I and VPS127I are entered in the log once for each of eleven request types. These request types are:

SRQA time required for a subsystem request for next dataset for a printer

SRQJ time required for a subsystem request for next dataset of a job

SRQC time required for a subsystem request for a control function

JDYA time required for a request for SYSOUT dataset allocation

JDUD time required for a request for unallocation of a SYSOUT dataset with “delete” specified

JDUK time required for a request for unallocation of a SYSOUT dataset with “keep” specified

NXDS time required to process next dataset requests for all printers

NXJB time required to process next job requests for all printers

TIMR time required for the VPS dispatcher subtask to locate work for all idle printers

SQUE time required to queue a SYSOUT dataset

QUEA time required to allocate a staging dataset

For each request type, message VPS126I lists the number of times that request type has been issued, the average amount of time used to process that request type, the highest amount of time used to process that request type, and the date and time that the highest amount was used. Message VPS127I lists the amount of time used to process a request type the last sixteen times the request type was processed.

These statistics are accumulated from VPS initialization to VPS termination, unless you choose to reset them at some point prior to termination. You can use the RESET option of the SSTAT command to reset the statistical information, effectively giving it a new starting point.

If you wish to have the statistical messages entered in the log at a time other than that specified by the STAINTVL, you can use the LOG option of the SSTAT command. This command tells VPS to immediately log the statistical information.

Normally, you will have no need to refer to these statistics. However, if you are experiencing performance problems within VPS, these statistics can help to determine the origin of the problem.

You can use a Message Modification member to eliminate these messages completely, if desired.

Users of the VPS Monitor and Control Facility (VMCF) can view these values on one of the VMCF screens.

Statistics Recorded In SMF Records

VPS Printer Detail and Summary Reports

When SMF=Y is specified in a VPS Printer Definition member, either explicitly or by default, VPS will write SMF type-6 records for the printer. The contents of these records is described in "SMF Recording by VPS" on page 6.24. A sample program, distributed as source member VPSSTAT2 in file LRS.VPS.V1R80.ASM, can be used to print VPS Printer Detail and Summary Reports from these SMF type-6 records.

The detail report shows the printer name, job number, job name, on-printer date and time, off-printer date and time, elapsed print time, number of lines, number of pages, and number of datasets printed from an individual SMF type-6 record. The summary report shows the total elapsed print time, total lines, total pages, total datasets, and total jobs printed by each printer.

Sample JCL to select and sort the records and to print the reports is shown below:

```
//JOBNAME  JOB  (YOUR JOB CARD PARAMETERS)
//*
//SORT     EXEC  PGM=SORTSORT BY PRINTER, DATE, AND TIME
//SYSOUT   DD    SYSOUT=*
//SORTWK01 DD    UNIT=SYSALLDA,SPACE=(CYL,(10,10))
//SORTWK02 DD    UNIT=SYSALLDA,SPACE=(CYL,(10,10))
//SORTWK03 DD    UNIT=SYSALLDA,SPACE=(CYL,(10,10))
//SORTIN   DD    DSN=your.smf.data,DISP=SHR
//SORTOUT  DD    DSN=,DISP=(NEW,PASS),
//         UNIT=SYSALLDA,SPACE=(CYL,(10,10))
//SYSIN    DD    *
SORT     FIELDS=(73,8,CH,A,11,4,PD,A,7,4,BI,A)
INCLUDE COND=(6,1,BI,EQ,X'06')
//*
//PRINT    EXEC  PGM=VPSSTAT2PRINT VPS DETAIL/SUMMARY REPORTS
//STEPLIB  DD    DSN=your.load.library,DISP=SHR
//SYSUT1   DD    DSN=,DISP=(OLD,DELETE)
//SYSPRINT DD    SYSOUT=*          DETAIL  REPORT
//SYSPRIN2 DD    SYSOUT=*          SUMMARY REPORT
```

VPS Printer Staging and Printing Statistics

The sample VPS Inactivate Exit supplied as member VPSSUE12 in file LRS.VPS.V1R80.ASM writes an SMF type-255 record whenever a printer is inactivated. These records contain information pertaining to staging and printing for a printer. A sample program, distributed as source member VPSSTAT1 in file LRS.VPS.V1R80.ASM, can be used to print a report of staging and printing statistics from these SMF records.

The fields printed on the report include the printer name, the printer's activation date and time, the printer's inactivation date and time, the requested size for the staging buffer (QBUFSIZE), the number of lines written to the staging dataset, the number of times that the staging dataset was allocated, the total number of I/Os to the staging dataset, the number of jobs printed that required staging, and the total number of lines, pages, datasets, and jobs printed by the printer.

If you choose to use the VPS Inactivate Exit to write these SMF records and program VPSSTAT1 to print the report, but wish to have the records created with some record type other than 255, you can modify both the VPS Inactivate Exit and program VPSSTAT1 to reference the record type that you choose. The "RECTYPE" equate in both programs sets the record type.

Sample JCL to print the report is shown below:

```
//JOBNAME  JOB   (YOUR JOB CARD PARAMETERS)
//*
//SORT     EXEC  PGM=SORTSORT BY PRINTER, DATE, AND TIME
//SYSOUT   DD    SYSOUT=*
//SORTWK01 DD    UNIT=SYSALLDA,SPACE=(CYL,(10,10))
//SORTWK02 DD    UNIT=SYSALLDA,SPACE=(CYL,(10,10))
//SORTWK03 DD    UNIT=SYSALLDA,SPACE=(CYL,(10,10))
//SORTIN   DD    DSN=your.smf.data,DISP=SHR
//SORTOUT  DD    DSN=,DISP=(NEW,PASS),
//         UNIT=SYSALLDA,SPACE=(CYL,(10,10))
//SYSIN    DD    *
SORT   FIELDS=(37,8,CH,A,53,4,PD,A,57,4,BI,A)
INCLUDE COND=(6,1,FI,EQ,255)  <=== USE APPROPRIATE RECORD TYPE
//*
//PRINT    EXEC  PGM=VPSSTAT1  PRINT VPS PRINTING/STAGING STATS
//STEPLIB  DD    DSN=your.load.library,DISP=SHR
//SYSUT1   DD    DSN=,DISP=(OLD,DELETE)
//SYSPRINT DD    SYSOUT=*      STATISTICS REPORT
```

Dynamic Printer Definition

Normally, the VPS control library must contain a Printer Definition Member for each printer that VPS is to control. However, there is a method which can be used to "dynamically" define printers to VPS without creating Printer Definition Members.

When the Pre-selection User Exit (User Exit 00) is enabled, that exit accesses JES control blocks and creates a list of information about output on the JES spool.

If PSACTIVE=N is specified in the System Initialization member, the exit will return information about SYSOUT datasets that match the selection criteria of the printers activated to VPS. This method decreases the number of requests that VPS makes to JES for work.

If PSACTIVE=Y is specified in the VPS System Initialization Member, the Pre-selection Exit will use the values of the PSCLASS, PSDEST, PSFORM and PSWRITER fields to determine which SYSOUT datasets it should report back on.

If output exists for which there is no active VPS printer, the Pre-selection Exit will search the VPSLIB library for a member with a name that matches either the destination, writer name, or form name of the output group (determined by the PSSELECT parameter). If a member of that name is found, the printer defined in that member will be activated.

If a member of that name is not found in the VPSLIB library, the Pre-selection Exit can dynamically "create" a printer, using the "master" Printer Definition Member specified in the DEFLTMEM parameter of the System Initialization Member (if any) and the VPS defaults for printer parameters. This dynamically created printer will assume an LUNAME and member name of the destination, writer name, or form name of the output, as designated by the PSSELECT parameter.

This ability to dynamically define and activate a printer which is not defined in the VPSLIB library is put into effect via the second positional parameter value of the PSACTIVE keyword. (See the definition of this keyword in "Building the System Initialization Member" on page 3.16 for the appropriate value).

The net effect of these activities is the dynamic creation of a printer for which no Printer Definition Member exists. If the values specified for printer parameters in your "master" Printer Definition Member are not appropriate to all dynamically defined printers, you can use the Printer Activation Exit (User Exit 11) to dynamically modify the values, via the $$CBSET macro. Also, utilizing dynamic printer definition still allows you to have Printer Definition Members in your VPSLIB library.

Dynamic printer definition would not be applicable to every installation. However, if your installation has a large number of printers, if those printers have VTAM lunames which can be used as a destination, form name, or writer name on a SYSOUT dataset, and if most or all of your printers have similar physical attributes, you may wish to consider this option. The degree of complexity in coding the Printer Activation Exit to modify the default values would be dependent on such things as your naming conventions (can you tell the LU type or model of a printer from its name?), how many different types of hardware you support, and how many different printer parameters you need to modify to get the desired results.

IPDS (Intelligent Printer Data Stream) Support

VPS can print SYSOUT datasets which are in IPDS format. These datasets may have been created by running VPS/IPDS in batch mode, or by other batch or online applications. The IPDCLASS printer keyword allows you to specify from 1 to 8 SYSOUT classes which VPS should assume to contain IPDS datasets.

VPS' processing of these datasets differs from its processing of "standard" format datasets in these ways:

- an indicator will be sent to the printer
  - for LU-1, BDS-FMH
  - for LU-0, WSF, data-chain start, select IPDS mode
  - for LU-3, IPDS is not supported
  - for TCP/IP, session initialization commands
- carriage control characters, if present, are ignored
- the reposition command is allowed if it is specified in pages rather than lines
- standard print translation (translation of non-printable characters via the translate table indicated in the PRTXLATE keyword) is not performed
- APL print translation (translation of non-printable characters via the translate table indicated in the PRTXLATE keyword) is not performed
- truncation of data (via the TRUNCATE keyword) is not performed
- trailing blank truncation (via the TRAILBLK keyword) is not performed
- the MAXLPG, FCB, CPI, PPM, MPP, and COMPRESS keywords are ignored, as is the first parameter value of the AUTOEJCT keyword
- use of the PA-2 key while printing restarts the dataset from the beginning rather than repositioning the dataset
- no messages pertaining to RESTART, REPOSITION, CANCEL, or INTERRUPT commands will appear on the printer
- when FORM=AUTO is specified, no form mount messages will appear on the printer

VPS' processing does include these "standard" functions:

- the Print Line Exit (user exit 01), Start Dataset Exit (user exit 02), End Dataset Exit (user exit 03), and Dataset Add Exit (user exit 14), are all called, if enabled, for IPDS datasets
- the IPDS Exit (user exit 23) is called for every IPDS command and for every ACK or NACK received
- the REPEAT command is supported
- the INTERRUPT command is supported
- multiple copies are supported

The rules which apply to IPDS datasets are:

- IPDS structured fields can span print lines
- IPDS acknowledgments are supported.
- the user datastream must do any required paper positioning to get to top of form prior to the start of printing and at the end of printing
- VPS will send a set-home-state IPDS command at the end of the dataset

VPS Requirements for Sending IPDS to a TCP/IP Printer

When sending IPDS data to a TCP/IP printer, a direct TCP/IP (sockets) connection using COMMTYPE=(TCPIP,SOK) is required. For most IPDS/IP printers, the remote port used to receive IPDS data is 5001.

PJL commands cannot be sent to the IPDS/IP printer. VPS printer activation will be rejected for any TCP/IP printer with PJLCMDS=Y and which also specifies IPDCLASS or CONVTYPE=IPDS. This is because all data sent to the remote port must be IPDS. No normal ASCII print files, PCL, PJL, etc. can be sent to the IPDS port.

The VPS printer member must have either IPDCLASS=* or CONVTYPE=IPDS. This means all files must either already be in IPDS format or VPS/IPDS must convert the files to IPDS. If IPDCLASS is specified (is not null), then IPDCLASS must either be set to '*' or else CONVTYPE=IPDS must be specified to indicate that files in other SYSOUT classes will be converted by VPS/IPDS.

Specifying CONVTYPE=IPDS requires a valid and non-expired value for the KEYIPDS keyword in the VPS system initialization member. Using IPDCLASS=* without CONVTYPE=IPDS will not require a valid VPS/IPDS key in the KEYIPDS system keyword.

SCS Command Usage by VPS

VPS will send certain SCS commands to SNA/SCS (LU-1) devices, based on the values of particular printer keywords. The keywords involved and the resulting SCS commands are:

- **Set Line Density (SLD) and Set Vertical Format (SVF)**

  The SLD and SVF commands are always sent together. Their values are established by interrogating the FCB. The SLD sets the lines per vertical inch (either 6 lpi or 8 lpi), and the SVF sets the maximum page length. VPS retrieves the channel stop locations from the FCB, but supports them internally, rather than sending them to the device in an SCS command.

  The VPS printer keywords that affect SLD and SVF are FCB and SVFACTN. If FCB is set to N, neither command will be sent. If FCB is set to Y, the SVFACTN keyword determines whether or not the SLD and SVF will be sent.

- **Set Print Density (SPD)**

  The SPD command sets the number of characters per horizontal inch (CPI) on a printer.

  The VPS printer keyword that affects SPD is CPI. If the CPI keyword has a non-zero value, VPS will send the SPD command to the device.

- **Set Horizontal Format (SHF)**

  The SHF command sets the maximum print position (MPP), the tab stops, and the left and right margins. (VPS does not use the left and right margins).

  The VPS printer keywords that affect SHF are MPP and COMPRESS. If MPP is set to a non-zero value, VPS will use that value for the MPP in the SHF command. If MPP is set to zero, and COMPRESS=Y is specified, VPS will send a SHF command with a default MPP of 132. (VPS' compression technique for LU-1 devices uses tabs to accomplish blank compression). If you wish to prevent the SHF command from being sent, you must specify both MPP=0 and COMPRESS=N.

VPS sends these SCS commands at the beginning of each session. It will also send them at the beginning of any dataset within a session if the dataset requires different values than those set for the previous dataset.

At the end of its VTAM session with a printer, VPS sends an SCS command with null values for each SCS command sent. This directs the printer to go back to its default settings. (Resetting of the SLD and SVF at end of session can be overridden by the SVFACTN keyword).

Some printers use the values supplied by SCS commands to determine the orientation of the printed page (portrait vs. landscape), based on a calculation of page width versus page length. The SCS commands that determine page width are SPD and SHF, which can be modified by VPS keywords MPP and CPI. The SCS commands dealing with page length are SLD and SVF, which can be modified by the VPS keyword FCB. A combination of user exits and FCBs could be used to dynamically set the orientation via SCS commands. The sample "Start Dataset Exit" on the distribution cartridge demonstrates setting the CPI and MPP keyword values based on the SYSOUT class and form name of the dataset about to be processed. It may require some experimentation to determine which values give the desired results on a particular model of printer. Most printers will return an SNA sense code of 1005 if they receive a value or combination of values that they consider invalid.

Using Facsimile Products with VPS

Facsimile gateways can emulate SNA RJE stations, 3270 devices, or TCP/IP devices. SNA RJE is the preferred connection, because it allows two-way communication with the FAX server, and the FAX server can send logs or notification back to VPS as JCL to be passed to the internal reader. With the installation of a special VPS User Exit 21 and some customizing of the FAX server, it is possible to receive a notification that indicates whether a FAX was successfully sent and deliver that notification to a TSO user.

An example of a VPS Printer Definition member for a FAX server is shown below:

```
*-------------------------------------------------------*
*                                                       *
*FAX SERVER                                             *
*                                                       *
*-------------------------------------------------------*
 ALOGMODE=RJE3790A,       LOG MODE
 AUTOEJCT=(N,,,N),        NO AUTO FF AT BEGIN DSN OR EOJ
 COMPRESS=N,              NO COMPRESSION
 CPI=0,                   NO CPI
 DEST=R10,                SELECT BY DESTINATION R10
 LUNAME=L5F0001,          VTAM NAME OF FAX SERVER
 MPP=0,                   NO MPP
 RJE=(Y,Y,Y,N),           RJE, SEND PDIR, ACCEPT INBOUND DATA
 RUSIZE=256,              SEND BUFFER SIZE
 SEPAR=N,                 NO SEPARATORS
 SEPINFO=FAX,             USED BY SPECIAL EXIT 21
 SVFACTN=(N,N,N),         NO SVF OR SLD
 UDATA='  LRS FAX'        USED BY SPECIAL EXIT 21
```

It is also possible to send AFP documents to a FAX server using VPS/PCL and VPS User Exits 14 and 22. VPS User Exit 22 removes the FAX Control Language (FCL) from the beginning and end of the document. VPS/PCL then converts the AFP document to PCL data. VPS User Exit 14 sends the FCL that was removed by User Exit 22 to the FAX server before and/or after the document. This allows an AFP print file to be delivered to any FAX machine.

To request that VPS remove the FCL, the data should be placed in a SYSOUT class that matches the STGCLASS parameter in the VPS printer definition. Exit 22 will check for SEPINFO=FAX to remove the FCL from the file. CONVTYPE=PCL must be specified to cause VPS to convert the document from AFP to PCL. Exit 14 will add back the FCL if SEPINFO=FAX is set for the printer and the SYSOUT class matches the STGCLASS parameter. PRTROPTS=02000000 should be specified to allow the records created by VPS/PCL to be split across multiple send buffers. AFPOPTS=8000 is suggested to eliminate the PCL command to jog the paper tray and PCLOPTS=8000 is suggested to inform VPS/PCL that the FAX server does not support duplex commands.

The versions of User Exits 14 and 22 which support sending PCL to FAX servers were implemented with fix 6.2.229.

A sample definition for a FAX server which allows sending PCL output follows:

```
*-------------------------------------------------------*
*                                                       *
*  FAX SERVER SENDING PCL                               *
*                                                       *
*-------------------------------------------------------*
 AFPOPTS=8000,           DON'T JOG TRAY
 ALOGMODE=RJE3790A,      LOGMODE ENTRY FOR SNA RJE
 AUTOEJCT=(N,,,N),       NO AUTO FF AT BEGIN DSN OR EOJ
 COMPRESS=N,             NO COMPRESSION
 CONVTYPE=PCL,           CONVERT AFP TO PCL
 CPI=0,                  NO CPI
 DEST=R10,               SELECT BY DESTINATION R10
 LUNAME=L5F0001,         VTAM NAME OF FAX SERVER
 MPP=0,                  NO MPP
 PCLOPTS=8000,           PRINTER CANNOT DUPLEX
 PRTROPTS=02000000,      SPLIT LARGE RECORDS ACROSS BUFFERS
 RJE=(Y,Y,Y,N),          RJE, SEND PDIR, ACCEPT INBOUND DATA
 RUSIZE=256,             SEND BUFFER SIZE
 SEPAR=N,                NO SEPARATORS
 SEPINFO=FAX,            USED BY EXITS 14, 21, 22
 STGCLASS=F,             USED BY EXITS 14 AND 22
 SVFACTN=(N,N,N),        NO SVF OR SLD
 UDATA='        LRS FAX' USED BY SPECIAL EXIT 21
```

The mode table entry referred to as RJE3790A in the ALOGMODE keyword is in the IBM default logmode table and is shown here:

```
RJE3790A   MODEENT LOGMODE=RJE3790A,              X
           FMPROF=X'03',                          X
           TSPROF=X'03',                          X
           PRIPROT=X'A3',                         X
           SECPROT=X'A1',                         X
           COMPROT=X'7080',                       X
           RUSIZES=X'8585',                       X
           PSERVIC=X'01106000F100800000010040'
```

Using the VPS/SAR (CA-View) Interface

The VPS/SAR interface allows users of Computer Associates' SYSOUT Archival Product CA-View (previously known as "SAR") to direct archived datasets to VPS for printing without restoring the dataset to the JES spool.

Activating the VPS/SAR interface requires that:

- USEROPTS=0002 is specified in the VPS Initialization member (VPSSTART)
- a module named SAREPI, supplied by Computer Associates, is present in a library accessible to VPS
- CA-View (SAR) is at Release 6.1 or higher
- VPS is at Release R6.0.070 or higher.

Using this facility eliminates the overhead of restoring SAR datasets to the JES spool. The full VPS command set is available for controlling the printing, such as REPOSITION, RESTART, CANCEL, INTERRRUPT, etc.

Some restrictions do apply while printing SAR datasets.

- Because the dataset does not exist on the JES spool, the dataset will not appear on the Output Queue Screen of VMCF, and users of VPS/Report Browse cannot browse the dataset. (A one-line dataset will appear on the JES spool while the dataset is being printed, and it will be deleted by VPS when printing is complete).
- GDDM datasets cannot be printed by VPS using this interface. If you have archived a GDDM dataset, you must instruct SAR to restore it to the JES spool if it is to be printed by VPS.

Error messages pertaining to problems with the VPS/SAR interface have message numbers VPS290E through VPS293E. Consult your Computer Associates representative for information on directing an archived dataset to VPS rather than to the JES spool.

Using VPS Keywords and Exits to Send Printer Commands

Many printers can understand command sets or languages that direct the printer to perform certain actions, such as choosing an orientation or a font. This allows a variety of printing options beyond those chosen as the default printer settings.

The challenge for the user is to find a method of sending the desired commands at the appropriate time. The commands could be imbedded in a SYSOUT dataset and sent as part of the data. However, this method requires that each user who creates output for the printer have access to and knowledge of all the appropriate commands. It also means that the report cannot be re-directed to another printer unless that printer supports the same printer commands.

Printers that offer IPDS capability can use the VPS/IPDS product for Advanced Function Printing (AFP), and printers that support Hewlett-Packard's Printer Command Language (PCL) can use the VPS/PCL product for AFP. Both of these products are described more fully in "AFP" on page 8.1.

For other command languages, or for users who do not wish to use these products, the VPS printer keywords (PCMDACTN, PCMDEND, PCMDDSNE, PCMDDSNS, PCMDOPTS, PCMDSEPE, PCMDSEPS, and PCMDSTRT) and/or VPS User Exit 14 provide the capability of inserting commands. The keywords can cause VPS to insert command data before or after each banner (separator) page and before or after each SYSOUT dataset to be delivered. In addition, VPS User Exit 14 can send printer commands and is invoked both before and after each banner page and before and after each SYSOUT dataset to be sent to the printer.

Using the VPS Printer Keywords to Insert Printer Commands

There are several printer keywords which control the insertion of printer commands before or after the separator or SYSOUT dataset: PCMDACTN, PCMDDSNE, PCMDDSNS, PCMDEND, PCMDOPTS, PCMDSEPE, PCMDSEPS and PCMDSTRT. The most commonly used of these keywords are PCMDSTRT and PCMDEND.

PCMDSTRT

PCMDSTRT indicates what commands should be sent before the banner (separator) page and before the SYSOUT dataset. The first subfield indicates the default module or string that contains printer commands that should be sent before the separator page. If '%STRING' is specified, the string of HEX characters specified by PCMDSEPS will be sent before the separator page. Otherwise, the value in the first subfield of PCMDSTRT will be used as the name for a module to be loaded with the start commands. If this default module cannot be loaded during printer activation, the printer will not be activated. See "Printer Command Module Formats" on page 6.58 for more information about the format of the printer command modules to be loaded.

The second subfield of the PCMDSTRT keyword indicates the default module or string that contains printer commands that should be sent before the SYSOUT dataset. If '%STRING' is specified, the string of HEX characters specified by PCMDDSNS will be sent before the SYSOUT dataset. Otherwise, the value in the second subfield of PCMDSTRT will be used as the name for a module to be loaded with the start commands. If this default module cannot be loaded during printer activation, the printer will not be activated. See "Printer Command Module Formats" on page 6.58 for more information about the format of the printer command modules to be loaded.

The third subfield of the PCMDSTRT keyword indicates how VPS should locate the name of a module to be loaded dynamically which contains printer commands. The valid values for the third subfield of the PCMDSTRT include constants and symbolic variables which represent SYSOUT keyword values. For the list of valid values, see "Installation" on page 3.1. For example, setting the 3rd subfield of PCMDSTRT to &WRITER would indicate that the WRITER name associated with the SYSOUT dataset should be used to dynamically load a module that contained printer commands. The start commands in the module loaded using this name will be sent to the printer before the SYSOUT dataset, instead of the default commands specified by the second subfield of the PCMDSTRT keyword. Also, if that module contains any end commands, those commands will be sent to the printer after the SYSOUT dataset. If the dynamically loaded module does not contain end commands, the default end commands will be sent. If the load fails for this dynamic start module, then the second subfield of the PCMDACTN keyword indicates if VPS should use the default value to send start commands, if VPS should send no printer commands, or if VPS should stop the printer with an error condition. See "Printer Command Module Formats" on page 6.58 for more information about the format of the printer command modules to be loaded.

PCMDEND

PCMDEND indicates what commands should be sent after the banner (separator) page and after the SYSOUT dataset. The first subfield indicates the default module or string that contains printer commands that should be sent after the separator page. If '%STRING' is specified, the string of HEX characters specified by PCMDSEPE will be sent after the separator page. Otherwise, the value in the first subfield of PCMDEND will be used as the name for a module to be loaded with the end commands. If this default module cannot be loaded during printer activation, the printer will not be activated. See "Printer Command Module Formats" on page 6.58 for more information about the format of the printer command modules to be loaded.

The second subfield of the PCMDEND keyword indicates the default module or string that contains printer commands that should be sent after the SYSOUT dataset. If '%STRING' is specified, the string of HEX characters specified by PCMDDSNE will be sent after the SYSOUT dataset. Otherwise, the value in the second subfield of PCMDEND will be used as the name for a module to be loaded with the end commands. If this default module cannot be loaded during printer activation, the printer will not be activated. See "Printer Command Module Formats" on page 6.58 for more information about the format of the printer command modules to be loaded.

PCMDDSNE and PCMDDSNS

The PCMDDSNE and PCMDDSNS keywords allow specifying up to 60 bytes that represent up to 30 bytes of HEX data to be sent to the printer. The string of data from the PCMDDSNE keyword will be sent after the SYSOUT dataset only if the second subfield of the PCMDEND keyword is '%STRING'. The string of data from the PCMDDSNS keyword will be sent before the SYSOUT dataset only if the second subfield of the PCMDSTRT keyword is '%STRING'.

PCMDSEPE and PCMDSEPS

The PCMDSEPE and PCMDSEPS keywords allow specifying up to 60 bytes that represent up to 30 bytes of HEX data to be sent to the printer. The string of data from the PCMDSEPE keyword will be sent after the banner (separator) page only if the first subfield of the PCMDEND keyword is '%STRING'. The string of data from the PCMDSEPS keyword will be sent before the banner (separator) page only if the first subfield of the PCMDSTRT keyword is '%STRING'.

PCMDACTN

PCMDACTN indicates the action to be taken by VPS when inserting the printer commands. The first subfield of PCMDACTN indicates if transparency should be added to the data which is being sent by VPS. Transparency sequences are normally used when sending to an ASCII printer which is connected to a protocol converter using VTAM. Transparency is not used when sending to TCP/IP devices. If PCMDACTN=(TRN), is specified, VPS will use the transparency specified for the TRNCLASS keyword to insert the transparency characters. For example, the default TRNCLASS=(,C,35) indicates that X'35' followed by the length of the data should be added. PCMDACTN=(NOTRN) is the default, which means no transparency sequences will be added to the printer commands.

The second subfield of PCMDACTN indicates what action VPS should take if the load fails for the value obtained by using the third subfield of the PCMDSTRT keyword to dynamically load a module. The values supported for this parameter are DEF, EDR or IGN. If 'DEF' is specified, the default value from the second subfield of the PCMDSTRT keyword will be used. If 'EDR' is specified, the printer will be stopped with an error condition (EDRAINED). If 'IGN' is specified, the printer commands will be ignored; no printer commands will be sent before or after the SYSOUT dataset. The second subfield of the PCMDACTN keyword is used when the value obtained from the third subfield of PCMDSTRT is blank or null or if there is no module found with a name which matches the value specified in the SYSOUT keyword. For example, if the third subfield of the PCMDSTRT keyword is 'WRITER', and no writer name was specified, the PCMDACTN will indicate whether the default start commands should be sent, no commands should be sent or if the printer should be EDRAINED. Or, if the WRITER name was 'ABC', but no module named 'ABC' could be located, then VPS will continue based on the value of the second subfield of the PCMDACTN keyword.

PCMDOPTS

The PCMDOPTS keyword allows specifying special options to be used when processing the other printer command keywords. The first byte of the 4-byte PCMDOPTS keyword value indicates when VPS should perform HEX to CHARACTER translation for the printer commands. Some protocol converters require the values of the special printer commands to be in character format. For example, if you wanted to send the Hewlett-Packard PCL reset command, which is X'1B45', the protocol converter would require you to send the characters 1B45. VPS uses the option bits set by the PCMDOPTS keyword to determine if this translation should be done. For more information on the PCMDOPTS values to be specified, see "Installation" on page 3.1.

Printer Command Module Formats

When using the VPS printer command keywords listed above, there is a special format for the load modules which contain printer command sequences.

This type of printer command load module is referred to as ‘combined’ format module and contains a 32-byte header mapped by the VPSSPMOD macro. The first 2 bytes of the module must be X’FFFE’. The header contains special processing flags, the length and address of the start commands, as well as the length and address of the end commands. This type of module is referred to as a ‘combined’ module, since it allows matching start and end commands to be obtained from the same load module. Examples of this type of module are provided as members SSTD and FPS13266 in LRS.VPS.V1R80.ASM and LRS.VPS.V1R80.LOAD on the distribution cartridge.

When VPS loads a module dynamically, based on the value of the SYSOUT keyword specified as the third subfield of the PCMDSTRT keyword, VPS checks to see if the module loaded is a ‘combined’ module and if there are end commands specified within the module. If so, then VPS uses those end commands to be sent after the normal dataset, instead of sending the default commands from the second subfield of the PCMDEND keyword.

If a ‘combined’ module is specified for the first or second subfield of the PCMDSTRT keyword, it is recommended that the same module name be used for the first or second subfield of the PCMDEND keyword. In this way, the matching start and end commands from the same load module will be sent before and after the separator or SYSOUT dataset. For example, specifying PCMDSTRT=(SSTD,FPS13266) and PCMDEND=(SSTD,FPS13266) in the VPS printer definition member, would indicate to obtain the printer commands to be sent before and after the separator from the module SSTD and to obtain the printer commands to be sent before and after the SYSOUT dataset from the module FPS13266.

Sample Modules with PostScript Printer Command Sequences

The following table shows members shipped in LRS.VPS.V1R80.ASM and LRS.VPS.V1R80.LOAD which contain PostScript formatting commands.

Member	Page Size	Format	Orientation	PostScript Level
FPS1GRYB	132X66	1-UP	Landscape	Level 1
FPS13266	132X66	1-UP	Landscape	Level 1
FPS18560	85X60	1-UP	Portrait	Level 1
FPS18566	85X66	1-UP	Portrait	Level 1
FPS2GRYB	132X66	2-UP	Portrait	Level 1
FPS2UP60	132X60	2-UP	Portrait	Level 1
FPS2UP66	132X66	2-UP	Portrait	Level 1
FPS23260	132X60	2-UP	Landscape	Level 1
FPS23266	132X66	2-UP	Landscape	Level 1
FPS28560	85X60	2-UP	Landscape	Level 1
FPS28566	85X66	2-UP	Landscape	Level 1
FPS43260	132X60	4-UP	Landscape	Level 1
FPS43266	132X66	4-UP	Landscape	Level 1
FPS48560	85X60	4-UP	Landscape	Level 1
FPS48566	85X66	4-UP	Landscape	Level 1
L132002C	132X100	2-UP	Landscape	Level 1
PGRYBR2C	132X100	2-UP	Portrait	Level 1
P3200G1C	132X100	1-UP	Portrait	Level 1
P32001C	132X100	1-UP	Portrait	Level 1
P32351C	132X135	1-UP	Portrait	Level 1

Figure 6-1: Distribution members containing PostScript formatting commands

Additional PostScript command modules can be created and linked into the appropriate load library. Simply specify the new module names as the WRITER name (or the appropriate SYSOUT keyword, as specified in the third subfield of the PCMDSTRT keyword) when sending output to the JES spool. The new names can also be used as the default start or end command module by specifying the name as the first or second subfield of the PCMDSTRT or PCMDEND keyword.

Sample Modules with PCL Command Sequences

The following table shows members shipped in LRS.VPS.V1R80.ASM and LRS.VPS.V1R80.LOAD which contain PCL formatting commands.

Member	Page Size	Format	Orientation
DBOK	85X60	Duplex	Portrait
DLET	72X54	Duplex	Portrait
DSTD	132X66	Duplex	Landscape
D132X100	132X100	Duplex	Portrait
SBOK	85X60	Simplex	Portrait
SLET	72X54	Simplex	Portrait
SSTD	132X66	Simplex	Landscape
S132X100	132X100	Simplex	Portrait
ZZZRESET			Reset to printer defaults

Figure 6-2: Distribution members containing PCL formatting commands

Additional PCL command modules can be created and linked into the appropriate load library. Simply specify the new module names as the WRITER name (or the appropriate SYSOUT keyword, as specified in the third subfield of the PCMDSTRT keyword) when sending output to the JES spool. The new names can also be used as the default start or end command module by specifying the name as the first or second subfield of the PCMDSTRT or PCMDEND keyword.

Using VPS User Exit 14 to Insert Printer Commands

It is possible to use VPS User Exit 14 in the same way as with previous releases, without any of the printer command keywords described above. VPS User Exit 14 can move the printer command data into the line work area, and VPS will send the data as in previous releases. However, using the printer command keywords can eliminate the need for VPS User Exit 14 and simplify printer definition.

It is also possible to use both VPS User Exit 14 and the printer commands keywords listed above. VPS User Exit 14 can send printer commands and set return code 08 when the commands are complete to indicate that VPS should ignore the printer command keywords. VPS User Exit 14 can send commands and then set return code 04 when the commands are complete to indicate that VPS should also send the commands as specified in the printer command keywords listed above, if the keywords were specified. VPS User Exit 14 can modify the name of the module to be used in the VPSSPCMD control block, which would cause VPS to load and use a different module than that specified by the printer command keywords above. In that case, VPS User Exit 14 would make any modifications to the VPSSPCMD control bock and then return to VPS with return code 04.

The sample version of VPS User Exit 14 supplied as member VPSSUE14 in file LRS.VPS.V1R80.ASM, along with the appropriate printer command keywords, will perform the same functions as performed by the sample VPS User Exit 14 members supplied with previous versions of VPS. To obtain similar results, the following keywords should be placed in the VPS printer members:

For both VTAM and TCP/IP printers with SEPINFO=HPL, setting PCMDSTRT=(SSTD,SSTD,&WRITER) and PCMDEND=(SSTD,SSTD) would cause the WRITER name to be used to load a dynamic module, if the WRITER name was specified. The start commands from the module SSTD would be sent before the SEPARATOR, and the end commands, which are the PCL reset commands, would be sent from the same module. The second subfield of PCMDACTN should be set to 'DEF' to send the default commands when the WRITER name is an invalid module name. Then, the default start and end commands for the normal dataset would be sent if the WRITER name is invalid.

For both VTAM and TCP/IP printers with SEPINFO=PS, setting PCMDSTRT=(FPS13266,FPS13266,&WRITER) and PCMDEND=(FPS13266,FPS13266) would cause the WRITER name to be used to load a dynamic module, if the WRITER name was specified. The start commands from the module FPS13266 would be sent before the SEPARATOR and the SYSOUT dataset by default, and the end commands, %%EOF, would be sent from the same module. The second subfield of PCMDACTN should be set to 'DEF' to send the default commands when the WRITER name is an invalid module name. Then, the default start and end commands for the normal dataset, the start and end commands from FPS13266, would be sent if the WRITER name is invalid.

For VTAM printers with either SEPINFO=HPL or SEPINFO=PS, the first subfield of the PCMDACTN should be set to TRN. Also, the TRNCLASS printer keyword should be set to the specify the transparency sequences to be added. The default TRNCLASS=(,C,35) obtains the same result as that performed by the sample VPS User Exit 14 with previous versions of VPS. If your printer had specified SEPINFO=HPLX36 or SEPINFO=PSX36, then you should set TRNCLASS=(,C,36) in the printer definition.

For TCP/IP printers with either SEPINFO=HPL or SEPINFO=PS, the first subfield of the PCMDACTN keyword should be set or allowed to default to NOTRN.

The sample version of VPS User Exit 14 supplied with VPS expects the printer to use the PCMDEND and PCMDSTRT keywords as above to indicate which commands should be sent to the printer. The processing for printers which have SEPINFO=FAX in the printer definition is the same as for previous versions of VPS. For printers with SEPINFO=PS, which indicates the printer understands PostScript commands, the exit sets a return code to bypass the PCMDEND and PCMDSTRT processing for a special WRITER name of 'ZZZZZZZZ'. For printers with SEPINFO=HPL, which indicates the printer understands Hewlett-Packard's PCL, the exit sets a return code to bypass the PCMDEND and PCMDSTRT processing for a special WRITER name of 'ZZZZZZZZ'. The exit also modifies the name of the module which contains the printer commands to 'DSTD' if the SYSOUT class is 'D' and there is no WRITER name specified.

If none of the functions described in the above paragraph are required, the SEPINFO fields can be removed from the printer definitions and/or VPS User Exit 14 can be disabled.

To use exit 14, the exit must be assembled and linked into a LINKLIST library or a library named in the STEPLIB DD in the VPS JCL. Sample JCL is supplied as member EXITASML in file LRS.VPS.V1R80.CNTL. The exit must be enabled to VPS, either by the EXIT14 keyword in the VPS Initialization member or by a command after VPS is initialized.

Certain keyword values are recommended for PCL printers using VPS User Exit 14:

AUTOEJCT= Should be set to (N,N,N,N). Specifying Y for any of the positional parameter values can result in blank pages between datasets or jobs.

AUTONL= Should be set to N (default value).

COMPRESS= Should be set to N.

CPI= Should be set to zero (default value).

CRCHAR= Should be set to 0D (default value).

FCB= Specify as Y only if the output contains carriage control that causes skips to channels other than 1.

FORMFEED= Should be set to Y (default value).

MAXLPG= Should be set to zero (default value).

MPP= Should be set to zero (default value).

NCCSPACE= Should be set to 1 (default value), 2 or 3. Do not specify zero.

SEPINFO= Must contain the characters "HPL" in the first three positions. The sample VPS User Exit 14 does special processing for several types of printers. The SEPINFO= data indicates to the exit that this printer is one of those that requires the special processing for PCL printers.

SVFACTN= Should be set to (N,N,N), so VPS will not send the Set Line Density (SLD) or Set Vertical Format (SVF) commands to the printer.

TRUNCATE= Should be set to zero (default value).

Locating Printer Start and End Commands

The following table indicates how the commands are located to send to the printer. The order of the items indicates which has the highest priority. For example, any module name supplied by VPS User Exit 14 overrides any values specified by the printer command keywords. The names of the fields used in the VPSSPCMD control block are shown, in case they are to be modified by VPS User Exit 14.

$PCMSDYN or $PCMEDYN indicates a dynamic module was loaded using the SYSOUT keyword value in the third subfield of the PCMDSTRT keyword or that VPS should load a new module named by VPS User Exit 14. $PCMSSTR indicates that the start commands are in a string field, and $PCMESTR indicates that the end commands are in a string field. This would be specified by '%STRING' in the first or second subfields of the PCMDEND or PCMDSTRT keyword. VPS User Exit 14 can change the normal processing by setting different flags or modifying the value of the VPSSPCMD module name or command string fields to be used to send the printer commands. For example, VPS User Exit 14 could turn off the $PCMSDYN or $PCMSMOD flag and set the $PCMSSTR flag to indicate that VPS should send a string of data for the start commands, instead of the commands in the module indicated. VPS would then use the length and value of the start string as specified in the PCMDSSTL and PCMDSSTV fields.

The VPSSPCMD control block is initialized for each start request and includes the start and end commands that will be sent for that separator or for that SYSOUT dataset.

Type	VPSSPCMD Flag	VPSSPCMD Field	Processing Notes	VPS Error Action
SEP START	$PCMSDYN	PCMDSYNM	Can only be set by exit 14.	If module not found, printer is EDRAINed.
SEP START	$PCMSSTR	PCMDSSTV	PCMDSTRT=(%STRING)	If string is null, no commands are sent
SEP START	$PCMSMOD	PCMDSMNM	If modified by exit 14 Default module load at activation	If module not found, printer is EDRAINed. Printer activation fails if not found
SEP END	$PCMEDYN	PCMDEYNM	Can only be set by exit 14	If module not found, printer is EDRAINed.
SEP END	$PCMESTR	PCMDESTV	If PCMDEND=(%STRING)	If string is null, no commands are sent
SEP END	$PCMEMOD	PCMDEMNM	If modified by exit 14 Default module load at activation	If module not found, printer is EDRAINed. Printer activation fails if not found
DSN START	$PCMSDYN	PCMDSYNM	If modified by exit 14 Using PCMDSTRT 3rd subfield	If module not found printer is EDRAINed. If module not found, PCMDACTN used
DSN START	$PCMSSTR	PCMDSSTV	PCMDSTRT=(,%STRING)	If string is null, no commands are sent
DSN START	$PCMSMOD	PCMDSMNM	If modified by exit 14 Default module load at activation	If module not found, printer is EDRAINed Printer activation fails if not found

Type	VPSSPCMD Flag	VPSSPCMD Field	Processing Notes	VPS Error Action
DSN END	$PCMEDYN	PCMDEYNM	If modified by exit 14 From 'combined' start module	If module not found, printer is EDRAINed. If not available, default module/string used.
DSN END	$PCMESTR	PCMDESTV	If PCMDEND=(,%STRING)	If string is null, no commands are sent.
DSN END	$PCMEMOD	PCMDEMNM	If modified by exit 14 Default module load at activation	If module not found, printer is EDRAINed. Printer activation fails if not found

External Security

The VPS external security interface allows system security rules to be written to control access to VPS printers. The interface uses the security token assigned to the SYSOUT dataset to determine the access rights, with respect to the VPS printer, of the user that created the SYSOUT dataset.

To use the external security interface, your system security package must allow access through the MVS System Authorization Facility (SAF), which uses the MVS RACROUTE macro.

The SAF class name is set using the SAFCLASS keyword of the system initialization member. The SAF resource name used to determine the access rights is of the following form:

VPS.stcname.prtname

where:

stcname is the VPS started task name

prtname is the VPS printer name

The VPS external security interface requires that the system security package provide the equivalent function of RACF Release 1.9 or above. In addition, JES2/JES3 must be at release 3.1.3 or above. If the PSO interface to JES is being used by VPS (rather than the SAPI interface to JES), VPS User Exit 15 must be enabled.

The following three sections describe procedures for defining resources and allowing user access for three security packages: RACF, CA-ACF2[1], and CA-TOP SECRET[2]. In the examples, we assume the following:

$VPS is the name of the resource class for VPS rules. This name is specified by the SAFCLASS keyword, but defaults to $VPS if unspecified.

VPSSTC is the name of the VPS started task.

LASER is the VPS name of a specific printer.

1. CA-ACF2 is a registered trademark of Computer Associates, Garden City NY.
2. CA-TOP SECRET is a registered trademark of Computer Associates, Garden City NY.

System Security Requirements - RACF

The resource class for VPS must be added to the SAF general resource table (ICHRRCDE) in SYS1.LINKLIB or any other authorized linklist library. An IPL must be done to pick up this change.

A sample entry to create module ICHRRCDE follows:

```
----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----
VPS      ICHERCDE CLASS=$VPS,       CLASS NAME FOR VPS/VMCF RULES      X
               ID=nnn,              NUMBER 1 - 255 TO IDENTIFY.        X
               MAXLNTH=39,          SET MAXIMUM ENTITY LENGTH TO 39    X
               FIRST=ALPHANUM,      FIRST CHAR CAN BE ALPHA/NUM        X
               OTHER=ANY,           OTHER CHARS CAN BE ANY             X
               POSIT=nn,            INDICATES OPTION FLAGS (SEE NOTE)  X
               OPER=N               IGNORE OPERATIONS ATTRIBUTE
```

Note: If you intend to create generic rules for access to VPS printers, be sure your POSIT number specified is unique or is used by other classes which allow generic profile access checking. See the RACF MACROS AND INTERFACES manual for more information on the ICHERCDE macro.

In addition, an entry must be made for the VPS class to allow using the SAF RACROUTE macro to communicate with the installation system security package. For example:

```
----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+---
ICHRFR01 CSECT
VPS      ICHRFRTB CLASS=$VPS,      CLASS NAME FOR VPS RULES (SEE NOTE) X
               ACTION=RACF         SEND REQUESTS TO RACF
ENDTAB   ICHRFRTB  TYPE=END        END OF TABLE.
               END
```

Note: The class name must be 4 to 8 characters in length and must consist of the following: A through Z, 0 through 9, # (X'7B'), @ (X'7C'), or $ (X'5B'). The first character must be A through Z, # (X'7B'), @ (X'7C'), or $ (X'5B'). Installations must include a # (X'7B'), @ (X'7C'), $ (X'5B'), or numeric character in the name of any class they define in order to guarantee that installation-defined classes do not conflict with IBM-defined classes.

In order to activate the general resource class, the following command would be issued for RACF:

```
SETROPTS CLASSACT($VPS)
```

To allow generic profile checking, use the GENERIC keyword on the SETROPTS command in RACF:

```
SETROPTS GENERIC($VPS)
```

For extended generic support, EGN can be specified on the SETROPTS command.

Entity names must be defined for each resource to be used for VPS access checking.

For RACF, the RDEFINE command is used to define each resource. In the following example of the RDEFINE command, the universal access for this resource is set to NONE; rules must be written to allow access for each user or group to the printer with the VPS name LASER through the VPS started task VPSSTC.

```
RDEFINE $VPS VPS.VPSSTC.LASER UACC(NONE)
```

If universal access is set to NONE for a particular VPS resource, then individual rules must be written to permit users to have READ access. If you are using RACF, the PERMIT command is used to allow user access to a resource. The following command would allow the user named LRS000 to direct output to the printer LASER through the VPS started task VPSSTC.

```
PERMIT VPS.VPSSTC.LASER CLASS($VPS) ID(LRS000) ACCESS(READ)
```

If you need to permit all RACF users within a group to access a VPS resource, the RACF group name can be specified on the PERMIT command. The following example shows allowing all users in group GRP000 to direct output to the printer LASER through the VPS started task VPSSTC.

```
PERMIT VPS.VPSSTC.LASER CLASS($VPS) ID(GRP000) ACCESS(READ)
```

To delete a resource defined in the class $VPS, issue the following RACF command:

```
RDELETE $VPS VPS.VPSSTC.LASER
```

If you would like to list all the resources defined with the general resource class named $VPS, the following RACF command can be issued:

```
SEARCH CLASS($VPS) MASK(*)
```

To list all users who can access a specific resource, issue the following RACF command:

```
RLIST $VPS VPS.VPSSTC.LASER AUTHUSER
```

System Security Requirements - CA-ACF2

A SAF Interface is provided with the CA-ACF2 product. To activate the interface, specify the SAF field on the GSO OPTS record. NOSAF is the default and indicates that the interface is not active. Set the field to SAF and perform a GSO REFRESH on the system console to activate the CA-ACF2 SAF interface.

To allow VPS to specify the CLASS name on the RACROUTE calls, the CLASS name of $VPS should be mapped to a TYPE in CA-ACF2. This is done by using a SAFMAPS record. In addition, SAFPROT records should be created to allow VPS to check authorization.

The SAFMAPS record allows all RACROUTE requests specifying CLASS($VPS) to be processed by CA-ACF2 as TYPE(ttt). Any 1-3 character name can be specified. In the example below, "VPS" is mapped to $VPS.

```
ACF
SET CONTROL(GSO)
SAFMAPS VPS/$VPS
```

With Release 6 of CA-ACF2, the SAFMAPS records have been replaced by CLASMAP records. The following CLASMAP record should be inserted:

```
CLASMAP.VPS RSRCTYPE(VPS) RESOURCE($VPS)
```

The SAFPROT record allows the VPS programs to issue RACROUTE calls which will be handled by CA-ACF2. Multiple SAFPROT records would be created: one type for the authorization calls which specify the CLASS $VPS and another for the VERIFY calls to check password and/or userid. These SAFPROT records could be combined by specifying multiple class names and by using standard CA-ACF2 masking techniques for the SUBSYS and CNTLPTS parameters.

A SAFPROT record can be qualified by appending a 1 to 8 character name (including the period, if used) to make the record unique. The record includes the name of the program which is in control when the RACROUTE call is made. This name is placed in the CNTLPTS and SUBSYS parameters. For more information on how this program name is determined, see the CA-ACF2 MVS SYSTEMS PROGRAMMERS GUIDE.

The following SAFPROT record would allow RACROUTE calls to check VPS user authorization. ".VPS1" is an example of a name that might be associated with the SAFPROT record to make it unique. The CNTLPTS and SUBSYS program names will be VP80SCHD.

```
ACF
SET CONTROL(GSO)
SAFPROT.VPS1 CLASSES($VPS) CNTLPTS(VP80SCHD) SUBSYS(VP80SCHD)
SAFPROT.VPS1 CLASSES($VPS) CNTLPTS(VP80SCH2) SUBSYS(VP80SCH2)
```

With Release 6 of CA-ACF2, the SAFPROT records have been replaced by SAFDEF records. The following SAFDEF records may be inserted to run VPS. The suffix on the CLASMAP and SAFDEF keywords may specify any unique qualifier, and the ID keyword provides up to 8 characters to identify the record. Masking techniques can be used for the PROGRAM and RB names, if desired. For some CA-ACF2 environments, SAFDEF statements may not be required.

```
SAFDEF.VPST1 ID(VPST1) MODE(GLOBAL) RB(VP80SCHD) PROGRAM(VP80SCHD)
RACROUTE(REQUEST=AUTH,CLASS=$VPS)
SAFDEF.VPST1 ID(VPST1) MODE(GLOBAL) RB(VP80SCH2) PROGRAM(VP80SCH2)
RACROUTE(REQUEST=AUTH,CLASS=$VPS)
```

To define VPS resources and allow users access, resource rule records should be created. The following example shows giving authority to direct output to the printer LASER through VPS started task VPSSTC to all users whose UID strings begin with “SYSPG” and to all users whose UID strings begin with “OPER”:

```
ACF
SET RESOURCE(VPS)
$KEY(VPS.VPSSTC.LASER) TYPE(VPS)
UID(SYSPG) ALLOW
UID(OPER) ALLOW
```

You can specify LIST or DECOMP commands to list all rules within a resource type. If you mapped the CLASS of $VPS to a resource type of VPS in a SAFMAPS record, the following would list all VPS resource rules for names which begin with “VPS” and are 40 characters or less.

```
ACF
SET RESOURCE(VPS)
LIST LIKE('VPS**************************************')
```

CA-ACF2 provides a utility named ACFBDCMP to list rules in a rule set. See the CA-ACF2 ADMINISTRATOR GUIDE for more information about listing CA-ACF2 resource rules.

System Security Requirements - CA-TOP SECRET

An interface is provided with the CA-TOP SECRET product to handle calls made through the MVS SAF interface, which uses the RACROUTE macro. In order to accept RACROUTE macro calls which specify a CLASS of $VPS, the class should be defined to CA-TOP SECRET in the Resource Descriptor Table. The following command will add the $VPS class to the RDT:

```
TSS ADDTO(RDT) RESCLASS($VPS) RESCODE(xx) ATTR(DEFPROT,LONG,GENERIC)
```

RESCLASS specifies the CLASS name to be used on RACROUTE calls.

RESCODE specifies a two-digit hexadecimal code which is used internally by CA-TOP SECRET to identify the resources of this class. Choose a unique number between 01 and 3F for the $VPS class.

ATTR specifies the attributes for resources in this class. DEFPROT protects this resource class by default; LONG allows resource names up to 44 characters in length; GENERIC supports generic prefixing for this resource class. Depending on your release of CA-TOP SECRET, some ATTR values may not be supported.

Other parameters can be specified when adding the $VPS class; see CA-TOP SECRET MVS TSS COMMAND FUNCTIONS GUIDE for more information.

When the resource class is defined to CA-TOP SECRET, you may need to associate an owner with the class. To add an owner for the $VPS class, where CMISDEPT is the owner ID, issue the following command:

```
TSS ADDTO(CMISDEPT) $VPS(VPS)
```

For VPS, PERMIT commands must be issued to establish user authorization. For example, to allow a user to direct output to the printer LASER through the VPS started task VPSSTC, the following would be issued:

```
TSS PERMIT(LRS000) $VPS(VPS.VPSSTC.LASER) ACCESS(READ)
```

The CA-TOP SECRET command WHOHAS allows listing user access to a resource or a set of resources. To list resources in CLASS of $VPS which begin with “VPS.”, the following could be issued:

```
TSS WHOHAS $VPS(VPS.)
```

Note: The $VPS class is also used (by default) for VMCF access. More rules may need to be added to same class if already defined for VMCF.

Automatic Restart Management

VPS Version 1 R8.0 uses the Automatic Restart Manager (ARM) component of MVS/ESA 5.2 to increase the availability of your systems. Automatic Restart Management is an MVS recovery function that can improve the availability of specific batch jobs or started tasks. When a job or task fails, or the system on which it is running fails, ARM can restart the job or task without operator intervention.

MVS automatic restart management is a Sysplex-wide integrated automatic restart mechanism that:

- Restarts MVS subsystems in place if they ABEND.
- Restarts all the elements of a workload (for example, VPS, the VPS server, VMCF/VTAM, and so on) on another MVS image after an MVS failure.
- Restarts a failed MVS image

MVS automatic restart management is available only to those MVS subsystems that register with the automatic restart manager (ARM). VPS registers with ARM automatically as part of VPS system initialization. If a VPS fails before it has registered with ARM, it will not be restarted. After a VPS has registered, it is restarted by the ARM according to a predefined policy for the workload.

When VPS registers with ARM, VPS provides the value 'LRSVPS' as the element type, and an element name which is made up of two parts - the VPS started task or jobname and the MVS system name. If two VPS regions attempt to register with the same element name, the second attempt is rejected by ARM.

During initialization, VPS issues an ARM WAITPRED (wait predecessor) request to wait, if necessary, for predecessor subsystems (such as VTAM and TCP/IP) to become available.

During normal termination VPS de-registers from ARM to ensure that is it not automatically restarted. Some error situations that occur during VPS initialization cause VPS to terminate with a user ABEND code U0005. Prior to issuing the user ABEND request, VPS will de-register from ARM because if VPS remained registered, an automatic restart would probably encounter the same error condition.

For hardware and software requirements to participate in automatic restart management, as well as information on defining the ARM policy data, refer to the IBM publication titled MVS/ESA Setting Up a Sysplex.

Defining an LCDS Printer to VPS V1 R8.0

Introduction

VPS V1R8.0 contains support for printers which process data in a format known as 'LCDS' format. The data is received in EBCDIC from the MVS system, along with the carriage control byte. The LCDS defined printer does any translation and carriage control processing required. It also processes the FCB (forms control buffer) to handle any vertical formatting required due to channel skips in the carriage control byte.

The LCDS defined printers will be connected to VPS using TCP/IP connections or through AnyQueue. In order to activate an LCDS printer, a valid, non-expired product key will be required for VPS/LCDS. Other product keys may also be required based on COMMTYPE and CONVTYPE printer keywords.

Processing Data for LCDS Defined Printers

VPS obtains the print data from the JES spool and processes each print line. If the data is AFP and conversion to PCL is requested, then the conversion will take place and the PCL data will be sent. In this case, the LCDS printer must be defined to use LPR/LPD protocols and the PCL data is sent to the printer without setting a special "C" control record with "lcds" in the record. The LCDS defined printer will handle the data as normal ASCII PCL data.

If no AFP to PCL conversion is necessary, VPS changes ASA carriage control to machine carriage control or adds machine carriage control if there is none in the data. VPS will bypass trailing blank truncation for LCDS datasets. Any translation requested by the PRTXLATE printer keyword will be done. The data should NOT be translated to ASCII. PRTXLATE=N will be recommended for LCDS printer definitions.

If any FCB is specified for the LCDS dataset which is a different FCB than that used for the previous dataset, the FCB will be sent to the LCDS defined printer with the 'load forms control buffer' command (X'63') immediately preceding the data. The length of the FCB plus the one-byte command will be sent immediately before the command.

Each line of the dataset will be sent to the printer, with the machine carriage control byte. The lines will have a two-byte length field sent immediately before the carriage control byte. This length field will contain the length of the print data and the carriage control byte.

Separator routines and user exits will be called for LCDS defined printers in the same way as they would be called for other devices. The separator print lines will be sent to the device in the same manner as other normal print lines. That is, the separator lines will contain machine carriage control bytes and will be prefixed with a two-byte length field. In addition, if the FCB for the separator is different than that used for the dataset, the FCB will be sent to the LCDS printer immediately before the separator lines. Then, the FCB for the dataset would be sent before the print lines.

Installation Requirements for LCDS Defined Printers

In order to define LCDS printers to VPS, the control library should be updated.

The VPS system initialization member (VPSSTART) in the VPS control library must contain a valid, non-expired product key for VPS/LCDS. In addition, there must be a valid product key for AnyQueue and/or VPS/TCPIP based on the connection type(s) used. If any PCL conversion is to be done for LCDS printers using LPR/LPD protocols, then a valid, non-expired key must be present for the VPS/PCL product. The values for these product keys are provided by LRS. The keywords are:

KEYANYQ	Required for COMMTYPE=(,ANYQUEUE)
KEYLCDS	Required for COMMTYPE=(,,LCDS) or (,,RECORD)
KEYPCL	Required for CONVTYPE=PCL
KEYTCP	Required for COMMTYPE=(TCPIP)

Each LCDS printer should be defined to VPS using a printer definition member in the VPS control library. The members must have the LCDS value in positional parameter 3 of the COMMTYPE keyword. One of the following must be specified:

```
COMMTYPE=(TCPIP,LPD,LCDS)
COMMTYPE=(TCPIP,SOK,LCDS)
COMMTYPE=(TCPIP,ANYQUEUE,LCDS)
COMMTYPE=(APPC,ANYQUEUE,LCDS)
```

Unless the printer is being accessed through AnyQueue using APPC, then a TCP/IP connection will be defined. The TCPHOST and TCPRPORT values should be specified to connect to the printer or to AnyQueue. The TCPHOST keyword should indicate the name or IP address:

TCPHOST=tcpip.host.name	Host name of AnyQueue or printer.
TCPHOST=nnn.nnn.nnn.nnn	IP address of AnyQueue or printer.

The TCPRPORT specifies the remote port address for AnyQueue or for the printer. If positional parameter 2 of the COMMTYPE is LPD, then TCPRPORT should be specified as 515. If positional parameter 2 of the COMMTYPE is SOK, then TCPRPORT should be set to the printer's port for a direct TCP/IP connection, which is often 9100. For AnyQueue connections, the TCPRPORT is set to the port specified in the AnyQueue configuration.

For connections using LPR/LPD protocols, the conversion from AFP to PCL is supported if the following keyword is specified:

```
CONVTYPE=PCL
```

Translation from EBCDIC to ASCII should NOT be requested. However, if there are certain EBCDIC values that need to be translated to other EBCDIC values or blanks, then a translation table could be specified. One of the following could be specified or allowed to default:

PRTXLATE=N	(no translation)
PRTXLATE=(Y,VPSSXLTE)	(non-printable values translated to blanks – VPS default)

If FCB processing is required for the LCDS defined printer, then the FCB keyword should be specified or allowed to default:

FCB=(Y,6,E) (FCB processing supported – VPS default)

At least one selection criteria keyword must be used to indicate which print files should be obtained from JES.

CLASS=

DEST=

FORM=

WRITER=

Special Considerations for using VPS with LCDS defined printers

Since the LCDS defined printers require data in a special format, some of the following should be considered when defining and using these devices.

Separator Routines

For LCDS printers defined as LPD devices, only DATASET separators are allowed. Those defined with direct TCP/IP connections (SOK), may have JOB, OUTGRP or DATASET separators.

When sending normal data to the LCDS defined printer, the data and all separator lines should be sent in EBCDIC, not ASCII. The sample VPS separators provided by LRS bypass EBCDIC to ASCII translation for the LCDS printers, even though they are TCP/IP devices.

When AFP to PCL conversion is done for a LCDS printer defined as a TCP/IP LPD device, the separator should be in a format that can be printed as a PCL file. In other words, the separator should NOT be EBCDIC data. Therefore, separators are NOT recommended for devices which may have both EBCDIC LCDS data and AFP-to-PCL conversion data sent to them.

VPS User Exit Routines

If VPS User Exit 01 (line exit) is used to modify or add lines to the existing dataset or if VPS User Exit 14 (add lines exit) is used to send data before or after the print file is sent to the printer, then the exit routine should send the data in the same format as the dataset to be delivered. That is, if the current dataset is an EBCDIC LCDS file, then the lines added should be in EBCDIC and should have carriage control. If the file to be sent is an AFP-to-PCL converted file, then the data should be in ASCII/PCL format.

Records sent from VPS User Exit 14 should have machine carriage control and also be prefixed with a 2-byte length field.

VPS will add the length prefix for lines added or modified by VPS User Exit 01 if the dataset is EBCDIC LCDS data. VPS will also process the line to send machine carriage control, unless a flag is set in the exit to indicate that the carriage control should not be processed.

If VPS User Exit 25 (TCP/IP control file exit) is used to modify the TCP/IP LPD control file records before they are sent to the LCDS defined printer, care should be taken to not remove or modify the “C” control record which contains “lcds” if the file is a normal EBCDIC LCDS print file. If the LPD control file does not contain “lcds” in the “C” control file record, then the dataset will not print correctly.

Possible Error Conditions using LCDS defined printers

A printer with LCDS in the third positional parameter of the COMMTYPE keyword should specify APPC or TCP/IP in the first positional parameter if the second positional parameter is ANYQUEUE. If the second positional parameter is LPD or SOK, the first positional parameter must be TCPIP. For example, any of the following will cause an error during printer activation:

COMMTYPE=(VTAM,,LCDS) (VTAM connections are not supported)

COMMTYPE=(,VPSPC,LCDS) (VPS/PC does not support LCDS)

Any of the following should be valid:

COMMTYPE=(TCPIP,LPD,LCDS)

COMMTYPE=(,LPD,LCDS) (LPD implies TCPIP)

COMMTYPE=(TCPIP,SOK,LCDS)

COMMTYPE=(APPC,ANYQUEUE,LCDS)

COMMTYPE=(TCPIP,ANYQUEUE,LCDS)

A printer with LCDS in the third positional parameter of the COMMTYPE keyword must have a valid KEYLCDS keyword in the VPS system initialization member. Otherwise, an error will be reported at printer activation.

A printer with LCDS in the third positional parameter and SOK or ANYQUEUE in the second positional parameter and which also has CONVTYPE=PCL will not be activated. Conversion of files to PCL will only be supported for LCDS printers which use LPD connections.

Sending Print Files to a Server in AFP Record Format

Introduction

VPS supports sending print files to servers that convert the files from Advanced Function Presentation (AFP) format to another printing language. A SYSOUT file is obtained from JES and passed to the print server in 'record' format. This format includes a 2-byte length field in addition to the print data that was stored on the JES spool. Special control records are passed with information from the JCL that was used to create the dataset on the JES spool.

How VPS Processes Print Files in AFP Record Format

VPS does not modify or translate the print records obtained from the JES spool. A 2-byte length field is prefixed to each print record. Carriage control will be delivered as it was stored on the JES spool, if the dataset has any carriage control. There are no terminating characters added at the end of each print record.

No AFP conversion will be done for these print files. If the CONVTYPE= keyword is specified, printer activation will fail.

If the customer desires to add records to the beginning or end of the print file with a separator routine, with PCMDSTRT or PCMDEND modules or strings or with VPS User Exit 14, the data added must have the same type of carriage control as the original file. If the original file has no carriage control, the lines added should also have no carriage control. If 2-byte length fields are added within the PCMDSTRT or PCMDEND modules or strings or by VPS User Exit 14, PCMDOPTS=0080 should be specified to indicate that VPS should bypass adding the 2-byte length field.

The connection to the server must be defined as an LPR/LPD connection. The control file is built with special records that begin with "-O" and contain information about the file from the JES spool. See the following table for information about those records.

OPASSTHRU=	CLASS=x,DESTINATION=xxx,FORMS=xxx, SEGMENTID=xxx
CLASS=	SYSOUT CLASS (SUBSET OF OPASSTHRU=)
DESTINATION=	SYSOUT DESTINATION (SUBSET OF OPASSTHRU=)
FORMS=	SYSOUT FORM NAME (SUBSET OF OPASSTHRU=)
SEGMENTID=	SEGMENTID (SUBSET OF OPASSTHRU=)
OADDRESS1=	1st ADDRESS field
OADDRESS2=	2nd ADDRESS field
OADDRESS3=	3rd ADDRESS field
OADDRESS4=	4th ADDRESS field
OBUILDING=	BUILDING
OCC=	‘YES’ or ‘NO’
OCCTYPE=	‘a’ for ASA, ‘m’ for Machine (only if OCC=YES)
OCHARS=	1 to 4 CHARS values
OCOPIES=	COPIES
ODATATYPE=	“l” (line) or “a” (AFPDS with X’5A’ records)
ODATACK=	DATACK
ODEPARTMENT=	DEPT
ODUPLEX=	DUPLEX
OFORMDEF=	DUMMY OR F1xxxxxx, where xxxxxx is FORMDEF
OFILEFORMAT=	RECORD
OINTRAY=	INTRAY
OJOBNAME=	JOBNAME
ONAME=	NAME
ONODEID=	NODE
OOFFSETXB=	OFFSETXB VALUE
OOFFSETXF=	OFFSETXF VALUE
OOFFSETYB=	OFFSETYB VALUE
OOFFSETYF=	OFFSETYF VALUE
OOUTBIN=	OUTBIN
OPAGEDEF=	P1xxxxxx, where xxxxxx is PAGEDEF
OPROGRAMMER=	PROGRAMMER NAME
OPRMODE=	‘SOS1’, ‘SOS2’ or ‘SOS3’
OROOM=	ROOM
OTITLE=	TITLE
OTRC=	‘YES’ or ‘NO’
OUSERID=	USERID

Installation Requirements for AFP Record Format Processing

In order to define servers which process print files in AFP record format, the VPS control library must be updated.

The VPS system initialization member (VPSSTART) in the VPS control library must contain a valid, non-expired product key for VPS/TCPIP and for VPS/LCDS. The values for these product keys are provided by LRS. The keywords are:

KEYTCP=
KEYLCDS=

A VPS printer definition member must be created in the VPS control library for each server. The members must specify the following:

COMMTYPE=(TCPIP,LPD,RECORD)

Because all servers which support the AFP record format must be defined as TCP/IP LPR/LPD connections, the TCPHOST and TCPRPORT values should be specified to connect to the printer . The TCPRPORT should be 515. The TCPHOST keyword should indicate the name or IP address of the server:

TCPHOST=tcpip.host.name	Host name of the print server
TCPHOST=nnn.nnn.nnn.nnn	IP address of the print server

There will be no translation of the print records, regardless of the specification of the PRTXLATE keyword.

Special Considerations for Using VPS with AFP Record Format

Since VPS performs special processing for print files when sending them to servers in AFP record format, some of the following should be considered when defining and using these servers.

Separator Routines

Separator routines can be specified at the beginning and/or end of each SYSOUT file or of each copy of the SYSOUT file. JOB and OUTGRP separators are not supported for LPD connections. If the customer desires to add a separator at the beginning or end of the print file or each copy of the print file, the data added must have the same type of carriage control as the original SYSOUT file. If the original file has no carriage control, the lines added should also have no carriage control. The data should be sent in EBCDIC, not translated to ASCII. If the separator records are different from those in the original file, the conversion of the print file at the remote server may produce unexpected results.

VPS User Exit Routines

If VPS User Exit 01 (line exit) is used to modify or add lines to the existing dataset, then the exit routine should ensure the lines are in the same format as the original print file. If VPS User Exit 22 (staging exit) is used to modify the SYSOUT file and the return code is set to indicate the VPS should deliver the print file, then the exit routine should ensure that the lines are in the same format as the original print file. For example, if the current file is EBCDIC, any print lines added should also be EBCDIC. The new or modified lines should have the same type of carriage control as the SYSOUT file.

If the customer desires to add records to the beginning or end of the print file with modules or strings of printer commands using the PCMDSTRT or PCMDEND keywords or by using VPS User Exit 14, the print records added must have the same type of carriage control as the original file. If the original file has no carriage control, the lines added should also have no carriage control. If the required 2-byte length fields are added within the PCMDSTRT or PCMDEND modules or strings or by VPS User Exit 14, PCMDOPTS=0080 should be specified to indicate that VPS should bypass adding the 2-byte length field.

Sending Notifications to Email or TSO Users

VPS can notify a TSO user or an email user when a file has been printed, requeued, or canceled or when the printer is EDRAINED.

The following keywords determine when and how VPS should notify users:

Keyword	Member	Notes
KEYEMAIL	System Initialization	Required for email notification.
KEYTCP	System Initialization	Required for email notification.
MAILHOST	System Initialization	Required for email notification.
MAILKWDS	Printer Definition	Used for email notification.
NOTIFY	Printer Definition	Indicates when to notify a user.
NOTMAIL	Printer Definition	Email address of user to notify.
NOTTSO	Printer Definition	TSO ID of user to notify.

Using the NOTIFY Printer Keyword

At least one of the four subfields of the NOTIFY keyword must be specified as 'Y', or VPS will not issue any notification messages for the printer.

If no NOTMAIL and NOTTSO keyword values were specified in the printer member and no NOTIFY values are found in the JCL associated with the current SYSOUT dataset, VPS will not issue any notification messages.

When a print file is delivered successfully and the first subfield of the NOTIFY keyword indicates that notification is required, the VPS217I message is formatted with the printer name, job name, job id and the status of the print request.

When a print file is requeued and the second subfield of the NOTIFY keyword indicates that notification is required, the VPS217I message is formatted with the printer name, job name, job id and the status of the print request. A reason for the requeue is added to the message.

When a print file is canceled and the third subfield of the NOTIFY keyword indicates that notification is required, the VPS217I message is formatted with the printer name, job name, job id and the status of the print request.

When a printer is EDRAINED and the fourth subfield of the NOTIFY keyword indicates that notification is required, the VPS216I message is formatted with the printer name, job name, job id and the error message text.

Notifying TSO Users

The VPS217I or VPS216I message is sent to any TSO user id specified in the NOTTSO keyword.

Also, VPS will search for up to four TSO user ids specified on the NOTIFY OUTPUT JCL statement keyword and send the VPS217I message to each. VPS will log the VPS217I messages to the VPS log, along with the TSO ID of the user(s) notified.

The TSO ID value may include a node name in addition to the user id.

A subsystem request is used to send the notify message.

Notifying Users by Email

Email notification requires VPS/TCPIP and VPS/Email. Also, the MAILHOST system keyword must be specified to indicate the name or IP address of the host which should be used for connection. This host should have a mail server capable of forwarding the mail message to the user.

The VPS217I or VPS216I message is delivered by VPS to any email users specified. One user may be specified as the value of the NOTMAIL printer keyword.

Additional users may be specified on the OUTPUT JCL statement. VPS will search all the OUTPUT JCL keyword values as requested by the MAILKWDS printer keyword. The default MAILKWDS value indicates to search all 16 USERDATA keywords. If VPS finds "NOTIFY:" followed by an email address as the value of the OUTPUT JCL statement keyword, VPS will attempt to deliver the notification message to that user.

VPS will queue the email notification requests to a special TCP/IP request task. The requests will be processed asynchronously by that task, and the VPS217I or VPS216I message will be delivered to the email user. If any errors occur while trying to send the message, VPS will place the NOTIFY request on an error queue. VPS will wait five minutes and again attempt to deliver the message. After three unsuccessful retry attempts, a VPS398E message will be issued and the NOTIFY message will be discarded.

Using PJL Commands

Introduction

Printer Job Language (PJL) describes printer commands to be sent to obtain information about the printer configuration and status of the device. The PJL commands themselves do not cause pages to be printed, but communicate directly with the printer. Many vendors have printers that respond to the PJL commands, including Hewlett-Packard, IBM, and Lexmark.

In order to send these commands and receive the responses from the printer, the printer must be directly connected to the sending application. For VPS, the printer must be defined as a direct TCP/IP (sockets) connection with COMMTYPE=(TCPIP,SOK). In addition, the printer network interface must support bi-directional communication, including the cable which connects the printer to the network.

VPS can send PJL INFO commands to obtain information from the printer, including current status, printer ID, configuration parameters, total number of pages printed, total available memory and a list of variables that have been set for the device. The status information can provide notice that the device is ready for printing or that there is a potential problem at the device (low toner, for example) when VPS starts the connection. VPS can also request 'unsolicited device status' to obtain messages if the status changes at the device while VPS is connected. VPS stores the status and variable information obtained from the printer and displays the relevant status information when a printer display command is issued.

VPS has an option to send PJL JOB and EOJ commands before and after each SYSOUT dataset is delivered to the printer. If the printer definition requests sending the JOB and EOJ commands and also that VPS ask for 'unsolicited status' messages for the JOB, VPS will not delete the SYSOUT dataset from the JES spool until the EOJ response has been received from the device, indicating that the last page of the job has been successfully printed. This option allows the sender to know that the entire SYSOUT dataset has been delivered and printed. When using the direct TCP/IP connection without the PJL JOB and EOJ commands, the PCL ECHO response is used to ensure that the entire file has been delivered and accepted by the printer. Using PJL commands allows the printer to notify VPS that the last page has printed, which provides additional data integrity.

The VPS printer definition can also include an option to send the 'ENTER LANGUAGE' command before each dataset is sent to the printer. By sending the PJL 'ENTER LANGUAGE' command, the wait time associated with the automatic selection of the printing language (PCL or PostScript, for example) can be eliminated.

PJL 'unsolicited status' messages may also be requested on a time interval, which may reduce or eliminate the possibility of a connection time-out while the printer is processing the print file and VPS is waiting for a response to indicate the print file was received.

By sending PJL command sequences to the printer, VPS can provide more information about the current status of the printer, including the message displayed on the printer. Printer options can be set to reduce wait time between datasets when the printer is set to automatically detect the incoming printing language, eliminate most timeout situations, or ensure that the entire dataset has not only been received at the printer, but that it has been printed successfully.

Printer Keywords for PJL Processing

Printer keywords are used to determine which PJL commands should be sent to the printer. All of the PJL keywords below are ignored unless COMMTYPE=(TCPIP,SOK) is specified for the printer.

PJLCMDS=
PJLINFO=
PJLOPTS=
PJLUSTAT=

If **PJLCMDS=N** is specified or is allowed to default, all the remaining PJL printer keyword values are ignored.

If **PJLCMDS=Y** is specified, VPS will send the following PJL commands to the printer, regardless of the values specified for other parameters of the PJLCMDS keyword or the values specified for the other PJL printer keywords:

PJL COMMENT	text to print if PJL commands are not supported
PJL USTATUSOFF	turn off unsolicited status messages
PJL ECHO	receive response to flush leftover status messages
PJL INFO STATUS	obtain the current printer status

Sending PJL JOB and EOJ Commands

If **PJLCMDS=(Y,JOB)** is specified, the PJL JOB command is sent at the beginning of each SYSOUT dataset and the PJL EOJ command is sent at the end of the SYSOUT dataset. On the JOB start command, VPS requests that the printer start printing at page 1. The name specified on the PJL JOB command can be up to 80 characters in length, and is set using the following values, separated by the slash (/) character:

Job name as specified in the JCL
Job ID
Procedure name from JCL (if any)
Step name from JCL
DD name from JCL
OS/390 system ID
VPS Started task name

An example of a name sent on the PJL JOB command follows:

LRS000A/JOB07079/TESTPROC/STEP1/SYSUT2/LRSX/VPS80P

If **PJLOPTS=0040** is specified, the value sent as the NAME will also be specified as the DISPLAY= value on the PJL JOB command. The printer will then display as many characters of the name as possible, based upon the size of the printer's display screen.

Sending PJL ENTER LANGUAGE Commands

If **PJLCMDS=(Y,,LANG)** is specified, VPS will send the PJL ENTER LANGUAGE command to the printer before the separator and before the normal print dataset. The language will be set to PCL unless the first record in the print dataset has PostScript commands. In that case, the PJL ENTER LANGUAGE POSTSCRIPT command will be sent. Because the begin separator or end separator may be in a different printer command language than the SYSOUT dataset, the PJL ENTER LANGUAGE will be sent before the start separator, before the normal print dataset, and before the end separator.

Sending the PJL ENTER LANGUAGE command can eliminate wait time for some printers if they are set to automatically switch print languages by scanning the incoming data to decide what type of print language is being delivered. If only a few bytes are delivered, the printer may wait for more data to decide what print language is being sent. This wait time can be eliminated if the PJL ENTER LANGUAGE command is delivered before any print data. Then the printer has no need to scan the data to automatically switch printer languages.

If the printer only supports one printer language (PCL, for instance), the PJL ENTER LANGUAGE command is unnecessary.

Sending PJL INFO Commands

The PJLINFO= keyword specifies whether certain PJL INFO commands should be sent to the printer. The PJL INFO commands obtain the printer ID and details about the configuration, file system, memory, number of pages printed, and variables supported by the printer. VPS sends the PJL INFO STATUS command to obtain the printer status each time VPS connects to the printer, regardless of the values specified for the PJLINFO= keyword. VPS sends the PJL INFO USTATUS and PJL INFO CONFIG if any USTATUS values were requested by the PJLUSTAT keyword.

If **PJLINFO=(CONFIG)** is specified, VPS sends the PJL INFO CONFIG command to obtain configuration information about the printer, including such items as whether the printer supports duplex mode, the number of input trays and output bins, the number of font cartridges, the print languages supported, the paper sizes supported, and whether the printer supports the unsolicited status requests. The values returned are stored in a VPS control block.

If **PJLINFO=(,FILE)** is specified, VPS sends the PJL INFO FILESYS command to obtain information about the file system installed at the printer. The values returned are stored in a VPS control block.

If **PJLINFO=(,,ID)** is specified, VPS sends the PJL INFO ID command to the printer to obtain the identification text for the printer. This text is stored in a VPS control block and is displayed if a VPS command is issued to display the TCP/IP characteristics.

If **PJLINFO=(,,,MEMORY)** is specified, VPS sends the PJL INFO MEMORY command to the printer to obtain printer memory information, including the total memory available and the largest block of memory available. The memory information is stored in a VPS control block.

If **PJLINFO=(,,,,PAGECT)** is specified, VPS sends the PJL INFO PAGECOUNT command to the printer to obtain the total number of pages printed at the printer. This information is stored in a VPS control block and is displayed if a VPS command is issued to display the TCP/IP characteristics.

If **PJLINFO=(,,,,,VARB)** is specified, VPS sends the PJL INFO VARIABLES command to the printer to obtain variable information, including print resolutions supported, personalities (e.g., printer languages) supported, input tray sizes, PCL symbol sets installed, etc. This information is stored in a VPS control block. It is used to determine if certain capabilities are available at this printer.

Using PJL Unsolicited Status Commands

Unsolicited status responses can be requested from the printer. To obtain the status of the printer on a time interval, the USTATUS TIMED command is sent. To obtain changes in the status of the device, the USTATUS DEVICE command is sent. To obtain a status message for each physical page that is printed, the USTATUS PAGE command can be sent. To obtain a status message when the printer receives the print job or when the last page of the print job is complete, the USTATUS JOB command is sent.

If **PJLUSTAT=(DEVON)** or **PJLUSTAT=(DEVVERB)** is specified, VPS will send the PJL USTATUS DEVICE command. These both indicate that VPS would like to receive a message if the device status changes. The DEVVERB value indicates that VPS should ask for VERBOSE response, which means that the printer will send messages about PJL syntax errors, in addition to device status changes. Setting **PJLUSTAT=(DEVVERB)** may be requested by the LRS technical support staff for debugging purposes.

Requesting unsolicited status for the device means that VPS can be informed if something happens at the printer while VPS is connected to it. For example, the printer can return a status code to indicate that it is low on toner, that the input tray is empty, etc. The status returned is stored in a VPS control block and is displayed when a VPS command is issued to display the TCP/IP characteristics or the printer status. Also, if the status returned is an abnormal or unexpected status code, VPS will write the status information returned from the printer to the VPS log in the VPS277I message. Normal status may also be written to the VPS log in the VPS277I message, based on the PJLOPTS keywords.

PJLUSTAT=(,JOBON) specifies to VPS to send the PJL USTATUS JOB command to the printer. However, this option is not allowed unless the PJLCMDS=(Y,JOB) is also specified to request that VPS send the JOB and EOJ commands.

If the PJL USTATUS JOB command is sent, the printer will return a status message when the job command is received at the start of the job and another message when the last page of the job has been printed. VPS will wait for the unsolicited status response for the end of the job before deleting that dataset from the JES spool and processing the next dataset.

NOTE: Using unsolicited job status can ensure that the entire print file has been printed and placed in the output bin. However, because VPS will wait for the response that indicates the entire dataset has been printed before requesting the next dataset from JES, there may be delays between datasets. This option may require additional time to print the datasets, but allows the sender to ensure that every page of the print file has printed successfully before VPS continues. If the USTATUS JOB is not requested, VPS will send the PCL ECHO or PostScript "==" command and wait for the response from the printer. When the PCL or PostScript response is returned, the printer has processed all the preceding PCL or PostScript commands and the file will be printed unless the printer is turned off, causing the data to be lost.

PJLUSTAT=(,,PAGEON) specifies to VPS to send the PJL USTATUS PAGE command to the printer. However, the USTATUS PAGE command will only be sent if the USTATUS JOB command is also sent. Since VPS will wait for the end of job status when the USTATUS JOB command is sent, VPS will also receive all the PAGE status responses.

If the PJL USTATUS PAGE command is sent, the printer will return a response for each physical page that is placed in the output bin. The page count is returned in the response. If the printer is in duplex mode, the page count will be incremented by 2. If not, the page count will be incremented by 1. The page count is stored in a VPS control block and is displayed if a VPS command is issued to display the printer TCP/IP characteristics.

PJLUSTAT=(,,,0) indicates that no PJL USTATUS TIMED command should be sent. If the 4th positional parameter is set to a numeric value between 5 and 300, VPS will use that value as the number of seconds to set for the PJL USTATUS TIMED command.

If the PJL USTATUS TIMED command is sent, the printer will return a status message after each interval expires. Requesting unsolicited status on a time interval means that VPS can be informed if something happens at the printer while VPS is connected to it. For example, the printer can return a status code to indicate it is low on toner, that the input tray is empty, etc. The status returned is stored in a VPS control block and is displayed when a VPS command is issued to display the TCP/IP characteristics or the printer status. Also, if the status returned is an abnormal or unexpected status code, VPS will write the status information returned from the printer to the VPS log in the VPS277I message.

NOTE: Using unsolicited status based on a time interval will cause network traffic between VPS and the printer at least once for each interval. This may eliminate time-out conditions where the network card connecting the printer to the TCP/IP network ends the connection when no buffers are sent or received within a certain time interval. If time-out conditions happen for a printer connection, the 4th positional parameter of the PJLUSTAT= keyword should be set at a value slightly less than the time-out value on the network interface card.

How VPS Sends the PJL Commands

If **PJLCMDS=N**, VPS sends no PJL commands. If **PJLCMDS=Y**, VPS sends some PJL commands at the start of the TCP/IP connection and others are sent before and after the print dataset is delivered.

The following commands are sent when the printer connection is established. If **PJLOPTS=0080** is specified, these commands are sent for every TCP/IP connection for the printer. If PJLOPTS=0080 is not specified, these commands are only sent for the first connection after the printer is activated.

PJL COMMENT	
PJL USTATUSOFF	
PJL ECHO	
PJL INFO ID	**if requested: see PJLINFO**
PJL INFO STATUS	
PJL INFO CONFIG	**if requested: see PJLINFO or PJLUSTAT**
PJL INFO FILESYS	**if requested: see PJLINFO**
PJL INFO MEMORY	**if requested: see PJLINFO**
PJL INFO USTATUS	**if requested: see PJLUSTAT**
PJL INFO VARIABLES	**if requested: see PJLINFO**

The **PJL COMMENT** is used to send a line of text that indicates that PJL commands are being sent, but that the printer does not support them. If the text prints at the printer, then PJLCMDS=N should be set in the VPS printer definition.

The **PJL USTATUSOFF** turns off any unsolicited status that might have been left on from a previous connection.

The **PJL ECHO** sends unique text to be returned by the printer. All response data up to the PJL ECHO response will be deleted by VPS, allowing any leftover responses to be flushed before VPS obtains response data for current commands from the printer.

The **PJL INFO** commands are sent after the PJL ECHO. VPS always asks for the printer status. Other INFO commands are sent based on the PJLINFO keyword or based upon whether any PJLUSTAT values were set to request unsolicited status. After each INFO command is sent, VPS waits for the response and stores the information returned in a VPS control block.

The following PJL commands are sent before each print file is delivered:

PJL INFO PAGECOUNT	if requested: see PJLINFO
PJL USTATUS DEVICE	if requested: see PJLUSTAT
PJL USTATUS JOB	if requested: see PJLUSTAT and PJLCMDS
PJL USTATUS PAGE	if requested: see PJLUSTAT
PJL USTATUS TIMED	if requested: see PJLUSTAT
PJL JOB	if requested: see PJLCMDS
PJL ENTER LANGUAGE	if requested: see PJLCMDS

VPS waits for the responses for the INFO commands sent. The ENTER LANGUAGE command may be sent more than once if a start and/or an end separator is sent.

VPS sends certain PJL commands after the last buffer of the print file has been delivered:

PJL EOJ	if requested: see PJLCMDS
PJL USTATUSOFF	

VPS waits after sending the EOJ command if PJLUSTAT=(,JOBON) was specified before sending the USTATUSOFF command. When the unsolicited JOB status is received for the end of the job, the text is checked to ensure the job was completed and not canceled. If the job was canceled, VPS will EDRAIN the printer. If the job was completed, VPS will request another print dataset from the JES spool.

PJL Status Codes

When VPS sends the INFO STATUS or the USTATUS DEVICE or USTATUS TIMED commands, the printer returns a status code. In addition, the informational text from the printer display area may be retuned. Each PJL status code consists of a 5-byte numeric field. The first 2 digits are used to identify the status category. The second or the second and third digits represent tray or bin numbers for some status codes. The remaining digits indicate more information about the printer status.

The status code categories are:

10yyy	Informational messages	
11xyy	Background paper mount	x= tray code
12xyy	Background paper tray status	x= tray code
15xxy	Output bin status	xx= output bin code
20yyy	PJL parser errors	
25yyy	PJL parser warnings	
27yyy	PJL semantic errors	
30yyy	Auto-continuable conditions	
32yyy	PJL file system errors	
35yyy	Possible operator intervention	
40yyy	Operator intervention required	
41xyy	Foreground paper mount	x= tray code
42xyy	Paper jam errors	x= number of jammed pages
43xyy	Optional paper handling device	x= device code
44xyy	LaserJet 4000 paper jam info	x= number of jammed pages
50yyy	Hardware errors	

For more information on the PJL status codes, see Hewlett-Packard's "Printer Job Language Technical Reference Manual" or the manual for your printer.

VPS displays the status code returned from the printer, along with a short text message to describe the status value, when a VPS printer status display command is issued. If a VPS printer display command is issued to show the TCP/IP characteristics, the status code and text will be displayed, plus any value returned from the display area on the printer. The text from the display area will be translated from ASCII to EBCDIC before being stored in the VPS control block. However, because the printer display area may be in a language other than English, the printer display text value may or may not be understood by the operator. Consequently, VPS has a table of short text values that explain the status code in a consistent format.

When the status display command is issued, the PJL status code and the VPS short message text are displayed. The following commands are examples of the VPS printer status display:

F VPS,DISPLAY,MYPRTR or.....
F VPS,DISPLAY,MYPRTR,STATUS

The following message is an example of the response to the VPS printer status display:

VPS981R MYPRTR PRINTING MYJOB(JOB00709) P---------4 L---------154
PJLCODE(10023,PROCESSING JOB)

When the TCP/IP display command is issued, the status code and the VPS short message text are displayed. Another message shows the message display text returned from the printer. The following commands are examples of the VPS TCP/IP display:

F VPS, DISPLAY,MYPRTR,TCPIP
F VPS, DISPLAY,MYPRTR,T
F VPS, DISPLAY,MYPRTR,V

The following messages are an example of the response to the VPS printer TCP/IP display command:

VPS996R MYPRTR TCPIP(PJL(LASTCODE(10001,READY/ONLINE),
RECEIVED(DATE=12/24/2001,TIME=23:59:59)))
VPS996R MYPRTR TCPIP(PJL(DISPLAY=”00 READY”))
VPS996R MYPRTR TCPIP(PJL(ID=”LASERJET 5P”))

The short message text associated by VPS with the PJL status code follows the code value. The date and time following the status code indicate the last time a status message was received from this device. The display value is what was received from the printer in the last status response. The ID is the value returned when the INFO ID was sent to the printer.

Retaining SYSOUT Files using VPS

VPS supports retaining a SYSOUT file on the JES spool after the file has been successfully delivered. In order for the file to remain on the JES spool, the SYSOUT attributes must be modified in some way to prevent VPS from obtaining the same file from JES and printing it again. VPS has introduced a new SYSOUT retention function to modify the SYSOUT attributes of the file and to monitor the files and purge them from the JES spool after the retention period has expired. There are also new keywords to indicate the characteristics to be associated with the retained SYSOUT file.

System Keywords for SYSOUT Retention

The SYSOUT retention feature is only enabled when VPS is using the JES SYSOUT Application Programming Interface (SAPI) to obtain files from the JES spool. SAPI=Y should be specified in the VPS system initialization member.

In order to use the VPS SYSOUT retention feature, you must specify a non-zero value for the second positional parameter of the INTERVAL keyword in the VPS system initialization member. This retention/expiration interval is specified in hours and minutes and indicates how often VPS should check for SYSOUT files which should be purged from the JES spool. For example, if the second positional parameter of the INTERVAL keyword is specified as 0020, then VPS would check every 20 minutes to determine if there are files which need to be purged from the JES spool. The interval can be modified with the SSET command.

Printer Keywords for SYSOUT Retention

If files should be retained on the JES spool after successful delivery, the printer member should specify RETAIN=Y. The second positional parameter of the RETAIN printer keyword specifies the default retain interval in hours. When VPS notifies JES that the file has been successfully delivered, VPS will modify the attributes of the SYSOUT file based on the RETHOLD and RETOUTP keywords. These keywords allow the SYSOUT file to be kept on the JES spool with attributes that will be different from the original attributes so that VPS will not attempt to deliver the file again.

The RETHOLD keyword can specify to hold the file (H), to place the file in system hold (S), or to not hold the file (N). RETHOLD=S is only supported with JES3. If RETHOLD=N is specified, the RETOUTP keywords must supply a different value for one of the 4 SYSOUT attributes (class, destination, form, or writer name) used by VPS to select spool files.

The RETOUTP keyword can specify that the SYSOUT class, destination, form, and writer name should remain the same or that they should be modified. The default is RETOUTP=(*,*,*,*), which indicates that the class, destination, form, and writer name should remain the same. If RETHOLD=Y is set for JES2 or RETHOLD=S is set for JES3, the file can be held with the same SYSOUT attributes as the original file.

The RETOUTP keyword can be specified with a different value for any or all of the 4 SYSOUT attributes. For example, RETOUTP=(Z,*,*,*) would change only the SYSOUT class, while the destination, form, and writer names would remain the same.

VPS checks the RETHOLD and RETOUTP values by comparing them with the printer's selection criteria from the CLASS, DEST, FORM, and WRITER keywords during printer activation and when any attempt is made to modify either the retain parameters or the selection criteria. If RETAIN=Y is specified and the value specified for RETHOLD and RETOUTP would cause JES to pass a retained file back to this VPS printer, then printer activation will be refused or the change request will be rejected.

Operating Considerations when using VPS SYSOUT Retention

VPS will retain files only if RETAIN=Y is specified in the VPS printer member. VPS will check the RETAINS= keyword on the OUTPUT JCL statement to obtain the time interval for which the file should be retained. If that value is not specified or if it is invalid, VPS will use the default retain time period from the second positional parameter of the RETAIN printer keyword; if that value is 0, then the file will not be retained.

The value of the RETAINS keyword in the OUTPUT JCL can be any one of the following formats:

RETAINS=hhhh	hours
RETAINS='hhhh:mm'	hours and minutes
RETAINS='hhhh:mm:ss'	hours, minutes and seconds
RETAINS=FOREVER	retain forever

VPS calculates the time when the SYSOUT file will be eligible to be purged and writes a record in the VPS checkpoint dataset. When the retention/expiration interval expires, all files whose retention periods have expired will be purged from the JES spool. It is also possible to purge files for one or more printers using the VPS EXPIRE command or using JES commands.

VPS will write retention information for each file that is retained on the JES spool to the file allocated with the DDNAME of VPSCKPT. Therefore, the VPS checkpoint dataset may need to be re-allocated to obtain sufficient space. Please see "Defining the VPS Checkpoint Dataset" on page 3.13.

Because the second value of the INTERVAL keyword indicates how often VPS should check for retained SYSOUT files that need to be purged from the JES spool, setting this value too low may cause VPS to read the checkpoint records more often than necessary. The retention periods are set in hours, so having VPS check every minute for files that should be purged might be too often. However, setting the second value of the INTERVAL keyword too high may mean that SYSOUT files will remain on the spool longer than expected, causing spool space to be wasted. The second positional parameter can be specified in hours and minutes. The minimum value is 0001, which would indicate 1 minute. The maximum value is 2459, which indicates 24 hours and 59 minutes. The INTERVAL value can be modified with the VPS SSET command.

Using VPS SYSOUT file retention may require an expansion of JES spool space, especially if many files are retained or if the files are retained for a long period of time. The second positional parameter of the VPS RETAIN printer keyword indicates the default number of hours to retain a SYSOUT file after it has been delivered. If this is set to a very high number (9999 hours is the maximum) or if the RETAINS= keyword on the OUTPUT JCL statement specifies a large number of hours or "FOREVER", then the SYSOUT file will remain on the JES spool until the interval expires or until the file is purged by a JES or VPS command. The VPS EXPIRE command can be used to purge files immediately for one printer, a group of printers, or all printers to recover JES spool space.

Section 7
Operation

Communicating with VPS®

Introduction

There are many situations in which an operator, end user, or person at the “help” desk may wish to communicate with VPS. For example, an operator in the computer room may wish to start or stop the VPS task. An end user may wish to inquire about the status of a VPS printer, change the selection criteria for a printer, or reposition a dataset being printed by VPS. “Help” desk personnel may wish to diagnose a problem with a particular printer, monitor VPS performance, or abnormally terminate VPS.

These functions can be accomplished via the OS/MVS START, STOP and MODIFY commands. (Some functions can also be accomplished by the use of the PA-1, PA-2, and CANCEL print keys. These special capabilities are discussed later in this section). While the START and STOP commands have a specific purpose and would usually be restricted to certain authorized operations personnel, the MODIFY command allows the user to issue any one of a variety of VPS commands. These VPS commands are explained in detail later in this section.

An installation may have internal restrictions on who can issue MVS commands. For that reason, the VPS Monitor and Control Facility (VMCF) is available to users of VPS. This full screen, menu driven interface to VPS executes under TSO. (Both CICS and VTAM versions of VMCF are also available for purchase). A security interface in VMCF can be used to restrict which printers a user can control and which commands a user can issue. Use of VMCF will simplify the process of issuing VPS commands, because the various options and parameters required on many of the commands are listed as options on menus. VPS’ processing of a command will be identical, whether the command was issued indirectly via choices on a VMCF screen or directly by MVS console command.

The START, STOP, and MODIFY Commands

The **START** (abbreviated as **S**) command is used only for starting the VPS system. Its format is:

S stcname

where stcname is the name of the VPS started task. The START command is not used if VPS is executed as a batch job.

Note: If you want VPS to execute under the control of a secondary subsystem, use the SUB keyword of the START command. For example:

S VPS,SUB=JESB

The **STOP** (abbreviated as **P**) command is used only for stopping the VPS address space. Its format is:

P stcname

where stcname is the name of the VPS started task (or the name of the VPS batch job). A STOP command is used for VPS "fast" termination. SYSOUT datasets that are currently being printed, if any, will be requeued in their entirety. See the VPS END command for a description of normal termination.

The **MODIFY** (abbreviated as **F**) command can be used for all other VPS operator communications. Its format is:

F stcname,cmd,prtrid,parm1,parm2,parmn,u=userid

where:

stcname: the name of the VPS started task (all examples in this section assume a started task name of VPS)

cmd: the VPS command name (only sufficient characters to make the command unique need be specified)

prtrid: the name of the printer(s) to which the command applies. prtrid can be any of the following:

VTAM Network Name if "IDTYPE=L" or "IDTYPE=B" was specified in the VPS System Initialization member.

VPSLIB Member Name if "IDTYPE=M" or "IDTYPE=B" was specified in the VPS System initialization member.

G=groupname where groupname is the group to which the printer belongs as defined in the "GROUP=" parameter in the printer definition.

S=status where *status* is:

A for active printers (those currently busy doing work)

I for inactive printers (those printers currently not busy doing work)

W for Wconnect printers (those currently waiting for a connection)

M for missing response printers (those where a missing response has been detected)

D for drained printers (those for which a stop command has been issued)

E for error drained printers (those that are drained due to an unrecoverable error).

A generic (partial) prtrid or groupname can be used by following the partial name with an asterisk.

Example: VPSPR* would issue the command to all VPS printers whose name starts with VPSPR.

Example: G=V* would issue the command to all VPS printers whose group name starts with V.

SYSTEM can be used to indicate that the command applies to the VPS system as a whole rather than an individual printer or group of printers.

parms: Consist of variable data, depending upon the requested command.

userid: Specifies the TSO userid to which the command response will be sent to.

Because VPS V1 R8.0 runs as a subsystem, you can use the VPS System Initialization parameter “SSI” to specify a command character to be used to issue commands to VPS, rather than using the MVS MODIFY command. For example, if you were to specify the following parameter in the VPS System Initialization member,

SSI=(VPSA,*,10)

you could then issue a command to start a printer as

***START,PRTR1**

rather than as

F VPS,START,PRTR1

If you define a VPS command character via the SSI parameter, you must also establish a non-zero value for the number of command buffers in that same parameter.

If you use VMCF to control VPS, and do not issue console commands to VPS on a regular basis, you probably do not need to establish a VPS command character.

VPS Command Summary

COMMAND NAME	FUNCTION
ABEND	Abnormally terminate VPS.
ACQUIRE	Initiate a session with a VPS printer.
ACTIVATE	Add a printer to the VPS System.
CANCEL	Cancel SYSOUT dataset or all datasets in a job which is currently being printed by VPS.
CLOSELOG	Close and re-open the VPS log dataset.
DISPLAY	Display VPS status and option information.
END	Normally terminate VPS.
EXPIRE	Expire SYSOUT files which were retained for VPS printer(s).
INACTIVATE	Remove a printer from the VPS System.
INTERRUPT	Interrupt the job currently printing.
LOG	Put a message in the VPS log dataset.
POST	Initiate the search for SYSOUT datasets immediately.
REACTIVATE	Remove a printer from the VPS system and immediately add the printer to the VPS system.
REFRESH	Refresh the “news” SYSOUT dataset(s) for all VPS printers.
RELEASE	Terminate a session with a VPS printer.
REPEAT	Repeat SYSOUT dataset that is being printed.
REPOSITION	Reposition SYSOUT dataset that is being printed.
RESTART	Restart SYSOUT dataset that is being printed.
SDUMP	Obtain an unformatted dump of the VPS address space.
SEL	Change printer selection criteria.
SET	Change current printer options.
SNAP	SNAP dump VPS control blocks.
SSET	Change current VPS system parameters.
SSTAT	Log or reset VPS statistics.
START	Start (remove drained status from) specified printer.
STOP	Stop (drain) specified printer

VPS Commands

ABEND

Function: Abnormally terminate VPS.

Description: This command will abnormally terminate VPS with a U001 abend.

Format: **F VPS,ABEND**

Comments: This command has no operands or prtrid specification.

Example: **F VPS,ABEND**

Abnormally terminate VPS

ACQUIRE

Function: Initiate a session with a VPS printer.

Description: This command allows the user to initiate a session with a printer through VTAM or TCP/IP. It can be used to validate VTAM or TCP/IP specifications for a printer, even when there is no work on the JES spool for VPS to select for the printer.

Format: **F VPS,ACQUIRE,prtrid**

Comments: Command must be issued for a specific printer.

This command will be rejected if VPS is already in session with the printer.

Example: **F VPS,ACQUIRE,VPSPRT99**

Attempt to initiate a session with VPS printer VPSPRT99.

ACTIVATE

Function: Add a printer to the VPS System.

Description: This command allows the addition of a printer to the VPS System without having to terminate and restart the VPS address space.

Format: **F VPS,ACTIVATE,membernm**

Comments: membernm is the VPSLIB PDS member name defining the printer to be added.

Example: **F VPS,ACTIVATE,VPSPRT99**

Add the printer that is described in VPSLIB member VPSPRT99 to the VPS System.

CANCEL

Function: Cancel SYSOUT dataset or all datasets in a job which is currently being printed by VPS.

Description: This command provides the ability to cancel a SYSOUT dataset or all datasets in a job which VPS is currently printing.

Format: **F VPS,CANCEL,prtrid{,D|J}**

Comments: Command must be issued for a specific printer.

Specifying ",D" after the printer ID will cancel all copies and "repeats" of the dataset currently being printed. Specifying ",J" after the printer ID will cancel all copies and "repeats" of the dataset currently being printed and any other datasets for the same job destined for this printer which have not yet been printed. If neither ",D" nor ",J" is specified, the command will default to ",D".

VPS will reject the command if the specified printer is not currently printing.

Example: **F VPS,CANCEL,VPSPRT99,D**

Cancel dataset currently being printed on printer VPSPRT99.

CLOSELOG

Function: Close and re-open the VPS log dataset.

Description: This command provides the facility to close and re-open the VPS log dataset. If the VPS log dataset is a preallocated DASD dataset, the CLOSELOG command will be rejected. If the VPS log dataset is a SYSOUT dataset, the log dataset will be available for printing, and a new SYSOUT dataset will be allocated and opened for continued logging.

Format: **F VPS,CLOSELOG**

Comments: This command has no operands or prtrid specification.

Example: **F VPS,CLOSELOG**

Close the VPS log dataset.

DISPLAY

Function: Display VPS status and option information.

Description: This command provides the facility to display option and status information pertinent to the individual VPS printers and/or the VPS System.

Format: **F VPS,DISPLAY,EXITS**

Display status of VPS exits (this can be coded as EXITS to see the status of all exits, as EXITnn to display the status of an individual exit, or as EXITnn-nn to display the status of a range of exits).

F VPS,DISPLAY,DEFAULT

Display options in the master printer default member.

F VPS,DISPLAY,prtrid,disopt1{,disopt2....,disoptn}

Display options in a particular printer member. disoptn specifies the requested display option(s).

Only sufficient characters to make the option unique need be specified.

STATUS:	Printer status
SELECTION:	Printer selection criteria
PROCESS:	Processing statistics
QUEUE:	Queue dataset statistics/options
GRAPH:	Graphics options
HARDWARE:	Hardware options
REQUEUE:	Requeue options
MISC:	Miscellaneous options
OPER:	Operational options
OPTIONS:	Printer options
TCPIP:	VTAM or TCP/IP related information
VTAM:	VTAM or TCP/IP related information
DIAG:	Printer diagnostic information
***:**	All the above except DIAG

F VPS,DISPLAY,SYSTEM

Display VPS system-wide options and status.

F VPS,DISPLAY,SYSTEM,KEYS

Displays each valid LRS product key that was specified during VPS initialization.

F VPS,DISPLAY,SYSTEM,MODULE,modid

Display information about a specific VPS module (i.e. load address, entry address, length, etc.).

F VPS,DISPLAY,SYSTEM,TASK

Display the status of each VPS task (system and printer tasks). Message VPS959R will be issued for each VPS task.

Comments: STATUS is the default display option for a printer display if no options are specified.

Example: **F VPS,DISPLAY,VPSPRT99,ST,SEL**

Display status information and selection criteria for printer VPSPRT99.

END

Function: Normally terminate VPS.

Description: This command will notify VPS to initiate normal termination processing.

Format: **F VPS,END**

Comments: This command has no operands or prtrid specification.

VPS will not terminate until all printers that are currently busy complete the job that they are processing.

Example: **F VPS,END**

Normally terminate VPS.

EXPIRE

Function: Expire SYSOUT files which have been retained by VPS.

Description: This command allows retained SYSOUT files for a printer or a group of printers to be purged from the JES spool if they were retained by VPS after successful delivery due to RETAIN=Y in the VPS printer definition. If the retained SYSOUT file is located on the JES spool and has not been modified since VPS retained it, it will be purged from the JES spool. If the SYSOUT file has been modified, it will be kept on the JES spool. The VPS944R message will show the number of files deleted, kept, or that were non-selectable.

Format: **F VPS,EXPIRE,prtrid**

Comments: The printer name can be a unique name, a partial name, or a group name. Using status (S=E, for example) is not supported for the EXPIRE command. Issue F VPS,EXPIRE,* to purge all VPS retained SYSOUT files.

Example: **F VPS,EXPIRE,TCPPR***

Expire all retained SYSOUT files for printers with names that begin with “TCPPR”.

INACTIVATE

Function: Remove a printer from the VPS System.

Description: This command allows the removal of a printer from the VPS System without having to terminate and restart the VPS address space. If the printer is currently busy, the inactivation will be scheduled and completed after the current job being printed is complete.

Format: **F VPS,INACTIVATE,prtrid**

Comments: Printer parameters can be dynamically changed without terminating the VPS address space by changing the printer parameters in the printer definition member, issuing an inactivate command for the printer, and issuing an activate command for the printer. At activation, the values specified in the printer definition member are brought into VPS.

Example: **F VPS,INACTIVATE,VPSPRT99**

Remove printer with a printer ID of VPSPRT99 from the VPS System.

INTERRUPT

Function: Interrupt the output currently printing on the specified printer.

Description: This command causes VPS to stop printing the dataset which is currently printing on the specified printer, and to request work for the printer from JES. (This allows interruption of a low priority dataset for a dataset of higher priority.)

Format: **F VPS,INTERRUPT,prtrid**

Comments: The interrupted dataset is not deleted from the JES spool. When VPS asks JES for work for the printer, it will receive the output with the highest JES priority.

If there is no new work for the printer on the JES spool, or if there is no work of a higher priority, the interrupted dataset will be selected again immediately. If the interrupted dataset has carriage control, or if the first subparameter of the MAXLPG keyword has a non-zero value, the interrupted dataset will begin printing from the top of the page where it was interrupted. If the dataset has no carriage control and the first subparameter of the MAXLPG keyword has a value of zero, the entire interrupted dataset will be printed.

Example: **F VPS,INTERRUPT,VPSPRT99**

Stop printing the dataset currently printing on printer VPSPRT99, and request work for the printer from JES.

LOG

Function: Put a message in the VPS log dataset.

Description: This command allows a message to be placed in the VPS log dataset.

Format: **F VPS,LOG,message**

Comments: The message must not be greater than 50 characters.

Example: **F VPS,LOG,THIS IS A MESSAGE**

Place “THIS IS A MESSAGE” in the VPS log dataset.

POST

Function: Initiate the search for SYSOUT datasets immediately.

Description: This command tells VPS to begin the search for SYSOUT datasets to be printed on VPS printers, even if the time interval specified in the INTERVAL parameter has not yet expired.

Format: **F VPS,POST**

Comments: None

Example: **F VPS,POST**

Initiate the search for SYSOUT datasets immediately.

REACTIVATE

Function: Remove a printer from the VPS System and immediately add the printer to the VPS system.

Description: This command allows the definition of a VPS printer to be "refreshed" from the Printer Definition Member in the VPS Control Library.

Format: **F VPS,REACTIVATE,prtrid**

Comments: The most common use for this command would be to bring into VPS an updated printer definition member for a printer already activated to VPS.

Example: **F VPS,REACTIVATE,VPSPRT99**

Remove the printer with a printer ID of VPSPRT99 from VPS and immediately add it to VPS, using the printer definition in the VPS Control Library.

REFRESH

Function: Refresh news SYSOUT dataset(s) for all VPS printers.

Description: This command will cause VPS to obtains each SYSOUT news dataset from the JES spool. Any printer currently printing will continue to use the previous news SYSOUT dataset until the printer becomes IDLE. At that time, the current news SYSOUT dataset will be associated with the printer.

Format: **F VPS,REFRESH,NEWS**

Comments: VPS will reject a REFRESH command is NEWS is not specified.

Example: **F VPS,REFRESH,NEWS**

Obtain the SYSOUT news dataset(s) from the JES spool.

RELEASE

Function: Terminate a session with a VPS printer.

Description: This command allows the user to terminate a VTAM or TCP/IP session with a printer.

Format: **F VPS,RELEASE,prtrid**

Comments: Command must be issued for a specific printer.

This command will be rejected if VPS does not have an active session with the printer, or if VPS is in session with the printer and the printer is busy.

Example: **F VPS,RELEASE,VPSPRT99**

Attempt to terminate a session with VPS printer VPSPRT99.

REPEAT

Function: Repeat SYSOUT dataset that is being printed.

Description: This command provides the ability to print additional copies of the dataset that VPS is currently printing.

Format: **F VPS,REPEAT,prtrid**

Comments: Command must be issued for a specific printer. VPS will reject the command if the specified printer is not currently printing.

Example: **F VPS,REPEAT,VPSPRT99**

Repeat dataset currently being printed on printer VPSPRT99.

REPOSITION

Function: Reposition SYSOUT dataset that is being printed.

Description: This command provides the ability to reposition the dataset that VPS is printing.

Format: **F VPS,REPOSITION,prtrid,a=bnnnnnnn**

a - L=LINES, P=PAGES

b - +=FORWARD, -=BACKWARD, @=ABSOLUTE

nnnnnnn - FORWARD, BACKWARD OR ABSOLUTE QUANTITY

Comments: Command must be issued for a specific printer. VPS will reject the command if the specified printer is not currently printing.

This command will be rejected for GDDM and SAS datasets.

Leading zeroes need not be specified in quantity field.

Any request that would cause positioning to be prior to the start of the dataset will have the same effect as repositioning to line 1.

Any request that would cause positioning to be past the end of the dataset will cancel printing the remainder of the dataset.

Example: **F VPS,REPOSITION,VPSPRT99,P=@50**

Reposition the dataset currently being printed on printer VPSPRT99 to page 50.

RESTART

Function: Restart current SYSOUT dataset that is being printed.

Description: This command provides the ability to restart printing at the beginning of the current dataset.

Format: **F VPS,RESTART,prtrid**

Comments: Command must be issued for a specific printer. VPS will reject the command if the specified printer is not currently printing.

Example: **F VPS,RESTART,VPSPRT99**

Restart dataset currently being printed on printer VPSPRT99.

SDUMP

Function: Obtain an unformatted dump of the VPS address space.

Description: This command is used to obtain an unformatted dump of the VPS address space. It should only be issued at the request of the VPS Support staff to obtain documentation to assist in diagnosing a particular problem.

Format: **F VPS,SDUMP**

Comments: The command will invoke the MVS SVC dump processor to obtain an unformatted dump of the VPS address space. The following storage areas will be included in the dump:

- CSA - The CSA and ECSA subpools (227, 228, 231 and 241).
- GRSQ - The GRS control blocks.
- LSQA - The LSQA and ELSQA subpools (203-205, 213-215, 223-225, 233-235 and 253-255).
- PSA - The PSA for either the processor at the time of the error or the processor at the time of the dump.
- RGN - The allocated pages in the VPS private area.
- SUM - A summary dump will be included with the SVC dump output.
- TRT - The system trace table.

Example: **F VPS,SDUMP**

Obtain an unformatted dump of the VPS address space.

Note: Use the SDUMP command only at the request of the VPS Support staff to diagnose a particular problem.

SEL

Function: Change printer selection criteria.

Description: This command provides the facility to alter the selection criteria of a VPS printer.

Format: If only primary selection criteria are specified:

F VPS,SEL,prtrid,{D=dst1}{,C=cls1}{,W=wtr1}{,F=frm1}

If primary and secondary selection criteria are specified:

F VPS,SEL,prtrid,{D=(dst1,dst2)}{,C=(cls1,cls2)}{,W=(wtr1,wtr2)}{,F=(frm1,frm2)}

dst1 = SYSOUT destination primary selection criterion

dst2 = SYSOUT destination secondary selection criterion

cls1 = SYSOUT class list primary selection criterion (1-8 classes)

cls2 = SYSOUT class list secondary selection criterion (1-8 classes)

wtr1 = Special writer program name primary selection criterion

wtr2 = Special writer program name secondary selection criterion

frm1 = Form name primary selection criterion

frm2 = Form name secondary selection criterion

The specified selection criteria are merged with the current selection criteria to determine the new selection criteria.

A selection criterion can be nullified by specifying a null value (**Example:** D= would nullify both primary and secondary destination).

A selection criterion can be retained by entering a dash. (**Example:** D=(-,U100) would retain the primary destination and set the secondary destination to U100).

Comments: Command must be issued for a specific printer.

The net effect of the command must leave at least one selection criterion in effect and must not create an overlap with the selection criteria of any other non-pooled printers in the VPS System. The selection criteria of a pooled printer can overlap with that of one or more other pooled printers, but cannot conflict with any non-pooled printers.

Example 1: **F VPS,SEL,VPSPRT99,C=,D=,W=WTR123**

Notify printer to add writer program name WTR123 to primary selection criteria and no longer use class and destination for primary selection.

Example 2: **F VPS,SEL,VPSPRT99,W=WTR123**

Notify printer to add writer program name WTR123 to primary selection criteria and continue to use any primary selection criteria already in effect.

Example 3: **F VPS,SEL,VPSPRT99,D=(-,R99)**

Notify printer to retain the current value for the primary destination and use R99 as the secondary destination.

Example 4: **F VPS,SEL,VPSPRT99,D=(-,)**

Notify printer to retain the current value for the primary destination and no longer use destination for secondary selection.

Example 5: **F VPS,SEL,VPSPRT99,D=(,-)**

Notify printer to remove destination as a primary selection criterion and retain the value of the secondary destination.

SET

Function: Change current printer options.

Description: This command provides the facility to change the following printer options. This command uses an abbreviated form of some of the options. In these cases, the full keyword is shown in parentheses.

AEJECT (AUTOEJCT), MAXLPG, RELREQ, RQOUTP (REQOUTP), RQDELT (REQDELT), RQHOLD (REQHOLD), RQLIMIT (REQLIMIT), RQROUTE (REQROUTE), SEPAR, TCPHOST, TPUT (TPUTUSER), TRACE

Format: **F VPS,SET,prtrid,opt1=value{,opt2=value.....optn=value}**

optn = The option to be changed

value = The new value to be assigned to the option

Comments: Command must be issued for a specific printer.

Only sufficient characters of the option name need be specified to make it unique.

To retain the original value for a particular positional parameter value, use a dash. To remove a value, use a null.

Example 1: **F VPS,SET,VPSPRT99,RQHOLD=N**

Notify printer that requeued datasets are not to be held.

Example 2: **F VPS,SET,VPSPRT99,TRACE=(Y,FF,80000000)**

Notify printer to activate internal tracing for printer VPSPRT99 and to set the trace options to X'FF', and the additional AFP trace options to X'80000000.

Example 3: **F VPS,SET,VPSPRT99,AEJECT=(-,-,-,N)**

Notify printer to leave the first three positional parameter values of the AUTOEJCT keyword unchanged, and to set the value of the fourth positional parameter value to N.

Example 4: **F VPS,SET,VPSPRT99,RQOUTP=(-,-,-,,-)**

Notify printer to leave the first, second, third, and fifth positional parameter values of the REQOUTP keyword unchanged, and to nullify the value of the fourth positional parameter value (remove WRITER from the requeue output parameter).

SNAP

Function: SNAP dump VPS control blocks.

Description: This command provides the facility to snap dump the VPS control blocks for a specified printer or for the VPS region.

Option 1: F VPS,SNAP,prtrid

Comments: Command must be issued for a specific printer.

The SNAP command has no parameters.

The output of the SNAP command will be queued to the class, destination, form, and writer specified in the VPSSTART member via the SNAPOUTP parameter.

If prtrid of DEFAULT is specified, the default control blocks will be snap dumped.

Example: **F VPS,SNAP,VPSPRT99**

Snap the control blocks for printer VPSPRT99.

Option 2: **F VPS,SNAP,SYSTEM**

Snap the control blocks for the VPS address space to obtain system diagnostic information.

Note: Use the SYSTEM option only by request of the VPS Support staff to diagnose a particular problem. This option consumes a large amount of CPU time.

SSET

Function: Change current VPS system parameters.

Description: This command provides the facility to modify VPS System parameters.

Format: **F VPS,SSET,sopt1=value,sopt2=value....soptn=value**

Comments: The SSET command provides the facility to change the following VPS System parameters:

EXITnn=(E|D,xx) To enable/disable and set the tracing status of VPS user exit nn (the exit number can be either 1 or 2 digits, i.e., EXIT01 and EXIT1 are both acceptable).

Note: This parameter can also specify a range of exits. For example:

F VPS,SSET,EXIT01-05=(E,80)

will enable user exits 1, 2, 3, 4 and 5, and specify that normal trace entries be created for each of the exits.

INTERVAL=(MMSS,HHMM) Specify time intervals between normal VPS timer requests and between SYSOUT retention requests.

Note: If the second value of the INTERVAL keyword was specified as zero during VPS initialization, it cannot be modified to a non-zero value with the SSET command.

LOG=Y|N To specify VPS logging active/inactive.

MAXACT=nnnnn To specify the maximum number of printers that can be concurrently doing work.

SWAP=Y|N To specify VPS address space swapability.

TCPIP=E|D|F To enable/disable/force termination of the VPS/TCPIP connection.

TRTYPES=xx To specify the types of VPS system events to be traced by VPS.

Note: The VPS/TCPIP connection process can be enabled or disabled if VPS is attempting to connect to the TCP/IP address space. By disabling the interface when the TCP/IP address space is not available, VPS will stop attempting to connect. When the TCP/IP address space is started, the TCP/IP connection can be established by enabling the interface with the SSET command.

WARNING: Once VPS has connected, the interface cannot be disabled using the SSET command. If the connection is forced to terminate with the SSET command, VPS will never attempt to reconnect; VPS must be restarted to re-establish the connection.

Example: **F VPS,SSET,LOG=N,SWAP=N**

Inactivate VPS logging and make the VPS address space nonswapable.

SSTAT

Function: Log or reset VPS statistics.

Description: This command provides the facility to enter VPS statistics into the VPS log and/or to reset the VPS statistics.

Format: **F VPS,SSTAT,opt1{,opt2}**

Comments: The possible options on the SSTAT command are LOG and RESET. LOG enters messages VPS126I and VPS127I into the VPS log. RESET zeroes out the accumulators used for calculating VPS statistics, effectively giving a new starting point for the accumulation of statistics.

The VPS statistics can be used as a debugging tool for diagnosing performance problems.

Example: **F VPS,SSTAT,LOG**

Enter the VPS statistics in the VPS log.

START

Function: Start (remove drained status from) specified printer.

Also issued to signify form has been mounted if printer has requested a form mount (FORM=AUTO mode).

Description: This command provides the ability to notify a printer to reinitiate SYSOUT dataset selection.

Format: **F VPS,START,prtrid**

Comments: VPS will reject the command if VPS termination is in process.

Example: **F VPS,START,VPSPRT99**

Notify printer VPSPRT99 that SYSOUT selection can resume.

STOP

Function: Stop (drain) specified printer

Description: This command provides the ability to notify a printer to terminate SYSOUT dataset selection.

Format: **F VPS,STOP,prtrid{,F|I}**

Comments: Optionally a parameter of force (F) or immediate (I) can be specified.

Immediate signifies to stop printing immediately, even if currently processing a job.

Force signifies to stop printing immediately and, if waiting for an event to occur, such as a printer ready condition after an intervention required, discontinue waiting for the required event.

If neither immediate nor force is specified, the printer will drain after completing the current job.

Example: **F VPS,STOP,VPSPRT99,I**

Notify printer VPSPRT99 to drain immediately.

Note: A STOP command with the FORCE option may be rejected by VPS when the status of a VTAM printer is WCONNECT. A VTAM "V NET,INACT,F" will end the WCONNECT state.

Using the Pa-1, Pa-2 and Cancel Keys

On LU-1 (SNA/SCS) printers, the PA-1, PA-2 and CANCEL print keys can be used to perform some functions which would otherwise require the user to issue a VPS command. The effect of using these keys depends upon what function is being performed by the printer at the time:

When the Printer is Printing

PA-1: Will RESTART printing the current SYSOUT dataset

PA-2: Will BACKUP the current SYSOUT dataset approximately 4-5 pages or 300 lines

CANCEL: Will CANCEL (delete) the current SYSOUT dataset

When the Printer is Waiting for a Forms Mount

If the printer has stopped following the printing of forms mounting instructions, the PA-1 and PA-2 keys serve the following functions:

PA-1: Notifies VPS that the appropriate form has been mounted.

PA-2: Notifies VPS to cancel the form mount and drain the printer.

Use of the PA-1, PA-2 and CANCEL print keys requires the user to perform the following sequence of operations:

1. Depress the HOLD print key
2. Depress the PA-1, PA-2 or CANCEL print key as appropriate
3. Depress the ENABLE print key

(Refer to the operations manual for your printer for any additional steps in this process).

Section 8
AFP

Overview

The VPS® AFP products (VPS/IPDS, VPS/PCL, and VPS/PDF) extend the features of VPS to include support for the Advanced Function Presentation Data Stream (AFPDS). These products will accept either AFPDS or line data as input. An AFPDS dataset is composed page output, such as that created by DCF. Line data is traditional computer print records, such as 1403 output or ASA output. The VPS AFP products will combine this AFPDS or line data with any required resources, such as FORMDEFS and PAGEDEFS, and will create an output datastream in the selected Page Description Language (PDL). VPS/IPDS creates the output in IBM's Intelligent Printer Data Stream (IPDS). VPS/PCL creates the output in Hewlett Packard's Printer Command Language (PCL). VPS/PDF creates the output in Adobe Acrobat Portable Document Format (PDF). VPS/PDF note: IBM's AFP Conversion and Indexing Facility (ACIF) is required to convert the file to MODCA-P and then, if CONVTYPE=PDF, the file will be converted to PDF.

The VPS AFP products can be run as an integral part of VPS, or they can be run in batch. (VPS/PDF cannot be run in batch.) The batch versions can be executed as a step of a job to convert the output dataset to a PDL for later printing. The integrated versions run transparently as a component of VPS. VPS will determine whether a SYSOUT dataset should be converted to the PDL by checking for the presence of a FORMDEF and/or PAGEDEF, or for the presence of any AFPDS records (those with carriage control characters of X'5A') in the input dataset. If either is present, the dataset will be converted to the requested PDL (IPDS or PCL) and sent to the printer. If the dataset does not qualify for conversion, it will be sent as a standard VPS print dataset.

Advantages of Using the VPS AFP Products

The VPS AFP products allow a mixture of AFP and non-AFP datasets to be delivered to a printer. Converting a dataset from AFPDS or line data to a PDL is resource intensive. Some documents need the advanced functions supplied by AFP, while others do not. VPS will convert the output that requires advanced functions, but will print non-AFP datasets directly. This prevents the needless conversion process for every dataset. VPS can deliver a non-AFP dataset, while retaining downloaded resources in the printer. This avoids the reloading of frequently used resources. VPS will also manage the downloaded resources within a printer to optimize their usage.

Features

All AFPDS resources are supported. The AFPDS resources are:

FORMDEF These commands establish and control the print environment.

PAGEDEF These commands control the presentation of each page of the print document.

PAGESEG These commands store text, images, graphics, and barcode to be presented in a page or overlay. Page segments can be included into the current environment.

OVERLAY These commands store text, images, graphics, and barcode to be presented in a page or another overlay. Overlays are environment independent.

FONT These commands control the presentation of fonts in a page, overlay, or page segment.

Double byte character set fonts are not supported by VPS/IPDS and VPS/PDF.

Certain AFPDS objects are supported with VPS/IPDS, VPS/PCL, and VPS/PDF. For more information see "VPS/IPDS, VPS/PCL, and VPS/PDF Supported Functions" on page C.1.

PRESENTATION TEXT These commands control the presentation of text in a page, overlay or page segment.

IM-IMAGE These commands control the presentation of images in a page, overlay, or page segment.

IO-IMAGE These commands control the presentation of images in a page, overlay, or page segment. This command set provides additional functions and controls that the IM-Image command set does not, such as compression, scaling, and resolution-independence.

GRAPHICS These commands control the presentation of graphics in a page, overlay, or page segment.

BARCODE These commands control the presentation of barcode in a page, overlay, or page segment.

VPS/IPDS supports all IPDS towers. The IPDS towers are:

Text This tower consists of Presentation Text Object Content Architecture (PTOCA) contained in the IPDS Write Text (WT) command.

IM Image This tower consists of image data contained in the IPDS Write Image (WI) command.

IO Image This tower consists of Image Object Content Architecture (IOCA) contained in the IPDS Write Image 2 (WI2) command.

Graphics This tower consists of Graphics Object Content Architecture (GOCA) contained in the IPDS Write Graphics (WG) command.

Barcode This tower consists of Barcode Object Content Architecture (BCOCA) contained in the IPDS Write Barcode (WBC) command.

For more information about AFPDS resource and object command sets and IPDS towers, refer to IBM's "Advanced Function Presentation: Data Stream Reference", "Advanced Function Presentation: Host Font Data Stream Reference", and "Data Stream and Object Architectures: Intelligent Printer Data Stream Reference" manuals.

Supported Hardware

VPS/IPDS will currently support any 240-DPI or 300-DPI IPDS printer that is attached to the 3270 network through VTAM or to the TCP/IP network using a direct TCP/IP (sockets) connection. VPS/IPDS will not support channel-attached printers.

VPS/PCL will support any PCL5-compatible printer. PCL4 printers have limited support because they only allow a 0 degree print direction, and they do not have the ability to print vector graphics.

Batch Versus Integrated Operation

The VPS/IPDS and VPS/PCL products can be run in batch or within VPS. When VPS/IPDS or VPS/PCL is run in batch, the time required to convert the datastream to the requested PDL is incurred when the batch job is run. When run within VPS, the datastream is converted to the requested PDL immediately before printing. This means the time that it takes to convert the datastream is incurred at print time.

The batch version cannot manage the resources as well as the integrated version. The batch version must always assume no resources are loaded, and always includes them in the datastream. The integrated version can keep track of which resources are already present in the printer, and adjusts the datastream accordingly.

The batch version may be more efficient in a situation where output is being created for multiple destinations. A large SYSOUT dataset which will be sent to ten destinations would be converted ten separate times if sent to VPS directly. If it was converted first in batch and then routed to all ten destinations, the conversion process would occur only once.

The batch version is not efficient when working with frequently used resources. Using the batch version, an overlay which is used by five different datasets would be loaded and deleted five times. The same overlay would only need to be loaded once if AFP is executed from within VPS. The first of the five datasets which used the overlay would cause it to be loaded. VPS would retain the overlay in the printer, allowing it to be invoked by the remaining four datasets.

There is no performance degradation when using VPS/PCL in batch mode with VPS/PC or VPS/TCPIP using LPR/LPD protocols because resources should be loaded for each print file as it is delivered.

VPS/PDF cannot be run in batch.

Installing the VPS AFP Products Within VPS

This section contains instructions for installing the VPS AFP products within VPS. For information about installing the base VPS product, refer to "Installation" on page 3.1. For information about using the VPS AFP products in batch mode, refer to "Installing the VPS/IPDS and VPS/PCL Products for Batch Processing" on page 8.19.

The VPS AFP products are on the same distribution cartridge with VPS, in IEBCOPY unloaded format with the following attributes:

- Standard Labels
- VOL=SER=VPSR80

There are several files on the distribution cartridge. The files to be restored are:

FILE NUMBER	DSNAME	CONTENTS
30	LRS.VPS.V1R80.PDEFLIB	Sample PAGEDEF library.
31	LRS.VPS.V1R80.FDEFLIB	Sample FORMDEF library.
32	LRS.VPS.V1R80.FONT300	Sample font library.
33	LRS.VPS.V1R80.OVLYLIB	Sample OVERLAY library.
34	LRS.VPS.V1R80.PSEGLIB	Sample PAGESEG library.

Most of the modifications to VPS required to run the VPS AFP products are printer keyword changes. The changes to the base VPS system consist of adding the AFP resource libraries to the VPS execution JCL. The DDNAMES for these libraries are FDEFLIB, PDEFLIB, FONTLIB, PSEGLIB, OVLYLIB and FONT300. (Other DDNAMEs can be used by setting the FDEFDD, FONTDD, OVLYDD, PDEFDD, and PSEGDD printer definition keyword values.)

Each of the VPS AFP products requires a special keyword that must be added to the VPS Initialization member in the VPS control library. The KEYIPDS keyword specifies the trial/license code for the VPS/IPDS product. The KEYPCL keyword specifies the trial/license code for the VPS/PCL product. The KEYPDF keyword specifies the trial/license code for the VPS/PDF product. These keys are generated by LRS and are supplied in file 8 of the VPS distribution cartridge (LRS.VPS.V1R80.CNTL).

When using the PSO interface (SAPI=N or SAPI not available), it is strongly recommended that VPS User Exit 15 be installed. The sample exit supplied with the base VPS system is sufficient. This exit supplies VPS with information about each SYSOUT dataset processed by VPS, such as PAGEDEF and FORMDEF, which enhances the operation of VPS. Without EXIT15, VPS must use either keyword or default values for the following parameters:

PAGEDEF
FORMDEF
DCKACTN
CHARS

If VPS User Exit 15 is not installed, these values will not be dynamic, but will be the same for every dataset printed. Exit 15 allows these values to be retrieved from the user's JCL.

VPS User Exit 24 is also recommended.

The following is an example of the VPS execution JCL with the AFP resource libraries included:

```
//* ------------------------------------------------------***
//*            VTAM PRINTER SUPPORT SYSTEM                 ***
//*                      V1 R8.0                           ***
//* ------------------------------------------------------***
//*
//VPS80    PROC  SMEM=VPSSTART
//VPS80    EXEC  PGM=VP80DRIV,PARM=&SMEM,REGION=4096K,TIME=1440
//STEPLIB  DD    DSN=LRS.VPS.V1R80.LOAD,DISP=SHR
//VPSLIB   DD    DSN=LRS.VPS.V1R80.CNTL,DISP=SHR
//SYSUDUMP DD    SYSOUT=A
//*
//FDEFLIB  DD    DSN=SYS1.FDEFLIB,DISP=SHR
//         DD    DSN=LRS.VPS.V1R80.FDEFLIB,DISP=SHR(optional)
//*
//PDEFLIB  DD    DSN=SYS1.PDEFLIB,DISP=SHR
//         DD    DSN=LRS.VPS.V1R80.PDEFLIB,DISP=SHR(optional)
//*
//FONTLIB  DD    DSN=SYS1.FONTLIBB,DISP=SHR
//*
//PSEGLIB  DD    DSN=SYS1.PSEGLIB,DISP=SHR
//*
//OVLYLIB  DD    DSN=SYS1.OVERLIB,DISP=SHR
//*
//FONT300  DD    DSN=SYS1.FONT300,DISP=SHR
//         DD    DSN=LRS.VPS.V1R80.FONT300,DISP=SHR(optional)
//         DD    DSN=SYS1.FONTLIBB,DISP=SHR
```

Adding System Keywords for VPS/IPDS, VPS/PCL, and VPS/PDF

The following keywords must be added to the VPS System Initialization Member:

KEYIPDS The KEYIPDS keyword specifies the trial/license code for the VPS/IPDS product. This keyword MUST be present to use the VPS/IPDS product. This key is generated by LRS and is supplied in file 1 of the VPS distribution cartridge.

KEYPCL The KEYPCL keyword specifies the trial/license code for the VPS/PCL product. This keyword MUST be present to use the VPS/PCL product. This key is generated by LRS and is supplied in file 1 of the VPS distribution cartridge.

KEYPDF The KEYPDF keyword specifies the trial/license code for the VPS/PDF product. This keyword MUST be present to use the VPS/PDF product. This key is generated by LRS and is supplied in file 1 of the VPS distribution cartridge.

Building the VPS/IPDS, VPS/PCL, and VPS/PDF Printer Definition Members

This section lists the keywords which should be added or modified in a printer definition member for a printer that will be used with the VPS AFP products. The keywords are divided into two groups. The first group includes keywords which are unique to the VPS AFP products, while the second group contains base VPS keywords which affect AFP processing. "Building the Printer Definition Members" on page 3.80 lists the possible values for each of these keywords.

Keywords Unique to VPS AFP Products

- **AFPADJ**

  The AFPADJ keyword defines x- and y- adjustment factors for AFP logical pages for VPS/PCL and VPS/PDF.

- **AFPKEYWD**

  A four-byte hex representation that specifies which OUTPUT statement and printer definition keywords should trigger AFP to IPDS, MODCA, PCL, or PDF conversion.

- **AFPMSGS**

  The AFPMSGS keyword specifies the resources (FORMDEF, PAGEDEF, and font) to use to print the VPS AFP conversion and VPS/IPDS NACK messages.

- **AFPOPTS**

  The AFPOPTS keyword is used to set special processing options in effect for a VPS AFP printer. Currently defined options include:

  - Inhibit jog of paper tray at the end of each job (VPS/IPDS and VPS/PCL only).
  - Clear the printer of downloaded resources after every dataset (VPS/IPDS and VPS/PCL only).
  - Jog the paper tray after each dataset (VPS/IPDS and VPS/PCL only).
  - Use the FCB as the default PAGEDEF name.
  - Only convert if the input dataset contains AFP commands or if the OUTPUT JCL statement specifies a FORMDEF or PAGEDEF name.
  - Process USERLIB resources as production resources (not secured resources) (VPS/IPDS and VPS/PCL only).
  - Ignore USERLIB datasets (VPS/IPDS and VPS/PCL only).
  - Use the largest available resource ID when numbering a resource (VPS/IPDS and VPS/PCL only).
  - Don't print warning and information conversion messages (VPS/IPDS and VPS/PCL only).
  - Printer tray(s) contain letterhead paper (VPS/IPDS and VPS/PCL only).
  - Do not convert outline fonts to bitmap fonts; always attempt to map the AFP outline font character set name to an AFP bitmap font character set name. Refer to page C.13 for information about default character set name mapping.
  - Always assume the FORMDEF 'cutsheet' option is on (i.e., so VPS/IPDS and VPS/PCL will not ignore the medium orientation) (VPS/IPDS and VPS/PCL only).

- **AFPRTAB**

  The AFPRTAB keyword specifies the name of a table used to map AFP resources to PCL printer resources.

  This keyword is ignored by VPS/IPDS and VPS/PDF.

- **CHARS**

  The CHARS keyword defines the default FONTS which VPS will use if none were associated with the SYSOUT via JCL.

- **DCKACTN**

  The DCKACTN keyword specifies whether the printer is to report certain datacheck errors and what action(s) the printer is to take when an exception is encountered. Coding this keyword parameter alters the IPDS Execute Order Anystate - Exception-Handling Control (XOA-EHC) command.

  This keyword is ignored by VPS/PCL and VPS/PDF.

- **DUPLEX**

  The DUPLEX keyword specifies whether the VPS AFP output should be simplex, normal duplex, or tumble duplex. This keyword overrides the FORMDEF duplex specification but is overridden by the OUTPUT JCL statement DUPLEX keyword.

  This keyword is ignored by VPS/PDF.

- **FDEFDD**

  The FDEFDD keyword identifies a DD statement in the VPS execution JCL containing form definition libraries to be used for VPS/IPDS, VPS/PCL, or VPS/PDF conversion.

- **FONTDD**

  The FONTDD keyword identifies a DD statement in the VPS execution JCL containing font libraries to be used for VPS/IPDS, VPS/PCL, or VPS/PDF conversion.

- **FORMDEF**

  The FORMDEF keyword defines the default FORMDEF which VPS will use if none was associated with the SYSOUT via JCL.

- **INTRAY**

  The INTRAY keyword specifies the input tray to use for all VPS AFP documents. This keyword overrides the FORMDEF bin specification but is overridden by the OUTPUT JCL statement INTRAY keyword.

  This keyword is ignored by VPS/PDF.

- **IPDOPTS**

  The IPDOPTS keyword is used to set special options in effect for a VPS/IPDS printer. Currently defined options include the following:

  - prevent loading of 42xx printer font table.
  - indicate 4224 repositioning required.
  - printer supports both 240 and 300 dpi fonts.

  This keyword is ignored by VPS/PCL and VPS/PDF.

- **OUTBIN**

  The OUTBIN keyword defines the default bin to which output should be routed on the printer.

  This keyword is ignored by VPS/PDF.

- **OVERLAYB**

  The OVERLAYB keyword specifies an OVERLAY that is to be printed on the back sides of the pages of all duplexed VPS AFP output. This OVERLAY is printed in addition to any OVERLAYs defined in the FORMDEF or on the OUTPUT JCL statement OVERLAYB keyword.

  This keyword is ignored by VPS/PDF.

- **OVERLAYF**

  The OVERLAYF keyword specifies an OVERLAY that is to be printed on the front sides of the pages of all VPS AFP output. This OVERLAY is printed in addition to any OVERLAYs defined in the FORMDEF or on the OUTPUT JCL statement OVERLAYF keyword.

  This keyword is ignored by VPS/PDF.

- **OVLYDD**

  The OVLYDD keyword identifies a DD statement in the VPS execution JCL containing overlay libraries to be used for VPS/IPDS, VPS/PCL, or VPS/PDF conversion.

- **PAGEDEF**

  The PAGEDEF keyword defines the default PAGEDEF which VPS will use if none was associated with the SYSOUT via JCL.

- **PCLOPMEM**

  The PCLOPMEM keyword is used to specify a member within the VPSLIB PDS that identifies to VPS/PCL the PJL commands for FORMDEF finishing operations for the printer.

  This keyword is ignored by VPS/IPDS and VPS/PDF.

- **PCLOPTS**

  The PCLOPTS keyword is used to set special processing options in effect for a VPS/PCL printer. Currently defined options include:

  - The printer is incapable of duplexing.
  - The printer does not support the PCL logical page offset commands.
  - Select a printer resident font only if both the font character set and code page table resources are mapped in the AFP resource table (AFPRTAB).
  - The option to support a 203mm A4 logical page width is set on the printer.
  - Don't wrap text in the PCL 'transparent data' command if it will be printed using a printer resident font.
  - The option to support a 'whole page' logical page size is set on the printer.
  - The printer only supports a unit of measure of 720.
  - Support envelope processing for the 3916 printer.
  - End processing if a printer overflow is detected.
  - Do not convert color to grayscale for non-color printer.
  - Use the printer default shading patterns for grayscale and highlight color shading.
  - Use the 12-byte header for user-defined patterns.

  This keyword is ignored by VPS/IPDS and VPS/PDF.

- **PDEFDD**

  The PDEFDD keyword identifies a DD statement in the VPS execution JCL containing page definition libraries to be used for VPS/IPDS, VPS/PCL, or VPS/PDF conversion.

- **PDFDBCS**

  The PDFDBCS keyword specifies the DBCS font name, CMAP name and size for VPS to use when converting a print file to PDF format.

  This keyword is ignored by VPS/IPDS and VPS/PCL.

- **PDFENCD**

  The PDFENCD keyword identifies the name of the AFP-to-PDF encoding table to be used for this printer.

- **PDFENCPY**

  The PDFENCPY keyword specifies the COPY permissions for an encrypted PDF file.

- **PDFENMOD**

  The PDFENCPY keyword specifies the MODIFY permissions for an encrypted PDF file.

- **PDFENMPW**

  The PDFENMPW keyword specifies the master password to be used to encrypt the PDF file.

- **PDFENPRT**

  The PDFENCPY keyword specifies the PRINT permissions for an encrypted PDF file.

- **PDFENUPW**

  The PDFENMPW keyword specifies the user password required to open an encrypted PDF file.

- **PDFENTYP**

  The PDFENTYP keyword specifies the type of encryption to be used for a PDF file.

- **PDFFONT**

  The PDFFONT keyword specifies the font name and size for VPS to use when converting a print file to PDF format.

  This keyword is ignored by VPS/IPDS and VPS/PCL.

- **PDFKWDS**

  The PDFKWDS keyword specifies which OUTPUT JCL statement keywords will be searched for VPS PDF conversion parameters.

  This keyword is ignored by VPS/IPDS and VPS/PCL.

- **PDFOPTS**

  The PDFOPTS keyword specifies special user options to be used for VPS PDF conversion. Currently defined options include:

  80000000 = Pass G4-MMR compressed IOCA to Acrobat. If this option is not set, VPS/PDF will decompress the G4-MMR IOCA and pass the uncompressed raster data to Acrobat. Setting this option can greatly reduce the AFP to PDF conversion time and the PDF file size, but Acrobat cannot process G4 MMR objects as transparent images, causing previously-placed data to be overlaid.

  40000000 = Add the Adobe core font demo pages to the end of the documents. These demo pages are provided to assist in determining the point sizes of fonts used in the document, and can be helpful in setting up the PDFRTAB. (See "Creating the PDF Resource Table" on page 8.68 for more information.)

  20000000 = Ignore requests for missing resources. VPS/PDF processing will continue even if OVERLAYs of PAGESEGs are not found in the resource file.

  10000000 = Enforce blank pages. By default, VPS/PDF will suppress blank pages that would be generated for duplex print jobs. Setting this flag will ensure that blank pages will be built in the output PDF file when at least part of the file is duplexed and conversion forces an 'eject to front facing' action (such as invoking a new medium map).

  This keyword is ignored by VPS/IPDS and VPS/PCL.

- **PDFPGSIZ**

  The PDFPGSIZ keyword specifies the height and width of the page to be used when converting the print file to PDF format.

  This keyword is ignored by VPS/IPDS and VPS/PCL.

- **PDFRTAB**

  The PDFRTAB keyword specifies the name of a table to map AFP resources and settings to Adobe resources and settings.

- **PIMSG**

  The PIMSG keyword specifies whether the VPS AFP conversion and VPS/IPDS NACK messages should be printed after the VPS AFP document. It also specifies how many recoverable NACKs should be ignored before VPS/IPDS terminates printing of the document.

  This keyword is ignored by VPS/PDF.

- **PSEGDD**

  The PSEGDD keyword identifies a DD statement in the VPS execution JCL containing page segment libraries to be used for VPS/IPDS, VPS/PCL, or VPS/PDF conversion.

Base VPS Keywords Affecting VPS AFP Products

- **ALOGMODE**

  VPS/IPDS needs to send a Function Management Header to LU-1 printers. This requires a VTAM LOGMODE entry with a Common Protocol of X'7080'. The VPS internal logmode VPSCOL meets this requirement. If the VTAM LOGMODE specified for the LU has a COMPROT of X'7080', this keyword can be omitted.

- **CKPTPAGE/CKPTLINE**

  CKPTPAGE is required for VPS/IPDS, but it can also be specified for VPS/PCL printers. If no value is specified, it will default to 10. This value determines how many pages VPS will send to the printer before requiring that the printer send an acknowledgment. (VPS requires that CKPTLINE be set to a non-zero value if CKPTPAGE is set to a non-zero value).

- **COMPRESS**

  The first positional parameter value of the COMPRESS keyword is used for non-AFP datasets.

  If the second positional parameter value of the COMPRESS keyword is set to "Y", VPS/IPDS will compress IPDS - Write Text (WT) records sent to the printer. These WT records are created from AFPDS Presentation Text (PTX) records and/or line data. They contain printer controls, such as location of data on a page, and the actual print data. When VPS/IPDS "compresses" these records, repeating characters are combined into "Repeat String" text controls to shorten the amount of data sent to the printer.

  If the third positional parameter value of the COMPRESS keyword is set to "T", VPS/PCL will compress outbound PCL raster data, by using the Tagged Image File Format (TIFF) encoding method.

  The fourth positional parameter value of the COMPRESS keyword specifies the level of compression for data converted from AFP to PDF by the VPS/PDF product.

- **CONVTYPE**

  CONVTYPE must be set to CONVTYPE=IPDS for an IPDS printer; to CONVTYPE=PCL for a PCL printer; and CONVTYPE=PDF for a PDF printer.

  When running VPS/PCL with VPS/PC or VPS/TCPIP using LPR/LPD protocols (with CONVTYPE=PCL and COMMTYPE=(APPC,VPSPC), COMMTYPE=(TCPIP,VPSPC) or COMMTYPE=(TCPIP,LPD)), AFPOPTS=4000 is recommended. This option causes VPS/PCL to send all resources required by a dataset when the dataset is sent, rather than assuming that the resources are present in the printer from a previous transmission. Because the PC or TCP/IP LPD printers can be used by other applications from the PC or IP networks, it cannot be assumed that resources will survive between dataset transmissions.

  CONVTYPE=PDF is supported for the following values in the second parameter of the COMMTYPE= keyword: ANYQUEUE, CDI, EMAIL, PAGECENT, RMTQUEUE, VPSPC.

- **DSPACE, DUNIT, and DVOLUME**

  These keywords define the amount of DASD space, the unit type of the device, and the volume on which several ACIF and VPS AFP files are to be allocated. Some of these include:

  ACIF input parameter file.
  ACIF output index file.
  ACIF output resource file.
  ACIF output document file.
  VPS/PDF output PDF file.
  VPS/IPDS or VPS/PCL printer message file.

  The size of the created MODCA or PDF files will almost always be larger than the original SYSOUT dataset since resources will be required for processing. The DPSPACE should be specified with values large enough to allow for the inclusion of any resources.

- **ERRACTN**

  VPS can requeue output, using the requeue keyword values, whenever conversion to the PDL fails. This prevents the printer from being EDRAINED when the error is in the SYSOUT dataset.

- **IPDCLASS**

  When data is sent to VPS in the IPDCLASS, it is assumed that the data is already in IPDS format. Therefore, no AFP to IPDS, PCL, or PDF conversion will take place.

  Output from the VPS AFP batch program must be placed in the IPDCLASS for an IPDS printer.

- **PCMDEND and PCMDSTART**

  These keywords specify what special printer commands VPS should send at the start and end of each separator and dataset. No commands will be sent before or after VPS/IPDS, VPS/PCL, or VPS/PDF datasets.

- **QSPACE, QUNIT, and QVOLUME**

  These keywords define the amount of DASD space, the unit type of the device, and the volume on which the staging dataset is to be allocated. A secondary staging dataset using these parameter values will also be allocated to contain VPS/IPDS or VPS/PCL output. The size of the created IPDS or PCL datastream will almost always be larger than the original SYSOUT dataset since resources will be required for processing. The QPSPACE should be specified with values large enough to allow for the inclusion of any resources.

- **RELREQ**

  VPS manages the resources within a printer. When the VTAM session with a printer ends, VPS deletes its tables which track the various resources within the printer. When the printer is acquired again, all downloaded resources must be sent again. It is more efficient to keep the printer in session with VPS as much as possible. RELREQ values of “A” and “I” should be avoided.

- **TRNCLASS**

  When data is sent to VPS in the TRNCLASS, it is assumed that the data is already in printer-ready format (such as PCL). Therefore, no AFP to IPDS, PCL, or PDF conversion will take place.

  Output from the VPS AFP batch program must be placed in the TRNCLASS for a PCL printer.

A typical printer definition member for a VPS printer using the VPS/IPDS product might look like this:

```
  AFPOPTS=1000,          1000 - USE FCB NAME AS PAGEDEF NAME
  ALOGMODE=VPSCOL,       USE LOGMODE IMAGE FOR FUNCTION MGT HEADERS
  AUTOEJCT=(N,N,N,N),    TURN OFF EXTRANEOUS FORM FEEDS
  CHARS=(GT10),          DEFAULT FONT
  CKPTLINE=100,          IGNORED FOR IPDS PRINTERS
  CKPTPAGE=5,            ASK FOR IPDS ACKNOWLEDGEMENT AFTER EVERY 5 PAGES
  COMPRESS=(,Y),         COMPRESS THE IPDS 'WT - WRITE TEXT' DATA
  CONVTYPE=IPDS,         CONVERT TO IPDS FORMAT
  DCKACTN=BLOCK,         BLOCK INVALID CHAR AND POSITIONING ERRORS
  DEST=U4030,            JES DESTINATION SELECTION CRITERIA
  ERRACTN=(STD,,EDR),    EDRAIN THE PRINTER AFTER A CONVERSION ERROR
  FCB=Y,                 FCB SUPPORT IS ACTIVE
  FDEFDD=FDEF01,         FORMDEF LIBRARY DD
  FONTDD=FONT300,        FONT LIBRARY DD
  FORMDEF=NDPLX,         DEFAULT FORMDEF
  IPDCLASS=I,            CLASS I DATASETS ARE ALREADY IPDS FORMAT
  LUNAME=L75509,         VTAM LUNAME
  OVLYDD=OVLYTEST,       OVERLAY LIBRARY DD
  PAGEDEF=1UPL60,        DEFAULT PAGEDEF
  PDEFDD=PDEF01,         PAGEDEF LIBRARY DD
  PRTROPTS=0220,         SPLIT LARGE PRINT LINES INTO MULT VTAM BUFFERS
*                        ENFORCE RECFM FOR CARRIAGE CONTROL PROCESSING
  PSEGDD=PSEGTEST,       PAGESEG LIBRARY DD
  RUSIZE=1024            1K VTAM RU SIZE
```

A typical printer definition member for a VPS printer using the VPS/PCL product might look like this:

```
  AFPADJ=(0,0,0,0),       NO OVERLAY MARGINS OR LOGICAL PAGE OFFSETS
  AFPOPTS=5000,           4000 - DELETE RESOURCES AFTER EVERY DATASET
*                         1000 - USE FCB NAME AS PAGEDEF NAME
  AFPRTAB=VPSSRTAB,       AFP RESOURCE TABLE IS LOAD MODULE VPSSRTAB
  ALOGMODE=VPSLU1,        USE LOGMODE IMAGE FOR SNA/SCS PRINTER
  AUTOEJCT=(N,N,N,N),     TURN OFF EXTRANEOUS FORM FEEDS
  CHARS=(GT10),           DEFAULT FONT
  COMPRESS=(,,T),         USE TIFF COMPRESSION FOR RASTER IMAGES
  CONVTYPE=PCL,           CONVERT TO PCL FORMAT
  DEST=U4031,             JES DESTINATION SELECTION CRITERIA
  ERRACTN=(,,REQ),        REQUEUE THE DATASET AFTER A CONVERSION ERROR
  FCB=Y,                  FCB SUPPORT IS ACTIVE
  FDEFDD=FDEF01,          FORMDEF LIBRARY DD
  FONTDD=FONT300,         FONT LIBRARY DD
  FORMDEF=NDPLX,          DEFAULT FORMDEF
  LUNAME=L75509,          VTAM LUNAME
  OVLYDD=OVLYTEST,        OVERLAY LIBRARY DD
  PAGEDEF=1UPL60,         DEFAULT PAGEDEF
  PCLOPTS=8000,           PRINTER CANNOT DUPLEX
  PDEFDD=PDEF01,          PAGEDEF LIBRARY DD
  PRTROPTS=0220,          SPLIT LARGE PRINT LINES INTO MULT VTAM BUFFERS
*                         ENFORCE RECFM FOR CARRIAGE CONTROL PROCESSING
  PSEGDD=PSEGTEST,        PAGESEG LIBRARY DD
  REQOUTP=(A,TSQ),        REQUEUE SYSOUT CLASS AND JES DESTINATION
  TRNCLASS=(T,C,35)       TRANSPARENCY CLASS AND FORMAT
```

A typical printer definition member for a VPS printer using the VPS/PDF product might look like this:

```
CHARS=(GT10),              DEFAULT FONT
COMPRESS=(,,,7),           USE LEVEL 7 COMPRESSION FOR DATA CONVERTED
COMMTYPE=(TCPIP,EMAIL),    A TCP/IP CONNECTION WITH VPS/EMAIL
CONVTYPE=PDF,              CONVERT TO PDF FORMAT
DEST=U4030,                JES DESTINATION SELECTION CRITERIA
ERRACTN=(STD,,EDR),        EDRAIN THE PRINTER AFTER A CONVERSION ERROR
FCB=Y,                     FCB SUPPORT IS ACTIVE
FDEFDD=FDEF01,             FORMDEF LIBRARY DD
FONTDD=FONT300,            FONT LIBRARY DD
FORMDEF=NDPLX,             DEFAULT FORMDEF
OVLYDD=OVLYTEST,           OVERLAY LIBRARY DD
PAGEDEF=1UPL60,            DEFAULT PAGEDEF
PDEFDD=PDEF01,             PAGEDEF LIBRARY DD
PDFENCD=VPSSENCD           ENCODING TABLE NAME
PDFKWDS=FFFF0000,          SEARCH THE 16 USERDATA FIELDS
PDFRTAB=VPSSPTAB,          PDF RESOURCE TABLE IS LOAD MODULE VPSSPTAB.
PSEGDD=PSEGTEST,           PAGESEG LIBRARY DD
TCPHOST=192.5.6.177,       INTERNET ADDRESS OF THE REMOTE HOST
TCPPRTR=SPECIAL@ABC.COM,   EMAIL ADDRESS OF THE RECIPIENT
TCPRPORT=25                PORT NUMBER TO CONNECT AT THE REMOTE HOST
```

VPS Exits and AFP Processing

All VPS exits can be installed and used in a VPS system running a VPS AFP product. Those of particular interest for VPS AFP include:

- Exit 14 - Dataset Add Exit

  This exit is called after the PDL for a printer has been determined. Any data added must be consistent with the PDL. For example, if the printer has CONVTYPE=IPDS, then Exit 14 can only add IPDS data. This data must be valid IPDS commands and must not violate the IPDS architecture. This exit is NOT called for VPS/PDF conversions.

- Exit 15 - JES Cross Memory Exit

  Exit 15 should always be installed when using the PSO interface (SAPI=N). Though VPS AFP can operate without this exit, Exit 15 provides values for many JCL keywords which enhance AFP processing.

- Exit 23 - IPDS Command Exit

  This exit is called for every IPDS command, ACK, or NACK received. It can modify or delete IPDS commands, but it cannot be used to insert IPDS commands. The exit can also inform VPS to ignore an ACK or NACK.

- Exit 24 - Subsystem Request Exit

  Exit 24 can be installed when using the PSO interface (SAPI=N). This exit enables VPS to uniquely identify SYSOUT datasets within a job that has the same JES2 dataset name and SYSOUT characteristics. This will occur whenever a SYSOUT dataset references multiple OUTPUT JCL statements.

- Exit 26 - AFP Resource Exit

  This exit is called to determine whether or not the current job is authorized to access the specified AFP resource or USERLIB dataset(s), and to check for resource name substitution. This exit is NOT called if VPS/IPDS or VPS/PCL is run in batch. This exit is not called for VPS/PDF conversion.

- Exit 27 - ACIF Parameter File Exit

  This exit is called to modify the input parameters when VPS invokes the AFP Conversion and Indexing Facility.

Storage Requirements

Storage requirements AFP The storage requirements listed below are in addition to the printer storage requirements listed in “Virtual Storage Requirements” on page 2.4, and are required for each VPS printer using AFP.

In-session Printer Requirements

Total Below 16M line: ASB - AFP system control block - 4K

Total Above 16M line: Font table - 48K

Overlay table - 48K

Page segment table - 24K

Actively Printing Printer Requirements

Total Above 16M line: Main input file buffer - QBUFSIZE

Font file buffer - FONTDD blocksize

Formdef file buffer - FDEFDD blocksize

Overlay file buffer - OVLYDD blocksize

Pagedef file buffer - PDEFDD blocksize

Pageseg file buffer - PSEGDD blocksize

Output file buffer - QBUFSIZE

IPDS command buffer - 32K (VPS/IPDS only)

PCL command buffer - 4K (VPS/PCL only)

Page font table - 4K

Overlay font table - 4K

Pageseg font table - 4K

Page overlay table - 254 bytes

Conditional processing table - 8K (when the PAGEDEF specifies conditional processing)

Page data save area - 4K (when the PAGEDEF specifies conditional processing)

Output file record work areas - 24K

Inline resource table - 3K (when the input file contains inline resources)

Installing the VPS/IPDS and VPS/PCL Products for Batch Processing

Installation of the batch AFP conversion programs simply requires that any job running the program have the VPS load library as its STEPLIB, or that the VPS load library be an authorized linklist library. VPS/PDF cannot currently be run in batch.

The following is a sample of the JCL required to run VPS AFP in batch:

```
//jobname    JOB  . . .
//STEP1      EXEC PGM=VPSAFP
//STEPLIB    DD   DSN=loadlib,DISP=SHR
//SYSPRINT   DD   SYSOUT=*
//*
//FDEFLIB    DD   DSN=SYS1.FDEFLIB,DISP=SHR
//            DD   DSN=fdeflib,DISP=SHR
//*
//PDEFLIB    DD   DSN=SYS1.PDEFLIB,DISP=SHR
//            DD   DSN=pdeflib,DISP=SHR
//*
//OVLYLIB    DD   DSN=SYS1.OVLYLIB,DISP=SHR
//            DD   DSN=ovlylib,DISP=SHR
//*
//PSEGLIB    DD   DSN=SYS1.PSEGLIB,DISP=SHR
//            DD   DSN=pseglib,DISP=SHR
//*
//FONTLIB    DD   DSN=SYS1.FONTLIBB,DISP=SHR
//            DD   DSN=fontlib,DISP=SHR
//*
//FONT300    DD   DSN=SYS1.FONT300,DISP=SHR
//            DD   DSN=font300lib,DISP=SHR
//*
//INFILE     DD   DSN=dataset,DISP=SHR
//*
//OUTFILE    DD   DSN=dataset,DISP=SHR
            - or -
//OUTFILE    DD   SYSOUT=I,DEST=....
//VPSLIB     DD   DSN=library,DISP=SHR
//*
//MSGFILE    DD   DSN=dataset,DISP=SHR
            - or -
//MSGFILE    DD   SYSOUT=A,DEST=....
            - or -
//MSGFILE    DD   DUMMY
//*
//PARMFILE   DD   *
.
.           (control statements)
.
/*
//
```

Notes:

- Each resource file must be a partitioned dataset consisting of records with carriage control.
- The input dataset must be a physical sequential dataset. If the input is AFPDS, the records must have carriage control.
- The output dataset must be a physical sequential dataset with undefined-length records. VPSAFP will alter the DCB RECFM if necessary. DO NOT use an output dataset with a block size that is larger than the QBUFSIZE of the printer the document will be printed on.
- The parameter file must be a physical sequential dataset with fixed-length 80-byte records.
- For VPS/IPDS, the SYSOUT class on the OUTFILE DD must match a class specified on the IPDCLASS= keyword in the VPS Printer Definition member.
- For VPS/PCL, the SYSOUT class on the OUTFILE DD must match a class specified on the TRNCLASS= keyword in the VPS Printer Definition member.
- A separate dataset is needed for the conversion messages. Add another JCL step to convert and print the messages dataset following the original conversion step.
- The VPSLIB DD is required when PCLOPMEM is specified in the PARMFILE. This library follows the same rules of syntax as the VPS control library, defined in "VPS Control Library" on page 3.2.

Batch Parameters

This section lists the VPS AFP batch parameters. These keyword parameters should be coded in a control statement file pointed to by DD card PARMFILE in the job step which executes VPS AFP. For example:

```
//PARMFILE DD DSN=datasetname,DISP=SHR
      - or -
//PARMFILE DD *
.
. (control statements)
.
/*
```

Please follow the same syntax rules used for VPS control library members when coding the PARMFILE control dataset. These syntax rules are described in "Syntax of VPS Control Library Members" on page 3.2.

AFPADJ= Specifies, via four positional parameters, adjustment factors to shift the logical page on the physical page for VPS/PCL datasets (CONVTYPE=PCL).

Positional parameter 1 is no longer used and will be ignored.

Positional parameter 2 is no longer used and will be ignored.

Positional parameters 3 and 4 specify the x- and y- values for adjustment factors to shift the logical page on the physical page.

These values are provided to help adjust AFP documents to PCL printers which have a much larger unprintable area than IPDS printers have. On most PCL printers, the unprintable area is about 4.3 mm around all edges of the physical page. IPDS printers have a much smaller unprintable area, so documents originally created for IPDS printers may print on PCL printers with data truncated at the edges of the page. (Note that many new PCL 5 printers support 'edge-to-edge' or 'whole page' printing. When this option is set, the printer will not truncate data in the unprintable area. The 0200 flag of PCLOPTS should be set if this option is turned on at the printer.)

For example, if VPS/PCL output is consistently being printed with data truncated at the left and bottom edges of the page, the x-value could be set to some positive number of decipoints, and the y-value could be set to some negative number of decipoints. VPS/PCL would shift the printed data (both variable page data and OVERLAY data), for each job, to the right and up. Beware that this could result in truncation of data at the right or top of the page for other documents. These adjustment values affect every dataset printed through VPS/PCL for the printer. It is much better to alter specific FORMDEFs, PAGEDEFs, and/or OVERLAYs that push data into the PCL printer's unprintable area.

These values are defined in decipoints (1 decipoint = 1/720 inch).

Valid Values: -720 to 720 for each factor

Default: (0,0,0,0)

Example: AFPADJ=(,,120,-144)

This specifies that VPS/PCL should shift the logical page to the right about .167 inch and up about .2 inch.

Note: This keyword is valid only for printers with CONVTYPE=PCL.

AFPOPTS= A four-byte hex representation of special options to be in effect. The value is specified as eight digits, representing four hex bytes (32 bits). The option bit specifications are:

80000000 = Reserved for internal use.

40000000 = Reserved for internal use.

20000000 = Reserved for internal use.

10000000 = Reserved for internal use.

08000000 = Reserved for internal use.

04000000 = Reserved for internal use.

02000000 = Reserved for internal use.

01000000 = Enforce RECFM of the dataset for CC processing.

00800000 = Use the largest available resource ID when numbering a resource.

00400000 = Don't write warning and informational conversion messages to the MSGFILE dataset.

00200000 = Printer tray(s) contain letterhead paper.

00100000 = Do not convert outline fonts to bitmap fonts; always attempt to map the AFP outline font character set name to an AFP bitmap font character set name. Refer to page C.13 for information about default character set name mapping.

00080000 = Reserved for future use.

00040000 = Always assume the FORMDEF 'cutsheet' option is on (i.e., so VPS/IPDS and VPS/PCL will not ignore the medium orientation).

00020000 = Undefined.

00010000 = Undefined.

00008000 = Undefined.

00004000 = Undefined.

00002000 = Undefined.

00001000 = Undefined.

00000800 = Undefined.

00000400 = Undefined.

00000200 = Undefined.

00000100 = Undefined.

00000080 = Undefined.

00000040 = Undefined.

00000020 = Undefined.

00000010 = Undefined.

00000008 = Undefined.

00000004 = Undefined.

00000002 = Undefined.

00000001 = Undefined.

Valid Values: 00000000 - FFFFFFFF

Default: 00000000

Example: AFPOPTS=01000000

AFPRTAB= A 1 to 8 character value that specifies the name of the AFP resource mapping table to be used for this printer. See "Using the VPS/PCL Resource Mapping Table (AFPRTAB)" on page 8.44 for more information about AFP resource mapping tables. This keyword is applicable only when PDL=PCL is specified.

Valid Values: Any valid AFP resource mapping table name.

Default VPSSRTAB

Example: AFPRTAB=VPSSRTB2

This specifies that VPS should use the resource mapping table named VPSSRTB2 if PDL=PCL is specified.

CHARS= Specifies the fonts to be used.

Valid Values: 1 - 4 alphanumeric characters per position. A maximum of four parameters can be specified, but no positions can be omitted (skipped).

Default: None.

Example: CHARS=(GT10,GT12,GT18,GT24)

This specifies that Gothic.10, Gothic.12, Gothic.18 and Gothic.24 fonts should be used for the print job.

Note: The values specified for CHARS will be prefixed by the characters "X0" before being used as member names for retrieval from the library specified on the FONTLIB/FONT300 DD statement in the JCL.

COMPRESS= Specifies, via two positional parameters, whether data should be compressed.

Positional parameter 1 specifies if IPDS Write Text (WT) records produced by VPS/IPDS should be compressed. This has no effect on output from VPS/PCL.

Valid Values: Y - Standard text compression.

N - No text compression.

Default: Y

IPDS WT records are created from AFPDS Presentation Text (PTX) records and/or line data. They contain printer controls, such as location of data on a page, and the actual print data. When VPS/IPDS "compresses" these records, repeating characters are combined into "Repeat String" text controls to shorten the amount of data sent to the printer.

Positional parameter 2 specifies if VPS/PCL should compress outbound PCL raster data. This has no effect on output from VPS/IPDS.

Valid Values: T - Tagged Image File Format (TIFF) encoding method.

N - No compression of outbound raster data.

Default: T

Note: VPS/PCL uses the Tagged Image File Format (TIFF) encoding method.

Example: COMPRESS=(Y,N)

This example indicates that VPS/IPDS should compress Write Text records for this printer and that VPS/PCL should not compress output PCL raster data for this printer.

COPYGPS= Specifies how many times the document is to be produced and how many copies of each page are to be printed. Up to eight group values can be coded.

When the FORMDEF parameter is NOT coded, the document will be produced the number of group values that are specified. The first time the document is produced, each page will be printed the number of times of the first group value. For each subsequent reproduction of the document, each page will be printed the number of times of the next corresponding group value. When the FORMDEF parameter IS coded, the entire document will be produced the number of group values that are coded on the COPYGPS parameter. The actual values coded on the COPYGPS parameter will be ignored.

Valid Values: Each group value can be a number between 1 and 255, but the total of all group values cannot exceed 255.

Default 1

Example: COPYGPS=(3,2,55,48)

If the FORMDEF parameter is NOT coded, the default form definition will be used, and the document will be produced four times with the first containing three copies of each page, the second containing two copies of each page, the third containing 55 copies of each page, and the fourth containing 48 copies of each page. The printer will jog the stacks of output between each reproduction of the document. If the FORMDEF parameter IS coded, the document will be produced four times.

Note: Remember that the output produced when the COPYGPS parameter is coded with more than one group value will be up to eight times larger (depending on the number of group values desired) than the output produced when the COPYGPS parameter is coded with only one group value. The user must take this into account when allocating an output dataset.

DCKACTN= Specifies whether the printer is to report certain data-check errors and what action the printer is to take when an exception is encountered. Coding this keyword parameter alters the IPDS Execute Order Anystate - Exception-Handling Control (XOA-EHC) command.

This keyword is ignored for VPS/PCL.

Positional parameter 1 specifies what data-check exceptions should be blocked:

Valid Values: UNBLOCK - Specifies that the printer is to report all data-check exceptions.

BLKCHAR - Specifies that the printer is not to report invalid-character errors.

BLKPOS - Specifies that the printer is not to report print-positioning errors.

BLOCK - Specifies that the printer is not to report either invalid-character or print-positioning errors.

BLKALL - Specifies that the printer is not to report invalid-character errors, print-positioning errors, or any other data-check errors for which alternate exception actions exist.

Default: BLOCK

Note: When BLKCHAR, BLKPOS, BLOCK, or BLKALL is specified, the printer will attempt to take an alternate exception action (AEA) when a data-check error which the printer is not to report is encountered. If an AEA is defined, the second and third parameters are ignored. If an AEA is not defined for the exception, the error IS reported and the second and third parameter specifications take effect.

Positional parameter 2 specifies whether the printer should try to take a page continuation action (PCA) when a data-check error, for which no AEA is to be taken or for which no AEA exists, is encountered.

Valid Values: NOPCACT - Specifies that when the printer encounters a datastream exception, for which no alternate exception action (AEA) exists or for which no AEA is to be taken, the printer should terminate processing of the page, overlay, or page segment and enter home state.

In this case, the value for positional parameter 3 takes effect.

PCACT - Specifies that when the printer encounters a datastream exception, for which no AEA exists or for which no AEA is to be taken, the printer should take any defined page continuation action. A printer may take either a “skip and continue” action or a “page continuation” action, depending on the printer. In this case, positional parameter 3 is ignored.

Default: NOPCACT

Positional parameter 3 specifies whether the printer should try to print as much of a page as possible up to the point of a data-check error for which no PCA is to be taken or for which no PCA exists.

Valid Values: NOEPPACT - Specifies that the printer should not print the page containing the error.

EPPACT - Specifies that the printer should end the page and try to print as much of the page, up to the point of the error, as possible. Processing can continue with the next page.

Default: NOEPPACT

Positional parameter 4 specifies whether the printer is to mark any print positioning errors.

Valid Values: HLIGHT - Specifies that the printer is to mark print-positioning errors even though the printer is supposed to block these errors.

NOHLIGHT - Specifies that the printer is not to mark print-positioning errors.

Default: NOHLIGHT

Example: DCKACTN=(BLKALL,PCACT,EPPACT,NOHLIGHT)

This specifies that the printer should ignore all data-check errors and try to take an AEA if an exception is encountered. If no AEA exists for the exception, the printer should report the error and attempt to take a “skip and continue” or “page continuation” action. If no PCA exists for the data-check error, the printer should end the page and try to print as much of the page as possible, up to the point of the exception. Print-positioning errors will not be highlighted.

Example: DCKACTN=(,,EPPACT)

This specifies that the printer should report any data-check error. If an exception is encountered, the printer should end the page and try to print as much of the page as possible, up to the point of the exception. Processing can continue with the next page. Print-positioning errors will be highlighted.

DUPLEX= Specifies whether the output should print simplex, normal duplex, or tumble duplex. This option will override the duplex specification in the FORMDEF.

Valid Values: NO, NORMAL, or TUMBLE

Default: None

Example: DUPLEX=TUMBLE

This specification indicates that the output should print tumble duplex.

FORMDEF= Specifies the form definition to be used.

Valid Values: 1 - 6 alphanumeric characters.

Default: A10110

Example: FORMDEF=A10111

This specifies that the form definition to be used for the print job should be F1A10111.

Note: The value specified for FORMDEF will be prefixed by the characters “F1” before being used as a member name for retrieval from the library specified on the FDEFLIB DD statement in the JCL.

FORMLEN= Specifies the physical length of the paper to be used so the printer does not have to be reconfigured for VPS/IPDS output, or so the AFPRTAB paper size specifications do not have to be altered for VPS/PCL output.

Valid Values: nn.nnnu

n is a digit 0 - 9

u is either CM or IN

Default: None

Example: FORMLEN=10.5IN

This specification indicates that the length of the paper used to print the output is 10.5 inches.

INTRAY= Specifies the input tray number for the output. This option will override the FORMDEF bin specification.

Valid Values: 0 - 255

Default: None

Example: INTRAY=2

This specification indicates that the paper source for the output is input tray #2.

IPDOPTS= A four-byte hex representation of special options to be in effect. The value is specified as eight digits, representing four hex bytes (32 bits). The option bit specifications are:

80000000 = Reserved for internal use.

40000000 = Don't load 42xx printer font table.

20000000 = The printer supports both 240 and 300 dpi fonts.

10000000 = Undefined.

08000000 = Undefined.

04000000 = Undefined.

02000000 = Undefined.

01000000 = Undefined.

00800000 = Undefined.

00400000 = Undefined.

00200000 = Undefined.

00100000 = Undefined.

00080000 = Undefined.

00040000 = Undefined.

00020000 = Undefined.

00010000 = Undefined.

00008000 = Undefined.

00004000 = Undefined.

00002000 = Undefined.

00001000 = Undefined.

00000800 = Undefined.

00000400 = Undefined.

00000200 = Undefined.

00000100 = Undefined.

00000080 = Undefined.

00000040 = Undefined.

00000020 = Undefined.

00000010 = Undefined.

00000008 = Undefined.

00000004 = Undefined.

00000002 = Undefined.

00000001 = Undefined.

Valid Values: 00000000 - FFFFFFFF

Default: 00000000

Example: IPDOPTS=40000000

This specifies that the 42xx printer font table should not be loaded.

Note: This keyword is valid only when PDL=IPDS is also specified.

KEYIPDS= Specifies the trial/license code for the VPS/IPDS product. This keyword MUST be present in order to use the VPS/IPDS product.

Valid Values: 60 characters. This key is supplied by LRS and identifies the CPU serial number on which the product is licensed. This key is supplied in file 8 of the VPS distribution cartridge (LRS.VPS.V1R80.CNTL).

Default: None

KEYPCL= Specifies the trial/license code for the VPS/PCL product. This keyword MUST be present in order to use the VPS/PCL product.

Valid Values: 60 characters. This key is supplied by LRS and identifies the CPU serial number on which the product is licensed. This key is supplied in file 8 of the VPS distribution cartridge (LRS.VPS.V1R80.CNTL).

Default: None

OFFSETXB= Specifies the logical page x-offset for the back side of each page of output. This option will override the FORMDEF logical page x-offset specified for the back side of the pages.

Valid Values: nnn.nnnu

n is a digit 0 - 9

u is either CM, IN, MM, PELS, or POINTS (PELS and POINTS must be specified in whole numbers).

Default: None

Example: OFFSETXB=0.9CM

This specification indicates that for the back side of each page of output, the logical page should be offset 0.9CM from the left edge of the physical page.

OFFSETXF= Specifies the logical page x-offset for the front side of each page of output. This option will override the FORMDEF logical page x-offset specified for the front side of the pages.

Valid Values: nnn.nnnu

n is a digit 0 - 9

u is either CM, IN, MM, PELS, or POINTS (PELS and POINTS must be specified in whole numbers)

Default: None

Example: OFFSETXF=1IN

This specification indicates that for the front side of each page of output, the logical page should be offset 1IN from the left edge of the physical page.

OFFSETYB= Specifies the logical page y-offset for the back side of each page of output. This option will override the FORMDEF logical page y-offset specified for the back side of the pages.

Valid Values: nnn.nnnu

n is a digit 0 - 9

u is either CM, IN, MM, PELS, or POINTS (PELS and POINTS must be specified in whole numbers).

Default: None

Example: OFFSETYB=150PELS

This specification indicates that for the back side of each page of output, the logical page should be offset 150 pels from the top edge of the physical page.

OFFSETYF= Specifies the logical page y-offset for the front side of each page of output. This option will override the FORMDEF logical page y-offset specified for the front side of the pages.

Valid Values: nnn.nnnu

n is a digit 0 - 9

u is either CM, IN, MM, PELS, or POINTS (PELS and POINTS must be specified in whole numbers).

Default: None

Example: OFFSETYF=60POINTS

This specification indicates that for the front side of each page of output, the logical page should be offset 60 points from the top edge of the physical page.

OUTBIN= Specifies the bin to which the output should be routed on the printer.

Valid Values: 1 - 65535

Default: None

Example: OUTBIN=2

This specifies that the output should be routed to bin #2 for this printer.

OVERLAYB= Specifies the name of an OVERLAY to be printed on the back sides of the pages. This OVERLAY will print in addition to any OVERLAYs specified in the FORMDEF.

Valid Values: 1 - 8 alphanumeric characters

Default: None

Example: OVERLAYB=01TEST

This specification indicates that OVERLAY 01TEST be placed on the back sides of all the pages.

OVERLAYF= Specifies the name of an OVERLAY to be printed on the front sides of the pages. This OVERLAY will print in addition to any OVERLAYs specified in the FORMDEF.

Valid Values: 1 - 8 alphanumeric characters

Default: None

Example: OVERLAYF=01TEST

This specification indicates that OVERLAY 01TEST be placed on the front sides of all the pages.

PAGEDEF= Specifies the page definition to be used.

Valid Values: 1 - 6 alphanumeric characters.

Default: A06462

Example: PAGEDEF=W240F3

This specifies that the page definition to be used for the print job should be P1W240F3.

Note: The value specified for PAGEDEF will be prefixed by the characters "P1" before being used as a member name for retrieval from the library specified on the PDEFLIB DD statement in the JCL.

PCLOPMEM= Specifies a member within the VPSLIB DD that identifies to VPS/PCL the PJL commands for FORMDEF finishing operations for the printer. If no PCLOPMEM table is defined, then VPS/PCL will not request any finishing operations from the printer.

Valid Values: Name of a member that exists in the VPSLIB DD.

Default: None.

Example: PCLOPMEM=FINOPS

This specification indicates that member FINOPS in the VPSLIB DD contains PJL commands for various FORMDEF finishing operations. See "Creating and Using the VPS/PCL PCLOPMEM Table" on page 8.61 for more information about the PCLOPMEM table.

Note: When this parameter is coded, the VPSLIB DD statement is required in the batch VPSAFP JCL.

PCLOPTS= A four-byte hex representation of special options to be in effect. The value is specified as eight digits, representing four hex bytes (32 bits). The option bit specifications are:

80000000 =Printer cannot duplex.
40000000 =Logical page offset commands are not supported.
20000000 =Do not optimize downloaded fonts. Normally, VPS/PCL will download a font character only when it is needed for printing. When this flag is on, VPS/PCL will download the font and all its 256 characters at once. This will result in a much larger output PCL dataset, but some printers may require that fonts be handled in this manner.
10000000 =Use printer resident fonts only if both the code page table and font character set are mapped in the AFP resource table (AFPRTAB).
08000000 =Support the '203mm A4 page width' option that is set on the printer.
04000000 =Do not wrap text in the PCL 'transparent data' command if it will be printed using a printer resident font (should be set if output will be sent through a Rightfax LPD server).
02000000 =Support the 'whole page' option that is set on the printer.
01000000 =Printer only supports a unit of measure of 720.
00800000 =Use IBM 3916 envelope processing.
00400000 =Use implicit raster data size.
00200000 =End processing if a storage overflow is detected.
00100000 =Do not convert color to grayscale for non-color printer (does not apply to GOCA; GOCA color specifications are always converted to grayscale for non-color printers).
00080000 =Use the printer default shading patterns for grayscale and highlight color shading (instead of downloading user-defined shading patterns).
00040000 =Use the 12-byte header for user-defined patterns (refer to the printer documentation for information on what user-defined pattern header is supported).
00020000 =Undefined.
00010000 =Undefined.
00008000 =Undefined.
00004000 =Undefined.
00002000 =Undefined.
00001000 =Undefined.
00000800 =Undefined.
00000400 =Undefined.
00000200 =Undefined.
00000100 =Undefined.
00000080 =Undefined.
00000040 =Undefined.
00000020 =Undefined.
00000010 =Undefined.
00000008 =Undefined.
00000004 =Undefined.
00000002 =Undefined.
00000001 =Undefined.

Valid Values: 00000000 - FFFFFFFF

Default: 00000000

Example: PCLOPTS=C0000000

This specifies that the printer supports neither duplex printing nor logical page offset commands.

Note: This keyword is valid only when PDL=PCL is also specified.

PDL= Specifies the page definition language to be created.

Valid Values: IPDS or PCL

Default: IPDS

Example: PDL=PCL

This specifies that the page definition language to be created by this execution of VPS AFP is PCL.

PRINTER= Specifies the model number of the IPDS printer that will print the document. This is important, because VPS/IPDS must know the printer resolution for processing purposes.

Valid Values: 3816 - Specifies that an IBM 3816 or compatible printer will receive the output produced by VPS/IPDS.

4028 - Specifies that an IBM 4028 or compatible printer will receive the output produced by VPS/IPDS.

4224 - Specifies that an IBM 4224 or compatible printer will receive the output produced by VPS/IPDS.

4230 - Specifies that an IBM 4230 or compatible printer will receive the output produced by VPS/IPDS.

4234 - Specifies that an IBM 4234 or compatible printer will receive the output produced by VPS/IPDS.

Default: None

Example: PRINTER=3816

This specifies that VPS/IPDS should produce output for an IBM 3816 or compatible printer which has a resolution of 240 dots per inch (DPI).

Note: **It is very important to code this parameter.** If the printer model is not specified, VPS/IPDS will have to convert all units per unit base-dependent fields to a generic base (14400). This will greatly affect fonts and images. The default font DD card of the VPS/IPDS JCL is FONTLIB, which points to the 240-DPI font library. These fonts cannot be successfully downloaded to a 300-DPI printer. Also, all IM-images will have to be converted to IO-images since VPS/IPDS is unsure of whether the image DPI matches the printer DPI (unless the IM-image was created with a units per unit base of 14400).

This keyword is only valid when PDL=IPDS is also specified.

PRMODE= Specifies that VPS AFP should look for and process shift out (x'0E') and shift in (x'0F') characters for a dataset that uses both a single-byte and a double-byte font.

Valid Values: SOSI1 or SOSI2

For SOSI1, each shift out and shift in character is converted to a blank.

For SOSI2, each shift out and shift in character is eliminated.

Default: None

Example: PRMODE=SOSI1

This specification indicates that each shift out and shift in character be replaced with a blank when it is processed.

SNAPHOLD= Specifies whether the SNAP SYSOUT dataset should be allocated as a held SYSOUT dataset.

Valid Values: Y or N

Default: N

Example: SNAPHOLD=Y

This specifies that the SNAP SYSOUT dataset should be held.

SNAPOUTP= Specifies the characteristics to be used when allocating a snap dump dataset.

Positional parameter 1 specifies the SYSOUT class to be used for the VPS snap dump dataset.

Valid Values: Any valid SYSOUT class (0 - 9 or A - Z).

Default: A

Positional parameter 2 specifies the destination to be used for the VPS snap dump dataset.

Valid Values: Any valid JES destination.

Default: LOCAL for JES2 and ANYLOCAL for JES3.

Example: SNAPOUTP=(,U100)

This specifies that the snap dump dataset should have a SYSOUT class of A and a destination of U100.

TRACE= Specifies, via two positional parameters, if tracing is to be active during the job and the type of tracing to be performed when tracing is active.

Positional parameter 1 specifies whether tracing is to be active.

Valid Values: Y or N

Default: N

Positional parameter 2 specifies the type of tracing to be performed.

Valid Values: 00 - FF

80 = Normal job tracing.

40 = Detail job tracing.

20 = Undefined.

10 = Undefined.

08 = Undefined.

04 = Undefined.

02 = Storage management.

01 = GTF tracing active.

Default: 00

Example: TRACE=(Y,C1)

This specifies that tracing should be on for this job, normal activities should be traced, detail activities should be traced, and GTF tracing should be active.

TRC= Specifies whether the print dataset contains table reference characters to select fonts.

Valid Values: Y or N

Default: N

Example: TRC=Y

WTO= Specifies how to issue console messages.

Positional parameter 1 specifies whether VPS informational messages (those with a suffix of "I") should be issued.

Valid Values: Y or N

Default: Y

Positional parameter 2 specifies the route code that should be used when issuing unsolicited WTOs.

Valid Values: 1 - 16

Default: 1

Example: WTO=(N,5)

This specifies that informational messages should not be issued, and that unsolicited WTOs are to use a route code of 5.

Performance for VPS AFP

Effects of VPS Keywords on Performance

Staging Keywords

QBUFSIZE QBUFSIZE controls the size of the buffer which VPS will use to write IPDS or PCL commands to the secondary staging dataset. The QBUFSIZE can be smaller than the maximum IPDS or PCL command size (32K), but it is better when most IPDS or PCL commands will fit into one QBUFSIZE.

QSPACE QSPACE controls the size of the primary staging dataset allocated by VPS. It also controls the size of the secondary staging dataset allocated by VPS when converting a dataset to IPDS or PCL. These datasets are independently allocated using the QSPACE values. The size of the converted dataset may be substantially larger than the input dataset. The QSPACE keyword must specify values large enough to contain the converted dataset.

QALLDYN QALLDYN controls when VPS will unallocate the primary staging dataset. If QALLDYN is set to "Y", VPS will unallocate the primary staging dataset whenever it runs out of work to process. If QALLDYN is set to "N", VPS will only unallocate the staging dataset when the printer is inactivated. Regardless of the QALLDYN value, VPS will always unallocate the secondary staging dataset after printing the dataset.

Checkpointing Keywords

CKPTPAGE CKPTPAGE controls how many pages VPS will send before requiring the printer to return an acknowledgment (ACK). Every time an ACK is requested, VPS must wait for the response before continuing. Specifying larger values for CKPTPAGE reduces the number of ACKs but increases the time required for recovery and reposition processing.

VTAM-Related Keywords

RELREQ The VPS RELREQ keyword defines when VPS will terminate the VTAM LU-LU session with a printer. For AFP, RELREQ parameters "I" and "A" should be avoided. These parameters cause VPS to release the session when the available work is finished. When VPS releases the VTAM session, VPS "forgets" about every resource it has loaded into the printer. When another AFP dataset is printed, any resources it requires must be loaded into the printer again. RELREQ parameters "W", "E" or "N" will avoid or prevent this situation and are recommended.

If it is necessary to share the printer with other applications, such as CICS or IMS, it is better to have the other applications place the output on the JES spool and have VPS select it, rather than to release the printer. This can be accomplished through DRS or the DRS/VPI.

Effects of Various AFPDS Resources

VPS/IPDS

OVERLAYS and PAGE SEGMENTSIM-images in overlays will be converted to IO-images if the image units per unit base does not agree with the printer dots per inch (DPI). Because this conversion is very time- and storage-consuming, it is best to use either IM-images with a units per unit base that agrees with the printer resolution or IO-images which are resolution-independent.

Up to 254 overlays and 127 page segments are allowed per job, subject to available printer storage.

FONTS Using printer resident fonts for a print job takes up much less time and storage than using fonts that must be downloaded to the printer. For VPS to access printer resident fonts, the AFPDS Begin Font (BFN) record of the font character set and the AFPDS Begin Code Page (BCP) record of the code page table must contain the CRC resource management and font resource management triplets. (Refer to IBM's "Advanced Function Printing: Host Font Data Stream Reference", IBM'S "About Type: Technical Reference for 240-Pel Digitized Type", and IBM's "About Type: Technical Reference for 4028 Font Metrics".) The CRC resource management triplet must be coded to mark both the character set and the code page table "public", meaning the printer will be queried for that font. If the font is not printer resident, it will be downloaded. The font resource management triplet must be coded in the BFN with the font global identifier and the font width. The font resource management triplet must be coded in the BCP with the graphic character set global identifier and the code page global identifier.

If an IPDS document is sent through VPS, only font host-assigned identifiers X'0001' through X'00FF' will be supported. Since VPS will not acknowledge the loading of fonts into the printer with identifiers over X'00FF', the user is responsible for "cleaning out" the printer by issuing an IPDS Delete Font (DF) for every font with a host-assigned identifier of over X'00FF' at the end of the dataset so that other IPDS datasets following the processing of that dataset may safely use any font host-assigned identifier.

Up to 255 fonts per job are permitted, subject to available printer storage.

VPS/IPDS will only support 240-dpi AFP fonts on 240-dpi IPDS printers. Both 240-dpi and 300-dpi AFP fonts will be supported on 300-dpi IPDS printers. VPS/IPDS will scale the 240-dpi AFP font character sets to 300-dpi. Since this scaling is very resource-intensive, VPS will issue message VPS769I for each AFP font character set that is scaled. It is strongly recommended that these 240-dpi font character sets be pre-scaled to 300-dpi (via LRS's VPSSAFNM utility or IBM's APSRCF30 utility) and stored in 300-dpi font libraries for use with the 300-dpi printer. (For more information about the VPSSAFNM utility, refer to page 8.91.)

VPS/IPDS will support AFP outline fonts on IPDS printers that support the outline font IPDS commands. Refer to your printer documentation for information. If the printer does not support outline fonts, or if the 0010 flag of AFPOPTS is specified in the VPS printer definition, VPS/IPDS will attempt to map the AFP outline font character set name to an AFP bitmap font character set name. (Refer to page C.13 for information on the default character set name mapping.)

VPS/PCL

OVERLAYS and PAGE SEGMENTS AFPDS overlays are passed to PCL printers as PCL macros. To avoid converting and downloading overlays and page segments, refer to "Using Printer Resident Overlays and Page Segments with VPS/PCL" on page 8.85 and "Using the VPS/PCL Resource Mapping Table (AFPRTAB)" on page 8.44.

AFPDS images (raster data) are converted from IOCA or IM-image to a raster format that a PCL printer understands. IOCA raster data is sometimes in compressed format. PCL printers do not support the same types of raster compression as IOCA. In converting IOCA to PCL raster data, VPS/PCL decompresses the following types of compression:

- IBM MMR-Modified Modified Read
- G4 MMR-Modified Modified Read (CCITT T.6 Group 4 2-dimensional coding standard for facsimile).

VPS/PCL does not support the following types of IOCA compression:

- RL4 (Run-Length 4)
- ABIC (Bilevel Q-Coder)
- Concatenated ABIC
- Color compression used by OS/2 Image Support
- G3 MH-Modified Huffman (CCITT T.4 Group 3 1-dimensional coding standard for facsimile)
- G3 MR-Modified Read (CCITT T.6 Group 3 2-dimensional coding standard for facsimile)
- JPEG algorithms

AFPDS graphics are converted from GOCA to HP-GL/2. If the printer does not support HP-GL/2 commands within macros, VPS/PCL will not convert an AFPDS overlay or page segment containing GOCA to a PCL macro. Therefore, every time that overlay or page segment is accessed, the PCL commands to print that overlay or page segment will be sent to the printer. However, conversion for that resource is done only once. VPS/PCL will assume that the printer supports HP-GL/2 within macros unless told differently in the AFP resource table. Refer to "Using the VPS/PCL Resource Mapping Table (AFPRTAB)" on page 8.44.

FONTS Using printer resident fonts takes less processing time than converting and downloading host resident AFP fonts. Refer to "Using the VPS/PCL Resource Mapping Table (AFPRTAB)" on page 8.44 for information on using printer resident fonts. The quality of resident fonts is usually better than that of downloaded AFP fonts. The fidelity of the document can suffer if the spacing characteristics of the PCL font differ from that of the AFP font used to create the document. Generally, this applies only to documents created by a package such as Document Composition Facility (DCF), and only with proportional fonts.

Some sample 300-DPI fonts are supplied in file LRS.VPS.V1R80.FONT300. These are only sample fonts, and may not meet all of your printing requirements. However, they can help during installation and testing of the PCL product.

VPS/PCL will support both 240-dpi and 300-dpi AFP fonts on PCL printers. VPS/PCL will scale the 240-dpi font character sets to 300-dpi. Since this scaling is very resource-intensive, VPS will issue message VPS769I for each AFP font character set that is scaled. It is strongly recommended that these 240-dpi font character sets be pre-scaled to 300-dpi (via LRS's VPSSAFNM utility or IBM's APSRCF30 utility) and stored in 300-dpi font libraries for use with the PCL printer. (For more information about the VPSSAFNM utility, refer to page 8.91.)

VPS/PCL will support AFP outline fonts by converting the character outlines to bitmapped raster patterns. Optionally, the 0010 flag of AFPOPTS can be set in the VPS printer definition so that VPS/PCL will attempt to map the AFP outline font character set name to an AFP bitmapped font character set name. (Refer to page C.13 for information on the default character set name mapping.)

VPS/PDF

FONTS During AFP to PDF conversion, font character sets may be mapped to Adobe core fonts through the PDFRTAB. A PDFRTAB entry that specifies both the point size for the core font and the Adobe core font typeface name will cause that character set to be mapped to the specified Adobe core font typeface. Mapping AFP font character sets to Adobe core fonts is recommended whenever possible. Type-3 fonts embedded in the PDF document have no associated font metrics. Font metrics are used to provide detailed information about the font and each character, allowing the characters to be scaled and smoothed consistently. Without font metrics, Adobe Acrobat is limited in its ability to accurately scale and smooth Type-3 fonts. If PDFOPTS=04000000 is not specified, VPS/PDF will inform Adobe Acrobat that character interpolation should occur, which will provide additional smoothing to the edges of Type-3 font characters. This additional smoothing may cause small characters to appear blurry. It is recommended to allow interpolation whenever possible. Font character sets that are not mapped to Adobe core fonts through the PDFRTAB will be converted to Adobe Type-3 fonts and embedded in the resulting PDF document. (See "Creating the PDF Resource Table" on page 8.68 and "Using the Font Point Size Summary Program (VPSSPTSZ)" on page 8.80 for more information.)

AFP font character sets that are mapped to Adobe core fonts can also retain their AFP font metrics by specifying the METRICS=AFP keyword on the TYPE=CHARSET entry. If the AFP font metrics are to be retained for a character set, an Adobe AFM font metrics file will be created based on the individual character metrics in the AFP character set, and embedded in the output PDF file. This new AFM metrics file will override the Adobe defined AFM metric file for the requested Adobe core typeface.

When mapping fonts to Adobe core fonts, there is no close match for the Sonoran typeface. Therefore, it is recommended that METRICS=AFP be specified to retain the AFP font's original character metrics. The default PDFRTAB retains the AFP font metrics for all Sonoran character sets.

During AFP to PDF conversion, AFP font character sets mapped to Adobe core fonts through the PDFRTAB must use Adobe's built-in Window's ANSI encoding. This encoding is based on the Window's 1252 code page table. VPS character translation tables can be created using the code page table translation program. (See "Using the Code Page Table Translation Program (VPSSCPXL)" on page 8.78 for more information.) The translation table can then be assembled and linked into a load library accessible to VPS and referenced in the PDFRTAB. (See "Creating the PDF Resource Table" on page 8.68 for more information.) If a VPS character translation table is not located in the PDFRTAB an internal VPS character translation table will be built, and used to convert text characters to code points compatible with Adobe's Window's ANSI encoding. If characters are printing incorrectly using an internal VPS character translation table, the code page table translation program may need to be used to create a customizable external VPS character translation table which can then be specified in the PDFRTAB.

During VPS/PDF conversion, if any code page table associated with a character set that is mapped to an Adobe core font is not located in the PDFRTAB, an internal VPS character translation table will be built. This will increase VPS/PDF conversion time and the amount of storage required for VPS/PDF conversion. The VPSSCPXL code page translation table program can be used to create external VPS character translation tables, which will decrease the storage requirements and conversion time required for VPS/PDF conversion.

If PRTROPTS=00000040 is not specified, AFP to PDF conversion will search for a matching entry in the PDFRTAB for the requested font resource. If a matching entry is not located perform Font Mapping based on the IBM Font Naming Conventions as described in the “IBM AFP Fonts - Font Summary” manual (G544-3810-03).

The Expanded Core, Compatibility and Proprinter Emulation Fonts will be mapped to one of the 12 core Adobe Acrobat fonts.

The mapping will be calculated from the AFP font’s Type Family, Typeface Point Size, Style, etc.

For example:

C0H300F0 would map to a Helvetica Italic, 16 point font

If a match cannot be made, a 9 point Courier font will be the default.

Note: During text to PDF conversion, if a PDFFONT keyword is coded in the VPS printer definition, that font and point size combination will override the default.

Resource Selection Priority

VPS/IPDS and VPS/PCL select a named resource based on the following hierarchy of its location:

- Resource loaded in the printer for the current dataset.
- Inline resource.
- USERLIB resource.
- Resource loaded in the printer for a previous dataset.
- Printer resident resource.
- VPS execution JCL library resource.

An exception to this hierarchy exists when the AFPOPTS flag 0400 is set, which tells VPS/IPDS and VPS/PCL to treat the USERLIB datasets as normal, production AFP resource libraries. When this flag is set, VPS/PCL will use the following hierarchy to select a named resource:

- Resource loaded in the printer for the current dataset.
- Inline resource.
- Resource loaded in the printer for a previous dataset.
- Printer resident resource.
- USERLIB resource.
- VPS execution JCL library resource.

Using the VPS/PCL Resource Mapping Table (AFPRTAB)

The VPS/PCL resource mapping table allows printer resident resources to be identified to VPS/PCL. Fonts are the most common resources that need to be accessed, but other resources include paper trays and macros which describe overlays or page segments.

Printer resident fonts can be mapped to AFP character sets. This allows VPS/PCL to avoid converting the AFP character set to PCL and then downloading it to the printer. This saves the time it takes to convert the font to PCL, the transmission time to download the font, and the storage on the printer the font would have occupied.

This function also allows access to PCL fonts for which there are no AFP equivalents. An AFP Coded Font can be created which points to a character set which does not exist in the AFP FONTLIBs, but does exist in the VPS/PCL resource table. This effectively allows access to any printer resident font, including those on a font cartridge. See "Creating a Coded Font" on page 8.84 for more information.

AFP OVERLAYs can be mapped to macros within the printer. This allows VPS/PCL to access an OVERLAY created as a PCL macro and stored in the printer. Reasons for doing this include avoiding the download and conversion time for an AFP OVERLAY or accessing a macro created by a non-AFP utility. Various methods can be used to load the macro into the printer, or the macro can be on a font cartridge.

AFP Page Segments can be mapped in the same manner as OVERLAYs.

The printer media input trays are identified in the table. The paper sizes and types are described.

The amount of printer memory is defined. This helps VPS/PCL determine when to delete resources to free up memory.

Color processing capabilities and raster resolutions supported are also defined in the table.

It is possible to have a different resource table for every printer, but this is not necessary. If many or all printers have the same set of resources, they can point to the same resource table.

Creating the AFP Resource Table

The macro instruction $$VRES is used to generate the AFPRTAB table. Sample JCL to assemble and linkedit the AFPRTAB table is provided as member ASMRTAB in file LRS.VPS.V1R80.CNTL.

Six sample tables are provided in file LRS.VPS.V1R80.ASM. Some sample tables map selected character sets from IBM-supplied font packages to PCL printer resident fonts. These tables are merely examples and will need to be altered to reflect a particular printer's resources. The table can be combined and/or modified, using standard editing procedures. The sample tables are VPSSRTAB, VPSSRTB1, VPSSRTB2, VPSSRTB3, VPSSRTB4, and VPSSRTB5.

All six tables contain the INITIAL type entry specifying:

- the printer is not a color printer,
- the default paper tray is PCL tray '1' (normally the top tray),
- the printer supports HP-GL/2 commands within macros, and
- VPS/PCL should not attempt to manage the printer memory.

The VPSSRTAB, VPSSRTB1, VPSSRTB2, VPSSRTB3, and VPSSRTB4 tables contain several TRAY type entries to map the following AFP trays to PCL trays:

Description (HP)	Description (Lexmark)	AFP Tray Code	PCL Tray Code
Top Tray	Tray 1	1	1
Lower Tray	Tray 3	2	4
Optional Tray	Tray 2	3	5
Envelope Feeder	Dual Rear Feeder 1	65	6
Manual Paper Feeder	Manual Paper Feeder	100	2

All six tables contain several PAPER type entries defining the following paper sizes supported by the PCL printer:

Description	PCL Paper Code	Type	Physical Page Width	Physical Page Height	Logical Page Portrait X-Offset	Logical Page Landscape X-Offset
Monarch	80	Envelope	3.875in	7.5in	.25in	.2in
Com-10	81	Envelope	4.125in	9.5in	.25in	.2in
DL	90	Envelope	110mm	220mm	6mm	5mm
C5	91	Envelope	162mm	229mm	6mm	5mm
B5	100	Envelope	176mm	250mm	6mm	5mm
Executive	1	Paper	7.25in	10.5in	.25in	.2in
Letter	2	Paper	8.5in	11in	.25in	.2in
Legal	3	Paper	8.5in	14in	.25in	.2in
Ledger	6	Paper	11in	17in	.25in	.2in
A5	25	Paper	148mm	210mm	6mm	5mm
A4	26	Paper	210mm	297mm	6mm	5mm
A3	27	Paper	297mm	240mm	6mm	5mm
B4 - JIS	46	Paper	257mm	364mm	6mm	5mm
B5 - JIS	45	Paper	182mmin	257mm	6mm	5mm

The sample tables are:

VPSSRTAB Contains the INITIAL, TRAY, and PAPER entries defined above, and specifies that each paper tray contains letter paper and that the envelope tray contains Com-10 envelopes.

VPSSRTB1 Contains the INITIAL, TRAY, and PAPER entries defined above, and specifies that each paper tray contains letter paper and that the envelope tray contains Com-10 envelopes. Also contains CHARSET and CODEPAGE type entries to map IBM compatibility character sets and code page tables to PCL printer resident fonts. Contains an overlay type entry to define printer-resident overlay 01BX4UP. (Refer to "Using Printer Resident Overlays and Page Segments with VPS/PCL" on page 8.85).

VPSSRTB2 Contains the INITIAL, TRAY, and PAPER entries defined above, and specifies that each paper tray contains letter paper and that the envelope tray contains Com-10 envelopes. Also contains CHARSET and CODEPAGE type entries to map IBM font licensed program character sets and code page tables to PCL printer resident fonts. Contains an overlay type entry to define printer-resident overlay 01BX4UP. (Refer to "Using Printer Resident Overlays and Page Segments with VPS/PCL" on page 8.85).

VPSSRTB3 Contains the INITIAL, TRAY, and PAPER entries defined above, and specifies that each paper tray contains letter paper and that the envelope tray contains Com-10 envelopes. Also contains CHARSET and CODEPAGE type entries to map IBM core interchange character sets and code page tables to PCL printer resident fonts. Contains an overlay type entry to define printer-resident overlay 01BX4UP. (Refer to "Using Printer Resident Overlays and Page Segments with VPS/PCL" on page 8.85).

VPSSRTB4 Contains the INITIAL, TRAY, and PAPER entries defined above, and specifies that each paper tray contains A4 paper and that the envelope tray contains B5 envelopes.

VPSSRTB5 Contains the INITIAL and PAPER entries defined above, and specifies that each paper tray contains letter paper and that the envelope tray contains Com-10 envelopes. This AFP resource table also takes advantage of the new PCL5 'select paper type' command. Instead of mapping AFP trays to PCL trays, the TRAY type entries map AFP trays to PCL paper types as follows:

AFP Tray Code	PCL Paper Type
1	dPlain
2	dPlain
3	dPlain
65	dPlain
100	dPlain

This table also contains several MEDIA type entries to map an AFP media type (specified in the FORMDEF) to a PCL paper type and paper size combination as follows:

AFP Media Name	AFP Media ID	PCL Paper Type	PCL Paper Size
ISO A4	06072B120004030100	dPlain	26
ISO A4 CO	06072B120004030101	dColor	26
ISO A4 TR	06072B120004030102	dTransparency	26
ISO A4 THD	06072B120004030105	dPlain	26
ISO A3	06072B12000403010A	dPlain	27
ISO A3 CO	06072B12000403010B	dColor	27
ISO A5	06072B120004030114	dPlain	25
ISO A5 CO	06072B120004030115	dColor	25
ISO B4	06072B12000403011E	dPlain	46
ISO B4 CO	06072B12000403011F	dColor	46
ISO B5	06072B120004030128	dPlain	100
ISO B5 CO	06072B120004030129	dColor	100
JIS B4	06072B12000403012A	dPlain	46
JIS B5	06072B12000403012B	dPlain	45
LETTER	06072B120004030132	dPlain	2
Letter CO	06072B120004030133	dColor	2
Letter TR	06072B120004030134	dTransparency	2
LEGAL	06072B12000403013C	dPlain	3
LEGAL CO	06072B12000403013D	dColor	3
EXEC	06072B120004030141	dPlain	1
LEDGER	06072B120004030143	dPlain	6
COM 10 ENV	06072B12000403014B	dPlain	81
MON ENV	06072B12000403014C	dPlain	80
DL ENV	06072B12000403014D	dPlain	90
C5 ENV	06072B12000403014F	dPlain	91

Since the PCL ‘select paper type’ command is a newer PCL5 command, some printers may not support it. Printers that do not understand this command will just print the paper type specified as if it is text. For printers that do not support the 'select paper type' command, a modified version of VPSSRTB5 that does not contain the PCLTYPE parameters can be used.

There are eight different TYPE= parameters. TYPE=INITIAL must only be coded once, and it must be the first macro coded in the table. TYPE=CHARSET, TYPE=CODEPAGE, TYPE=MEDIA, TYPE=OVERLAY, TYPE=PAGESEG, TYPE=PAPER, and TYPE=TRAY can be coded as many times as necessary.

The parameters of $$VRES are explained below. Examples of each entry follow.

TYPE= CPID|CSID|INITIAL|CHARSET|CODEPAGE|OVERLAY|PAGESEG|PAPER|TRAY

CPID Maps a CPGID (code page global identifier) and a GCSGID (graphic character set global identifier) to an AFP code page table name.

CODEPGE= AFP code page table name.
CODEPGE=1-8 alphanumeric characters
Default: None.
Note: This parameter is required in the TYPE=CPID entry.

CPGID= AFP code page global identifier.
CPGID=0 through 65535
Default: None.
Note: This parameter is required in the TYPE=CPID entry.

GCSGID= AFP graphic character set global identifier.
GCSGID=0 through 65535
Default: None.
Note: This parameter is required in the TYPE=CPID entry.

CSID Maps an FGID (font global identifier), a font width value, and a GCSGID (graphic character set global identifier) to an AFP font character set name.

CHARSET= AFP font character set name
CHARSET=1-8 alphanumeric characters
Default: None.
Note: This parameter is required in the TYPE=CSID entry.

FGID= AFP font global identifier.
FGID=0 through 65535
Default: None.
Note: This parameter is required in the TYPE=CSID entry.

GCSGID= AFP graphic character set global identifier.
GCSGID=0 through 65535
Default: None.
Note: This parameter is required in the TYPE=CSID entry.

WIDTH= AFP font width value.
WIDTH=0 through 65535
Default: None.
Note: This parameter must be specified in the TYPE=CSID entry if the CHARSET specified is a bitmap font character set name (‘C0xxxxxx’ or ‘C1xxxxxx’). This parameter must not be specified in the TYPE=CSID entry if the CHARSET specified is an outline font character set name (‘CZxxxx’).

INITIAL Must be first entry in table.

COLOR= Indicates color support on the printer.
COLOR=YES Printer has color support.
COLOR=NO Printer does not have color support
Default: COLOR=NO

DPI= Indicates image (raster) resolution supported in addition to the printer’s standard resolution.
DPI=600 (Only value supported).
Default: None

MACGL2= Indicates whether HPL-GL/2 within PCL macros is supported on the printer.
MACGL2=NO Printer does not support HPL-GL/2 within PCL macros.
MACGL2=YES Printer does support HPL-GL/2 within PCL macros.
Default: YES

MEMORY= Amount of printer memory in ‘K’. (For example, MEMORY=1024 equals 1 megabyte.)
MEMORY=0 through MEMORY=32768
Default: None

DEFTRAY= Default paper tray. If the bin number specified in the FORMDEF does not match any of the bin numbers assigned to the printer’s trays, this value will determine the default paper source. Allowable values are a valid PCL tray code (1-32767) or:

ENVFEED
LOWTRAY
OPTTRAY
OPTTRA2
TOPTRAY (default)

ENVFEED= Envelope feeder.
ENVMANF= Manual envelope feeder.
ENVMAN2= Manual envelope feeder 2.
ENVMAN3= Manual envelope feeder 3.

LOWTRAY= Lower paper tray.

MANFEED= Manual paper feeder.

MANFEE2= Manual paper feeder 2.

MANFEE3= Manual paper feeder 3.

OPTTRAY= Optional paper tray.

TOPTRAY= Top paper tray.

For ENVFEED, ENVMANF, ENVMAN2, ENVMAN3, LOWTRAY, MANFEED, MANFEE2, MANFEE3, OPTTRAY, OPTTRA2 and TOPTRAY, the value is specified as:

(size,bin#)

For envelope feeders and trays, allowable size values are:

A3
A4
A5
B4-JIS
B5 (default for envelope trays/feeders)
B5-JIS
C5
COM10
DL
EXECUTIVE
LEDGER
LEGAL
LETTER (default for paper trays/feeders)
MONARCH

The ENVFEED, ENVMANF, ENVMAN2, ENVMAN3, LOWRAY, MANFEED, MANFEE2, MANFEE3, OPTTRAY, and TOPTRAY parameters of the INITIAL type entry are only being supported for migration purposes. The TRAY and PAPER type entries provide more flexibility and are easier to use. Refer to "Converting from VPS V1 R7.0 to VPS V1 R8.0" on page A.1 for more information.

CHARSET Maps an AFP CHARSET to a PCL font.

If the font characteristics defined with these parameters do not exactly match a printer resident font, then the PCL printer will substitute a font that matches as many of the criteria as possible. This may not always give the desired result. Make sure that the printer resident fonts are available if they are being mapped with this entry.

CHARSET= AFP CHARSET name.

CHARSET=1-8 alphanumeric characters beginning with C0 or C1.

Default: None.

HMI= Horizontal motion index to be used with the font. This is specified as the number of 1/120 inch increments. For fixed-pitch fonts, the HMI affects all printable characters, including the space. For proportional fonts, the HMI affects only the space character. An example of the use of this parameter would be to allow printing with a printer's resident 16.67 pitch Line Printer font at some other pitch, such as 15.

HMI=00000.000 through HMI=32767.000

Default: None. The size of the current font in use determines the horizontal motion index.

Example: HMI=8

This prints a fixed-pitch font at 15 characters per inch (8/120 of an inch per character allows 15 characters per inch).

SPACING= Font spacing type. Fixed spaced is also known as mono-spaced. Typographic is also known as proportionately spaced.

SPACING=FIXED

SPACING=TYPOGRAPHIC

Default: None.

Note: If SPACING=FIXED is specified, PITCH is also required.

SIZE= Point size for typographic fonts.

SIZE=000.25 through SIZE=999.75

Default: None.

Note: If SIZE is specified, SPACING is required.

PITCH= Pitch for fixed spaced fonts.

PITCH=000.10 through PITCH=576.00

Default: None.

Note: If PITCH is specified, SPACING=FIXED is required.

WEIGHT= Stroke weight.

Allowable stroke weight values:

'ULTRA THIN'
'EXTRA THIN'
'THIN'
'EXTRA LIGHT'
'LIGHT'
'DEMI LIGHT'
'SEMI LIGHT'
'MEDIUM'
'DEMI BOLD'
'SEMI BOLD'
'BOLD'
'EXTRA BOLD'
'BLACK'
'EXTRA BLACK'
'ULTRA BLACK'

Default: None.

STYLE= Font treatment.

Allowable font treatment values:

'UPRIGHT'
'ITALIC'
'CONDENSED'
'CONDENSED ITALIC'
'COMPRESSED'
'EXPANDED'
'OUTLINE'
'INLINE'
'SHADOWED'
'OUTLINE SHADOWED'

Default: None.

TYPEFACE= PCL typeface number.

TYPEFACE=00000 through TYPEFACE=65535

Default: None.

FONTID= PCL soft font font ID. This parameter defines the font ID of a soft font which is loaded into the printer by a means external to VPS.

This parameter is mutually exclusive with all other parameters on the TYPE=CHARSET specification. It should only be specified if a soft font has been loaded into the printer and the font ID of this font is known.

CODEPAGE Maps an AFP CODEPAGE to a PCL symbol set.

CODEPGE= AFP CODEPAGE name.

CODEPGE=1-8 alphanumeric characters beginning with T0 or T1.

Default: None.

SYMBSET= PCL symbol set that the AFP codepage will be mapped to.

SYMBSET=1-5 alphanumeric characters.

Default: None.

XLATTAB= Translate table to be used for EBCDIC to ASCII translation.

XLATTAB=1-8 alphanumeric characters beginning with an alpha character.

Default: None.

Note: This table name must be unique. It must not have the same name as any VPS module or exit.

MEDIA **Maps an AFP media type to a PCL paper type and a PCL paper size.**

AFPNAME= AFP media type name (specified in the FORMDEF).

AFPNAME= **1-32 alphanumeric characters (uppercase and lowercase)**

Default: None.

AFPOID= AFP object (media) identifier.

AFPOID=2-32 characters representing 1-16 hexadecimal characters.

Default: None.

PAGECOD= PCL page size code.

PAGECOD=1 through 32767

Default: None.

PCLTRAY= PCL tray code.

PCLTRAY=1 through 32767

Default: None.

PCLTYPE= PCL paper type.

PCLTYPE=1-32 alphanumeric characters (uppercase and lowercase)

Default: None.

Notes: PCLTRAY and PCLTYPE are mutually exclusive.

Some printers do not support the PCL 'select paper type' command. For these printers, no PCLTYPE parameters should be specified in the MEDIA type entries.

Although it is allowable to specify only a PAGECOD and not a PCLTRAY or a PCLTYPE for a MEDIA type entry, the printer may not allow selecting input only by paper size. Some printers require that an input tray also be selected, and the default tray will be used if one is not specified. It may be possible to set an option on the printer to support selecting input by paper size only (such as 'TRAY SWITCH = YES'). Please refer to your printer documentation for more information.

OVERLAY Maps an AFP OVERLAY to a PCL macro ID.

OVERLAY= AFP OVERLAY name.

OVERLAY=1-8 alphanumeric characters beginning with O1.

Default: None.

MACROID= PCL macro number. This macro must be loaded into the printer and have the MACROID number assigned to it.

MACROID=00000 through MACROID=32767

Default: None.

UOM= Unit of measure. VPS/PCL sets the unit of measure to 720. If the macro uses a different unit of measure, it must be specified, so that both the macro and the VPS/PCL-converted output will print correctly.

UOM=96 through 7200

Default: 720

PAGESEG Maps an AFP PAGESEG to a PCL macro ID.

PAGESEG= AFP Page Segment name.

PAGESEG=1-8 alphanumeric characters beginning with S1.

Default: None.

MACROID= PCL macro number. This macro must be loaded into the printer and have the MACROID number assigned to it.

MACROID=00000 through MACCROID=32767

Default: None.

UOM= Unit of measure. VPS/PCL sets the unit of measure to 720. If the macro uses a different unit of measure, it must be specified, so that both the macro and the VPS/PCL-converted output will print correctly.

UOM=96 through 7200

Default: 720

PAPER Defines paper sizes supported on PCL printers. Note that the values specified for these parameters should reflect the actual values supported by the printer, not user-defined values. The PAPER type entries provided in the sample AFP resource tables should require minimal customization. The PORTOFF and LANDOFF parameters are the only parameter values that may need to be adjusted. For example, on older HP printers, the default logical page x-offset is .25 inches from the left edge of the physical page for letter paper. On some new printers, an option can be set on the printer to enable 'edge-to-edge' or 'whole page' printing. In this case, the PORTOFF value should be changed from PORTOFF=.25IN to PORTOFF=0IN. VPS/PCL must know where the printer considers the default logical page x-offset to be in order to correctly place data on the page.

PAGECOD= PCL page size code.
PAGECOD=1 through 32767
Default: None.

PAGETYP= Paper type.
PAGETYP=PAPER | ENVELOPE | CONTINUOUS
Default: None.

PAGEWDT= Physical page width.
PAGEWDT=1.000IN through 218.450IN
or
25.400MM through 5548.630MM
Default: None.

PAGEHGT= Physical page height.
PAGEHGT=1.000IN through 218.450IN
or
25.400MM through 5548.630MM
Default: None.

PORTOFF= Default logical page portrait x-offset (as defined by the printer).
PORTOFF=0.000IN through 218.450IN
or
0.0000MM through 5548.630MM
Default: None.

LANDOFF= Default logical page landscape x-offset (as defined by the printer).
LANDOFF=0.000IN through 218.450IN
or
0.0000MM through 5548.630MM
Default: None.

Notes: When FORMLEN is specified on the OUTPUT statement, only the paper sizes listed in the printer's AFPRTAB PAPER type entries will be searched for an appropriate paper size.

TRAY Maps the AFP bin number (defined in the FORMDEF, the INTRAY OUTPUT JCL statement keyword, or the INTRAY VPS definition keyword) to a PCL tray code or a PCL paper type and to a PCL paper size code.

AFPTRAY= AFP tray number.
AFPTRAY=1 through 255
Default: None.

PCLTRAY= PCL tray code.
PCLTRAY=0 through 32767
Default: None.

PCLTYPE= PCL paper type.
PCLTYPE=1-32 alphanumeric characters.
Default: None.

PAGECOD= PCL page size code.
PAGECOD=1 through 32767
Default: None.

Notes: PCLTRAY and PCLTYPE are mutually exclusive.

A particular PAGECOD can be used numerous times in the TRAY type entries, but that PAGECOD should be defined only once in the PAPER type entries. If a PAGECOD used in a TRAY type entry is not defined in a PAPER type entry, VPS/PCL will refer to an internal table of PCL paper size information.

Although it is allowable to specify only a PAGECOD and not a PCLTRAY or a PCLTYPE for a TRAY type entry, the printer may not allow selecting input only by paper size. Some printers require that an input tray also be selected, and the default tray will be used if one is not specified. It may be possible to set an option on the printer to support selecting input by paper size only (such as 'TRAY SWITCH = YES'). Please refer to your printer documentation for more information.

When FORMLEN is specified on the OUTPUT statement, VPS/PCL will search the AFPRTAB PAPER type entries for an appropriate paper size that will override the TRAY type PCLTRAY selection for the print job. (VPS/PCL will use the FORMLEN value to select a paper size that is the closest match, without exceeding the paper height.)

Example of TYPE=CPID entry

```
CPID      $$VRES   TYPE=CPID,                    +
                  GCSGID=697,                   +
                  CPGID=37,                     +
                  CODEPGE=T1D0BASE              +
```

This entry informs VPS/PCL to use code page table T1D0BASE when a GRID with GCSGID=697 and CPGID=37 is encountered in the AFP datastream.

Example of TYPE=CSID entry

```
CSID      $$VRES   TYPE=CSID,                    +
                  FGID=2305,                    +
                  GCSGID=697,                   +
                  WIDTH=240,                    +
                  CHARSET=C0H400Z0              +
```

This entry informs VPS/PCL to use character set C0H400Z0 when a GRID with FGID=2305, GCSGID=697, and width=240 is encountered in the AFP datastream.

Example of TYPE=CSID entry

```
CSID      $$VRES   TYPE=CSID,                    +
                  FGID=2304,                    +
                  GCSGID=697,                   +
                  CHARSET=CZH200                +
```

This entry informs VPS/PCL to use character set CZH200 when a GRID with FGID=2304 and GCSGID=697 is encountered in the datastream.

Example of TYPE=INITIAL entry

```
INITIAL   $$VRES   TYPE=INITIAL,                +
                  COLOR=N,                      +
                  DPI=600,                      +
                  MEMORY=4096                   +
```

This entry informs VPS/PCL that the printer does not support color, and that it will print raster data at 600 DPI, in addition to its standard 300 DPI resolution. It also has 4 MB of memory.

Example of TYPE=CHARSET entry

```
C0H20060  $$VRES  TYPE=CHARSET,                                    +
                  CHARSET=C0H20060,     HELVETICA 6 PT UPRIGHT.   +
                  WEIGHT='MEDIUM',                                +
                  SPACING='TYPOGRAPHIC',                          +
                  SIZE='6',                                       +
                  STYLE='UPRIGHT',                                +
                  TYPEFACE='4148'       UNIVERS
```

This entry informs VPS/PCL that the AFP character set C0H20060, which is Helvetica, should be mapped to the printer resident font Univers. The typeface number for Univers is 4148. The size, style and weight are set to match C0H20060, and the spacing is defined as typographic (proportional). When VPS/PCL encounters C0H20060 in an AFP document or other resource such as a PAGEDEF, it will send the appropriate PCL commands to the printer to invoke the Univers font. This avoids the process of loading C0H20060 from the FONTLIB, converting it to PCL, and downloading it to the printer.

Example of TYPE=CODEPAGE entry

```
T1100395  $$VRES  TYPE=CODEPAGE,                                   +
                  CODEPGE=T1000395,     US, CANADA ENGLISH        +
                  SYMBSET='8U',         ROMAN-8                   +
                  XLATTAB=VPSSXASC      TRANSLATE TABLE
```

This entry maps the AFP codepage T1000395 to the printer resident PCL symbol set ROMAN-8. It also specifies that the ASCII to EBCDIC translation should use the external table named VPSSXASC. If the XLATTAB keyword had been omitted, VPS/PCL would have used its own internal translate table.

Example of TYPE=MEDIA entry

```
$$VRES  TYPE=MEDIA,
       AFPNAME='ISO A4 TR',         AFP MEDIA NAME (FROM FORMDEF)
       AFPOID=06072B120004030102,   AFP OBJECT (MEDIA) IDENTIFIER
       PAGECOD=26,                  PCL PAGE SIZE CODE - A4 PAPER
       PCLTYPE='dTransparency'      PCL PAPER TYPE -TRANSPARENCY
```

This entry maps AFP media 'ISO A4 TR' to PCL paper type 'dTransparency' and PCL page size A4 (code 26).

Example of TYPE=OVERLAY entry

```
OVERLAY   $$VRES    TYPE=OVERLAY,                    +
                    OVERLAY=O1LRS1,                  +
                    MACROID='12345'
```

This entry maps the AFP OVERLAY name LRS1 to the printer resident macro number 12345. Whenever VPS/PCL encounters the OVERLAY LRS1 in an AFP document or resource such as a FORMDEF, it will include the PCL commands to invoke the printer resident macro number 12345. This avoids the process of loading LRS1 from the OVLYLIB, converting it to PCL, and downloading it to the printer. Please note that the permanent macro must have been loaded into the printer by some means. See "Using the VPS/PCL Resource Mapping Table (AFPRTAB)" on page 8.44 for examples on how to accomplish this.

Example of TYPE=PAGESEG entry

```
PAGESEG    $$VRES     TYPE=PAGESEG,                    +
                      PAGESEG=S1LRS1,                  +
                      MACROID='12121'
```

This entry maps the AFP PAGESEG name LRS1 to the printer resident macro number 12121. Whenever VPS/PCL encounters the PAGESEG LRS1 in an AFP document or resource such as a FORMDEF, it will include the PCL commands to invoke the printer resident macro number 12121. This avoids the process of loading LRS1 from the PSEGLIB, converting it to PCL, and downloading it to the printer. Please note that the permanent macro must have been loaded into the printer by some means. See "Using the VPS/PCL Resource Mapping Table (AFPRTAB)" on page 8.44 for examples on how to accomplish this.

Example of TYPE=PAPER entry

```
LETTER   $$VRES   TYPE=PAPER,                                    +
                  PAGECOD=2,          PCL PAGE SIZE CODE (LETTER)    +
                  PAGETYP=PAPER,      PAGE TYPE                      +
                  PAGEWDT=8.5IN,      PHYSICAL PAGE WIDTH            +
                  PAGEHGT=11IN,       PHYSICAL PAGE HEIGHT           +
                  PORTOFF=.25IN,      DEFAULT PCL PORTRAIT X-OFFSET  +
                  LANDOFF=.2IN        DEFAULT PCL LANDSCAPE X-OFFSET
```

This entry defines PCL page size code '2', letter paper, which is 8.5" x 11" with a default logical page offset (on HP printers) of .25" in portrait and .2" in landscape.

Example of TYPE=TRAY entry

```
LOWTRAY   $$VRES   TYPE=TRAY,                                      +
                  AFPTRAY=2,          AFP BIN NUMBER                 +
                  PCLTRAY=4,          PCL TRAY CODE       (LOWER TRAY)   +
                  PAGECOD=2           PCL PAGE SIZE CODE  (LETTER)
```

This entry maps AFP tray '2' to PCL tray '4' (lower tray on HP printers). The PCL tray contains letter size paper, PCL page size code '2'.

Creating and Using the VPS/PCL PCLOPMEM Table

The VPS/PCL PJL operations table (defined by the PCLOPMEM= printer definition keyword) identifies the PJL commands to be used for a particular printer to achieve the finishing operation(s) specified in the FORMDEF. Since different printers support different sets of PJL commands, this table must be coded for VPS/PCL to request finishing operations from the printer. Upon printer activation, VPS will build a control block containing all the information supplied in the PCLOPMEM member. If the PCLOPMEM table is altered, any VPS printer pointing to the table must be reactivated so the control block will be rebuilt.

The PCLOPMEM table can contain the following types of records:

1. A comment record, which contains a '*' in column 1 or contains all blanks. Comment records are ignored.
2. A section identification record, which contains the identifying FORMDEf finishing operation delimited by the "<" and ">" characters. The section identification can begin in any column on the line, but it cannot be continued on the next line. No spaces should occur between the delimiters. The valid section identifiers are as follows:

<CORNER_STAPLE_BOTTOM_RIGHT_CORNER>
<CORNER_STAPLE_TOP_RIGHT_CORNER>
<CORNER_STAPLE_BOTTOM_LEFT_CORNER>
<CORNER_STAPLE_TOP_LEFT_CORNER>
<CORNER_STAPLE_DEFAULT>
<SADDLE_STITCH_BOTTOM_EDGE>
<SADDLE_STITCH_TOP_EDGE>
<SADDLE_STITCH_RIGHT_EDGE>
<SADDLE_STITCH_LEFT_EDGE>
<SADDLE_STITCH_DEFAULT>
<EDGE_STITCH_BOTTOM_EDGE>
<EDGE_STITCH_TOP_EDGE>
<EDGE_STITCH_RIGHT_EDGE>
<EDGE_STITCH_LEFT_EDGE>
<EDGE_STITCH_DEFAULT>
<SEPARATION_CUT_BOTTOM_EDGE>
<SEPARATION_CUT_TOP_EDGE>
<SEPARATION_CUT_RIGHT_EDGE>
<SEPARATION_CUT_LEFT_EDGE>
<SEPARATION_CUT_DEFAULT>
<PERFORATION_CUT_BOTTOM_EDGE>
<PERFORATION_CUT_TOP_EDGE>
<PERFORATION_CUT_RIGHT_EDGE>
<PERFORATION_CUT_LEFT_EDGE>
<PERFORATION_CUT_DEFAULT>
<ZFOLD_BOTTOM_EDGE>
<ZFOLD_TOP_EDGE>
<ZFOLD_RIGHT_EDGE>
<ZFOLD_LEFT_EDGE>
<ZFOLD_DEFAULT>
<END_CORNER_STAPLE>
<END_SADDLE_STITCH>
<END_EDGE_STITCH>
<END_SEPARATION_CUT>
<END_PERFORATION_CUT>
<END_ZFOLD>

All the section identifier values, except for the END_ sections, define valid FORMDEF finishing operations. The END_ sections should be coded to tell VPS/PCL how to turn off any printer finishing operations that have been set. Although VPS/PCL will always issue the PJL RESET command at the end of the dataset to return the printer to its currently defined environment, the END_ sections should be specified in case any finishing operations are to occur at the document level or page level (as opposed to the printfile level).

Comments may be entered after the closing delimiter, with at least 1 blank separating the delimiter from the comment.

3. A PJL command record, which contains at least 1 complete PJL command. These records contain the PJL commands that are to be associated with the previous section. Note that these records are not validated in any way. VPS/PCL will issue the PJL command exactly as it is coded, beginning with the first non-blank character and ending with the last non-blank character, and a CR/LF will be added after the line. There is no limit to the number of PJL commands that can be associated with a section. A PJL command can begin in any column on the line, but it should not be continued on the next line.

Four sample PCLOPMEM tables are provided in LRS.VPS.V1R80.CNTL. These tables may need to be altered to achieve the desired results.

PCLOPCAN - Defines the PJL commands for a Canon imageRunner 8500 printer:

```
<CORNER_STAPLE_BOTTOM_RIGHT_CORNER>
@PJL COMMENT CANPJL SET SORTERMODE = GENERICON
@PJL COMMENT CANPJL SET STAPLE = ONELOWRIGHT

<CORNER_STAPLE_TOP_RIGHT_CORNER>
@PJL COMMENT CANPJL SET SORTERMODE = GENERICON
@PJL COMMENT CANPJL SET STAPLE = ONEUPRIGHT

<CORNER_STAPLE_BOTTOM_LEFT_CORNER>
@PJL COMMENT CANPJL SET SORTERMODE = GENERICON
@PJL COMMENT CANPJL SET STAPLE = ONELOWLEFT

<CORNER_STAPLE_TOP_LEFT_CORNER>
@PJL COMMENT CANPJL SET SORTERMODE = GENERICON
@PJL COMMENT CANPJL SET STAPLE = ONEUPLEFT

<CORNER_STAPLE_DEFAULT>
@PJL COMMENT CANPJL SET SORTERMODE = GENERICON
@PJL COMMENT CANPJL SET STAPLE = ONEUPLEFT

<SADDLE_STITCH_BOTTOM_EDGE>
@PJL COMMENT CANPJL SET SORTERMODE = GENERICON
@PJL COMMENT CANPJL SET STAPLE = SADDLESTITCH

<SADDLE_STITCH_TOP_EDGE>
@PJL COMMENT CANPJL SET SORTERMODE = GENERICON
@PJL COMMENT CANPJL SET STAPLE = SADDLESTITCH

<SADDLE_STITCH_RIGHT_EDGE>
@PJL COMMENT CANPJL SET SORTERMODE = GENERICON
@PJL COMMENT CANPJL SET STAPLE = SADDLESTITCH

<SADDLE_STITCH_LEFT_EDGE>
@PJL COMMENT CANPJL SET SORTERMODE = GENERICON
@PJL COMMENT CANPJL SET STAPLE = SADDLESTITCH
```

<SADDLE_STITCH_DEFAULT>
@PJL COMMENT CANPJL SET SORTERMODE = GENERICON
@PJL COMMENT CANPJL SET STAPLE = SADDLESTITCH

<EDGE_STITCH_BOTTOM_EDGE>
@PJL COMMENT CANPJL SET SORTERMODE = GENERICON
@PJL COMMENT CANPJL SET STAPLE = TWOLOW

<EDGE_STITCH_TOP_EDGE>
@PJL COMMENT CANPJL SET SORTERMODE = GENERICON
@PJL COMMENT CANPJL SET STAPLE = TWOUP

<EDGE_STITCH_RIGHT_EDGE>
@PJL COMMENT CANPJL SET SORTERMODE = GENERICON
@PJL COMMENT CANPJL SET STAPLE = TWORIGHT

<EDGE_STITCH_LEFT_EDGE>
@PJL COMMENT CANPJL SET SORTERMODE = GENERICON
@PJL COMMENT CANPJL SET STAPLE = TWOLEFT

<EDGE_STITCH_DEFAULT>
@PJL COMMENT CANPJL SET SORTERMODE = GENERICON
@PJL COMMENT CANPJL SET STAPLE = TWOLEFT

<ZFOLD_BOTTOM_EDGE>
@PJL COMMENT CANPJL SET ZFOLD = GENERICON

<ZFOLD_TOP_EDGE>
@PJL COMMENT CANPJL SET ZFOLD = GENERICON

<ZFOLD_RIGHT_EDGE>
@PJL COMMENT CANPJL SET ZFOLD = GENERICON

<ZFOLD_LEFT_EDGE>
@PJL COMMENT CANPJL SET ZFOLD = GENERICON

<ZFOLD_DEFAULT>
@PJL COMMENT CANPJL SET ZFOLD = GENERICON

<END_CORNER_STAPLE>
@PJL COMMENT CANPJL SET STAPLE = GENERICOFF

<END_SADDLE_STITCH>
@PJL COMMENT CANPJL SET STAPLE = GENERICOFF

<END_EDGE_STITCH>
@PJL COMMENT CANPJL SET STAPLE = GENERICOFF

<END_ZFOLD>
@PJL COMMENT CANPJL SET ZFOLD = GENERICOFF

PCLOPHP - Defines the PJL commands for a Hewlett Packard LaserJet 5si Mopier printer:

<CORNER_STAPLE_BOTTOM_RIGHT_CORNER>
@PJL SET FINISH = STAPLE

<CORNER_STAPLE_TOP_RIGHT_CORNER>
@PJL SET FINISH = STAPLE

<CORNER_STAPLE_BOTTOM_LEFT_CORNER>
@PJL SET FINISH = STAPLE

<CORNER_STAPLE_TOP_LEFT_CORNER>
@PJL SET FINISH = STAPLE

<CORNER_STAPLE_DEFAULT>
@PJL SET FINISH = STAPLE

<END_CORNER_STAPLE>
@PJL SET FINISH = NONE

PCLOPIBM - Defines the PJL commands for an IBM InfoPrint 32 printer:

<CORNER_STAPLE_BOTTOM_RIGHT_CORNER>
@PJL SET STAPLE = ONEPORT

<CORNER_STAPLE_TOP_RIGHT_CORNER>
@PJL SET STAPLE = ONEPORT

<CORNER_STAPLE_BOTTOM_LEFT_CORNER>
@PJL SET STAPLE = ONEPORT

<CORNER_STAPLE_TOP_LEFT_CORNER>
@PJL SET STAPLE = ONEPORT

<CORNER_STAPLE_DEFAULT>
@PJL SET STAPLE = ONEPORT

<EDGE_STITCH_BOTTOM_EDGE>
@PJL SET STAPLE = TWOPORT

<EDGE_STITCH_TOP_EDGE>
@PJL SET STAPLE = TWOPORT

<EDGE_STITCH_RIGHT_EDGE>
@PJL SET STAPLE = TWOLAND

<EDGE_STITCH_LEFT_EDGE>
@PJL SET STAPLE = TWOLAND

<EDGE_STITCH_DEFAULT>
@PJL SET STAPLE = TWOPORT

<END_CORNER_STAPLE>
@PJL SET STAPLE = NONE

<END_EDGE_STITCH>
@PJL SET STAPLE = NONE

PCLOPXRX - Defines the PJL commands for a XEROX Document Center 265 printer:

<CORNER_STAPLE_BOTTOM_RIGHT_CORNER>
@PJL COMMENT OID_ATT_FINISHING OID_VAL_FINISHING_STAPLE
@PJL COMMENT XRXSTAPLE = PORTRAIT

<CORNER_STAPLE_TOP_RIGHT_CORNER>
@PJL COMMENT OID_ATT_FINISHING OID_VAL_FINISHING_STAPLE
@PJL COMMENT XRXSTAPLE = PORTRAIT

<CORNER_STAPLE_BOTTOM_LEFT_CORNER>
@PJL COMMENT OID_ATT_FINISHING OID_VAL_FINISHING_STAPLE
@PJL COMMENT XRXSTAPLE = PORTRAIT

<CORNER_STAPLE_TOP_LEFT_CORNER>
@PJL COMMENT OID_ATT_FINISHING OID_VAL_FINISHING_STAPLE
@PJL COMMENT XRXSTAPLE = PORTRAIT

<CORNER_STAPLE_DEFAULT>
@PJL COMMENT OID_ATT_FINISHING OID_VAL_FINISHING_STAPLE
@PJL COMMENT XRXSTAPLE = PORTRAIT

<END_CORNER_STAPLE>
@PJL COMMENT OID_ATT_FINISHING OID_VAL_GENERIC_NONE

Using the PCL Diagnostic Program

The PCL diagnostic program VPSSLPCL analyzes an ASCII PCL file and generates a report. The report lists all the PCL and HP-GL/2 commands found in the input file. Each command is listed in its hexadecimal format, in ASCII, and with a brief description of the command. For some commands in which the length is significant, a length value is also printed.

This program can be used for diagnostic or tuning purposes. It can estimate the size of a PCL macro, estimate the amount of printer storage used by an OVERLAY or PAGESEG, and aid in diagnosing problems with the PCL data stream.

The easiest way to use the VPSSLPCL program is to run VPS/PCL as a batch job and pass the output from it to the VPSSLPCL program in the same job. Sample JCL to perform these functions is supplied as member PRINTPCL in file LRS.VPS.V1R80.CNTL.

It is possible to run the VPSSLPCL program against PCL files that were not created by VPS/PCL. Remember that the dataset must be an ASCII dataset.

Familiarity with the PCL datastream is required to understand the report in any detail. The "PCL5 Printer Language Technical Reference Manual" from Hewlett Packard is the reference manual for the PCL datastream. User manuals supplied with printers also include descriptions of the PCL datastream commands.

A sample page of output from the VPSSLPCL program is shown here:

```
PCL COMMAND ANALYSIS                                        PAGE     1
-------------------------------------------------------------------
ASCII              COMMAND DESCRIPTION          HEXADECIMAL
-------------------------------------------------------------------

E                  RESET                        45
&l1H               PAPER SOURCE                 266C3148
&l1S               PRINT MODE                   266C3153
&l1S               PRINT MODE                   266C3153
&l002A             PAGE SIZE                    266C30303241
&l000E             TOP MARGIN                   266C30303045
9                  CLEAR HORIZ MARGINS          39
&l0L               PERF SKIP                    266C304C
&l066F             TEXT LENGTH                  266C30363646
&l00001X           NUMBER OF COPIES             266C303030303158
&1-00062.00U       LONG EDGE OFFSET             266C2D303030363322E3030
&a000000.00H       HOR CUSOR-DECIPTS            26613030303030302E3030
&a000117.00V       VER CUSOR-DECIPTS            26613030303131372E3030
```

Using the VPS/PDF Resource Mapping Table (PDFRTAB)

The VPS/PDF resource mapping table allows users to map AFP resources to PDF resources, including font resources, input paper trays, and paper sizes.

Since physical page size is not determined by an AFP document's logical page size, it will be necessary to map AFP bin numbers (specified in the FORMDEF or on the JCL OUTPUT statement INTRAY parameter) to physical paper sizes. This can be done using the TYPE=TRAY, TYPE=MEDIA, and TYPE=PAPER entries.

AFP font character sets can be mapped to Adobe core fonts using a TYPE=CHARSET entry. This decreases VPS/PDF conversion time and output PDF file size. AFP character sets that are not mapped in the PDFRTAB will be converted to Adobe Type-3 fonts and embedded in the PDF file. Adobe Type-3 fonts have no associated font metrics to provide detailed information about the characters of each font, so Adobe Acrobat is limited in its ability to accurately scale and smooth the Type-3 font characters. Because of this, mapping AFP font character sets to Adobe core fonts is recommended whenever possible.

AFP font character sets that are mapped to Adobe core fonts can also retain their AFP font metrics by specifying the METRICS=AFP keyword on the TYPE=CHARSET entry. If the AFP font metrics are to be retained for a character set, an Adobe AFM font metrics file will be created based on the individual character metrics in the AFP character set, and embedded in the output PDF file. If the METRICS=AFP keyword is specified for an AFP outline font, an Adobe PFB file, which contains the character definitions, will also be created, and embedded in the output PDF file. This new AFM metrics file will override the Adobe defined AFM metric file for the requested Adobe core typeface. When embedding AFP outline fonts, a custom encoding file (based on the requested code page table), will also be created and embedded in the output PDF document. This custom encoding will allow characters in the outline font that have non-standard postscript glyph names to be accessed and displayed.

Legal Considerations:

It is important to remember that AFP outline fonts are expressed as computer programs, which may be copyrighted. The embedding of the AFM and PFB files into the output PDF file, as described in the previous paragraph, copies portions of the AFP outline font's computer program into the output PDF document. Therefore, you should determine whether the AFP outline fonts that your company uses are copyrighted, or are otherwise protected by a third party, and if they are, whether your company's license allows you to embed the AFM and PFB files into the output PDF document.

When an AFP font character set is mapped to an Adobe core font, the Windows ANSI symbol set will be used. VPS/PDF will internally build and use a translate table for use with an AFP code page table, but this translate can be overridden using a TYPE=CODEPAGE entry.

Creating the PDF Resource Table

The macro instruction $$VPDF is used to generate the PDFRTAB table. Sample JCL to assemble and linkedit the PDFRTAB table is provided as member ASMPTAB in LRS.VPS.V1R80.CNTL.

Two sample tables are provided in file LRS.VPS.V1R80.ASM. These sample tables map common IBM AFP font character sets to Adobe core fonts and common IBM AFP font code page tables to character translate tables. Both tables specify an initial zoom factor of 'RETAIN' in the INITIAL type entry. Both tables contain several PAPER type entries defining the following paper sizes:

Paper Size	Type	Physical Page Width	Physical Page Height
Monarch	Envelope	3.875in	7.5in
Com-10	Envelope	4.125in	9.5in
DL	Envelope	110mm	220mm
C5	Envelope	162mm	229mm
B5	Envelope	176mm	250mm
Executive	Paper	7.25in	10.5in
Letter	Paper	8.5in	11in
Legal	Paper	8.5in	14in
Ledger	Paper	11in	17in
A5	Paper	148mm	210mm
A4	Paper	210mm	297mm
A3	Paper	297mm	240mm
B4 - JIS	Paper	257mm	364mm
B5 - JIS	Paper	182mmin	257mm

Both tables also contain several MEDIA type entries defining the following AFP media types.

AFP Media Name	AFP Media ID	PCL Paper Size
ISO A4	06072B120004030100	A4
ISO A4 CO	06072B120004030101	A4
ISO A4 TR	06072B120004030102	A4
ISO A4 THD	06072B120004030105	A4
ISO A3	06072B12000403010A	A3
ISO A3 CO	06072B12000403010B	A3
ISO A5	06072B120004030114	A5
ISO A5 CO	06072B120004030115	A5
ISO B4	06072B12000403011E	B4
ISO B4 CO	06072B12000403011F	B4
ISO B5	06072B120004030128	B5
ISO B5 CO	06072B120004030129	B5
JIS B4	06072B12000403012A	B4-JIS
JIS B5	06072B12000403012B	BS-JIS
LETTER	06072B120004030132	LETTER
Letter CO	06072B120004030133	LETTER
Letter TR	06072B120004030134	LETTER
LEGAL	06072B12000403013C	LEGAL
LEGAL CO	06072B12000403013D	LEGAL
EXEC	06072B120004030141	EXEC
LEDGER	06072B120004030143	LEDGER
COM 10 ENV	06072B12000403014B	COM-10
MON ENV	06072B12000403014C	MONARCH
DL ENV	06072B12000403014D	DL
C5 ENV	06072B12000403014F	CS

The three sample PDFRTAB tables are:

VPSSPTAB Maps each paper tray to LETTER paper; maps the envelope feeder to COM-10 envelopes; and maps common AFP character sets to Adobe core fonts.

VPSSPTB1 Maps each paper tray to A4 paper; maps the envelope feeder to B5 envelopes; and maps common AFP character sets to Adobe core fonts.

VPSSPTB2 Maps each paper tray to LETTER paper and maps the envelope feeder to COM-10 envelopes. Does not map any AFP character sets to Adobe core fonts.

There are six different TYPE= parameters. TYPE=INITIAL must be coded only once, and it must be the first entry in the table. TYPE=TRAY, TYPE=MEDIA, TYPE=PAPER, TYPE=CHARSET and TYPE=CODEPAGE may be coded as many times as necessary.

The parameters of $$VPDF are explained below. Examples of each entry follow.

TYPE=INITIAL | CHARSET | CODEPAGE | MEDIA | PAPER | TRAY

INITIAL Must be the first entry in the table.

ZOOM= Specifies the initial zoom factor when a document is opened. Valid values are:

ZOOM=RETAIN Open the document with the current Acrobat zoom setting.

ZOOM=FITPAGE Open the document to fit the entire contents of the page in the window.

ZOOM=FITWIDTH Open the document to fit the entire width of the page in the window.

ZOOM=FITHEIGHT Open the document to fit the entire height of the page in the window.

Default: RETAIN

PAGESIZ= Specifies the default physical paper size. Valid values are 1-32 alphanumeric characters. The specified value should also be defined in a TYPE=PAPER entry, with the physical paper dimensions included.

Default: None.

CHARSET Maps an AFP font character set to an Adobe core font.

CHARSET= AFP font character set name. Valid values are 1-8 alphanumeric characters beginning with C0 or C1 (indicating the character set is bitmapped) or CZ (indicating the character set is outline).

Default: None.

TYPEFACE= Adobe core font typeface. Valid values are:

Courier	Helvetica-BoldOblique
Courier-Bold	Times-Roman
Courier-Oblique	Times-Bold
Courier-BoldOblique	Times-Italic
Helvetica	Times-BoldItalic
Helvetica-Bold	Symbol
Helvetica-Oblique	ZapfDingbats

Default: None.

SIZE= Font point size. Valid values are 000.25 through 999.75.

Default: None.

If the CHARSET entry specifies an AFP bitmapped character set (name prefix is C0 or C1), then both the SIZE and TYPEFACE parameters must be specified.

If the CHARSET entry specifies an AFP outline character set (name prefix is CZ), then the TYPEFACE parameter must be specified. The SIZE parameter should not be specified; VPS/PDF will obtain the appropriate point size from the AFP document. VPS/PDF cannot currently convert AFP outline fonts, so they must be mapped in the PDF resource table.

METRICS= Specifies whether AFP font metrics should be retained.

METRICS= None. Do not retain the AFP font metrics.

METRICS= AFP. Retain the AFP font metrics for AFP outline fonts, and AFP raster fonts.

Default: None.

CODEPAGE Maps an AFP code page table to a translate table. This entry is ignored if the associated AFP character set is being converted to an Adobe Type 3 font.

CODEPGE= AFP code page table name. Valid values are 1-8 alphanumeric characters beginning with T1.

Default: None.

XLATTAB= Translate table to be used for font code point conversion. Valid values are 1-8 alphanumeric characters, beginning with an alpha character. This table name must be unique; it cannot have the same name as any VPS module or exit.

Default: None.

MEDIA Maps an AFP media type to a physical paper size.

AFPNAME= AFP media type name (specified in the FORMDEF). Valid values are 1-32 alphanumeric characters (uppercase and lowercase).

Default: None.

AFPOID= AFP media type identifier. Valid values are 2-32 characters representing 1-16 hexadecimal characters.

Default: None.

PAGESIZE= Physical paper size name. Valid values are 1-32 alphanumeric characters. The specified value should also be defined in a TYPE=PAPER entry, with the physical paper dimensions included.

Default: None.

PAPER Specifies the physical paper dimensions.

PAGESIZ= Physical paper size name. Valid values are 1-32 alphanumeric characters.

Default: None.

PAGETYP= Paper type. Valid values are PAPER or ENVELOPE.

Default: None.

PAGEWDT= Physical page width. Valid values are:

1.00IN through 218.45IN

or

25.400MM through 5548.63MM

Default: None.

PAGEHGT= Physical page height. Valid values are:

1.00IN through 218.45IN

or

25.400MM through 5548.63MM

Default: None.

TRAY Maps the AFP bin number (defined in the FORMDEF, the INTRAY OUTPUT JCL statement keyword, or the INTRAY VPS printer definition keyword) to a physical paper size.

AFPTRAY= AFP tray number. Valid values are 1 through 255.

Default: None.

PAGESIZ= Physical paper size name. Valid values are 1-32 alphanumeric characters. The specified value should also be defined in a TYPE=PAPER entry, with the physical paper dimensions included.

Default: None.

Example of TYPE=INITIAL entry:

```
INITIAL  $$VPDF TYPE=INITIAL                    +
                ZOOM=FITPAGE
```

This entry informs VPS/PDF to open the document magnified to fit the entire page in the window.

Examples of TYPE=CHARSET entry:

```
C0H20060 $$VPDF TYPE=CHARSET,                   +
                CHARSET=C0H20060,               +
                TYPEFACE=Helvetica-Bold,        +
                SIZE=6
```

This entry informs VPS/PDF to map character set C0H20060 to a Helvetica-Bold 6-point Adobe font.

```
CZH000   $$VPDF TYPE=CHARSET,                   +
                CHARSET=CZH000,                 +
                TYPEFACE=Helvetica
```

This entry informs VPS/PDF to map character set CZH000 to a Helvetica Adobe font. The point size is determined from information in the AFP document.

Example of TYPE=CODEPAGE entry:

```
T1V10500 $$VPDF TYPE=CODEPAGE,                  +
                CODEPGE=T1V10500,               +
                XLATTAB=VPSSX500
```

This entry informs VPS/PDF to translate code points using translate table VPSSX500 when code page T1V10500 is active and an Adobe core font is in use.

Example of TYPE=TRAY and TYPE=PAPER entries:

```
TRAY001  $$VPDF TYPE=TRAY,                    +
               AFPTRAY=1,                     +
               PAGESIZ=LEGAL
```

```
LEGAL    $$VPDF TYPE=PAPER,                    +
               PAGESIZ=LEGAL,                 +
               PAGETYP=PAPER,                 +
               PAGEWDT=8.5IN,                 +
               PAGEHGT=14IN
```

These entries inform VPS/PDF to format data for 8.5” x 14” paper when AFP bin ‘1’ is specified.

Example of TYPE=MEDIA and TYPE=PAPER entries:

```
MONENV   $$VPDF TYPE=TRAY,                    +
               AFPNAME='MON ENV',             +
               AFPOID=06072B12000403014C,     +
               PAGESIZ=MONARCH
```

```
MONARCH  $$VPDF TYPE=PAPER,                   +
               PAGESIZ=MONARCH,               +
               PAGETYP=ENVELOPE,              +
               PAGEWDT=3.875IN,               +
               PAGEHGT=7.5IN
```

These entries inform VPS/PDF to format data for 3.875” x 7.5” envelope when AFP media ‘MON ENV’ is specified.

Using the VPS/PDF Character Encoding Table (PDFENCD)

The VPS/PDF character encoding table allows AFP graphic character identifiers to be mapped to code points compatible with Adobe's built-in Window's ANSI encoding table.

During AFP to PDF conversion, AFP font character sets that are mapped to Adobe code fonts through the PDFRTAB must use Adobe's built-in Window's ANSI encoding table. The PDFENCD table contains a list of AFP graphic character identifiers, and the Window's ANSI compatible code point associated with that character. The PDFENCD table will be used by the VPSSCPXL utility to create external VPS character translation tables, and during AFP to PDF conversion to create internal translation tables. (See "Using the Code Page Table Translation Program (VPSSCPXL)" on page 8.78, and "VPS/PDF" on page 8.41 for more information.)

It is possible to have a different encoding table for every printer, but this is not necessary. If many or all printers should use the same encoding, they can point to the same VPS/PDF character encoding table.

Creating the PDF Encoding Table

The macro instruction $$VPENCD is used to generate a PDFENCD table. Sample JCL to assemble and linkedit the PDFENCD table is provided as member ASMENCD in LRS.VPS.V1R80.CNTL.

One sample table is provided in file VPS.V1R80.ASM. This sample table maps common AFP Graphic Character Identifiers to a code point compatible with the Adobe Window's ANSI encoding.

There are two different TYPE= parameters. TYPE=INITIAL must be coded only once, and it must be the first entry in the table. TYPE=ENCODE may be coded as many times as necessary.

The parameters of $$VPENCD are explained below. Examples of each entry follow.

TYPE= INITIAL | ENCODE

INITIAL Must be the first entry in the table.

ENCODE Maps an AFP Graphic Character Identifier to an Adobe Window's ANSI compatible code point.

AFPGCID= AFP Graphic Character Identifier. Valid values are 1 – 8 alphanumeric characters.

Default: None.

UNICODE= Unicode value for AFP Graphic Character Identifier. Valid values are 2 hexadecimal digits. (See "Latin Character Set and Window's ANSI Encoding" on page 8.93 for more information.)

Default: None.

ANSI= New Window's ANSI compatible code point to assign to the AFP Graphic Character Identifier. Valid value is 1 hexadecimal digit.

Default: None.

If ANSI=00 is specified, the code point for the AFP Graphic Character Identifier will remain unchanged.

Example of TYPE=INITIAL entry:

```
INITIAL  $$VPENCD TYPE=INITIAL
```

This entry informs VPS/PDF that the PDFENCD table follows.

Examples of TYPE=ENCODE entry:

```
SP010000 $$VPENCD TYPE=ENCODE,                  +
               AFPGCID=SP010000,                +
               UNICODE=0020,                    +
               ANSI=20
```

This entry maps the SP010000 AFP Graphic Character Identifier for the space character to a WINANSI compatible code point of hexadecimal 20.

```
SF150000 $$VPENCD TYPE=ENCODE,                  +
               AFPGCID=SF150000,                +
               UNICODE=2592,                    +
               ANSI=00
```

This entry will leave the code point for the AFP Graphic Character Identifier SF150000 unchanged since ANSI=00 is specified.

Using the Code Page Table Translation Program (VPSSCPXL)

During AFP to PDF conversion, AFP font character sets that are mapped to Adobe core fonts through the PDFRTAB must use Adobe's built in Window's ANSI encoding. This encoding will be based on the values entered in the PDFENCD table (see "Creating the PDF Encoding Table" on page 8.76 for more information).

The code page table translation program VPSSCPXL will accept any single-byte font code page table and create a VPS character translation table compatible with Adobe's built in Window's ANSI encoding. The translation table can then be assembled and linked into a load library accessible to VPS and referenced in the PDFRTAB. (See "Creating the PDF Resource Table" on page 8.68 for more information.) Characters present in the font code page table that are undefined in the PDFENCD table will remain unchanged.

When creating the new VPS character translation table the graphic character identifiers in the code page table are used to search the PDFENCD table. If a matching entry is located the ANSI value in the PDFENCD table entry will be used as the new code point for that graphic character ID. If a matching entry is not found in the PDFENCD table, the code point will be set to the code point associated with the default graphic character ID specified in the code page.

VPS character translation tables for two common code page tables can be found in the VPS source library (LRS.VPS.V1R80.ASM). The standard T1 code page table prefix will be changed to TX for the associated translation table. For example, the translation table for T1V10500 will be named TXV10500.

Member VPSSCPXL in the VPS control library (LRS.VPS.V1R80.CNTL) is a sample of JCL that can be used to execute this program.

A sample of output from the VPSSCPXL program is shown here:

```
*-------------------------------------------------------------------*
*                                                                   *
*        VTAM PRINTER SUPPORT SYSTEM - VERSION 1, RELEASE 8.0       *
*                                                                   *
*                        LEVI, RAY & SHOUP, INC.                    *
*                        2401 WEST MONROE STREET                    *
*                        SPRINGFIELD, IL 62704                      *
*                                                                   *
*-------------------------------------------------------------------*
*                                                                   *
*   MODULE NAME:    TXD0BASE        (ENCODING TABLE USED: VPSSENCD) *
*                                                                   *
*   ATTRIBUTES:     RENT,REUS,REFR / KEY 8                          *
*                                                                   *
*   CALLED BY:      N/A - THIS MODULE IS A TRANSLATE TABLE          *
*                                                                   *
*   MODULES CALLED: N/A                                             *
*                                                                   *
*-------------------------------------------------------------------*
*                                                                   *
*   FUNCTION:                                                       *
*                                                                   *
*   THIS MODULE IS USED TO TRANSLATE THE T1D0BASE CODEPAGE TO       *
*   WINANSI (ASCII) FOR VPS/PDF CONVERSIONS.                        *
*                                                                   *
*-------------------------------------------------------------------*
         EJECT
TXD0BASE CSECT
TXD0BASE AMODE ANY
TXD0BASE RMODE ANY
         SPACE
         DC    X'20202020202020202020202020202020'    00-0F
         DC    X'20202020202020202020202020202020'    10-1F
         DC    X'20202020202020202020202020202020'    20-2F
         DC    X'20202020202020202020202020202020'    30-3F
         DC    X'20A020202020202020A22E3C282B7C'      40-4F
         DC    X'26202020202020202020212420293BAC'    50-5F
         DC    X'2D2F20202020202020202C255F3E3F'      60-6F
         DC    X'20202020202020202020203A2340273D22'  70-7F
         DC    X'20616263646566676869207B20202020'    80-8F
         DC    X'206A6B6C6D6E6F707172207D2020B120'    90-9F
         DC    X'2020737475767778797A2020205B207F'    A0-AF
         DC    X'20B9B2B3202020202020202020205D2020'  B0-BF
         DC    X'7B41424344454647484920202020202020'  C0-CF
         DC    X'7D4A4B4C4D4E4F505152202020A7202020'  D0-DF
         DC    X'5C20535455565758595A202020202020'    E0-EF
         DC    X'30313233343536373839202020202020'    F0-FF
         END   ,
```

Using the Font Point Size Summary Program (VPSSPTSZ)

The font point size summary program, VPSSPTSZ, analyzes a single-byte font character set and generates a summary report of the possible point sizes for the font. The VPSSPTSZ program is intended to provide a starting point for selecting the proper size to specify in the PDFRTAB when performing font mapping to Adobe core fonts. (See "Creating the PDF Resource Table" on page 8.68 for more information.)

It is important to note that the values in the character set used to calculate the point sizes output by VPSSPTSZ may not be a direct representation of the font's actual size. There is no guarantee that the sizes listed in the summary report will be the correct size to specify in the PDFRTAB.

Member VPSSPTSZ in the VPS control library (LRS.VPS.V1R80.CNTL) is a sample of JCL that can be used to execute this program.

A sample page of output from the VPSSPTSZ program is shown here:

```
****************************** Top of Data ***************************
    POINT SIZE INFORMATION FOR CHARACTER SET C0H20080          00010000
                                                               00020000
                                                               00030000
 POINT SIZE FROM FND NOMINAL POINT SIZE:    8.00               00040000
 POINT SIZE FROM FNO DEFAULT BASELINE INCREMENT:    8.55       00050000
 POINT SIZE FROM FNC MAXIMUM CHARACTER BOX HEIGHT:   10.56     00060000
                                                               00070000
                                                               00080000
  ***  E N D   O F   R E P O R T  ***                           00090000
                                                               00091000
                                                               00092000
                                                               00093000
                                                               00094000
                                                               00095000
                                                               00100000
                                                               00110000
    POINT SIZE INFORMATION FOR CHARACTER SET C0H200B0          00120000
                                                               00130000
                                                               00140000
 POINT SIZE FROM FND NOMINAL POINT SIZE:   0.00                00150000
 POINT SIZE FROM FNO DEFAULT BASELINE INCREMENT:   12.84       00160000
 POINT SIZE FROM FNC MAXIMUM CHARACTER BOX HEIGHT:   15.84     00170000
                                                               00180000
                                                               00190000
  ***  E N D   O F   R E P O R T  ***                           00200000
                                                               00201000
                                                               00202100
                                                               00202200
                                                               00203000
*************************** Bottom of Data ***************************
```

Sample FORMDEFS and PAGEDEFS Distributed with VPS

Several FORMDEFs and PAGEDEFs are delivered with VPS in the LRS.VPS.V1R80.FORMDEF and LRS.VPS.V1R80.PAGEDEF libraries. These provide a variety of standard printing environments. The names of the FORMDEFs and PAGEDEFs and some suggested combinations are listed below. Comments in the PAGEDEFs provide suggestions for when a particular font should be used. These suggestions can be viewed by browsing the PAGEDEFs.

Name	Description
NDPLX	Normal duplex, normal offsets
NDPLXB	Normal duplex, binding offsets
NDPLXL	Normal duplex, normal offsets
SMPLX	Simplex
SMPLXL	Simplex
TDPLX	Tumble duplex, normal offsets
TDPLXB	Tumble duplex, binding offsets
TDPLXL	Tumble duplex, normal offsets
NDLXLO	Normal duplex, uses sample overlay BX4UP
SMLXLO	Simplex, uses sample overlay BX4UP
TDLXLO	Tumble duplex, uses sample overlay BX4UP

Table 8-1: Sample FORMDEFs Supplied With VPS

Name	Description	Orientation	Lines per Page
1UPL60	1-UP	Landscape	60
1UPL64	1-UP	Landscape	64
1UPL66	1-UP	Landscape	66
1UPP60	1-UP	Portrait	60
1UPP64	1-UP	Portrait	64
1UPP66	1-UP	Portrait	66
2UPL60	2-UP	Landscape	60
2UPP60	2-UP	Portrait	60
4UPL60	4-UP	Landscape	60

Table 8-2: Sample PAGEDEFs Supplied With VPS

FORMDEF	PAGEDEF	Orientation	Result
F1NDPLX	P11UPP60	Portrait	1-up, 60 lpp, normal duplex, normal offsets
F1NDPLXB	P11UPP60	Portrait	1-up, 60 lpp, normal duplex, side binding offsets
F1SMPLX	P11UPP60	Portrait	1-up, 60 lpp, simplex, normal offsets
F1TDPLX	P11UPP60	Portrait	1-up, 60 lpp, tumble duplex, normal offsets
F1TDPLXB	P11UPP60	Portrait	1-up, 60 lpp, tumble duplex, top binding offsets
F1NDPLX	P11UPP64	Portrait	1-up, 64 lpp, normal duplex, normal offsets
F1NDPLXB	P11UPP64	Portrait	1-up, 64 lpp, normal duplex, side binding offsets
F1SMPLX	P11UPP64	Portrait	1-up, 64 lpp, simplex, normal offsets
F1TDPLX	P11UPP64	Portrait	1-up, 64 lpp, tumble duplex, normal offsets
F1TDPLXB	P11UPP64	Portrait	1-up, 64 lpp, tumble duplex, top binding offsets
F1NDPLX	P11UPP66	Portrait	1-up, 66 lpp, normal duplex, normal offsets
F1NDPLXB	P11UPP66	Portrait	1-up, 66 lpp, normal duplex, side binding offsets
F1SMPLX	P11UPP66	Portrait	1-up, 66 lpp, simplex, normal offsets
F1TDPLX	P11UPP66	Portrait	1-up, 66 lpp, tumble duplex, normal offsets
F1TDPLXB	P11UPP66	Portrait	1-up, 66 lpp, tumble duplex, top binding offsets
F1NDPLX	P12UPP60	Portrait	2-up, 60 lpp, normal duplex, normal offsets
F1NDPLXB	P12UPP60	Portrait	2-up, 60 lpp, normal duplex, side binding offsets
F1SMPLX	P12UPP60	Portrait	2-up, 60 lpp, simplex, normal offsets
F1TDPLX	P12UPP60	Portrait	2-up, 60 lpp, tumble duplex, normal offsets
F1TDPLXB	P12UPP60	Portrait	2-up, 60 lpp, tumble duplex, top binding offsets
F1SMPLXL	P11UPL60	Landscape	1-up, 60 lpp, simplex, normal offsets
F1NDPLXL	P11UPL60	Landscape	1-up, 60 lpp, normal duplex, normal offsets
F1TDPLXL	P11UPL60	Landscape	1-up, 60 lpp, tumble duplex, normal offsets
F1SMPLXL	P11UPL64	Landscape	1-up, 64 lpp, simplex, normal offsets
F1NDPLXL	P11UPL64	Landscape	1-up, 64 lpp, normal duplex, normal offsets
F1TDPLXL	P11UPL64	Landscape	1-up, 64 lpp, tumble duplex, normal offsets
F1SMPLXL	P11UPL66	Landscape	1-up, 66 lpp, simplex, normal offsets
F1NDPLXL	P11UPL66	Landscape	1-up, 66 lpp, normal duplex, normal offsets
F1TDPLXL	P11UPL66	Landscape	1-up, 66 lpp, tumble duplex, normal offsets
F1SMPLXL	P12UPL60	Landscape	2-up, 60 lpp, simplex, normal offsets
F1NDPLXL	P12UPL60	Landscape	2-up, 60 lpp, normal duplex, normal offsets
F1TDPLXL	P12UPL60	Landscape	2-up, 60 lpp, tumble duplex, normal offsets
F1SMPLXL	P14UPL60	Landscape	4-up, 60 lpp, simplex, normal offsets
F1NDPLXL	P14UPL60	Landscape	4-up, 60 lpp, normal duplex, normal offsets
F1TDPLXL	P14UPL60	Landscape	4-up, 60 lpp, tumble duplex, normal offsets
F1SMLXLO	P14UPL60	Landscape	4-up, 60 lpp, simplex, normal offsets, overlay
F1NDLXLO	P14UPL60	Landscape	4-up, 60 lpp, normal duplex, normal offsets, overlay
F1TDLXLO	P14UPL60	Landscape	4-up, 60 lpp, tumble duplex, normal offsets, overlay

Table 8-3: Results of FORMDEF/PAGEDEF Combinations

Creating a Coded Font

The VPS/PCL resource mapping table allows AFP CHARACTER SETs to be mapped to PCL fonts. It may be desirable to access a PCL font for which there is no AFP equivalent. In this case, a CHARACTER SET name can be added to AFPRTAB that does not exist in the AFP font libraries. To access this CHARACTER SET from a PAGEDEF, a CODED FONT must be created, containing the CHARACTER SET name and a CODEPAGE name.

A utility is provided to assist in creating a new CODED FONT. The utility consists of an ISPF panel, a CLIST, and an edit macro. Members VAFPCFPA, VAFPCFCR, and VAFPCFMA in file LRS.VPS.V1R80.CNTL contain the panel, the CLIST, and the edit macro respectively.

To install the CODED FONT utility, the panel (VAFPCFPA) must be copied to a valid ISPF panel library, and the CLIST (VAFPCFCR) and the edit macro (VAFPCFMA) must both be copied to a valid CLIST library. To invoke the command, issue CLIST VAFPCFCR from ISPF option 6.

A sample CODED FONT (X0SAMPLE) is provided in file LRS.VPS.V1R80.FONT300. The sample contains T1SAMPLE as the CODE PAGE and C0SAMPLE as the CHARACTER SET. Defaults are set to use the provided samples. However, these defaults can be changed in the CLIST (VAFPCFCR) to use any existing CODED FONT.

The Coded Font Creation Utility uses the sample CODED FONT or any other existing CODED FONT as a template to create new CODED FONTS. The user enters an output dataset name, an output CODED FONT name, a CHARACTER SET name and a CODE PAGE name. The utility uses the information entered to create a new CODED FONT in the specified library. The utility creates the new CODED FONT by creating a copy of the input CODED FONT and changing the CHARACTER SET and CODE PAGE values to match the output values. If the input values do not match those found in the input CODED FONT, no change will take place. It is suggested that the sample be used for input.

Using Printer Resident Overlays and Page Segments with VPS/PCL

AFP OVERLAYS and PAGE SEGMENTS can be mapped to macros already resident in the printer by using the AFPRTAB. These macros are loaded in the printer by a means external to VPS/PCL.

The same PCL commands must appear in the same sequence, no matter which method is used to load the macro. An ID number must be assigned, and then the macro itself loaded. This is the sequence:

```
Assign ID number:   PCL MACRO ID COMMAND  1B266631303059  macro ID #100
Start macro:        PCL START MACRO CMD   1B26663058
                      .
    macro commands    .
                      .
Stop macro:         PCL STOP  MACRO CMD   1B26663158
```

Refer to the “PCL5 Printer Language Technical Reference Manual” from Hewlett Packard for more detail concerning PCL commands.

Certain commands coded in these PCL printer resident macros may cause unpredictable results. For example:

Printer Reset <ESC>E

This command will cause any temporary resources that have been loaded by VPS/PCL to be deleted. The printer defaults will be restored. Also, any partial pages of data will be printed.

Universal Exit Language <ESC>%-12345X

In addition to performing a printer reset, the command turns off the PCL 5 printer language processor and turns control over to the PJL (Printer Job Language) processor.

Form Feed <FF>

VPS/PCL should be allowed exclusive control over page ejects. The correct page will be in process before the macro is invoked.

Duplex Page Side Selection <ESC>&a#G

VPS/PCL should be allowed exclusive control over page side selection. The correct page side will be selected before any printer resident macros are invoked.

Paper Source <ESC>&1#H

VPS/PCL will have selected the correct PCL paper source based on the bin number specified in the FORMDEF and any bin mappings in the AFPRTAB. When this command is received by the printer, any unprinted pages are printed.

Page Size <ESC>&1#A

VPS/PCL will have selected the page size based on the current bin specified in the FORMDEF and the paper size specified in the AFPRTAB.

When this command is received by the printer, any unprinted pages are printed, and the top margin, text length, left margin, and right margin are reset to the printer defaults.

Logical Page Orientation <ESC>&1#0

VPS/PCL always sets the logical page orientation to portrait at the beginning of processing. AFP resources use print direction instead of page orientation to rotate data, so VPS/PCL will do the same. The printer will only accept this command once per page, whereas the PCL "print direction" command can be used multiple times on a page. When this command is received by the printer, any unprinted pages are printed, and the top margin, text length, left margin, right margin, horizontal motion index, and vertical motion index are reset to the printer defaults.

Left Margin <ESC>&a#L

VPS/PCL sets the left margin to the left edge of the logical page. Changing this value in a printer resident macro could result in loss of data processed by VPS/PCL.

Right Margin <ESC>&a#M

VPS/PCL sets the right margin to the right edge of the logical page. Changing this value in a printer resident macro could result in loss of data processed by VPS/PCL.

Top Margin <ESC>&1#E

VPS/PCL sets the top margin to the top of the physical page. Changing this value in a printer resident macro could result in loss of data processed by VPS/PCL.

Text Length <ESC>&1#F

VPS/PCL sets the text length as close to the length of the physical page as possible. Changing this value in a printer resident macro could result in loss of data processed by VPS/PCL.

The "#" in these examples refers to the value field.

The two examples shown on the next page demonstrate how an OVERLAY (or PAGE SEGMENT) might be loaded. In these examples, a macro would be loaded into the printer after first selecting a macro ID. A resource table entry for the OVERLAY might look like this:

```
OVERLAY   $$VRES    TYPE=OVERLAY,          +
          OVERLAY=O1BX400,                 +
          MACROID='100'
```

This entry indicates that when AFP OVERLAY "O1BX400" is encountered, VPS/PCL should not load it from the OVLYLIB, but should instead invoke macro ID #100 in the printer.

Example 1: To load a PCL macro from an MVS load library:

```
//jobname JOB job..card..information
//STEP010 EXEC  PGM=IEBGENER
//SYSPRINT   DD SYSOUT=*
//SYSIN      DD DUMMY
//SYSUT1     DD DSN=LRS.VPS.V1R80.CNTL(MACID100),DISP=SHR
//            DD DSN=LRS.VPS.V1R80.CNTL(BX4UP),DISP=SHR
//SYSUT2     DD SYSOUT=T,DEST=U100
//*
```

This JCL assumes the following:

- LRS.VPS.V1R80.CNTL(MACID100) contains the assign macro ID PCL command
- LRS.VPS.V1R80.CNTL(BX4UP) contains the complete PCL macro
- The VPS printer definition servicing DEST=U100 contains the TRNCLASS keyword set to TRNCLASS=(T,xx,xx).

Example 2: To load a PCL macro from a PC hard disk:

```
COPY C:/MACROID1.PCL LPT1
COPY C:/MACRO1.PCL LPT1
```

These commands assume the following:

- The printer is connected to LPT1
- C:/MACROID1.PCL contains the assign macro ID PCL command
- C:/MACRO1.PCL contains the complete PCL macro

Other methods of loading a macro into the printer can be employed. VPS/PC is capable of automatically loading macros.

Using the Sample Overlay Provided with VPS/PCL

A sample PCL macro is distributed with VPS/PCL as an example of using the AFPRTAB table to map an AFP OVERLAY to a PCL printer resident macro. Instructions for loading this macro into a printer are given below.

Three of the sample AFPRTAB tables provided with VPS/PCL (VPSSRTB1, VPSSRTB2, and VPSSRTB3) include an entry which maps the AFP overlay O1BX4UP to PCL macroid 100. The sample FORMDEFs provided have three FORMDEFs which invoke this overlay. They are F1SMLXLO, F1NDLXLO and F1TDLXLO. When these FORMDEFs are used in conjunction with specifying VPSSRTAB on the AFPRTAB keyword, the printer will include the PCL overlay on every page. This assumes that the macro has been loaded into the printer. Care should also be taken to use the correct PAGEDEFs and CHARS (fonts), or the output will not be formatted correctly. An example of a PAGEDEF/FORMDEF/CHARS combination is given below.

Loading the Sample PCL Overlay

The macro is supplied as member BX4UP in file LRS.VPS.V1R80.CNTL. An additional member in the same library, called MACID100, is also required. The following JCL can be used to load the macro into the printer. This JCL is supplied as member LOADPCL in file LRS.VPS.V1R80.CNTL.

```
//JOBNAME  JOB  (YOUR JOB CARD INFORMATION)
//*
//*-------------------------------------------------------------*
//*                                                             *
//* JCL TO LOAD THE SAMPLE PCL 4-UP MACRO INTO A PRINTER.       *
//*                                                             *
//* THIS JCL ASSUMES THE FOLLOWING KEYWORDS ARE SPECIFIED IN    *
//* THE VPS PRINTER DEFINITION MEMBER.                          *
//*                                                             *
//*  TRNCLASS=(T,X,XX)                                          *
//*  DEST=U1                                                    *
//*                                                             *
//*-------------------------------------------------------------*
//*
//STEP1   EXEC  PGM=IEBGENER
//SYSUT1   DD DSN=LRS.VPS.V1R80.CNTL(MACID100),DISP=SHR
//         DD DSN=LRS.VPS.V1R80.CNTL(BX4UP),DISP=SHR
//SYSUT2   DD SYSOUT=T,DEST=U1
//SYSPRINT DD SYSOUT=*
//SYSIN    DD DUMMY
```

The following is an example of a JOB which will cause the macro to be invoked as an overlay. This JCL prints the sample AFPRTAB 4-up simplex with boxes around each logical page. This JCL assumes that VPS/PCL is installed, and that the printer selecting destination U1 has CONVTYPE=PCL specified in its VPS printer definition member.

```
//JOBNAME  JOB  (YOUR JOB CARD INFORMATION)
//*
//O4D     OUTPUT DEST=U1,PAGEDEF=4UPL60,FORMDEF=SMLXLO
//STEP1   EXEC  PGM=IEBGENER
//SYSPRINT   DD SYSOUT=*
//SYSIN      DD DUMMY
//SYSUT1     DD DSN=LRS.VPS.V1R80.ASM(VPSSRTAB),DISP=SHR
//SYSUT2     DD SYSOUT=A,OUTPUT=*.O4D,CHARS=GT24
//*
```

The MACID100 member consists of the following PCL commands:

Disable Underline
Primary Stroke Weight = 0 (medium)
Select Symbol Set = 0N (ISO 8859 - Latin1)
Reset
Macro ID = 100

The BX4UP member consists of the following PCL commands:

Macro Control = 0 (start)
... macro commands
Macro Control = 1 (stop)
Macro Control = 10 (make macro permanent)
Reset

Converting AFP Files for Viewing

VPS provides two conversion methods for viewing AFPDS files or line data with PAGEDEF/FORMDEF as follows:

To convert for viewing, specify 1) **CONVTYPE=MODCA** or 2) **CONVTYPE=PDF** in the VPS printer definition. VPS will determine whether a SYSOUT dataset should be converted by checking for AFP characteristics specified via the AFPKEYWD keyword in the VPS printer definition; or the presence of a FORMDEF or PAGEDEF, or for the presence of any AFPDS records (those with X'5A' in the carriage control field). If either is present, VPS will call IBM's AFP Conversion and Indexing Facility (ACIF) to convert the file to MODCA-P. If CONVTYPE=PDF the file will also be converted to PDF. The converted file will be delivered to VPS/PC or to another platform using the CONNECT:Direct Interface (VPS/CDI). Once the file is stored, a MODCA file can be displayed by any AFP viewing interface and a PDF file can be displayed by Adobe's Acrobat Reader.

For example, if you have AFP files that are normally printed from MVS, you could convert those files to MODCA-P for viewing and deliver them through VPS/PC to the PageCenter Plus product (also from Levi, Ray & Shoup, Inc.), where they could be archived and viewed by users on the LAN.

CONVTYPE=MODCA requires VPS/PC, VPS/CDI, or VPS/Email to deliver the documents. Therefore, one of the following should be specified in the VPS printer member:

COMMTYPE=(DUMMY,CDI)	**VPS CONNECT:Direct Interface**
COMMTYPE=(APPC,VPSPC)	**VPS/PC using VTAM/APPC**
COMMTYPE=(TCPIP,VPSPC)	**VPS/PC using TCPIP/Sockets**
COMMTYPE=(TCPIP,EMAIL)	**VPS/Email**
COMMTYPE=(,PAGECENT)	**PageCenter**

CONVTYPE=PDF requires AnyQueue, VPS/CDI, or VPS/Email to deliver the documents. Therefore, one of the following should be specified in the VPS printer member:

COMMTYPE=(DUMMY,CDI)	**VPS CONNECT:Direct Interface**
COMMTYPE=(APPC,LRSQUEUE)	**AnyQueue using VTAM/APPC**
COMMTYPE=(TCPIP,LRSQUEUE)	**AnyQueue using TCPIP/Sockets**
COMMTYPE=(TCPIP,EMAIL)	**VPS/Email**

Using the PAGEDEF and/or FORMDEF keywords in the printer definition would cause all files to be converted to MODCA or PDF format for viewing. Otherwise the files would only be converted if PAGEDEF or FORMDEF had been specified on the OUTPUT JCL statement or if the files contain AFP records (X'5A' in the carriage control).

VPS creates input parameters and calls IBM's ACIF program to convert the file. Before the parameters are sent to ACIF, VPS User Exit 27 is called to allow modification of the input parameters. For more information on the ACIF Parameter File Exit, see "Exit 27: ACIF Parameter File Exit" on page 5.67.

The AFP resource files should be allocated to VPS during startup to locate fonts, PAGEDEF, FORMDEF, etc. VPS User Exit 15, as provided on the VPS distribution cartridge, should be installed and enabled to allow VPS to obtain information from the OUTPUT JCL statement which will be used to process the AFP files. In addition, VPS User Exit 24 is recommended for JES2 sites. For more information on VPS requirements to convert AFP files, see "Installing the VPS AFP Products Within VPS" on page 8.4.

Using the VPSSAFNM and VPSSAFNA Utilities

The VPSSAFNM and VPSSAFNA utilities convert 240-dpi AFP font character sets to 300-dpi font character sets. VPSSAFNM can be used to convert 1 240-dpi character set at a time, and VPSSAFNA can be used to convert all 240-dpi character sets of a font library. Although VPS/IPDS and VPS/PCL will convert 240-dpi character sets to 300-dpi during AFP conversion, it is stongly recommended that these batch utilities be used to pre-scale the 240-dpi character sets for use on 300-dpi printers since the scaling is very resource-intensive. The scaled 300-dpi AFP font character sets should be placed in a new 300-dpi font library, and this library should be concatenated before the 240-dpi library in the VPS PROC font DD. The utilities will only convert AFP font character set members (typically, the members whose names start with 'C0').

Please note that scaling a font will slightly alter the appearance of the characters. Bar code and optical character recognition fonts may not be readable to scanning devices after they are scaled, so the VPSSAFNM and VPSSAFNA utilities should not be used to scale these fonts. **Bar code and optical character recognition fonts must be designed at 300-dpi for use on 300-dpi printers.**

Sample JCL to run the VPSSAFNM utility is in member VPSSAFNM in file LRS.VPS.V1R80.CNTL:

```
//jobname JOB (your job card information)
//*
//SCALE    PROC NAME=
//STEP1    EXEC PGM=VPSSAFNM,REGION=4096K
//STEPLIB  DD DSN=VPS.V1R80.LOAD,DISP=SHR
//SYSUDUMP DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SYSUT1   DD DSN=your.240.dpi.font.library(&NAME),DISP=SHR
//SYSUT2   DD DSN=your.300.dpi.font.library(&NAME),DISP=SHR
//         PEND
//*
//charset  EXEC PROC=SCALE,NAME=charset
//
```

- A region size of at least 4MB is required.
- SYSUT1 specifies the input 240-dpi character set.
- SYSUT2 specifies the dataset to contain the output 300-dpi character set; the LRECL of the 300-dpi library should be at least 12284.

Sample JCL to run the VPSSAFNA utility is in member VPSSAFNM in file LRS.VPS.V1R80.CNTL:

```
//jobname JOB (your job card information)
//*
//STEP1    EXEC PGM=VPSSAFNM,REGION=4096K
//STEPLIB  DD DSN=VPS.V1R80.LOAD,DISP=SHR
//SYSUDUMP DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SYSUT1   DD DSN=your.240.dpi.font.library,DISP=SHR
//SYSUT2   DD DSN=your.300.dpi.font.library,DISP=SHR
//
```

- A region size of at least 4MB is required.
- SYSUT1 specifies the input 240-dpi font library.
- SYSUT2 specifies the output 300-dpi font library; the LRECL of the 300-dpi font library should be at least 12284.

Return codes for VPSSAFNM and VPSSAFNA:

00 - All AFP font character sets converted successfully.

04 - One or more AFP font character sets were not converted for one of the following reasons:

- Character set incomplete (missing commands).
- Invalid/unknown character set record.
- Invalid command length.
- Invalid point size.
- No conversion necessary:
  - Character set is not bitmapped.
  - Character set is not bounded-box.
  - Character set is not 240-dpi.

When one of the above occurs with the VPSSAFNA utility, processing will continue with the next character set in the SYSUT1 font library.

08 - One of the following fatal errors occurred:

- SYSUT1 OPEN abend/failure.
- SYSUT1 I/O failure.
- SYSUT1 'FIND' failure.
- SYSUT1 RECFM invalid.
- SYSUT2 OPEN abend/failure.
- SYSUT2 I/O failure.
- SYSUT2 'STOW' failure.
- SYSUT2 RECFM or LRECL invalid.

Latin Character Set and Window's ANSI Encoding

CHAR	NAME	Char Code(HEX)
A	A	41
Æ	AE	C6
Á	Aacute	C1
Â	Acircumflex	C2
Ä	Adieresis	C4
À	Agrave	C0
Å	Aring	C5
Ã	Atilde	C3
B	B	42
C	C	43
Ç	Ccedilla	C7
D	D	44
E	E	45
É	Eacute	C9
Ê	Ecircumflex	CA
Ë	Edieresis	CB
È	Egrave	C8
Ð	Eth	D0
_	Euro	80
F	F	46
G	G	47
H	H	48
I	I	49
Í	Iacute	CD
Î	Icircumflex	CE
Ï	Idieresis	CF
Ì	Igrave	CC
J	J	4A
K	K	4B
L	L	4C
£	Lslash	—
M	M	4D
N	N	4E
Ñ	Ntilde	D1
O	O	4F

CHAR	NAME	Char Code(HEX)
Œ	OE	8C
Ó	Oacute	D3
Ô	Ocircumflex	D4
Ö	Odieresis	D6
Ò	Ograve	D2
Ø	Oslash	D8
Õ	Otilde	D5
P	P	50
Q	Q	51
R	R	52
S	S	53
Š	Scaron	8A
T	T	54
Þ	Thorn	DE
U	U	55
Ú	Uacute	DA
Û	Ucircumflex	DB
Ü	Udieresis	DC
Ù	Ugrave	D9
V	V	56
W	W	57
X	X	58
Y	Y	59
Ý	Yacute	DD
Ÿ	Ydieresis	9F
Z	Z	5A
_	Zcaron	8E
a	a	61
á	aacute	E1
â	acircumflex	E2
´	acute	B4
ä	adieresis	E4
æ	ae	E6
à	agrave	E0
&	ampersand	26

CHAR	NAME	Char Code(HEX)
å	aring	E5
^	asciicircum	5E
~	asciitilde	7E
*	asterisk	2A
@	at	40
ã	atilde	E3
b	b	62
\	backslash	5C
|	bar	7C
{	braceleft	7B
}	braceright	7D
[	bracketleft	5B
]	bracketright	5D
¢	breve	—
¦	brokenbar	A6
•	bullet	95
c	c	63
¡	caron	—
ç	ccedilla	E7
¸	cedilla	B8
¢	cent	A2
ˆ	circumflex	88
:	colon	3A
,	comma	2C
©	copyright	A9
¤	currency	A4
d	d	64
†	dagger	86
‡	daggerdbl	87
°	degree	B0
¨	dieresis	A8
÷	divide	F7
$	dollar	24
ÿ	dotaccent	—
ý	dotlessi	—
e	e	65
é	eacute	E9

CHAR	NAME	Char Code(HEX)
ê	ecircumflex	EA
ë	edieresis	EB
è	egrave	E8
8	eight	38
…	ellipsis	85
—	emdash	97
–	endash	96
=	equal	3D
ð	eth	F0
!	exclam	21
¡	exclamdown	A1
f	f	66
.	fi	—
5	five	35
.	fl	—
f	florin	83
4	four	34
.	fraction	—
g	g	67
ß	germandbls	DF
`	grave	60
>	greater	3E
«	guillemotleft	AB
»	guillemotright	BB
‹	guilsinglleft	8B
›	guilsinglright	9B
h	h	68
½	hungarumlaut	—
-	hyphen	2D
i	i	69
í	iacute	ED
î	icircumflex	EE
ï	idieresis	EF
ì	igrave	EC
j	j	6A
k	k	6B
l	l	6C

CHAR	NAME	Char Code(HEX)
<	less	3C
¬	logicalnot	AC
³	lslash	—
m	m	6D
¯	macron	AF
-	minus	—
µ	mu	B5
×	multiply	D7
n	n	6E
9	nine	39
ñ	ntilde	F1
#	numbersign	23
o	o	6F
ó	oacute	F3
ô	ocircumflex	F4
ö	odieresis	F6
œ	oe	9C
²	ogonek	—
ò	ograve	F2
1	one	31
½	onehalf	BD
¼	onequarter	BC
¹	onesuperior	B9
ª	ordfeminine	AA
º	ordmasculine	BA
ø	oslash	F8
õ	otilde	F5
p	p	70
¶	paragraph	B6
(	parenleft	28
)	parenright	29
%	percent	25
.	period	2E
·	periodcentered	B7
‰	perthousand	89
+	plus	2B
±	plusminus	B1

CHAR	NAME	Char Code(HEX)
q	q	71
?	question	3F
¿	questiondown	BF
"	quotedbl	22
„	quotedblbase	84
“	quotedblleft	93
”	quotedblright	94
‘	quoteleft	91
’	quoteright	92
‚	quotesinglbase	82
'	quotesingle	27
r	r	72
®	registered	AE
¢	ring	—
s	s	73
š	scaron	9A
§	section	A7
;	semicolon	3B
7	seven	37
6	six	36
/	slash	2F
	space	20
£	sterling	A3
t	t	74
þ	thorn	FE
3	three	33
¾	threequarters	BE
³	threesuperior	B3
˜	tilde	98
™	trademark	99
2	two	32
²	twosuperior	B2
u	u	75
ú	uacute	FA
û	ucircumflex	FB
ü	udieresis	FC
ù	ugrave	F9

CHAR	NAME	Char Code(HEX)
_	underscore	5F
v	v	76
w	w	77
x	x	78
y	y	79
ý	yacute	FD

CHAR	NAME	Char Code(HEX)
ÿ	ydieresis	FF
¥	yen	A5
z	z	7A
_	zcaron	9E
0	zero	30

VPS/PCL GRID to AFP Font Resource Name Mapping

When a GRID (global resource identifier) is encountered in an AFP ‘MCF - Map Coded Font’ command, VPS/PCL must attempt to map the GRID to AFP font resource names. This can be in one of 3 ways:

- User exit 26 resource substitution. VPSSUE26 can be modified to map the 8-byte GRID values to AFP coded font resource names (the ‘X0’ font library members).
- AFPRTAB specifications. The TYPE=CPID and TYPE=CSID entries can be coded in the AFPRTAB to map the GCSGID (graphic character set global identifier), CPGID (code page global identifier), FGID (font global identifier), and font width to AFP code page table names (the ‘T1’ font library members) and to AFP font character set names (the 'Cx' font library members). Refer to “Creating the AFP Resource Table” on page 8.45 for more information.
- Internal tables. VPS/PCL will first invoke exit 26 to look for GRID to AFP coded font resource name substitution. If the GRID is not mapped in exit 26, VPS/PCL will look in the AFPRTAB for GRID AFP font resource specifications. If the GRID was not fully mapped, VPS/PCL will use internal tables to select AFP font resources by name. If the GRID cannot be resolved with the internal tables, VPS/PCL will end processing of the document and issue message VPS772E.

The following is a complete list of the VPS/PCL internal GCSGID/CPGID to AFP code page table name mapping:

CPGID	GCSGID	AFP Code Page Table	Description
0	65535	T1001033	MICR, CMC-7 COMBINED EBCDIC
37	697	T1V10037	USA/CANADA - CECP EBCDIC
38	103	T1000038	US-ASCII CHARACTER SET EBCDIC
259	340	T1000259	SYMBOLS, SET 7 EBCDIC
260	341	T1000260	CANADIAN FRENCH - 116 EBCDIC
273	697	T1V10273	GERMANY F.R./AUSTRIA- CECP EBCDIC
274	697	T1V10274	BELGIUM - CECP EBCDIC
275	697	T1V10275	BRAZIL - CECP EBCDIC
276	277	T1000276	CANADA FRENCH - 94 EBCDIC
277	697	T1V10277	DENMARK/NORWAY - CECP EBCDIC
278	697	T1V10278	FINLAND/SWEDEN- CECP EBCDIC
280	697	T1V10280	ITALY- CECP EBCDIC
281	697	T1V10281	JAPAN LATIN - CECP EBCDIC
282	697	T1V10282	PORTUGAL - CECP EBCDIC
284	697	T1V10284	SPAIN/LATIN AMERICA - CECP EBCDIC
285	697	T1V10285	UNITED KINGDOM - CECP EBCDIC
286	317	T1000286	AUSTRIA/GERMANY F.R., ALT 3270 EBCDIC
287	321	T1000287	DENMARK/NORWAY, ALTERNATE 3270 EBCDIC
288	325	T1000288	FINLAND/SWEDEN, ALTERNATE 3270 EBCDIC
289	329	T1000289	SPAIN, ALTERNATE 3270 EBCDIC
290	332	T1000290	JAPAN KATAKANA EBCDIC
290	172	T1V10290	JAPAN KATAKANA EBCDIC
293	380	T1000293	APL USA EBCDIC
293	340	T1000293	APL USA EBCDIC
297	697	T1V10297	FRANCE - CECP EBCDIC
310	963	T1000310	GRAPHIC ESCAPE APL/TN EBCDIC
361	1145	T1000361	INTERNATIONAL SET 5 EBCDIC
363	630	T1000363	SYMBOLS, SET 8 EBCDIC
367	103	T1000367	ASCII ASCII
382	1145	T1000382	AUSTRIA, GERMANY, SWITZERLAND EBCDIC
383	1145	T1000383	BELGIUM EBCDIC
384	1145	T1000384	BRAZIL EBCDIC
385	1145	T1000385	CANADA FRENCH EBCDIC
386	1145	T1000386	DENMARK/NORWAY EBCDIC

CPGID	GCSGID	AFP Code Page Table	Description
387	1145	T1000387	SWEDEN/FINLAND EBCDIC
388	1145	T1000388	FRANCE, SWITZERLAND EBCDIC
389	1145	T1000389	ITALY, SWITZERLAND ITALIAN EBCDIC
390	1145	T1000390	JAPAN LATIN EBCDIC
391	1145	T1000391	PORTUGAL EBCDIC
392	1145	T1000392	SPAIN/PHILIPPINES EBCDIC
393	1145	T1000393	LATIN AMERICA SPANISH EBCDIC
394	1145	T1000394	U.K., AUSTRAL., IRE., H.K., N.Z. EBCDIC
395	1145	T1000395	UNITED STATES, CANADA ENGLISH EBCDIC
396	1241	T1B00BGS	BOOKMASTER SPECIALS EBCDIC
420	235	T1000420	ARABIC BILINGUAL EBCDIC
420	1461	T1E00420	ARABIC BILINGUAL WITH EURO EBCDIC
423	218	T1000423	GREECE - 183 EBCDIC
424	941	T1000424	ISRAEL HEBREW EBCDIC
424	1356	T1000424	ISRAEL HEBREW EBCDIC
437	919	T1000437	PERSONAL COMPUTER ASCII
500	697	T1V10500	INTERNATIONAL #5 EBCDIC
803	1147	T1000803	HEBREW CHARACTER SET A EBCDIC
803	1357	T1000803	HEBREW CHARACTER SET A EBCDIC
808	1385	T1000808	PC, CYRILLIC, RUSSIAN WITH EURO ASCII
813	925	T1000813	GREECE - ISO/ASCII 8-BIT ASCII
813	1371	T1E00813	GREECE ISO 8859-7 ASCII
819	697	T1000819	LATIN1 ISO/ANSI 8-BIT ASCII
829	909	T1000829	MATH SYMBOLS EBCDIC
836	936	T1000836	PEOPLES REPUBLIC OF CHINA PRC EBCDIC
838	1176	T1000838	THAILAND EBCDIC
838	1279	T1000838	THAILAND EBCDIC
848	1390	T1000848	PC, CYRILLIC, UKRAINE WITH EURO ASCII
849	1387	T1000849	PC, CYRILLIC, BELO RUSSIAN EURO ASCII
850	980	T1000850	PC MULTILINGUAL ASCII
851	981	T1000851	GREEK - PERSONAL COMPUTER ASCII
852	982	T1000852	LATIN2 MULTILINGUAL PC ASCII
852	1377	T1E00852	LATIN 2 MULTILINGUAL PC W EURO ASCII
853	983	T1000853	LATIN3 PERSONAL COMPUTER ASCII CII
855	985	T1000855	CYRILLIC - PERSONAL COMPUTER ASCII
856	986	T1000856	HEBREW - PERSONAL COMPUTER ASCII
856	1358	T1000856	HEBREW - PERSONAL COMPUTER ASCII
857	987	T1000857	LATIN5 PC ASCII

CPGID	GCSGID	AFP Code Page Table	Description
857	1380	T1E00857	LATIN 5 TURKEY PC WITH EURO ASCII
858	988	T1000858	PC - MULTILINGUAL WITH EURO ASCII
860	990	T1000860	PORTUGAL - PERSONAL COMPUTER ASCII
861	991	T1000861	ICELAND - PERSONAL COMPUTER ASCII
862	992	T1000862	HEBREW - PERSONAL COMPUTER ASCII
863	993	T1000863	CANADIAN FRENCH - PC ASCII
864	994	T1000864	ARABIC - PERSONAL COMPUTER ASCII
864	1463	T1E00864	ARABIC PC WITH EURO ASCII
865	995	T1000865	NORDIC - PERSONAL COMPUTER ASCII
866	996	T1000866	CYRILLIC #2 - PERSONAL COMPUTER ASCII
867	1360	T1000867	ISRAEL - PERSONAL COMPUTER ASCII
869	998	T1000869	GREECE - PERSONAL COMPUTER ASCII
869	1373	T1E00869	GREECE - PERSONAL COMPUTER ASCII
870	959	T1000870	LATIN2 MULTILINGUAL EBCDIC
871	697	T1V10871	ICELAND - CECP EBCDIC
872	1383	T1000872	CYRILLIC PC WITH EURO ASCII
874	1176	T1000874	THAILAND - PERSONAL COMPUTER ASCII
874	1279	T1000874	THAILAND - PERSONAL COMPUTER ASCII
875	925	T1000875	GREECE EBCDIC
875	1371	T1E00875	GREECE EBCDIC
876	968	T1000876	OCR-A ASCII ASCII
877	969	T1000877	OCR-B ASCII ASCII
877	1502	T1E00877	OCR B PC WITH EURO ASCII
880	960	T1000880	CYRILLIC MULTILINGUAL EBCDIC
889	1102	T1000889	THAILAND EBCDIC
892	968	T1000892	OCR - A EBCDIC
893	969	T1000893	OCR - B EBCDIC
893	1502	T1E00893	OCR B WITH EURO EBCDIC
897	1164	T1000897	JAPAN PC #1 ASCII
899	340	T1000899	SYMBOLS, SET 7 ASCII ASCII
899	1310	T1000899	SYMBOLS, SET 7 ASCII ASCII
901	1394	T1000901	PC, BALTIC - MULTILINGUAL W EURO ASCII
902	1392	T1000902	8-BIT ESTONIA WITH EURO ASCII
903	1166	T1000903	PEOPLES REPUBLIC OF CHINA - PC ASCII
904	1167	T1000904	REPUBLIC OF CHINA ROC - PC ASCII
905	1286	T1000905	LATIN3 MULTILINGUAL EBCDIC
910	1113	T1000910	APL ASCII ASCII
910	1330	T1000910	APL ASCII ASCII

CPGID	GCSGID	AFP Code Page Table	Description
912	959	T1000912	LATIN2 ISO/ANSI 8-BIT ASCII
913	1286	T1000913	LATIN 3, ISO/ASCII ASCII
914	1256	T1000914	LATIN4 ISO/ANSI 8-BIT ASCII
915	1150	T1000915	CYRILLIC ISO/ASCII 8-BIT ASCII
916	941	T1000916	HEBREW ISO/ASCII 8-BIT ASCII
920	1152	T1000920	LATIN5 ISO/ANSI 8-BIT ASCII
921	1346	T1000921	PC, BALTIC - MULTILINGUAL ASCII
922	1347	T1000922	ESTONIA PC ASCII
923	1353	T1000923	LATIN 9 ASCII
924	1353	T1000924	LATIN 9 EBCDIC EBCDIC
1002	1132	T1001002	DCF REL 2 COMPATIBILITY EBCDIC
1003	1133	T1DCDCFS	U.S. TEXT SUBSET EBCDIC
1003	1133	T1001003	U.S. TEXT SUBSET EBCDIC
1004	1146	T1001004	IBM PC DESKTOP PUBLISHING ASCII
1008	1162	T1001008	ARABIC ISO/ASCII 8-BIT ASCII
1008	1464	T1E01008	ARABIC ISO WITH EURO ASCII
1025	1150	T1001025	CYRILLIC MULTILINGUAL EBCDIC
1026	1152	T1001026	LATIN5 EBCDIC
1027	1172	T1001027	JAPANESE LATIN EXTENDED EBCDIC
1028	1199	T1001028	HEBREW PUBLISHING EBCDIC
1029	1154	T1001029	ARABIC EXTENDED ISO/ACSII 8-BIT ASCII
1032	1227	T1001032	MICR, E13-B COMBINED EBCDIC
1038	1257	T1001038	SYMBOLS, ADOBE ASCII ASCII
1039	1258	T1001039	GML LIST SYMBOLS EBCDIC
1041	1187	T1001041	JAPANESE EXTENDED - PC ASCII
1042	1188	T1001042	SIMPLIFIED CHINESE EXTENDED - PC ASCII
1043	1189	T1001043	TRADITIONAL CHINESE EXTENDED PC ASCII
1046	1177	T1001046	ARABIC EXTENDED ISO/ASCII 8-BIT ASCII
1046	1465	T1E01046	ARABIC EXTENDED ISO WITH EURO ASCII
1068	1259	T1001068	TEXT WITH NUMERIC SPACING EBCDIC
1069	1256	T1001069	LATIN4 EBCDIC EBCDIC
1087	1257	T1001087	SYMBOLS, ADOBE EBCDIC
1091	1191	T1001091	SYMBOL SET 7, MODIFIED EBCDIC
1092	1191	T1001092	SYMBOL SET 7, MODIFIED - PC ASCII
1093	2040	T1001093	IBM LOGO EBCDIC
1110	1111	T1001110	LATIN2 MULTILINGUAL EBCDIC

CPGID	GCSGID	AFP Code Page Table	Description
1111	1111	T1001111	LATIN2 ISO/ANSI 8-BIT ASCII
1112	1305	T1001112	BALTIC - MULTILINGUAL, EBCDIC EBCDIC
1122	1307	T1001122	ESTONIA, EBCDIC EBCDIC
1123	1326	T1001123	CYRILLIC, UKRAINE EBCDIC EBCDIC
1124	1326	T1001124	CYRILLIC, UKRAINE ISO-8 ASCII
1125	1331	T1001125	PC, CYRILLIC UKRAINIAN ASCII
1129	1336	T1001129	VIETNAMESE ISO-8 ASCII
1130	1336	T1001130	VIETNAMESE EBCDIC EBCDIC
1131	1338	T1001131	PC, CYRILLIC, BELO RUSSIAN ASCII
1132	1341	T1001132	LAO EBCDIC EBCDIC
1133	1341	T1001133	LAO EBCDIC EBCDIC
1139	1122	T1001139	JAPAN ALPHANUMERIC KATAKANA ASCII
1140	695	T1001140	USA, CANADA ECECP EBCDIC
1141	695	T1001141	AUSTRIA, GERMANY ECECP EBCDIC
1142	695	T1001142	DENMARK, NORWAY ECECP EBCDIC
1143	695	T1001143	FINLAND, SWEDEN ECECP EBCDIC
1144	695	T1001144	ITALY ECECP EBCDIC
1145	695	T1001145	SPAIN, LATIN AMERICA ECECP EBCDIC
1146	695	T1001146	UK ECECP EBCDIC
1147	695	T1001147	FRANCE ECECP EBCDIC
1148	695	T1001148	INTERNATIONAL ECECP EBCDIC
1149	695	T1001149	ICELAND ECECP EBCDIC
1153	1375	T1001153	LATIN2 MULTILINGUAL WITH EURO EBCDIC
1154	1381	T1001154	CYRILLIC MULTILINGUAL WITH EURO EBCDIC
1155	1378	T1001155	EBCDIC TURKEY WITH EURO EBCDIC
1156	1393	T1001156	EBCDIC BALTIC - MULTI WITH EURO EBCDIC
1157	1391	T1001157	EBCDIC ESTONIA WITH EURO EBCDIC
1158	1388	T1001158	EBCDIC CYRILLIC, UKRAINE W EURO EBCDIC
1160	1395	T1001160	THAILAND EBCDIC WITH EURO EBCDIC
1161	1395	T1001161	THAILAND PC WITH EURO ASCII
1162	1396	T1001162	WINDOWS THAILAND ASCII
1163	1397	T1001163	VIETNAMESE ISO-8 WITH EURO ASCII
1164	1397	T1001164	VIETNAMESE EBCDIC WITH EURO EBCDIC
1166	1441	T1001166	VIETNAMESE EBCDIC WITH EURO EBCDIC
1250	1410	T1001250	WINDOWS, LATIN 2 ASCII
1251	1411	T1001251	WINDOWS CYRILLIC ASCII

CPGID	GCSGID	AFP Code Page Table	Description
1252	1412	T1001252	WINDOWS, LATIN 1 ASCII
1253	1413	T1001253	WINDOWS GREEK ASCII
1254	1414	T1001254	WINDOWS TURKISH ASCII
1257	1421	T1001257	WINDOWS BALTIC RIM ASCII
1258	1418	T1001258	WINDOWS VIETNAMESE ASCII
1300	1450	T1001300	GENERIC BAR CODE/OCR-B EBCDIC
1301	1451	T1001301	GENERIC BAR CODE/OCR-B EBCDIC
1302	1452	T1001302	GENERIC BAR CODE/OCR-B EBCDIC
1303	1453	T1001303	GENERIC BAR CODE/OCR-B EBCDIC
2055	0	T1DABASE	AUSTRIA/GERMANY F.R.- DABASE EBCDIC
2056	0	T1DBBASE	BELGIUM/SWISS/LUXEMBOURG-DBBASE EBCDIC
2057	0	T1DDBASE	DENMARK/NORWAY/ICELAND - DDBASE EBCDIC
2058	0	T1DEBASE	FINLAND/SWEDEN - DEBASE EBCDIC
2059	0	T1DFBASE	FRANCE - DFBASE EBCDIC
2060	0	T1DIBASE	ITALY - DIBASE EBCDIC
2061	0	T1DNBASE	NETHERLANDS/PORTUGAL - DNBASE EBCDIC
2062	0	T1DSBASE	SPAIN - DSBASE EBCDIC
2063	0	T1D0BASE	DCF REL 2 COMPATIBILITY EBCDIC
2065	0	T1GI0361	INTERNATIONAL SET 5 EBCDIC
2066	0	T1GPI363	PI FONTS EBCDIC
2067	0	T1GI0382	AUSTRIA, GERMANY, SWITZERLAND EBCDIC
2068	0	T1GI0383	BELGIUM EBCDIC
2069	0	T1GI0384	BRAZIL EBCDIC
2070	0	T1GI0385	CANADA FRENCH EBCDIC
2071	0	T1GI0386	DENMARK/NORWAY EBCDIC
2072	0	T1GI0387	DENMARK/NORWAY EBCDIC
2073	0	T1GI0388	FRANCE, LUXEMBOURG, SWITZERLAND EBCDIC
2074	0	T1GI0389	ITALY, SWITZERLAND ITALIAN EBCDIC
2075	0	T1GI0390	JAPAN LATIN EBCDIC
2076	0	T1GI0391	PORTUGAL EBCDIC
2077	0	T1GI0393	LATIN AMERICA SPANISH EBCDIC
2078	0	T1GI0394	U.K., AUSTRAL., IRE., H.K., N.Z. EBCDIC
2079	0	T1GI0395	UNITED STATES, CANADA ENGLISH EBCDIC
2080	0	T1M00830	MATH FORMAT EBCDIC
2081	0	T1GE0200	SONORAN DISPLAY FONTS EBCDIC

CPGID	GCSGID	AFP Code Page Table	Description
2082	0	T1GE0300	SONORAN PETITE FONT EBCDIC
2083	0	T1L0DUMP	LCS 3800-1 DUMP CHARACTER SET EBCDIC
2084	0	T1L0FOLD	LCS 3800-1 GOTHIC FOLDED EBCDIC
2085	0	T1D0GP12	DCF GP12 COMPATIBILITY EBCDIC
2086	0	T1L0OCRB	LCS 3800-1 GOTHIC/OCR-B EBCDIC
2087	0	T1L0OCR1	LCS 3800-1 GOTHIC/OCR-A EBCDIC
2088	0	T1L0OCR2	LCS 3800-1 GOTHIC/OCR-A EBCDIC
2089	0	T1L0OCR3	LCS 3800-1 GOTHIC/OCR-A EBCDIC
2089	0	T1L0PCAN	LCS 3800-1 GOTHIC EBCDIC
2090	0	T1L0PCHN	LCS 3800-1 GOTHIC EBCDIC
2091	0	T1S0S192	6670 SYMBOL SET OS/6 EBCDIC
2092	0	T1S0S193	6670 SYMBOL SET 12-PITCH EBCDIC
2093	0	T1S0S198	6670 SYMBOL SET 10-PITCH EBCDIC
2094	0	T1L00FMT	LCS 3800-1 FORMAT CHARACTERS EBCDIC
2095	0	T1L00KN1	LCS 3800-1 GOTHIC/KATAKANA EBCDIC
2096	0	T1L00QNC	LCS 3800-1 GOTHIC EBCDIC
2097	0	T1L000GN	LCS 3800-1 GOTHIC EBCDIC
2098	0	T1L000RN	LCS 3800-1 GOTHIC EBCDIC
2099	0	T1L000SN	LCS 3800-1 TEXT 1 P 2 EBCDIC
2100	0	T1L000XN	LCS 3800-1 GOTHIC EBCDIC
2101	0	T1L000YN	LCS 3800-1 GOTHIC EBCDIC
2102	0	T1L02773	LCS 3800-1 GOTHIC/KATAKANA EBCDIC
2103	0	T1L02774	LCS 3800-1 GOTHIC/KATAKANA EBCDI
2104	0	T1L038BA	LCS 3800-1 GOTHIC EBCDIC
2105	0	T1L038TE	LCS 3800-1 TEXT 1 P 2 EBCDIC
2107	0	T1L0AD10	APL2 EBCDIC
2108	0	T1S0AE10	APL EBCDIC
2109	0	T1L0AG10	APL2 EBCDIC
2110	0	T1L0AG12	APL2 EBCDIC
2111	0	T1L0AG15	APL2 EBCDIC
2112	0	T1L0AI10	APL2 EBCDIC
2113	0	T1S0AP10	APL2 EBCDIC
2114	0	T1L0AT10	APL2 EBCDIC
2115	0	T1L00APL	APL2 EBCDIC
2116	0	T1DUBASE	UNITED KINGDOM - DUBASE EBCDIC
2118	1243	T1B00037	BOOKMASTER USA/CANADA EBCDIC
2119	1243	T1B00273	BOOKMASTER USA/CANADA EBCDIC
2120	1243	T1B00274	BOOKMASTER BELGIUM EBCDIC
2121	1243	T1B00275	BOOKMASTER BRAZIL EBCDIC

CPGID	GCSGID	AFP Code Page Table	Description
2122	1243	T1B00277	BOOKMASTER DENMARK/NORWAY EBCDIC
2123	1243	T1B00278	BOOKMASTER FINLAND/SWEDEN EBCDIC
2124	1243	T1B00280	BOOKMASTER ITALY EBCDIC
2125	1243	T1B00281	BOOKMASTER JAPAN LATIN EBCDIC
2126	1243	T1B00282	BOOKMASTER PORTUGAL EBCDIC
2127	1243	T1B00284	BOOKMASTER SPAIN/LATIN AMERICA EBCDIC
2128	1243	T1B00285	BOOKMASTER UNITED KINGDOM EBCDIC
2129	1243	T1B00297	BOOKMASTER FRANCE EBCDIC
2130	1245	T1B00361	BOOKMASTER INTERNATIONAL EBCDIC
2131	1245	T1B00382	BOOKMASTER GERMANY/AUSTRIA EBCDIC
2132	1245	T1B00383	BOOKMASTER BELGIUM EBCDIC
2133	1245	T1B00384	BOOKMASTER BRAZIL EBCDIC
2134	1245	T1B00385	BOOKMASTER CANADA FRENCH EBCDIC
2135	1245	T1B00386	BOOKMASTER DENMARK/NORWAY EBCDIC
2136	1245	T1B00387	BOOKMASTER FINLAND/SWEDEN EBCDIC
2137	1245	T1B00388	BOOKMASTER FRANCE EBCDIC
2138	1245	T1B00389	BOOKMASTER ITALY EBCDIC
2139	1245	T1B00390	BOOKMASTER JAPAN EBCDIC
2140	1245	T1B00391	BOOKMASTER PORTUGAL EBCDIC
2141	1245	T1B00392	BOOKMASTER SPAIN/PHILIPPINES EBCDIC
2142	1245	T1B00393	BOOKMASTER LATIN AMERICA EBCDIC
2143	1245	T1B00394	BOOKMASTER UNITED KINGDOM EBCDIC
2144	1245	T1B00395	BOOKMASTER USA/CANADA EBCDIC
2145	1243	T1B00500	BOOKMASTER INTERNATIONAL #5 EBCDIC
2147	1243	T1B00871	BOOKMASTER ICELAND EBCDIC

The following is a complete list of the VPS/PCL internal GCSGID/FGID/width to AFP code page table name mapping:

FGID	Font Width	GCSGID	Character Set	Description
3	144	2032	C0L00BOA	OCRB BOA (10-PITCH)
5	144	2025	C0S0OR10	ORATOR (10-PITCH)
11	144	2023	C0S0CR10 *	COURIER (10-PITCH)
11	144	2036	C0S0CE10	COURIER EXTENDED (10-PITCH)
12	144	2023	C0S0PR10	PRESTIGE (10-PITCH)
18	144	2023	C0S0CI10	COURIER ITALIC (10-PITCH)
19	144	2034	C0L00AOA	OCR AOA (10-PITCH)
19	144	2035	C0L00AON	OCRA AON (10-PITCH)
30	144	2024	C0S0S198	SYMBOLS (10-PITCH)
30	144	2027	C0L0FM10 *	ORMAT (10-PITCH)
37	144	2025	C0S0CH10	COURIER OVERSTRUCK ELONGATED (10-
38	144	2025	C0S0OB10	ORATOR BOLD (10-PITCH)
39	144	2023	C0D0GB10	GOTHIC BOLD (10-PITCH)
40	144	2023	C0D0GT10	GOTHIC (10-PITCH)
41	144	2023	C0D0RT10	ROMAN (10-PITCH)
42	144	2023	C0D0ST10	SERIF (10-PITCH)
43	144	2023	C0D0SI10	SERIF ITALIC (10-PITCH)
45	144	2029	C0S0AE10	APL (10-PITCH)
46	144	2023	C0S0CB10	COURIER BOLD (10-PITCH)
66	120	2023	C0D0GT12	GOTHIC (12-PITCH)
68	120	2023	C0D0GI12	GOTHIC ITALIC (12-PITCH)
69	120	2023	C0D0GB12	GOTHIC BOLD (12-PITCH)
70	120	2023	C0D0ST12	SERIF (12-PITCH)
71	120	2023	C0D0SI12	SERIF ITALIC (12-PITCH)
72	120	2023	C0D0SB12	SERIF BOLD (12-PITCH)
80	120	2026	C0S0S192	SYMBOLS OS6 (12-PITCH)
80	120	2027	C0L0FM12 *	FORMAT (12-PITCH)
80	120	2030	C0S0S193	SYMBOLS (12-PITCH)
84	120	2025	C0S0SR12	SCRIPT (12-PITCH)
85	120	2023	C0S0CR12 *	COURIER (12-PITCH)
85	120	2036	C0S0CE12	COURIER EXTENDED (12-PITCH)
86	144	2023	C0S0PR12	PRESTIGE (10-PITCH)
87	120	2023	C0S0LR12	LETTER GOTHIC (12-PITCH)
92	120	2023	C0S0CI12	COURIER ITALIC (12-PITCH)
108	120	2023	C0S0CB12	COURIER BOLD (12-PITCH)
110	120	2023	C0S0LB12	LETTER GOTHIC BOLD (12-PITCH)

FGID	Font Width	GCSGID	Character Set	Description
111	120	2023	C0S0PB12	PRESTIGE BOLD (12-PITCH)
112	120	2023	C0S0PI12	PRESTIGE ITALIC (12-PITCH)
155	120	2023	C0S0BITR	BOOK BOLD ITALIC (MIXED-PITCH)
159	120	2023	C0S0BRTR	BOOK (MIXED-PITCH)
160	120	2023	C0S0ESTR	ESSAY (MIXED-PITCH)
162	120	2023	C0S0EITR	ESSAY ITALIC (MIXED-PITCH)
163	120	2023	C0S0EBTR	ESSAY BOLD (MIXED-PITCH)
173	120	2023	C0S0ELTR	ESSAY LIGHT (MIXED-PITCH)
174	120	2023	C0D0GP12	GOTHIC PROPORTIONAL (MIXED-PITCH)
175	120	2023	C0S0DOTR	BOOK (MIXED-PITCH)
196	120	2023	C0S0EOTR	ESSAY OVERSTRUCK (MIXED-PITCH)
196	120	2028	C0S0EOTR	ESSAY OVERSTRUCK (MIXED-PITCH)
203	108	2037	C0D0GT13	GOTHIC (13.3-PITCH)
214	96	2023	C0S0CB15	COURIER BOLD (15-PITCH)
215	96	2023	C0S0CI15	COURIER ITALIC (15-PITCH)
223	96	2023	C0S0CR15	COURIER (15-PITCH)
225	96	2027	C0L0FM15	FORMAT (15-PITCH)
229	96	2023	C0D0ST15	SERIF (15-PITCH)
230	96	2022	C0L0DUMP	DUMP (15-PITCH)
230	96	2023	C0D0GT15	GOTHIC (15-PITCH)
231	96	2037	C0D0GC15	GOTHIC CONDENSED (15-PITCH)
275	78	2023	C0D0GT18	GOTHIC (18-PITCH)
280	72	2029	C0S0AE20	APL (20-PITCH)
281	72	2037	C0D0GT20	GOTHIC (20-PITCH)
290	54	2037	C0D0GT24	GOTHIC (27-PITCH)
302	144	2025	C0S0CO10	COURIER OVERSTRUCK (10-PITCH)
303	96	2023	C0D0GL15	GOTHIC LIGHT (15-PITCH)
303	120	2023	C0D0GL12	GOTHIC LIGHT (12-PITCH)
303	144	2023	C0D0GL10	GOTHIC LIGHT (10-PITCH)
304	0	1306	C06208pt	GOTHIC KATAKANA
304	0	2039	C06200pt *	GOTHIC TEXT LATIN1
304	0	2041	C06200pt	GOTHIC TEXT LATIN1
305	0	968	C0920Apt	OCRA
306	0	969	C0920Bpt	OCRB
307	0	1364	C0420Ppt	COURIER APL2
310	144	2023	C0D0GR10	GOTHIC REVERSE (10-PITCH)

FGID	Font Width	GCSGID	Character Set	Description
311	96	2038	C0L00GUC	GOTHIC UPPERCASE (15-PITCH)
312	96	2038	C0L0GU15	GOTHIC UPPERCASE (15-PITCH)
312	120	2038	C0L0GU12	GOTHIC UPPERCASE (12-PITCH)
312	140	2038	C0L0GU10	GOTHIC UPPERCASE (10-PITCH)
318	0	2039	C07400pt	PRESTIGE LATIN1 BOLD
318	0	2041	C07400pt	PRESTIGE LATIN1 BOLD
319	0	2039	C07300pt	PRESTIGE LATIN1 ITALIC
319	0	2041	C07300pt	PRESTIGE LATIN1 ITALIC
322	0	1364	C0440Ppt	COURIER APL2 BOLD
332	120	2023	C0D0SO12	SERIF OVERSTRUCK (12-PITCH)
333	144	2033	C0L00T11	TEXT (10-PITCH)
334	144	2033	C0L0TU10	TEXT (10-PITCH)
335	0	1241	C0B20Ccp	BOOKMASTER SPECIALS
335	0	2039	C0B200cp *	BOOKMASTER LATIN1
335	0	2041	C0B200cp	BOOKMASTER LATIN1
336	0	1241	C0B40Ccp	BOOKMASTER SPECIALS BOLD
336	0	2039	C0B400cp *	BOOKMASTER LATIN1 BOLD
336	0	2041	C0B400cp	BOOKMASTER LATIN1 BOLD
337	0	1241	C0B30Ccp	BOOKMASTER SPECIALS ITALIC
337	0	2039	C0B300cp *	BOOKMASTER LATIN1 ITALIC
337	0	2041	C0B300cp	BOOKMASTER LATIN1 ITALIC
338	0	1241	C0B50Ccp	BOOKMASTER SPECIALS BOLD ITALIC
338	0	2039	C0B500cp *	BOOKMASTER LATIN1 BOLD ITALIC
338	0	2041	C0B500cp	BOOKMASTER LATIN1 BOLD ITALIC
339	0	1241	C0B60Ccp	BOOKMASTER SPECIALS REVERSE
339	0	2039	C0B600cp *	BOOKMASTER LATIN1 REVERSE
339	0	2041	C0B600cp	BOOKMASTER LATIN1 REVERSE
398	96	2038	C0L00GSC	GOTHIC UPPERCASE (15-PITCH)
400	0	2039	C05200pt *	LETTER GOTHIC LATIN1
400	0	2041	C05200pt	LETTER GOTHIC LATIN1
404	0	2039	C05400pt	LETTER GOTHIC LATIN1 BOLD
404	0	2041	C05400pt	LETTER GOTHIC LATIN1 BOLD
416	0	1191	C04201pt	COURIER SYMBOLS
416	0	1261	C04202pt	COURIER LATIN235
416	0	1264	C04204pt	BOUTROS TYPING ARABIC

FGID	Font Width	GCSGID	Character Set	Description
416	0	1268	C04207pt	COURIER LATIN4
416	0	1275	C04201pt	COURIER SYMBOLS
416	0	1279	C04206pt	COURIER THAI
416	0	1300	C04203pt	COURIER CYRILLIC GREEK
416	0	1341	C04209pt	COURIER LAO
416	0	1362	C04205pt	SHALOM HEBREW
416	0	2039	C04200pt *	COURIER LATIN1
416	0	2041	C04200pt	COURIER LATIN1
417	192	2023	C0S0CD15	COURIER DOUBLE WIDE (15-PITCH)
420	0	1191	C04401pt	COURIER SYMBOLS BOLD
420	0	1261	C04402pt	COURIER LATIN235 BOLD
420	0	1264	C04404pt	BOUTROS TYPING ARABIC BOLD
420	0	1268	C04407pt	COURIER LATIN4 BOLD
420	0	1275	C04401pt	COURIER SYMBOLS BOLD
420	0	1279	C04406pt	COURIER THAI BOLD
420	0	1300	C04403pt	COURIER CYRILLIC GREEK BOLD
420	0	1341	C04309pt	COURIER LAO BOLD
420	0	1362	C04405pt	SHALOM HEBREW BOLD
420	0	2039	C04400pt *	COURIER LATIN1 BOLD
420	0	2041	C04400pt	COURIER LATIN1 BOLD
424	0	1261	C04302pt	COURIER LATIN235 ITALIC
424	0	1264	C04304pt	BOUTROS TYPING ARABIC ITALIC
424	0	1268	C04307pt	COURIER LATIN4 ITALIC
424	0	1279	C04306pt	COURIER THAI ITALIC
424	0	1300	C04303pt	COURIER CYRILLIC GREEK ITALIC
424	0	1341	C04409pt	COURIER LAO ITALIC
424	0	1362	C04305pt	SHALOM HEBREW ITALIC
424	0	2039	C04300pt *	COURIER LATIN1 ITALIC
424	0	2041	C04300pt	COURIER LATIN1 ITALIC
425	192	2023	C0S0CW15	COURIER DOUBLE WIDE ITALIC (15-PITCH)
428	0	1261	C04502pt	COURIER LATIN235 BOLD ITALIC
428	0	1264	C04504pt	BOUTROS TYPING ARABIC BOLD ITALIC
428	0	1268	C04507pt	COURIER LATIN4 BOLD ITALIC

FGID	Font Width	GCSGID	Character Set	Description
428	0	1279	C04506pt	COURIER THAI BOLD ITALIC
428	0	1300	C04503pt	COURIER CYRILLIC GREEK BOLD ITALiC
428	0	1341	C04509pt	COURIER LAO BOLD ITALIC
428	0	1362	C04505pt	SHALOM HEBREW BOLD ITALIC
428	0	2039	C04500pt *	COURIER LATIN1 BOLD ITALIC
428	0	2041	C04500pt	COURIER LATIN1 BOLD ITALIC
432	0	2039	C07200pt	PRESTIGE LATIN1
432	0	2041	C07200pt	PRESTIGE LATIN1
433	72	2031	C0L0KN20	KATAKANA (20-PITCH)
433	96	2031	C0L0KN15	KATAKANA (15-PITCH)
433	120	2031	C0L0KN12	KATAKANA (12-PITCH)
433	144	2031	C0L0KATA	KATAKANA (10-PITCH)
440	144	1262	C02055P0	PROPRINTER EMULATION (10-PITCH)
441	120	1262	C02054Q0	PROPRINTER EMULATION (12-PITCH)
442	84	1262	C02051R0	PROPRINTER EMULATION (17.1-PITCH)
443	288	1262	C02059L0	PROPRINTER EMULATION (5-PITCH)
444	240	1262	C02058M0	PROPRINTER EMULATION (6-PITCH)
445	168	1262	C02056N0	PROPRINTER EMULATION (8.55-PITCH)
446	144	1262	C02075P0	PROPRINTER EMULATION (10-PITCH)
447	120	1262	C02074Q0	PROPRINTER EMULATION (12-PITCH)
448	288	1262	C02079L0	PROPRINTER EMULATION (5-PITCH)
449	240	1262	C02078M0	PROPRINTER EMULATION (6-PITCH)
451	144	1262	C02051K0	PROPRINTER EMULATION (10-PITCH)
452	84	1262	C02055F0	PROPRINTER EMULATION (17.1-PITCH)
452	120	1262	C02055E0	PROPRINTER EMULATION (12-PITCH)
452	144	1262	C02055D0	PROPRINTER EMULATION (10-PITCH)
452	288	1262	C02055J0	PROPRINTER EMULATION (5-PITCH)

FGID	Font Width	GCSGID	Character Set	Description
453	168	1262	C02059C0	PROPRINTER EMULATION (8.55-PITCH)
453	240	1262	C02059B0	PROPRINTER EMULATION (6-PITCH)
453	288	1262	C02059A0	PROPRINTER EMULATION (5-PITCH)
454	144	1262	C02071K0	PROPRINTER EMULATION (10-PITCH)
455	120	1262	C02075E0	PROPRINTER EMULATION (12-PITCH)
455	144	1262	C02075D0	PROPRINTER EMULATION (10-PITCH)
455	288	1262	C02075J0	PROPRINTER EMULATION (5-PITCH)
456	240	1262	C02079B0	PROPRINTER EMULATION (6-PITCH)
456	288	1262	C02079A0	PROPRINTER EMULATION (5-PITCH)
521	96	2031	C0L0KL15	KATAKANA (15-PITCH)
521	120	2031	C0L0KL12	KATAKANA (12-PITCH)
521	144	2031	C0L0KL10	KATAKANA (10-PITCH)
2304	0	1191	C0H201cp	HELVETICA SYMBOLS
2304	0	1261	C0H202cp	HELVETICA LATIN235
2304	0	1264	C0H204cp	ITC BOUTROS MODERN ROKAA ARABIC
2304	0	1268	C0H207cp	HELVETICA LATIN4
2304	0	1275	C0H201cp	HELVETICA SYMBOLS
2304	0	1279	C0H206cp	THONBURI
2304	0	1300	C0H203cp	HELVETICA CYRILLIC GREEK
2304	0	1341	C0H209cp	PUSUWAN
2304	0	1362	C0H205cp	NARKISS TAM HEBREW
2304	0	2039	C0H200cp *	HELVETICA LATIN1
2304	0	2041	C0H200cp	HELVETICA LATIN1
2305	0	1191	C0H401cp	HELVETICA SYMBOLS BOLD
2305	0	1261	C0H402cp	HELVETICA LATIN235 BOLD
2305	0	1264	C0H404cp	ITC BOUTROS MODERN ROKAA ARABIC BOLD
2305	0	1268	C0H407cp	HELVETICA LATIN4 BOLD
2305	0	1275	C0H401cp	HELVETICA SYMBOLS BOLD
2305	0	1279	C0H406cp	THONBURI BOLD
2305	0	1300	C0H403cp	HELVETICA CYRILLIC GREEK BOLD
2305	0	1341	C0H409cp	PUSUWAN BOLD

FGID	Font Width	GCSGID	Character Set	Description
2305	0	1362	C0H405cp	NARKISS TAM HEBREW BOLD
2305	0	2039	C0H400cp *	HELVETICA LATIN1 BOLD
2305	0	2041	C0H400cp	HELVETICA LATIN1 BOLD
2306	0	1261	C0H302cp	HELVETICA LATIN235 ITALIC
2306	0	1264	C0H304cp	ITC BOUTROS MODERN ROKAA ARABIC ITALIC
2306	0	1268	C0H307cp	HELVETICA LATIN4 ITALIC
2306	0	1279	C0H306cp	THONBURI ITALIC
2306	0	1300	C0H303cp	HELVETICA CYRILLIC GREEK ITALIC
2306	0	1341	C0H309cp	PUSUWAN ITALIC
2306	0	1362	C0H305cp	NARKISS TAM HEBREW ITALIC
2306	0	2039	C0H300cp *	HELVETICA LATIN1 ITALIC
2306	0	2041	C0H300cp	HELVETICA LATIN1 ITALIC
2307	0	1261	C0H502cp	HELVETICA LATIN235 BOLD ITALIC
2307	0	1264	C0H504cp	ITC BOUTROS MODERN ROKAA ARABIC BOLD
2307	0	1268	C0H507cp	HELVETICA LATIN4 BOLD ITALIC
2307	0	1279	C0H506cp	THONBURI BOLD ITALIC
2307	0	1300	C0H503cp	HELVETICA CYRILLIC GREEK BOLD ITALIC
2307	0	1341	C0H509cp	PUSUWAN BOLD ITALIC
2307	0	1362	C0H505cp	NARKISS TAM HEBREW BOLD ITALIC
2307	0	2039	C0H500cp *	HELVETICA LATIN1 BOLD ITALIC
2307	0	2041	C0H500cp	HELVETICA LATIN1 BOLD ITALIC
2308	0	1191	C0N201cp	TIMES NEW ROMAN SYMBOLS
2308	0	1261	C0N202cp	TIMES NEW ROMAN LATIN235
2308	0	1264	C0N204cp	ITC BOUTROS SETTING ARABIC
2308	0	1268	C0N207cp	TIMES NEW ROMAN LATIN4
2308	0	1275	C0N201cp	TIMES NEW ROMAN SYMBOLS
2308	0	1279	C0N206cp	BURIRUM
2308	0	1300	C0N203cp	TIMES NEW ROMAN CYRILLIC GREEK
2308	0	1341	C0N209cp	KAEWFAH
2308	0	1362	C0N205cp	NARKISS HEBREW
2308	0	2039	C0N200cp *	TIMES NEW ROMAN LATIN1
2308	0	2041	C0N200cp	TIMES NEW ROMAN LATIN1

FGID	Font Width	GCSGID	Character Set	Description
2309	0	1191	C0N401cp	TIMES NEW ROMAN SYMBOLS BOLD
2309	0	1261	C0N402cp	TIMES NEW ROMAN LATIN235 BOLD
2309	0	1264	C0N404cp	ITC BOUTROS SETTING ARABIC BOLD
2309	0	1268	C0N407cp	TIMES NEW ROMAN LATIN4 BOLD
2309	0	1275	C0N401cp	TIMES NEW ROMAN SYMBOLS BOLD
2309	0	1279	C0N406cp	BURIRUM BOLD
2309	0	1300	C0N403cp	TIMES NEW ROMAN CYRILLIC GREEK BOLD
2309	0	1341	C0N409cp	KAEWFAH BOLD
2309	0	1362	C0N405cp	NARKISS HEBREW BOLD
2309	0	2039	C0N400cp *	TIMES NEW ROMAN LATIN1 BOLD
2309	0	2041	C0N400cp	TIMES NEW ROMAN LATIN1 BOLD
2310	0	1261	C0N302cp	TIMES NEW ROMAN LATIN235 ITALIC
2310	0	1264	C0N304cp	ITC BOUTROS SETTING ARABIC ITALIC
2310	0	1268	C0N307cp	TIMES NEW ROMAN LATIN4 ITALIC
2310	0	1279	C0N306cp	BURIRUM ITALIC
2310	0	1300	C0N303cp	TIMES NEW ROMAN CYRILLIC GREEK ITALIC
2310	0	1341	C0N309cp	KAEWFAH ITALIC
2310	0	1362	C0N305cp	NARKISS HEBREW ITALIC
2310	0	2039	C0N300cp *	TIMES NEW ROMAN LATIN1 ITALIC
2310	0	2041	C0N300cp	TIMES NEW ROMAN LATIN1 ITALIC
2311	0	1261	C0N502cp	TIMES NEW ROMAN LATIN235 BOLD ITALIC
2311	0	1264	C0N504cp	ITC BOUTROS SETTING ARABIC BOLD ITALIC
2311	0	1268	C0N507cp	TIMES NEW ROMAN LATIN4 BOLD ITALIC
2311	0	1279	C0N506cp	BURIRUM BOLD ITALIC
2311	0	1300	C0N503cp	TIMES NEW ROMAN CYRILLIC GREEK BOLD ITALI
2311	0	1341	C0N509cp	KAEWFAH BOLD ITALIC

FGID	Font Width	GCSGID	Character Set	Description
2311	0	1362	C0N505cp	NARKISS HEBREW BOLD ITALIC
2311	0	2039	C0N500cp *	TIMES NEW ROMAN LATIN1 BOLD ITALIC
2311	0	2041	C0N500cp	TIMES NEW ROMAN LATIN1 BOLD ITALIC
20224	0	2039	C08400cp	BOLDFACE LATIN1
20224	0	2041	C08400cp	BOLDFACE LATIN1
24320	60	1262	C02055G0	PROPRINTER EMULATION (24-PITCH)
24320	120	1262	C02055H0	PROPRINTER EMULATION (12-PITCH)
24320	120	1262	C02055H0	PROPRINTER EMULATION (18-POINT)
24322	60	1262	C02075G0	PROPRINTER EMULATION BOLD (9-POINT)
24322	120	1262	C02075H0	PROPRINTER EMULATION BOLD (18-POINT)
24323	120	1262	C02071H0	PROPRINTER EMULATION BOLD (18-POINT)
24324	30	1262	C02055S0	PROPRINTER EMULATION SMALL (4-POINT)
24325	30	1262	C02057S0	PROPRINTER EMULATION EXPANDED SMALL (4-PO
24326	30	1262	C02075S0	PROPRINTER EMULATION SMALL BOLD (4-POINT)
24327	30	1262	C02077S0	PROPRINTER EMULATION EXPANDED SMALL BOLD
24328	60	1262	C02059G0	PROPRINTER EMULATION (9-POINT)
24329	60	1262	C02079G0	PROPRINTER EMULATION BOLD (9-POINT)
49975	67	340	C0S0SYM0	SYMBOLS7 (10-PITCH)
49975	80	340	C0S0SYM2	SYMBOLS7 (12-PITCH)
51767	0	040	C0IBM0cp	IBM LOGO

Notes about the above GCSGID/FGID/width to character set mapping table:

The internal FGID/GCSGID/width table only contains mappings to SBCS bitmapped font character sets.

If a character set name cannot be mapped based on the FGID/GCSGID/width values, an attempt will be made to map to a character set based only on the FGID/width values. If an FGID applies to more than 1 character set,VPS/PCL will select a default character set, identified in the table with '*'.

For character sets ending in 'cp' above, the last 2 characters of the character set name will be determined by the font width specified in the GRID as follows:

Font Width	Last 2 Characters	Description
60	'50'	24 pitch
72	'60'	20 pitch
84	'70'	17.1 pitch
96	'80'	15 pitch
108	'90'	13.3 pitch
120	'00'	12 pitch
144	'B0'	10 pitch
169	'D0'	8.5 pitch
240	'J0'	6 pitch

For character sets ending in ‘pt’ above, the last 2 characters of the character set name will be determined by the font width specified in the GRID as follows:

Font Width	Last 2 Characters	Description
20	‘30’	3-point
27	‘40’	4-point
33	‘50’	5-point
40	‘60’	6-point
47	‘70’	7-point
53	‘80’	8-point
60	‘90’	9-point
67	‘00’	10-point
73	‘A0’	11-point
80	‘B0’	12-point
87	‘C0’	13-point
93	‘D0’	14-point
100	‘E0’	15-point
107	‘F0’	16-point
113	‘G0’	17-point
120	‘H0’	18-point
127	‘IO’	19-point
133	‘J0’	20-point
140	‘K0’	21-point
147	‘L0’	22-point
153	‘M0’	23-point
160	‘N0’	24-point
167	‘O0’	25-point
173	‘P0’	26-point
180	‘Q0’	27-point
187	‘R0’	28-point
193	‘S0’	29-point
200	‘T0’	30-point
207	‘U0’	31-point
213	‘V0’	32-point
220	‘W0’	33-point
227	‘X0’	34-point
228	‘Y0’	35-point
240	‘Z0’	36-point
247	‘11’	37-point
253	‘21’	38-point
254	‘31’	39-point
267	‘41’	40-point
273	‘51’	41-point
280	‘61’	42-point
287	‘71’	43-point
293	‘81’	44-point

Font Width	Last 2 Characters	Description
300	‘91’	45-point
307	‘01’	46-point
313	‘A1’	47-point
320	‘B1’	48-point

Section 9
VPS/XES to AFP

Overview

The VPS/XES to AFP conversion routines convert documents containing Xerox 3700, 2700, and 404x escape sequences into standard AFP documents. These AFP documents can then be printed using VPS/PCL or VPS/IPDS and can also be archived and viewed using PageCenter or PageCenter Plus. This conversion provides a migration path for Xerox customers who have written applications based on the XES printer language and enables them to migrate to newer hardware without the requirement to re-write existing applications.

A user-coded configuration table, XESRTAB, is used to define default setup information for the XES printer being emulated, including default escape character, default fonts, default margins, and default page size. The table also maps XES font names to equivalent AFP font resources and supplies the AFP FORMDEF to be associated with the VPS/XES to AFP output.

While normally run under VPS®, the VPS/XES to AFP converter can also be run in batch. (See "Installing VPS/XES to AFP for Batch Processing" on page 9.14.)

Installation

The steps required to install the VPS/XES to AFP product are:

1. Install VPS. (See “Installation” on page 3.1.)
2. Add VPS/XES to AFP keywords to the System Initialization Member. (See “Adding System Keywords for VPS/XES to AFP” on page 9.3.)
3. Build the VPS Printer Definition Members for the VPS/XES to AFP printers. (See “Building the VPS/XES to AFP Printer Definitions” on page 9.4.)
4. Generate the XESRTAB configuration table. (See “Configuring and Installing the VPS/XES to AFP Control Table (XESRTAB)” on page 9.6.)
5. Add the VPS/XES to AFP printers to the Printer Activation List (optional). (See “Adding VPS/XES to AFP Printers to Activation List” on page 9.13.)

Adding System Keywords for VPS/XES to AFP

The following keyword must be added to the VPS System Initialization Member for VPS/XES to AFP:

KEYXSAFP

The KEYXSAFP keyword specifies the trial/license code for the VPS/XES to AFP product. This keyword MUST be present to use the VPS/XES to AFP product. This key is generated by LRS and is supplied in file 8 of the VPS distribution cartridge (LRS.VPS.V1R80.CNTL).

Building the VPS/XES to AFP Printer Definitions

The following keywords must be specified for VPS/XES to AFP printers:

CONVTYPE

The CONVTYPE keyword specifies a conversion option for the AFP document following the XES to AFP conversion. Refer to "AFP" on page 8.1 for information about the IPDS, MODCA, PCL, and PDF CONVTYPE options.

XESCLASS

The XESCLASS keyword specifies the SYSOUT class(es) of datasets that should be processed by VPS/XES to AFP.

XESOPTS

The XESOPTS keyword is used to set special processing options in effect for a VPS/XES to AFP printer. Currently, no special options are defined.

XESRTAB

The XESRTAB keyword specifies the name of the VPS/XES to AFP control table and the name of the setup definition to be used for the VPS/XES to AFP printer. See "Configuring and Installing the VPS/XES to AFP Control Table (XESRTAB)" on page 9.6 for more information about this control table.

Sample Printer Definition for a VPS/XES to AFP printer

```
*-------------------------------------------------------------------------------------------------------------------*
* PCLPRTR – XES TO PCL PRINTER                                                                                      *
*-------------------------------------------------------------------------------------------------------------------*
  AFPOPTS=4000,                  4000 – DELETE RESOURCES AFTER EVERY DATASET
  AFPRTAB=VPSSRTAB,              AFP RESOURCE TABLE IS LOAD MODULE VPSSRTAB
  ALOGMODE=VPSLU1,               USE LOGMODE IMAGE FOR SNA/SCS PRINTER
  AUTOEJECT=(N,N,N,N),           TURN OFF EXTRANEOUS FORM FEEDS
  CONVTYPE=PCL,                  CONVERT TO PCL FORMAT
  DEST=U4031,                    JES DESTINATION SELECTION CRITERIA
  LUNAME=L75509,                 VTAM LUNAME
  PRTROPTS=0220,                 0200 –  SPLIT LARGE PRINT LINES INTO MULTIPLE
*                                        VTAM BUFFERS
*                                0020 –  ENFORCE RECFM FOR CC PROCESSING
  XESCLASS=X,                    CONVERT DATASET WITH SYSOUT CLASS 'X' FROM
*                                XES TO AFP
  XESRTAB=(VPSSXTAB,SETUP1)      VPS/XES TO AFP CONTROL TABLE IS VPSSXTAB AND
                                 THE NAME OF THE SETUP DEFINITION IS SETUP1
```

Figure 9-1: VPS/XES to AFP sample printer definition

Configuring and Installing the VPS/XES to AFP Control Table (XESRTAB)

The XESRTAB configuration table is divided into two sections. The first section uses the $$XSETUP macro to define default printer setup information. This setup information is used by the VPS/XES to AFP conversion routine to establish XES environment defaults, before beginning conversion of the input XES document. The second section of the table contains one or more font tables, which are used to map input XES font names to equivalent AFP font resources.

The main function of the $$XSETUP macro is to define the printer default font which determines the initial page orientation when conversion begins. The other important values are the page size, font table and initial printer margins. The remaining parameters are optional and allow you to customize the initial XES print environment including default UDK character and XES font assignments.

Below is an example of an XES printer setup definition using the $$XSETUP macro.

```
SETUP1 $$XSETUP UDK=!,                  Default UDK character   *
     FONTTAB=FONT300,                   Font table              *
     DEFFONT=Titan12iso-P,              Printer default font    *
     DEFFONT0=Titan10iso-P,             Default font 0          *
     DEFFONT1=XCP12.5iso-L,             Default font 1          *
     PAGESIZE=(850,1100),               Page size = Letter      *
     PMARGINS=(200,200,120,2430),       Portrait Margins        *
     LMARGINS=(120,120,200,3100),       Landscape Margins       *
     FORMDEF=VPSXES                     AFP FORMDEF
```

Figure 9-2: XESRTAB Configuration Table (section 1)

The above example defines a printer default font of “Titan12iso-P” which establishes an initial print orientation of portrait when conversion begins. The output page size is defined as 8.5 x 11 inches (Letter) and initial portrait and landscape margins are set.

This example also defines a default UDK character and specifies default font assignments for XES font 0 and 1. The FORMDEF parameter indicates the AFP FORMDEF which should be used with the output AFPDS document. This is required to resolve XES hopper selection commands and to provide a mapping of XES hopper numbers to AFP bin numbers. For a description of the FORMDEF requirements for VPS/XES to AFP documents please refer to “VPS/XES to AFP FORMDEF requirements” on page 9.18.

The FONTTAB parameter of the $$XSETUP macro references a font table in the second section of the XESRTAB definitions. The font table defines the mapping of input XES font names to equivalent AFP font resources, it also provides a facility to override the default line and character spacing of the AFP fonts to match the attributes of the XES font.

```
$$XFONT=Titan12iso-P,     XEROX FONT                *
     IBMFONT=C0S0PR12,    IBM EQUIVALENT FONT       *
     IBMBOLD=C0S0PB12,    IBM EQUIVALENT BOLD       *
     CODEPAGE=T1D0BASE,   AFP CODEPAGE              *
     XLPI=6,              LINE SPACING              *
     ORIENT=PORTRAIT      ORIENTATION
```

Figure 9-3: XESRTAB Configuration Table (section 2)

The font table information is very important as it is used by the conversion process to know the orientation and font metrics of the XES fonts. All fonts used in XES documents must be mapped in this table; an error will be reported and conversion will terminated if an undefined font is encountered.

Each font definition must specify the XES font name, font orientation and default AFP normal and bold fonts. Unless specified, the default line and character spacing of the selected AFP font will be used. If this does not correctly match the XES font then the line and character spacing attributes can be modified using the XLPI, SIA and SVI keywords. Refer to "$$XFONT Macro" on page 9.11 for details.

When first setting up a font table the most important attributes for correct results are the size and line spacing of the font. If the line spacing of the selected font is incorrect this will result in incorrect page breaks and possibly premature termination of merge pages. The VPS/XES to AFP convertor will use the default line spacing of the selected AFP font unless the XLPI parameter is specified to explicitly set the number of lines per inch. If this value is set correctly then it will ensure that text is positioned correctly down the page and page breaks will occur in the correct locations. Once the vertical spacing is correct it is then possible to review the typeface selection, font size and character spacing to ensure that horizontal text positioning is correct.

VPS/XES to AFP Control Table

Table layout

Below is a sample table showing the general structure of the macro definitions.

```
SETUP1 $$XSETUP UDK=!,                    DEFAULT UDK CHARACTER*
            FONTTAB=FONT300,              FONT TABLE           *
            DEFFONT=Titan12iso-P,         PRINTER DEFAULT FONT *
            DEFFONT0=Titan10iso-P,        DEFAULT FONT 0       *
            DEFFONT1=XCP12.5iso-L,        DEFAULT FONT 1       *
            PAGESIZE=(850,1100),          PAGE SIZE = LETTER   *
            PMARGINS=(200,200,120,2430), PORTRAIT MARGINS      *
            LMARGINS=(120,120,200,2350), LANDSCAPE MARGINS     *
            FORMDEF=VPSXES                DEFAULT FORMDEF

Additional setup definitions …

*
FONT300$$XFONT                            START OF FONT TABLE
*
      $$XFONT XFONT=Titan12iso-P,XEROX FONT*
            CODEPAGE=T1D0BASE,     CODEPAGE                    *
            IBMFONT=C0420000,      IBM EQUIVALENT FONT         *
            IBMBOLD=C0440000,      IBM EQUIVALENT BOLD FONT    *
            XLPI=6,                XEROX FONT LINES PER INCH   *
            ORIENT=PORTRAIT        PORTRAIT ORIENTATION

Additional font definitions …

END
```

Figure 9-4: Example VPS/XES to AFP Control Table

Note: The table macros must be coded in the order shown above.

$$XSETUP Macro

```
Setupname   $$XSETUP UDK=,            DEFAULT UDK CHARACTER   (OPTIONAL)
              FONTTAB=,               FONT TABLE
              DEFFONT=,               PRINTER DEFAULT FONT
              DEFFONT0=,              DEFAULT FONT 0          (OPTIONAL)
              DEFFONT1=,              DEFAULT FONT 1          (OPTIONAL)
              DEFFONT2=,              DEFAULT FONT 2          (OPTIONAL)
              DEFFONT3=,              DEFAULT FONT 3          (OPTIONAL)
              DEFFONT4=,              DEFAULT FONT 4          (OPTIONAL)
              DEFFONT5=,              DEFAULT FONT 5          (OPTIONAL)
              DEFFONT6=,              DEFAULT FONT 6          (OPTIONAL)
              DEFFONT7=,              DEFAULT FONT 7          (OPTIONAL)
              PAGESIZE=(n,n),         PAGE SIZE               (OPTIONAL)
              PMARGINS=(n,n,n,n),     PORTRAIT MARGINS        (OPTIONAL)
              LMARGINS=(n,n,n,n),     LANDSCAPE MARGINS       (OPTIONAL)
              FORMDEF=                DEFAULT FORMDEF         (OPTIONAL)
```

Figure 9-5: $$XSETUP Macro

Parameters:

Setupname XES setup name

UDK Default UDK character. (If omitted no default UDK will be set.)

FONTTAB Name of a font table defined later in the XESRTAB definitions which will be used to relate an XES font to its equivalent AFP font.

DEFFONT XES default font. The font defined here will set the initial page orientation and should match the hardware default font of the XES printer being emulated. (The status page of the original XES printer will indicate the default font.)

DEFFONT0-9 Default XES font assignments. (Optional)

PAGESIZE Physical dimensions of the paper being used in $1/10^{th}$ of an inch. Two values must be specified indicating the X and Y dimensions of the paper. (Optional)

LETTER = (850,1100) (8.5 x 11 inches)
A4 = (827,1169) (8.27 x 11.69 inches) (Default)

PMARGINS Default margins to be used when processing a portrait document. The values are (Top, Bottom, Left, Right) and are in 1/300th of an inch. (Optional)

XES default portrait margins

LETTER = (200,200,120,2430)
A4 = (153,153,240,2241) (Default)

LMARGINS Default margins to be used when processing a landscape document. The values are (Top, Bottom, Left, Right) and are in 1/300th of an inch. (Optional)

XES default landscape margins

LETTER = (120,120,200,3100)
A4 = (84,84,168,3339) (Default)

FORMDEF Name of a FORMDEF to use to resolve hopper selection requests and to offset print on particular devices or control stacker functions (i.e. offset stacking). If omitted the default FORMDEF of "VPSXES" will be used. For a description of the default FORMDEF please refer to "FORMDEF" on page 3.147.

Note: All XES font names must be entered in the correct case.

The $$XSETUP macro provides the ability to define default XES environment settings which will be in effect when conversion begins. XES environment defaults are only used if they are not overridden within the document itself.

$$XFONT Macro

```
tabname     $$XFONT           START OF FONT TABLE
*
            $$XFONT XFONT=,   XES FONT
                 IBMFONT=,    IBM EQUIVALENT FONT
                 IBMBOLD=,    IBM EQUIVALENT BOLD FONT
                 CODEPAGE=,   CHARACTER CODE PAGE          (OPTIONAL)
                 XLPI=n.nn,   LINES PER INCH               (OPTIONAL)
                 SVI=n,       SET VARIABLE SPACE INCREMENT (OPTIONAL)
                 SIA=n,       INTER CHARACTER ADJUSTMENT   (OPTIONAL)
                 ORIENT=      FONT ORIENTATION
```

Figure 9-6: $$XFONT Macro

Parameters:

Tabname Must only be specified on first entry of each font table. This name is referenced in the $$XSETUP FONTTAB parameter. (The first entry in each font table should specify the table name and no other parameters.)

XFONT XES font name 1-24 characters. (Must be entered in correct case.)

IBMFONT The AFP font equivalent to the XES font named above. (This is the AFP font character set name and not a coded font name.)

IBMBOLD Bold version of AFP font. Used when a begin bolding sequence is encountered in a document. (If omitted, bolding requests will be ignored for this font.)

CODEPAGE The name of the AFP code page table to be used with the selected character set. (Default = T1D0BASE.)

XLPI The number of lines per inch for the XES font. This value is used to override the default spacing of the AFP font to emulate its XES equivalent. (Default = Line spacing of AFP font)

SIA The intercharacter adjustment is used to adjust the spacing of characters in a word. The value specified in $1/1440^{th}$ of an inch is inserted between characters that form a word but not between words. This can be used to adjust the spacing of an AFP font to more closely match its Xerox equivalent.

SVI The Set Variable Space Increment value defines the character increment of the space character in $1/1440^{th}$ of an inch. This value only has effect if the AFP font selected supports variable space increments. (Default = AFP font default space increment.)

ORIENT The orientation of the XES font. This can be LANDSCAPE or PORTRAIT and there is no default.

Font Metrics

To enable the VPS/XES to AFP conversion routine to precisely position and center text, it is necessary to extract AFP font metrics information as part of the XESRTAB generation process. This information is extracted automatically by the VPSSFNTM routine, which reads the AFP font libraries and builds character metrics tables which are included with the XESRTAB definitions.

The ASMXTAB JCL which is provided in file 8 of the distribution cartidge. (The VPS CNTL dataset) contains the necessary steps to assemble the XESRTAB definitions and build the required font metrics information.

The ASMXTAB job consists of the following steps:

- Step 1: Assemble XESRTAB and punch list of AFP fonts
- Step 2: Sort AFP font names and remove duplicates
- Step 3: Execute VPSSFNTM to extract AFP font metrics information
- Step 4: Assemble font metrics tables
- Step 5: Assemble XESRTAB and generate object code
- Step 6: Link edit XESRTAB and include font metrics tables

Before running the ASMXTAB JCL you should review the following steps:

Step 2: The SORT utility control statements may need to be modified because of differences between SORT routines.

Step 3: The FONTLIB concatenation should be reviewed and must include all AFP font libraries which will be used when printing the converted AFPDS documents. If VPS/XES to AFP is being executed internally within the VPS address space then the FONTLIB concatenation should match the FONT300 or FONTLIB concatenations defined in the VPS execution JCL.

If the XESRTAB definitions contain AFP font names which do not exist in the customers' AFP font libraries then a return code of 4 will be generated from the final link edit step. This is not necessarily an error as these fonts may not be used, if one of these fonts is referenced in an XES document the conversion will terminate with error message VPS714E. If the AFP font is available, simply update the FONTLIB concatenation in STEP3 and re-run the ASMXTAB JCL to include the necessary font metrics information.

A sample XESRTAB control table, VPSSXTAB, is provided in the LRS.VPS.V1R80.ASM library.

Adding VPS/XES to AFP Printers to Activation List

If you are using the Printer Activation Inclusion List to automatically start VPS printers at system initialization, you should add the member names of the VPS/XES to AFP printers to that list. For more information, see "Building the Printer Activation Inclusion List" on page 3.77.

Installing VPS/XES to AFP for Batch Processing

Installation of the batch VPS/XES to AFP conversion programs simply requires that any job running the program have the VPS load library as its STEPLIB, or that the VPS load library be an authorized linklist library.

The following is a sample of the JCL required to run VPS/XES to AFP in batch:

```
//jobname  JOB . . .
//STEP1    EXEC PGM=VPSXESA
//STEPLIB  DD   DSN=loadlib,DISP=SHR
//SYSPRINT DD   SYSOUT=*
//TRACE    DD   SYSOUT=*
//*
//XESIN    DD   DSN=dataset,DISP=SHR
//*
//AFPOUT   DD   DSN=dataset,DISP=SHR
  - or -
//*FPOUT   DD   SYSOUT=*,DEST=dest
//*
//MSGFILE  DD   DSN=dataset,DISP=SHR
  - or -
//*SGFILE  DD   SYSOUT=*,DEST=dest
  - or -
//*SGFILE  DD   DUMMY
//*
//PARMFILE DD   *
  .
  .
  . (control statements)
  .
  .
/*
//
```

Figure 9-7: Sample JCL required to run VPS/XES to AFP in Batch

Notes:

- The input dataset XESIN must be a physical sequential dataset.
- The output dataset AFPOUT must be a physical sequential dataset with variable-length records and carriage control characters.
- The parameter dataset PARMFILE must be a physical sequential dataset with fixed-length 80-byte records.

Batch Parameters

This section lists the VPS/XES to AFP parameters. These keywords should be coded in a control statement file pointed to by DD card PARMFILE in the job step which executes VPS/XES to AFP. The same syntax rules used for VPS control library members apply to the PARMFILE dataset.

KEYXSAFP= Specifies the trial/license code for the VPS/XES to AFP product. This keyword MUST be present in order to use the VPS/XES to AFP product.

Valid Values: 60 characters. This key is generated by LRS and is supplied in file 8 of the VPS distribution cartridge (LRS.VPS.V1R80.CNTL).

Default: None.

SNAPHOLD= Specifies whether the SNAP SYSOUT dataset should be allocated as a held SYSOUT dataset.

Valid Values: Y or N

Default: N

Example: SNAPHOLD=Y

This specifies that the SNAP SYSOUT dataset should be held.

SNAPOUTP= Specifies the characteristics to be used when allocating a snap dump dataset.

Positional parameter 1 specifies the SYSOUT class to be used for the VPS snap dump dataset.

Valid Values: Any valid SYSOUT class (0 - 9 or A - Z).

Default: A

Positional parameter 2 specifies the destination to be used for the VPS snap dump dataset.

Valid Values: Any valid JES destination.

Default: LOCAL for JES2 and ANYLOCAL for JES3

Example: SNAPOUTP=(,U100)

This specifies that the snap dump dataset should have a SYSOUT class of A and a destination of U100.

TRACE= Specifies, via two positional parameters, if tracing is to be active during the job and the type of tracing to be performed when tracing is active.

Positional parameter 1 specifies whether tracing is to be active.

Valid Values: Y or N

Default: N

Positional parameter 2 specifies the type of tracing to be performed.

Valid Values: 00 - FF

80 = Normal job tracing

40 = Detail job tracing

20 = Undefined

10 = Undefined

08 = VTAM entry/exit

04 = GTF trace VTAM buffers

02 = Storage management

01 = GTF tracing active

Default: 00

Example: TRACE=(Y,C1)

This specifies that tracing should be on for this job, normal activities should be traced, detail activities should be traced, and GTF tracing should be active.

WTO= Specifies how to issue console messages.

Positional parameter 1 specifies whether VPS informational messages (those with a suffix of "I") should be issued.

Valid Values: Y or N

Default: Y

Positional parameter 2 specifies the route code that should be used when issuing unsolicited WTOs.

Valid Values: 1 - 16

Default: 1

Example: WTO=(N,5)

This specifies that informational messages should not be issued, and that unsolicited WTOs are to use a route code of 5.

XESOPTS= A two-byte hex representation of special options to be in effect. The value is specified as four digits, representing two hex bytes (16 bits). Currently, no option bits are in use.

Valid Values: 0000 - FFFF

Default: 0000

Example: XESOPTS=0000

XESRTAB= Specifies the name of the VPS/XES to AFP control table and the name of the setup definition to be used for conversion.

Positional parameter 1 specifies the 1-8 character name of the VPS/XES to AFP control table. See "Configuring and Installing the VPS/XES to AFP Control Table (XESRTAB)" on page 9.6 for more information.

Valid Values: Any valid XES resource table name.

Default: VPSSXTAB

Positional parameter 2 specifies the 1-8 character name of the setup definition defined in the XES resource table.

Valid Values: Any valid setup definition name.

Default: None. The first setup definition in the XESRTAB will be used.

Example: XESRTAB=(VPSSXTAB,SETUP1)

VPS/XES to AFP FORMDEF requirements

Below is the default FORMDEF used by the VPS/XES to AFP data stream converter. This FORMDEF is used to resolve XES hopper selection requests to AFP bin numbers. F1VPSXES can be found in file 31 of the VPS distribution cartridge (the VPS FDEFLIB Library).

The XES hopper number relates to the copygroup number below and is used to map this value to an equivalent AFP bin number.

```
/*****************************************************************
 * Default FORMDEF for VPS/XES to AFP converter                   *
 *****************************************************************/
   FORMDEF VPSXES
       OFFSET 0 IN 0 IN  /* Offset of print from paper origin    */
       REPLACE YES;
     COPYGROUP 0         /* Xerox Hopper select zero             */
       BIN 1;            /* IBM BIN select equivalent            */
     COPYGROUP 1         /* Xerox Hopper select one              */
       BIN 1;            /* IBM BIN select equivalent            */
     COPYGROUP 2         /* Xerox Hopper select two              */
       BIN 2;            /* IBM BIN select equivalent            */
     COPYGROUP 3         /* Xerox Hopper select three            */
       BIN 3;            /* IBM BIN select equivalent            */
     COPYGROUP 4         /* Xerox Hopper select four             */
       BIN 4;            /* IBM BIN select equivalent            */
     COPYGROUP 5         /* Xerox Hopper select five             */
       BIN 5;            /* IBM BIN select equivalent            */
     COPYGROUP 6         /* Xerox Hopper select six              */
       BIN 6;            /* IBM BIN select equivalent            */
     COPYGROUP 7         /* Xerox Hopper select seven            */
       BIN 7;            /* IBM BIN select equivalent            */
```

Figure 9-8: Default FORMDEF used by the VPS/XES to AFP Data Stream Converter

A customized FORMDEF may be created for use with different printer types to alter the relationships between XES hoppers and the appropriate AFP bin numbers. These customized FORMDEFs can be referenced via the FORMDEF parameter of the $$XSETUP macro.

Section 10
VPS/TCPIP

Overview

VPS/TCPIP allows sending print datasets from the JES spool on MVS to TCP/IP devices. The same VPS® address space can be used to deliver output to both VTAM and TCP/IP devices. All printers can be displayed and controlled using the VPS console commands or VPS Monitor and Control Facility (VMCF).

VPS obtains a dataset from JES that matches the selection criteria (CLASS, DEST, FORM and/or WRITER) specified in the VPS definition for the TCP/IP printer. The dataset is then processed and delivered based on the TCP/IP connection type.

There are 3 types of connections available for TCP/IP printers:

- LPR/LPD protocol
- TCP/IP direct sockets connection
- LRS Queue - VPS/PC, AnyQueue, VPS/RemoteQueue

LPR/LPD Protocol

The most commonly used print server on a TCP/IP host is the Line Printer Daemon (LPD). The command which would be used to send print is called Line Print Remote (LPR). The protocols which describe printing to a Line Printer Daemon are often called LPR/LPD protocols. The port used by LPD to receive print data is 515.

When using LPR/LPD protocol, the spool dataset is processed by VPS to create a data file. In addition to the data file, a control file is built and sent which informs the LPD at the remote host how the data file should be printed. Control file records can be modified, deleted or added by VPS User Exit 25. The control file will be sent before or after the data file, based on the TCPOPTS value set for the printer.

Carriage control fields in the data file are replaced by line control commands, and EBCDIC characters can be translated to ASCII using the translate table specified on the PRTXLATE keyword. If the dataset is in the transparency class, no line control is added, and translation will be bypassed. VPS will call any printer-related exits which are loaded and enabled, including VPS user exit 25.

Because the LPR/LPD protocol requires that the TCP/IP connection be terminated after each print file, normal MVS job processing cannot be supported. JOB or OUTGRP separators are bypassed by VPS when sending data to a remote LPD.

The main advantage of using LPR/LPD protocol is that is supported by most TCP/IP devices. The main disadvantage of using LPR/LPD protocol is that the connection must be terminated after each print file is delivered. This makes it difficult or impossible to do normal job processing, such as adding separators at the beginning and end of each job. In addition, LPR/LPD protocol requires that each byte of data to be delivered is counted in order to send the exact count of the number of bytes in the data file. This requires staging the print buffers before any delivery of those print buffers can begin.

To use LPR/LPD protocols, specify COMMTYPE=(TCPIP,LPD).

TCP/IP Direct Sockets Connection

Some printers support a direct TCP/IP connection, often called a ‘sockets’ or ‘port’ connection. This type of connection allows buffers of data to be sent to the printer directly and does not require a Line Printer Daemon (LPD). The port used to receive data is usually 9100, but may be 9102, 9109, or 9400. If port 9400 is used, a special job information buffer may be sent to the device to provide information about the sender of the print file. For more information about this job information buffer, see “TCP/IP Printers Using Port 9400” on page 10.11.

When using the sockets connection, VPS processes the spool dataset to create the print file. Carriage control fields are replaced by line control commands, and EBCDIC characters can be translated to ASCII using the translate table specified on the PRTXLATE keyword. If the dataset is in the transparency class, no line control is added, and translation will be bypassed. VPS will call any printer-related exits which are loaded and enabled.

The main advantage of using the direct sockets connection is that the connection can be maintained and requests can be made for status responses during delivery of the data. This means that normal job processing can be supported for printers using direct sockets connection. JOB, OUTGRP or DATASET separators can be used. The TCP/IP connection can be maintained until the entire job is processed by specifying RELREQ=A, or until all the files available on the JES spool for this printer have been delivered by specifying RELREQ=I. The only disadvantage of the direct sockets connection is that it is not supported by most TCP/IP devices.

To use the direct sockets connection, specify COMMTYPE=(TCPIP,SOK).

VPS/PC, AnyQueue and VPS/RemoteQueue

VPS/PC, AnyQueue and VPS/RemoteQueue are products available from Levi, Ray & Shoup, Inc., which receive print output from VPS and place the output in print queues on the LAN. VPS/PC for Windows, VPS/PC for OS/2, VPS/PC for NT, AnyQueue and VPS/RemoteQueue support connections to VPS using either a TCP/IP sockets connection or a VTAM LU 6.2 APPC connection. When using any of these products with a TCP/IP connection, the port to be used to receive data is chosen when the product is configured.

VPS delivers the spool dataset to VPS/PC, AnyQueue or VPS/RemoteQueue which processes the print file, changes carriage control characters to line control commands, and translates the data based on the LAN configuration files. Transparent or binary files can be delivered, based on the TRNCLASS keyword in VPS printer definition. VPS/PC, AnyQueue or VPS/RemoteQueue places the print data in a print queue, in a PC file, or in a user’s EMAIL.

The main advantage of using VPS/PC, AnyQueue or VPS/RemoteQueue is to allow the LAN administrator to decide where each print file should be delivered based on the JES SYSOUT CLASS, DEST, FORM, WRITER or JOBNAME. With only one printer definition in the VPS system, an unlimited number of LAN printers can be supported. The configuration files can be updated on the LAN with no changes to the MVS system or to VPS.

To use VPS/PC with a TCP/IP connection, specify COMMTYPE=(TCPIP,VPSPC).

To use AnyQueue with a TCP/IP connection, specify COMMTYPE=(TCPIP,ANYQUEUE).

To use VPS/RemoteQueue with a TCP/IP connection, specify COMMTYPE=(TCPIP,RMTQUEUE).

Installation

Installation Steps

The steps required to install the VPS/TCPIP product are:

1. **Install the MVS TCP/IP product.** (See “TCP/IP System Requirements” on page 10.4.)
2. **Install VPS.** (See “Installation” on page 3.1.)
3. **Add VPS/TCPIP keywords to the System Initialization Member**. (See “Adding System Keywords for VPS/TCPIP” on page 10.5.)
4. **Build the VPS Printer Definition Members for the TCP/IP printers.** (See “Building TCP/IP Printer Definitions” on page 10.6.)
5. **Add the VPS TCP/IP printers to the Printer Activation List** (optional). (See “Adding TCP/IP Printers to Activation List” on page 10.12.)
6. **Implement User Exit 25 to modify the TCP/IP printer control file** (optional). (See “Installing User Exit 25” on page 10.13.)

For IBM’s TCP/IP for MVS Version 3 Release 1 or later, it may be necessary to add the //SYSTCPD DD statement to the VPS startup JCL. Under normal circumstances, this DD statement is not required. Adding the //SYSTCPD DD statement may be necessary if the following are true:

- TCPTYPE=IBM310, TCPTYPE=IBM320, or TCPTYPE=IBM340 is specified in the VPS System Initialization Member
- The TCPHOST printer keyword for one or more printers specifies host name, not IP address
- Multiple IBM TCP/IP address spaces are active on MVS

The //SYSTCPD DD statement allows the enterprise to use its own naming conventions for the TCPIP.DATA dataset, which enables running more than one TCP/IP address space on MVS. To determine if the //SYSTCPD DD statement is necessary, consult “IBM TCP/IP for MVS: Planning and Migration Guide”, Chapter 5.

When using VPS/TCPIP with IBM's MVS TCP/IP for OS/390 2.5 or higher (OpenEdition), the user ID associated with the VPS address space must be defined to the external security manager as a “superuser” or must have READ authority to the BPX.SERVER profile in the FACILITY class of the external security manager. Failure to establish this type of authority can result in message “VPS382E ANS WORD NEGATIVE TYPE=GETHOSTNAME FUNC=0B ANS=FFFFFFFF 0000009C” when VPS/TCPIP attempts to connect to MVS TCP/IP.

TCP/IP System Requirements

MVS Requirements:

VPS/TCPIP requires MVS/ESA 4.2.0.

VTAM Requirements:

Because VPS is primarily a VTAM application, VTAM must be installed on the MVS system where VPS will be running. A VTAM APPL definition is required, even if no VTAM printers are defined to VPS. For more information, see "VTAM Definition Requirements" on page 2.7.

TCP/IP for MVS Requirements:

Either IBM's TCP/IP for MVS product or Interlink Computer Sciences MVS TCP/IP product must be installed. The TCP/IP product must be installed on the same OS/390 (MVS) system where VPS is running.

For Interlink Computer Sciences MVS TCP/IP product, version 1.1 or later is recommended.

You may want to review the following parameters in your ICS configuration member for API (APICFGxx):

MAXADDR Set to number of VPS systems using VPS/TCPIP

MAXUSER Set to the maximum number of active VPS printers (MAXACT)

MAXEPA Set to the maximum number of active VPS printers (MAXACT)

DRS Requirements:

In order to direct online (CICS, IMS, etc.) print output to the JES spool to be delivered by VPS to VTAM or TCP/IP devices, the Dynamic Report System (DRS) from Levi, Ray & Shoup, Inc., is recommended. DRS allows dynamic creation of JES spool files by calling DRS from an application program or by using the DRS Virtual Printer Interface.

Adding System Keywords for VPS/TCPIP

The following keywords can be added to the VPS System Initialization Member for VPS/TCPIP:

KEYTCP

TCPDMN

TCPIPID

TCPLHOST

TCPPORT

TCPTYPE

The **KEYTCP** keyword specifies the trial/license code for the VPS/TCPIP product. This keyword MUST be present to use the VPS/TCPIP product. This key is generated by LRS and is supplied in file 8 of the VPS distribution cartridge (LRS.VPS.V1R80.CNTL).

The **TCPDMN** keyword allows associating a DOMAIN name with the local host name for the MVS TCP/IP system. Some LPR/LPD printer control commands use the host name to identify the sender of the print file. The host name obtained may or may not be the fully-qualified name. If there is no period (.) in the host name obtained by VPS with the 'get host name' request to MVS TCP/IP, the domain name specified by the TCPDMN keyword will be appended to the host name obtained.

TCPDMN is optional; if used, specify the value for DOMAIN in the TCPIP configuration files. For IBM, the value is on the DOMAINORIGIN keyword in the tcpip.TCPIP.DATA file. For Interlink Computer Sciences, the DOMAIN keyword is specified on the ACFHOST definition.

TCPIPID is required; if it is not specified, VPS will not attempt to connect to the MVS TCP/IP address space, and no TCP/IP printers can be activated. For IBM, TCPIPID should be the jobname or started task name of the MVS TCP/IP address space. For Interlink Computer Sciences, set TCPIPID to the 4-character subsystem ID. The default subsystem ID for Interlink Computer Sciences is ACSS.

The **TCPLHOST** keyword allows specifying the address of the local host where VPS is running. This address is used when VPS uses the BIND to select the local address and PORT number. This keyword is OPTIONAL. If the TCPLHOST keyword is not specified, the TCP/IP system on MVS will assign a local address. If the TCPLHOST value is specified, it must be an address that is valid for the MVS system where VPS is running.

The **TCPPORT** keyword specifies the port numbers to be used by VPS when connecting to the MVS TCP/IP system.

TCPPORT is optional; if LPR/LPD protocols are used, specify a value in the range 721 to 731.

For IBM, that port can be reserved for VPS by adding it to the configuration file using a PORT keyword which names the VPS started task name. For example:

722 TCP VPS NOAUTOLOG

For Interlink Computer Sciences, it is not necessary to reserve a PORT for VPS.

For more information about VPS/TCPIP's use of ports, see "How VPS/TCPIP Uses TCP/IP Ports" on page 10.19.

The **TCPTYPE** keyword specifies the type of MVS TCP/IP products. IBM and Interlink Computer Sciences application interfaces are supported.

TCPTYPE is optional; if not specified, the default is IBM340, which indicates that VPS should use the V3R4 API interface to communicate with TCP/IP. TCPTYPE=IBM310 indicates that VPS should use the V3R1 API interface to communicate with TCP/IP. TCPTYPE=IBM320 indicates that VPS should use the V3R2 API interface to communicate with TCP/IP.

TCPTYPE=ICS indicates that VPS should communicate by using the Interlink Computer Sciences application programming interface.

For more information on the VPS/TCPIP system keywords, see "Building the System Initialization Member" on page 3.16.

Building TCP/IP Printer Definitions

The following keywords are used only for VPS TCP/IP printers:

TCPDISC= Specifies what steps VPS/TCPIP should take when releasing the connection to a remote device.

TCPHOST= Specifies the Internet address of a remote TCP/IP host in 'dotted decimal' format. The host address is specified as a series of 4 numbers, separated by periods. Each number must be in the range 0-255. If TCPTYPE=IBM310, TCPTYPE=IBM320, TCPTYPE=IBM340 or TCPTYPE=ICS is specified at VPS startup, the TCPHOST can be specified as the name of the remote host. When using IBM TCP/IP and keyword USEROPTS=0400, the TCPHOST name can be 60 characters in length.

TCPLPORT= Specifies a local port or range of ports to attempt to use for the TCP/IP connection. The port number, along with the IP address of the local MVS host, will become the local address of VPS during the connection.

TCPMRD= Specifies the time interval in minutes for VPS to wait for a TCP/IP request to complete. If the request does not complete within this interval, the connection will be terminated and the printer will be EDRAINED. The default is 00, which means that VPS will never time out the connection.

TCPOPTS= A four byte hex representation of special printer options to be in effect for this TCP/IP printer. The value is specified as eight digits, representing four hex bytes.

TCPPRTR= Specifies the name of the printer at the remote TCP/IP host. The default is the member name of the VPS printer definition.

TCPRPORT= Specifies a port number to use for connection to the remote TCP/IP host. For LPD, the port should be set or allowed to default to 515. For VPS/PC for Windows, the port must match the port defined during TCP/IP configuration for the VPS/PC product.

TCPHOST is required for VPS TCP/IP printer definitions. In addition, COMMTYPE=(TCPIP,xxxxxxxx) is required.

Because TCP/IP devices have different requirements than VTAM printers, other VPS printer keywords may need to be specified with values that are not the VPS defaults. These keywords are summarized in "Printer Keywords" on page 10.16. Those parameters which are consistent for all VPS TCP/IP printers could be placed in a printer default member that is referred to by the DEFLTMEM keyword in individual printer definition members.

Sample VPS printer definition members for each type of TCP/IP connection are shown below:

Sample printer definition for LPR/LPD protocol

```
* ------------------------------------------------------------ *
*      TCPPRT01:  TEST LPD PRINTER                             *
* ------------------------------------------------------------ *
  CLASS=A,
  DEST=U6917,
  COMMTYPE=(TCPIP,LPD),
  FCB=N,
  GRPNAME=TCPIP,
  NLSEQ=0D0A,
  PRTXLATE=(Y,VPSSXASC),
  SEPAR=(B,VPSSSEP2,DATASET),
  TCPHOST=192.5.252.89,
  TCPPRTR=main
```

Sample printer definition for TCP/IP direct sockets connection using port 9100

```
* ------------------------------------------------------------*
*      TCPPRT02:  TEST SOCKETS PRINTER                        *
* ------------------------------------------------------------*
  CLASS=AZ,
  DEST=U6918,
  COMMTYPE=(TCPIP,SOK),
  FCB=N,
  FFSEQ=0D0C0D,
  NLSEQ=0D0A,
  PRTXLATE=(Y,VPSSXASC),
  RELREQ=I,
  SEPAR=(B,VPSSSEP2,JOB),
  TCPHOST=187.5.6.78,
  TCPRPORT=9100
```

Sample printer definition for TCP/IP direct sockets connection using port 9400

```
* ------------------------------------------------------------*
*      TCPPRT03:  TEST SOCKETS PRINTER                        *
* ------------------------------------------------------------*
  CLASS=ABC,
  DEST=U6920,
  COMMTYPE=(TCPIP,SOK),
  NLSEQ=0D0A,
  PRTXLATE=(Y,VPSSXASC),
  RELREQ=I,
  TCPHOST=187.93.2.41,
  TCPOPTS=00000080,
  TCPRPORT=9400
```

Sample printer definition for VPS/PC

```
* ------------------------------------------------------- *
*    TCPPRT04:  TEST VPS/PC PRINTER                       *
* ------------------------------------------------------- *
  CLASS=A,
  DEST=U6919,
  COMMTYPE=(TCPIP,VPSPC),
  TCPHOST=192.4.250.77,
  TCPRPORT=2222
```

Sample printer definition for AnyQueue

```
* ------------------------------------------------------- *
*    TCPPRT05:  TEST AnyQueue PRINTER                     *
* ------------------------------------------------------- *
  CLASS=A,
  DEST=U6921,
  COMMTYPE=(TCPIP,ANYQUEUE),
  RUSIZE=2048,
  TCPHOST=192.4.250.76,
  TCPRPORT=4444
```

If VPS is sending using the LPR/LPD protocols, the following table may be useful in determining which VPS keywords are the equivalent of TSO LPR command keywords.

LPR Keyword	VPS Keyword	Description
ACK	(default)	Wait for final acknowledgment from remote printer.
NOACK	TCPOPTS=40000000	Do not wait for final acknowledgment.
BINARY	TRNCLASS=	Do not translate or add line control.
NOBINARY	PRTXLATE=	Translate from EBCDIC to ASCII using table specified.
BURST	TCPOPTS=80000000	Request burst page be printed at remote host.
NOBURST	(default)	No burst page requested at remote host.
CC		VPS uses dataset RECFM for carriage control.
NOCC		To ignore carriage control, use VPS User Exit 01.
CLASS		JOB classification can be set in VPS User Exit 25. Default is local host name.
COPIES		VPS uses dataset copy count on JES spool.
FILTER		Special printing filter option:
f	(default)	Formatted print dataset
l	TCPOPTS=00200000	Allows passing control sequence to the printer
		(The following filters can be set in VPS User Exit 25)
o		PostScript
c		Plot CIF file - VPS handles as transparency class.
d		DVI file - VPS handles as transparency class.
g		Plot file - VPS handles as transparency class.
n		Ditroff file - VPS handles as transparency class.
t		Troff file - VPS handles as transparency class.
v		Raster file - VPS handles as transparency class.
HEADER		Headers could be added in VPS User Exit 01
NOHEADER	(default)	
HOST	TCPHOST=	Address of remote host.
INDENT		INDENT value can be set in VPS User Exit 25.
JOB		JOB description can be set in VPS User Exit 25. Default is a concatenation of the following: SMF system ID, VPS STC name, and JES dataset name.

LPR Keyword	VPS Keyword	Description
LANDSCAPE		PostScript commands for landscape can be added in VPS User Exit 01 and/or VPS User Exit 14.
LINECOUNT	MAXLPG=	Max lines printed per page for datasets without carriage control.
MAIL	TCPOPTS=10000000	Request remote host to notify user when print is complete. VPS User Exit 25 can be used to modify the name of the user to be notified. VPS will use the first NOTIFY value from the OUTPUT statement, if available. If there is no NOTIFY statement, the TPUTUSER field will be used.
NAME		Name of source file can be set in VPS User Exit 25. Default is a concatenation of the SMF system ID, VPS STC name, and JES dataset name.
POSTSCRIPT		PostScript commands can be added in VPS User Exit 01 or VPS User Exit 14.
NOPOSTSCRIPT	(default)	
PRINTER	TCPPRTR=	Name of printer at remote host.
TITLE		Title information can be added in VPS User Exit 25.
TOPMARGIN		Blank lines on a page can be added by VPS User Exit 01.
TRACE	TRACE=	Trace details of interaction with remote printer.
TYPE	TRACE=	Trace progress as data is being processed.
VERSION		VPS DISPLAY,SYSTEM command shows VPS version.
WIDTH	MPP=	Set line width (maximum print position).

TCP/IP Printers Using Port 9400

If your printer allows connection using the direct TCP/IP connection to port 9400, you may need to set TCPOPTS=00000080 to send the special job information buffer to the device each time a connection is made. The job information buffer contains fields which describe the host, user, job name and queue name associated with the sender of the print file. The job information buffer is not printed, but the information is sent to any software which may be monitoring the printer.

If TCPOPTS=00000080 is not set when TCPRPORT=9400 and COMMTYPE=(TCPIP,SOK), the print file may not print correctly. The printer expects the first data received after a connection is established to contain the length of the special buffer and will use any print data that arrives as the length field.

VPS builds the job information buffer from a work area that contains fields with values based on the VPS system, the VPS printer definition and the characteristics of the print dataset obtained from JES. VPS normally sends 8 fields to the printer:

Field	Value or Source	Description
1	Calculated	Buffer length and number of fields
2	TCPPRTR	Queue number at remote device (see Note)
3	X'01'	NPAP flag byte
4	MVS host name	Sender's TCP/IP host name
5	Job name	Sender's job name
6	VPS STC name	Sender's user name
7	Printer member name	Sender's queue name
8	X'FFFFFFFFFFFF'	NPAP alert string

Note: If TCPPRTR was not specified, the default value of X'31' for the first parallel port will be used. If the value of the TCPPRTR keyword begins with one of the following text strings, the appropriate corresponding value will be sent:

TCPPRTR	Value	Description
P1	X'31'	Send to parallel port 1
P2	X'32'	Send to parallel port 2
P3	X'33'	Send to parallel port 3
P4	X'34'	Send to parallel port 4
P5	X'35'	Send to parallel port 5
S1	X'39'	Send to serial port
BALANCE	X'30'	Request load balancing

It is possible to modify the values placed in the fields of the job information buffer with VPS User Exit 25. Up to 128 bytes of text can be added to each of the 4 text fields (host, job, user, and queue names). VPS will send all the text in each field up to the first null character. For more information about VPS User Exit 25, see "Installing User Exit 25" on page 10.13 or "Exit 25: TCP/IP Control File Exit" on page 5.62.

Adding TCP/IP Printers to Activation List

If you are using the Printer Activation Inclusion List to automatically start VPS printers at system initialization, you should add the member names of the VPS TCP/IP printers to that list. For more information, see "Building the Printer Activation Inclusion List" on page 3.77.

Installing User Exit 25

VPS User Exit 25 is an optional exit that will be called for VPS TCP/IP printers using COMMTYPE=(TCPIP,SOK) and TCPOPTS=00000080 or COMMTYPE=(TCPIP,LPD). The exit allows modification of the control file which is sent by VPS to the printer.

For LPR/LPD protocol

In addition to the data file which contains the output dataset, a control file is built by VPS which informs the remote host how the data file should be printed. Control file records may be modified, deleted or added by VPS user exit 25.

The control file records are built in a control line area which is passed to VPS user exit 25. The macro which maps the control line area is shipped in LRS.V1R12.MACLIB on the distribution cartridge as #LRTCCNT.

The prefix of the control lines area contains information about the all control records, such as total length of the control block, the number of control lines available, the number of control lines used and a copy count. The prefix area should NOT be modified.

The control records follow the prefix. Each record has a field to indicate the length of the data used in that entry and status flags to indicate if the control record is the filter record or if the control record will be bypassed. Control record entries can be added or modified. In addition, a control record can be bypassed by setting the bypass flag.

Each control record has a ‘type’ field followed by up to 256 bytes of additional data. The last byte of data must be the ASCII new line character (X’0A’). If the data in the control record is changed, the length of the data should be updated to include both the ‘type’ field and the following data, including the new line character.

One, and only one, filter record must be sent as part of the control file. The valid types of filter records are documented in the #LRTCCNT macro.

When the exit returns to VPS, the control records will be scanned. Any records which contain errors that can be detected by VPS will be flagged and bypassed. If the minimum requirements for the control file are not met, the printer will be EDRAINED. Logic errors that cannot be detected by VPS, such as invalid order of the control records, may cause unpredictable results at the remote host.

If the records meet the minimum requirements, VPS will update the prefix to indicate the number of records which should be sent to the remote host. The control file will be built and sent either before or after the data file, based on the VPS printer definition.

For COMMTYPE=(TCPIP,SOK) and TCPOPTS=00000080

A special buffer with job information fields is sent to the device at the beginning of each connection. This buffer is not printed, but is used by the printer to provide information about the job to any software which is monitoring the printer.

The job information buffer is built by VPS with data from the VPS system, the printer definition and the SYSOUT characteristics of the dataset being printed. The fields are passed to exit 25 in a work area mapped by the #LRTCJIF macro and may be modified by the exit.

The first field of the buffer contains a length value and the number of fields present. There are also fields which contain printer flags and text fields that identify the sender of the print file. The text fields contain the host name, the job name, the user name, and the queue name of the sender. Each of the text fields can be modified to send up to 128 bytes of information; the value of the field should be terminated with a null character (x'00').

Descriptions of the fields that can be sent in the job information buffer are located in the #LRTCJIF mapping macro.

For more information on implementing VPS User Exit 25, see "Installing User Exit 25" on page 10.13. For general information about implementing VPS user exits, see "User Exits" on page 5.1.

Problem Determination

VPS provides facilities to aid in problem determination; these are described in "Problem Determination" on page 15.1. "Messages and Codes" on page 14.1 lists all possible VPS messages, their meanings, and any actions to be taken.

VPS will issue message VPS380I when VPS connects to the MVS TCP/IP system. This message shows the local host name and the port number to be used to communicate with TCP/IP.

To display the status of the VPS TCP/IP connection, you can issue the VPS system display command:

```
F VPS,DISPLAY,SYSTEM
```

This command will issue message VPS979R to display the current status of the VPS TCP/IP connection, the local host name, and the current port number in use by VPS.

If the MVS TCP/IP system is shut down, VPS will issue the VPS383E message indicating that the connection was severed. Each time the VPS system wait interval expires, VPS will attempt to re-connect to TCP/IP. If the MVS TCP/IP system will be shut down for a long period of time, the VPS TCP/IP interface can be disabled by using the following command:

```
F VPS,SSET,TCPIP=D
```

When the MVS TCP/IP system is restarted, the following command can be issued to enable the VPS TCP/IP interface:

```
F VPS,SSET,TCPIP=E
```

To display the current status of a VPS TCP/IP printer, the following command can be issued, where prtr-id is the member name of the printer:

```
F VPS,DIS,prtr-id
```

For more information about the TCP/IP parameters, the following command can be issued, where prtr-id is the member name of the printer:

```
F VPS,DIS,prtr-id,V
```

A VPS996R and VPS997R message will be displayed to show whether the printer is currently connected to a remote host, the address and printer name at the remote host, the TCP/IP options for the printer, under what conditions the connection will be released for the printer, and the send buffer size in use for the printer connection.

The missing response detector, internal trace and snap dump facilities can be used for TCP/IP devices. GTF tracing allows capturing all commands and buffers sent to and received from TCP/IP. For more information on these and other VPS diagnostic facilities, see "Problem Determination" on page 15.1.

Printer Keywords

Several printer keywords have values that are unique to or recommended for TCP/IP printers, or have values that do not apply in the TCP/IP environment. These keywords are described below.

CHNSIZE= CHNSIZE will be ignored for TCP/IP printers if TCPTYPE=IBM310, TCPTYPE=IBM320, or TCPTYPE=IBM340 is specified. For TCPTYPE=ICS, CHNSIZE will be used to determine the maximum number of data buffers that can be sent before waiting. If CHNSIZE=0 is specified or obtained by default, VPS will use the maximum send number provided by Interlink Computer Sciences.

COMMTYPE= COMMTYPE=(TCPIP,xxxxxx) is reserved for TCP/IP printers using VPS/TCPIP. Other values may be added to further describe the type of connection to be made.

COMMTYPE=(TCPIP,LPD)	LPR/LPD protocol
COMMTYPE=(TCPIP,SOK)	Sockets connection
COMMTYPE=(TCPIP,VPSPC)	VPS/PC
COMMTYPE=(TCPIP,ANYQUEUE)	AnyQueue

COMPRESS= COMPRESS=Y is ignored for printers with COMMTYPE=(TCPIP,xxxxxxxx).

FFSEQ= It is recommended that FFSEQ=0C be specified for TCP/IP printers. However, some devices require FFSEQ=0C0D to print the first line of each page correctly.

GDMCLASS= GDMCLASS is not supported for VPS/TCPIP printers.

NLSEQ= It is recommended that NLSEQ=0D0A be specified for TCP/IP printers.

PRTXLATE= If you need to translate EBCDIC data to ASCII, you should specify the name of a translate table you wish to use in the second positional parameter value of the PRTXLATE keyword. A sample translate table named VPSSXASC is provided in file LRS.VPS.V1R80.LOAD.

Those datasets which should not be translated can be placed in a special SYSOUT class on the JES spool, and the TRNCLASS keyword should be specified with the list of the SYSOUT class(es) in the first positional parameter and a “T” in the second positional parameter.

RELREQ= RELREQ will be used for TCP/IP connections except when the printer is connected using LPR/LPD protocols. To force VPS to use the RELREQ keyword value for LPR/LPD, set TCPOPTS=04000000. This option is not recommended, because LPD implementations require that the connection be closed after each print file is delivered.

SEPAR= If the printer is connected using LPR/LPD protocol, the remote host may not print the file until the connection is closed. Files from other systems may print between the files that VPS sends. Therefore, the SEPAR keyword value is only used if DATASET separators are requested. JOB or OUTGRP separators will be ignored for LPR/LPD connections. If both start and end separators are desired, specify SEPAR=(B,,DATASET).

For the direct sockets connection, JOB, OUTGRP, or DATASET separators are supported.

All separator programs provided with the VPS product will translate the separator lines from EBCDIC to ASCII if the printer is a TCP/IP device.

TRNCLASS= "T" can be used as the value of the second positional parameter to specify TCP/IP transparency. No characters will be inserted into the data to indicate transparency, no line controls will be inserted, and no translation will be performed on the data.

When the second positional parameter value is "T", the third and fourth positional parameter values are not allowed.

VPS Commands

There are some options on VPS commands that apply only to the TCP/IP environment.

DISPLAY

Function: Display VPS status and option information

Description: This command provides the facility to display option and status information pertinent to the individual VPS printers and/or the VPS system. It includes TCPIP-related information when the "TCPIP" option is specified for a printer.

Example: **F VPS,DISPLAY,prtrid,TCPIP**

Display the VPS/TCPIP information, via message VPS996R.

SSET

Function: Change current VPS system parameters.

Description: This command provides the facility to modify VPS System parameters.

Format: **F VPS,SSET,sopt1=value,sopt2=value....soptn=value**

Comments: The SSET command now provides the ability to modify the TCP/IP environment:

TCPIP=E|D|F To enable/disable/force termination of the VPS/TCPIP connection

Example: **F VPS,SSET,TCPIP=E**

Enable the VPS/TCPIP connection.

How VPS/TCPIP Uses TCP/IP Ports

VPS/TCPIP uses the values of three keywords to determine which ports to use for TCP/IP connections.

Keyword	Type	Default	Description
TCPPORT	SYSTEM	721-731	Local port for system connection
TCPLPORT	PRINTER	721-731	Local port for printer connection
TCPRPORT	PRINTER	515	Remote port for printer connection

TCP/IP PORT FOR SYSTEM CONNECTION

At VPS startup, a connection is made by a VPS system task to the MVS TCP/IP address space. VPS uses a BIND request to select a local port. This local port number is combined with the protocol type (TCP) and the local IP address of the MVS system to make up a unique address.

If the default value of 721-731 is used for the TCPPORT system keyword, then VPS attempts to BIND to port 721. If that port is not available, VPS would attempt to BIND using port 722. As soon as an available port is located, that port will be used for the duration of the VPS system connection. Normally, VPS will stay connected to TCPIP until shutdown.

TCP/IP PORT FOR PRINTER CONNECTION

When a printer obtains work from JES, a connection must be made to the MVS TCP/IP address space and then to the remote TCP/IP host. The local port specified on the BIND request would normally be the same port as used for the system connection, if the system port is in the range specified for the TCPLPORT keyword and if TCPOPTS=00001000 is not set. For example, if VPS connected at port 721 at startup, then each printer would continue to attempt use that port. If that port were not available, the ports specified in the TCPLPORT would be tried in the order specified. TCPOPTS=00001000 requests VPS to always use the ports in the order specified in the TCPLPORT keyword, regardless of the value of the port used for the system connection.

To identify the remote host for the connection for the printer, the TCPHOST keyword is used to set the remote address, and the TCPRPORT is used for the remote port number for the connection. The remote port defaults to 515, which is the “well-known” port for the Line Printer Daemon (LPD).

UNIQUE ADDRESS COMBINATIONS REQUIRED

The combination of local and remote endpoint addresses must make a unique value. Each endpoint of the connection uses the IP address, the protocol value (TCP), and the port number to make up its part of the address combination. For example, if the MVS system has an IP address of 1.2.3.4 and the remote host where the printer is located has an IP address of 5.6.7.8, then the combination of port 721 at 1.2.3.4 (for VPS) and 515 at 5.6.7.8 (for the remote LPD) must represent a unique connection.

Many printers can be connected to VPS at any point in time, all using the same local port number and local IP address. The only time that a different local port is required is when the combination of the sending and receiving endpoint addresses for a connection do not represent a unique combination. If a connection already exists with the same local and remote port numbers, protocol types, and IP addresses, then another local port can be chosen to make the combination unique.

WHY USE MULTIPLE LOCAL PORTS?

The reasons that another connection might be still active and an additional local port might be necessary for a printer include the following:

Multiple printers are defined at the same remote IP address and must be connected simultaneously. For example, an AIX machine may have several print queues which are defined to VPS as separate printer definitions. For VPS to be connected to multiple print queues at the same host, a different local port would be used for each active connection.

A connection is kept active during the TIME-WAIT state because the remote host did not acknowledge that the connection was closed. IBM enforces a two minute TIME-WAIT state according to the TCP/IP protocol. For example, some printer cards that emulate Line Printer Daemons do not respond to the CLOSE command which ends the connection. During the TIME-WAIT state, VPS must use a different local port to make the next connection.

WHAT VALUES SHOULD BE USED FOR TCPLPORT OR TCPPORT?

If the printers are going to obtain their local port numbers from a default printer definition, the default of (721-731) or some subset of that value should be used. Since TCPPORT is used only for the system connection, one port can be specified, and it can be reserved for VPS to use. Then VPS will always obtain the same TCPPORT value at startup.

If there are multiple printers at the same IP address, the port range specified for those printers should be sufficient to connect to all printers. If the range is not large enough, VPS will put the printers that are unable to connect into a WCONNECT state and will process the connection requests as other printers at the same IP address disconnect.

For those printers which do not respond to the CLOSE call, enough local ports should be specified to allow printing as many files as might be processed during the two minute TIME-WAIT state.

The LPR/LPD protocol describes the sender as using a port in the range 721-731. This means that eleven ports are available for connections to those LPD servers which enforce this restriction. For a printer that does not respond to the CLOSE and goes into the TIME-WAIT state, and which has more than eleven files which need to be sent within two minutes, the printer will be EDRAINED. It can be restarted with VPS User Exit 08 or by a START command.

Many LPD implementations do not require the sending port to be in the range of 721-731. For those devices, TCPLPORT can be set to any range which is not reserved for another application. In some cases, a range of ports such as 3000-3999 can be specified to eliminate any errors due to a “port not available” or “address in use” condition.

If all printers respond to the CLOSE call which terminates the TCP/IP connection, and the VPS system has no TCP/IP printers with duplicate IP addresses, then one TCPLPORT value will be sufficient for all printers defined. All active connections would use the same local port number.

When VPS is attempting to connect to the remote host, each of the local ports defined for that printer is attempted. If every attempt comes back with an “address in use” type error, then VPS searches its internal control blocks to see if there is a VPS printer already connected with this address. If so, VPS can put the printer that is attempting to connect into a WCONNECT state. When the other VPS printer’s connection is terminated, those printers waiting for a connection to the same IP host address will be notified that they can attempt to connect. At that point, the connection attempts will start again for each waiting VPS printer with that IP address. If the local port is now available, the waiting printer will get connected.

However, if all the local ports are attempted and all return an “address in use” error, but there is no VPS printer which is connected for the same IP address, VPS has no way of knowing when another connection can be attempted. In this case, some other application is connected to the remote host and is using some port in the range defined to VPS for this printer, or the local port is not available due to the TIME-WAIT state. Since VPS cannot know when the local port will be available, it must EDRAIN the printer. VPS User Exit 08 can restart the printer after a defined interval, and the connection attempt will be retried.

Section 11
VPS/EMAIL

Overview

VPS/Email allows sending print datasets from the JES spool to an email address using Simple Mail Transfer Protocol (SMTP) and the TCP/IP network. VPS/Email requires VPS/TCPIP in order to transmit the dataset to the remote host.

VPS/Email can send the JES SYSOUT dataset as message text or as an attachment (file). In both cases SMTP is used to transfer the dataset from the OS/390 system to the remote TCP/IP host. If the dataset is to be sent as an attachment, Multipurpose Internet Mail Extensions (MIME) format is used. The dataset can be encoded using BASE64 encoding if it should be delivered as a binary file.

VPS/Email allows a VPS® printer definition to be used to send to any email user. The recipient name(s) can be specified in the JCL which places the dataset on the JES spool. Recipients can be primary recipients (TO:), secondary recipients (CC:) or 'blind' secondary recipients (BCC:). VPS/Email also allows setting the subject of the outgoing message by specifying SUBJECT: in the JCL which places the dataset on the JES spool.

The sender name is set in the VPS/Email parameter area based on the user ID of the creator of the job and the host name of the OS/390 system where VPS is running. VPS sets the DATE: value by retrieving the system clock time (GMT) and the offset from GMT to calculate the local time. This is the only date and time information supplied by VPS/Email. Mail servers that forward an email note and the receiving mail server may change the “sent time” in the DATE: record, so it is represented in the local time of the recipient.

If the SYSOUT dataset is a transparent (binary) file, it can be sent as an attachment and encoded using BASE64 encoding. This allows any binary value to be retained in the file and passed to the remote host. The file name for an email attachment can be specified in the JCL that places the dataset on the JES spool.

If a file name is specified with a PDF file extension, VPS/Email can convert the normal line data in the SYSOUT file to PDF format to be delivered as an attachment.

A VPS/Email address book can be loaded for each VPS/Email printer. The address book allows substitution of user names and/or email addresses for an alias name or the name of a distribution list. The VPS/Email address book is optional.

VPS User Exit 28 can be used to add additional recipients, modify recipient names, modify the sender name, modify the date or modify the subject of the message. Up to 100 TO: recipients, 32 CC: recipients and 32 BCC: recipients can be specified. The file name can be modified, if the dataset is to be sent as an email attachment.

Also refer to “Sending Notifications to Email or TSO Users” on page 6.81 for further information.

Installation

The steps required to install the VPS/Email product are:

1. Install VPS. (See “Installation” on page 3.1.)
2. Install VPS/TCPIP. (See “Installation” on page 10.3.)
3. Build the VPS/Email printer definitions. (See “Building VPS/Email Printer Definitions” on page 11.4.)
4. Assemble and link any VPS/Email address book modules. (See “Generating a VPS/Email Address Book” on page 11.18.)
5. Add the VPS/Email printers to the Printer Activation List. (See “Adding VPS/Email printers to Activation List” on page 11.21.)
6. Implement User Exit 28 to modify VPS/Email parameters (optional). (See “Installing User Exit 28” on page 11.22.)

Note: If SAPI=N was specified at VPS initialization, then EXIT 15 is required if the VPS/Email product is being used.

Adding System Keywords for VPS/Email

All the system keywords for VPS/TCPIP are used by VPS/Email. In addition, the following VPS System Initialization keyword is required for VPS/Email:

KEYEMAIL

The KEYEMAIL keyword specifies the trial/license code for the VPS/Email product. This keyword MUST be present in the VPS System Initialization member to use the VPS/Email product. This key is generated by LRS and is supplied in file 8 of the VPS distribution cartridge (LRS.VPS.V1R80.CNTL).

The MAILHOST keyword is required for notification via VPS/Email.

For more information on VPS/Email and VPS/TCPIP system keywords, see "Building the System Initialization Member" on page 3.16.

Building VPS/Email Printer Definitions

The following keywords are used only for VPS/Email printers:

MAILBOOK= Specifies the name of a load module that contains a table of user names and/or email addresses to be substituted for an alias or list name. For more information on creating the mail address book, see "Generating a VPS/Email Address Book" on page 11.18.

MAILCSET= Specifies the name of the character set to be used when sending a SYSOUT file as message text.

MAILFNAM= Specifies the default file name to be used if no FILENAME: value is located in the OUTPUT statement JCL associated with the SYSOUT file. This keyword is only used for VPS/Email printers when VPS is sending the SYSOUT file as an attachment.

MAILKWDS= Specifies which OUTPUT JCL statement keywords should be searched for the TO:, CC:, BCC:, SUBJECT:, or FILENAME: keywords. The value is specified as 8 digits, representing 4 hex bytes.

MAILOPTS= A four byte hex representation of special printer options to be in effect for this VPS/Email printer. The value is specified as 8 digits, representing 4 hex bytes.

MAILSTAT= Specifies whether VPS should request delivery status notification for the SYSOUT file which is being sent to an email user. This keyword is only used for VPS/Email printers (COMMTYPE=(TCPIP,EMAIL).

The following VPS Printer keywords are used when converting the SYSOUT file to PDF format:

PDFDBCS= Specifies the DBCS font name, CMAP name and size for VPS to use when converting a print file to PDF format.

PDFENCPY= Specifies the COPY permissions for an encrypted PDF file.

PDFENMOD= Specifies the MODIFY permissions for an encrypted PDF file.

PDFENMPW= Specifies the master password to be used to encrypt the PDF file.

PDFENPRT= Specifies the PRINT permissions for an encrypted PDF file.

PDFENUPW= Specifies the user password required to open an encrypted PDF file.

PDFENTYP= Specifies the type of encryption to be used for a PDF file.

PDFFONT= Specifies the font name and size for VPS to use when converting a print file to PDF format.

PDFKWDS= Specifies which OUTPUT JCL statement keywords should be searched for PDF conversion keywords. The value is specified as 8 digits, representing 4 hex bytes.

PDFOPTS= Specifies special printer options to be in effect during PDF conversion.

PDFPGSIZ= Specifies the page height and width in hundredths of an inch to be used for PDF conversion.

The following VPS printer keywords are also necessary to define VPS/Email printers:

COMMTYPE=COMMTYPE=(TCPIP,EMAIL) is required for VPS/Email printers.

TCPHOST= TCPHOST must be specified as the address or name of the host to which VPS should connect to deliver mail. This host is normally a mail server which will forward the message to the remote host where the email user is defined.

TCPPRTR= TCPPRTR should be specified as a default address for any print dataset which has no primary recipient (TO:) value specified in the OUTPUT JCL statements keywords.

TCPRPORT= TCPRPORT should be specified as 25 for VPS/Email printers.

Certain VPS printer keywords have special significance for VPS/Email printers:

NCCSPACE= NCCSPACE=0 is not allowed for VPS/Email printers. Normal print files should have CRLF added for each print record. NCCSPACE=1 will be set for any VPS/Email printer which has NCCSPACE=0 in the printer definition and a message will be issued at printer activation.

NLSEQ= NLSEQ=0D0A is required for VPS/Email printers. Any other value will be changed and a message will be issued at printer activation.

REQLIMIT= REQLIMIT=0 is not allowed for VPS/Email printers. If the requeue line limit is set to 0, VPS will modify the requeue limit to 5 (500 lines maximum), and a message will be issued at printer activation. REQLIMIT should be specified as a non-zero value to prevent flooding the remote mail server with large amounts of data.

SEPAR= For VPS/Email, each dataset is considered a separate entity and job separators are not allowed. Only DATASET separators can be used with VPS/Email devices. SEPAR=(,,JOB) or SEPAR=(,,OUTGRP) will be ignored.

TRNCLASS= TRNCLASS cannot be specified with the second subfield of “C”, “B” or “S”. The only valid value for the type of transparency is “T”. VPS will set the TRNCLASS type to “T” and issue a warning message at printer activation if any other transparency type had been specified in the printer definition.

TRUNCATE= TRUNCATE=0 is not allowed for VPS/Email printers. For SMTP email message text, no line may exceed 1000 bytes, including the new line sequence. VPS will set TRUNCATE=998 if TRUNCATE=0 is specified, and a message will be issued at printer activation.

Note: Some mail systems do not understand a form feed (X'0C') or a form feed in combination with a carriage return (X'0D'). They can correctly interpret only a new line sequence (X'0D0A'). When viewing e-mail through one of these systems, the form feed sequence may appear as “garbage” characters. To prevent VPS from sending form feeds at the beginning of the data or within the data, specify FORMFEED=N and AUTOEJCT=(N,N,N,N).

If the file is sent as an attachment with a file name that ends in .doc, a word processing program that opens the file should understand the form feeds and break to a new page at the correct point.

For more information on keywords related to VPS/TCPIP devices, including those used for VPS/Email, see “Printer Keywords” on page 10.16.

PDF Conversion for VPS/Email

VPS/Email supports the automatic conversion of a SYSOUT dataset to a file in PDF format to be delivered to an email user.

VPS/Email will convert the SYSOUT to PDF if the file name extension is ".pdf", or if CONVTYPE=PDF. The file name extension can be part of the file name specified using the FILENAME keyword in the JCL or it could be the default 'normal' file extension specified in the second subparameter of the MAILFNAM keyword in the VPS printer definition. The file name extension can be specified as ".pdf" or ".PDF" or any combination of upper and lower case.

When VPS/Email sends the PDF file to the email user, the file is sent as an attachment. A VPS separator routine can be used to send message text to describe the PDF file. Also, the FILEDESC keyword can be specified in the OUTPUT JCL keywords to send file description records to be displayed as message text when the document is delivered. When the recipient opens the file a PDF file reader program will be launched to view the document.

The conversion of the SYSOUT file to the PDF file to be sent uses the following printer keywords:

PDFDBCS
PDFENCD
PDFENCPY
PDFENMOD
PDFENMPW
PDFENPRT
PDFENUPW
PDFENTYP
PDFFONT
PDFKWDS
PDFOPTS
PDFPGSIZ
PDFRTAB

In addition, the following VPS keywords can be specified on the OUTPUT JCL statement:

PDFAUTH
PDFENCPY
PDFENMOD
PDFENMPW
PDFENPRT
PDFENUPW
PDFENTYP
PDFFONT
PDFIXKWD
PDFPGSIZ
PDFSUBJ
PDFTITLE

For more information on the VPS Printer keywords used for PDF conversion, see Chapter 3, "Installation". For more information on the OUTPUT JCL keywords, see "Using OUTPUT JCL Keywords to Specify PDF Conversion Parameters" on page 11.15.

RTF Conversion for VPS/Email

VPS/Email performs special processing for SYSOUT files to be delivered as email attachments if the file name ends with the 'rtf' extension. This extension indicates that the file should be sent in 'rich text format'.

The name of the file for the attachment can be specified as FILENAME= on the OUTPUT JCL statement in any keyword which will be searched by VPS based on the MAILKWDS= value in the VPS/Email printer definition. The default is MAILKWDS=FFFF0000, which indicates VPS should search all 16 USERDATA fields to obtain the file name value. If the file name is not specified in JCL, a default file name can be specified using the MAILFNAM= keyword in the VPS/Email printer definition.

The extension portion of the file name can be '.rtf' or '.RTF' or any combination of upper and lower case. If the file name ends with the 'rtf' extension, VPS/Email replaces the new line sequence specified in the NLSEQ= keyword with the '\line' command and replaces the form feed sequence specified in the FFSEQ= keyword with the '\page' command. This substitution is done for the entire SYSOUT dataset, and the dataset is sent to the email user as an attachment (file). If a separator page is also sent, no substitution is done for the NLSEQ or FFSEQ because the separator is sent as message text and is not included in the attached file.

In order for the email recipient to open and read the RTF file without errors, certain RTF commands must be inserted at the beginning and at the end of the file. These RTF commands may be added to the SYSOUT dataset using VPS User Exit 14 or by using the PCMDSTRT and PCMDEND keywords in the VPS/Email printer definition.

Four sample modules are shipped in the VPS load library that contain RTF commands to be sent at the start and at the end of the RTF file.

RTFPORT: Commands to set portrait mode (60 lines with 89 characters each), with "Courier New" fixed pitch font, size 10.

RTFPORTP: Commands to set portrait mode (60 lines with 89 characters each) with "Pica" fixed pitch font, size 10.

RTFLAND: Commands to set landscape mode (60 lines with 149 characters each) with "Courier New" fixed pitch font, size 8.

RTFLANDP: Commands to set landscape mode (60 lines with 149 characters each) with "Pica" fixed pitch font, size 8.

For the following example, the VPS printer definition included these keywords:

MAILKWDS=FFFF0000	**Search USERDATA for email keywords**
PCMDEND=(,)	**Or PCMDEND was not specified**
PCMDSTRT=(,,&WRITER)	**Use WRITER name to load start/end commands**

The following JCL would be used to send a SYSOUT file to an email user as rich text format in landscape mode. The JCL specifies WRITER=RTFLAND, which causes VPS to load and use the RTFLAND module to send RTF commands at the start and at the end of the SYSOUT file. The email recipient will receive a file named EMAILDOC.RTF that can be opened with a word processing program which understands rich text format commands.

```
//*JOB CARD HERE
//*SAMPLE JCL FOR VPS/EMAIL OUTPUT
//EMAIL   EXEC PGM=IEBGENER
//SYSPRINT DD  SYSOUT=*
//OUT1  OUTPUT DEST=U6100,WRITER=RTFLAND,
//         USERDATA=('TO:USER1@SAMPLE.COM',
//         'CC:USER2@SAMPLE.COM',
//         'BCC:USER3@SAMPLE.COM',
//         'SUBJECT:RTF ATTACHMENT SAMPLE!!!',
//         'FILENAME:EMAILDOC.RTF') <==RTF extension indicates RTF processing
//SYSIN    DD DUMMY
//SYSUT1   DD DSN=TEST.EMAIL(DOC),DISP=SHR
//SYSUT2   DD SYSOUT=A,OUTPUT=*.OUT1
```

Note: If the name of the printer command module cannot be specified in the JCL (as the WRITER name, for example), a default printer command module name can be specified in the PCMDSTRT and PCMDEND keywords in the VPS/Email printer definition. In this case, ALL files sent using this VPS/Email printer definition would contain the rich text format commands.

PCMDEND=(,RTFLAND)	**Always send RTF landscape commands at end**
PCMDSTRT=(,RTFLAND)	**Always send RTF landscape commands at start**

Sample printer definitions for VPS/Email

```
*-----------------------------------------------------*
* EMAIL01:  EMAIL PRINTER - DATASET AS MESSAGE TEXT   *
*-----------------------------------------------------*
 CLASS=A,
 DEST=U3001,
 MAILBOOK=MYBOOK,
 MAILKWDS=FFFF0000,
 MAILOPTS=00000000,
 NLSEQ=0D0A,
 PRTXLATE=(Y,VPSSXASC),
 REQLIMIT=99,
 TCPHOST=192.5.6.177,
 TCPPRTR=SPECIAL@ABC.COM,
 TCPRPORT=25
```

```
*-----------------------------------------------------*
* EMAIL02:  EMAIL PRINTER - DATASET AS ATTACHMENT     *
*-----------------------------------------------------*
 CLASS=A,
 DEST=U3002,
 MAILBOOK=MYBOOK,
 MAILKWDS=FFFF0000,
 MAILOPTS=E0000000,
 NLSEQ=0D0A,
 PRTXLATE=(Y,VPSSXASC),
 REQLIMIT=99,
 SEPAR=(S,VPSSSEP6,DATASET),
 TCPHOST=192.5.6.177,
 TCPPRTR=SPECIAL@ABC.COM,
 TCPRPORT=25
```

Using OUTPUT JCL Keywords to Specify VPS/Email Parameters

The value of the **MAILKWDS=** keyword in the VPS/Email printer definition indicates which OUTPUT JCL statement keywords should be searched for the appropriate VPS/Email keywords.

The VPS/Email keywords which are obtained from these OUTPUT JCL statement values are:

BCC:	**Secondary (blind copy) recipient**
CC:	**Secondary (copy) recipient**
FILEDESC:	**File description text to be sent before attachment**
FILENAME:	**File name for attachment**
NOTIFY:	**Email user to be notified**
SUBJECT:	**Subject of email message**
TO:	**Primary recipient**

BCC specifies a blind copy recipient and can be up to 60 characters of upper and lower case letters, numbers, and certain punctuation characters, such as dash, slash, underscore, the 'at' sign, and period. The BCC keyword can be specified multiple times, one in each OUTPUT statement keyword value.

CC specifies a copy recipient and can be up to 60 characters of upper and lower case letters, numbers, and certain punctuation characters, such as dash, slash, underscore, the 'at' sign, and period. The CC keyword can be specified multiple times, one in each OUTPUT statement keyword value.

FILEDESC specifies a file descriptor record to be displayed as text if the SYSOUT file is delivered as an attachment. Each FILEDESC value may be up to 60 characters of upper and lower case letters, numbers, and certain punctuation characters, such as the dash, slash, underscore and period. There can be up to 12 FILEDESC values, one in each OUTPUT statement keyword value.

FILENAME specifies a file name to be used if the SYSOUT file is delivered as an attachment and can be up to 60 characters of upper and lower case letters, numbers, and certain punctuation characters, such as the dash, slash, underscore and period. There can be only one FILENAME value; duplicate FILENAME keywords will be ignored.

NOTIFY specifies the recipient of a notification message delivered by VPS based on the NOTIFY keyword in the VPS printer definition. The value can be up to 60 characters of upper and lower case letters, numbers, and certain punctuation characters, such as dash, slash, underscore, the 'at' sign, and period. The NOTIFY keyword can be specified multiple times, one in each OUTPUT statement keyword value.

SUBJECT specifies the subject of the email message and can be up to 60 characters of upper and lower case letters, numbers, and certain punctuation characters, such as the dash, slash, underscore and period. There can be only one SUBJECT value; duplicate SUBJECT keywords will be ignored.

TO specifies the primary recipient and can be up to 60 characters of upper and lower case letters, numbers, and certain punctuation characters, such as dash, slash, underscore, the 'at' sign, and period. The TO keyword can be specified multiple times, one in each OUTPUT statement keyword value.

The **VPS keywords specified on the OUTPUT JCL statement are not case sensitive**. The keywords and their values may be separated by colon ":" or by an equal sign "=". For example, all of the following keywords are equivalent:

TO:
to:
To:
tO:
TO=
to=
To=
tO=

The **VPS/Email keyword values are case sensitive**; that is, the values will be used exactly as specified. For example, the subject of the email message will have both upper and lower case values if the following were specified:

SUBJECT=This is the story of my life

The following OUTPUT JCL statement keywords can be used to provide the VPS/Email keyword values:

ADDRESS	**(Any or all 4 of the ADDRESS fields.)**
BUILDING	
DEPT	
DEST	**(Up to 60 bytes - used for TO: value only.)**
NAME	
PRTQUEUE	**(Up to 60 bytes of the PRTQUEUE value.)**
ROOM	
USERDATA	**(Any or all 16 of the USERDATA fields.)**
TITLE	
WRITER	**(Used for TO: value only.)**

Up to 60 bytes of the DEST on the DD or OUTPUT JCL statement can be used as a primary recipient (TO:) value only. If it has "IP:" in the field, then the 60 bytes following the "IP:" will be used. The "TO:" keyword itself is optional. The DEST on the DD or OUTPUT JCL statement cannot be used for any other VPS/Email keyword, such as CC, SUBJECT, etc.

Up to 8 bytes of the WRITER on the DD or OUTPUT JCL statement can be used as a primary recipient (TO:) value only. The "TO:" keyword itself is optional. The WRITER cannot be used for any other VPS/Email keyword, such as BCC, FILENAME, etc.

The default is MAILKWDS=FFFF0000, which specifies that VPS should search all 16 USERDATA values.

If values are not found in the OUTPUT JCL statement keywords for the following keywords, the default values will be used:

TO:	**TCPPRTR value (unless MAILOPTS=00400000)**
SUBJECT:	**VPSEMAIL/sysid/jobname/jobid/procname/stepname/ddname**
FILENAME:	**MAILFNAM value**

JCL examples:

The following VPS printer definition uses MAILKWDS=FFFF0000. Only the USERDATA values will be searched.

```
*-----------------------------------------------------*
* VPS PRINTER DEFINITION                              *
*-----------------------------------------------------*
 CLASS=M,
 DEST=U3333,
 MAILKWDS=FFFF0000,
 NLSEQ=0D0A,
 PRTXLATE=(Y,VPSSXASC),
 REQLIMIT=99,
 TCPHOST=192.5.6.177,
 TCPPRTR=SPECIAL@ABC.COM,
 TCPRPORT=25
```

The following JCL would send the dataset 'SALES.RESULTS.DATA' as message text to two people with a subject of 'Sales Results'. The primary recipient would be 'lc.president@xxx.com' and that name would appear as the TO: value in the message header for both recipients. The CC: value of 'joe.sales@xxx.com' would appear in the message header for both recipients.

```
//       job card
//*
//STEP1    EXEC  PGM=IEBGENER
//OUT1     OUTPUT DEST=U3333,
//          USERDATA=('TO:lc.president@xxx.com',
//          'CC:joe.sales@xxx.com',
//          'SUBJECT:Sales Results')
//SYSPRINT  DD DUMMY
//SYSIN     DD DUMMY
//SYSUT2    DD SYSOUT=M,OUTPUT=*.OUT1
//SYSUT1    DD DISP=SHR,DSN=SALES.RESULTS.DATA
```

The following VPS printer definition uses MAILKWDS=FFFF0200. Both the USERDATA and the DEST values will be searched.

```
*-----------------------------------------------------*
* VPS PRINTER DEFINITION                              *
*-----------------------------------------------------*
 CLASS=M,
 DEST=<IP>,
 MAILKWDS=FFFF0200,
 NLSEQ=0D0A,
 PRTXLATE=(Y,VPSSXASC),
 REQLIMIT=99,
 TCPHOST=192.5.6.177,
 TCPPRTR=SPECIAL@ABC.COM,
 TCPRPORT=25,
 WRITER=IPEMAIL
```

The following JCL would send message text to three people with a subject of 'SALES MEETING NEXT WEEK'. The primary recipient would be 'joe.sales@xxx.com' and that name would appear as the TO: value in the message header for all recipients. The CC: value of 'betty.mgr@yyy.com' would appear in the message header for all recipients. However, the value 'lc.president@xxx.com' would not be listed, except as a CC: value in the header of the message sent to 'lc.president@xxx.com'.

```
//       job card
//*
//STEP1    EXEC  PGM=IEBGENER
//OUT1     OUTPUT DEST='IP:joe.sales@xxx.com',
//          USERDATA=('CC:betty.mgr@yyy.com',
//          'BCC:lc.president@xxx.com',
//          'SUBJECT:SALES MEETING NEXT WEEK'),
//          WRITER=IPEMAIL
//SYSPRINT  DD DUMMY
//SYSIN     DD DUMMY
//SYSUT2    DD SYSOUT=M,OUTPUT=*.OUT1
//SYSUT1    DD *
 Joe:

 We will have a sales meeting on Monday at 9 a.m. at headquarters.
 Please let me know if you cannot attend.

 Thanks.

 Your Boss
/*
```

The following VPS printer definition uses MAILKWDS=0000F020, which indicates VPS should search the 4 ADDRESS fields and the TITLE field for VPS/Email parameters. In addition, the MAILOPTS value specifies that the SYSOUT dataset should be sent as an attachment (file).

```
*-----------------------------------------------------*
* VPS PRINTER DEFINITION                              *
*-----------------------------------------------------*
 CLASS=E,
 DEST=U3333,
 MAILKWDS=0000F020,
 MAILOPTS=C0000000,
 NLSEQ=0D0A,
 PRTXLATE=(Y,VPSSXASC),
 REQLIMIT=99,
 TCPHOST=192.5.6.177,
 TCPPRTR=SPECIAL@ABC.COM,
 TCPRPORT=25
```

The following JCL would send the dataset 'SALES.PROMOTION.TRAVEL.DATA' as a attachment to a message to three people with a subject of 'TRAVEL PLANS'. The primary recipient would be 'lc.president@xxx.com' and that name would appear as the TO: value in the message header for all recipients. The CC: values of joe.sales@xxx.com and 'betty.mgr@yyy.com' would appear in the message header for all recipients. The file name at the remote host would default to VPSnnnnn.TXT, where nnnnn is a number between 00000 and 99999.

```
//       job card
//*
//STEP1    EXEC  PGM=IEBGENER
//OUT1     OUTPUT DEST=U3333,
//          ADDRESS=('TO:lc.president@xxx.com',
//          'CC:joe.sales@xxx.com')
//          'CC:betty.mgr@yyy.com')
//          TITLE='SUBJECT:TRAVEL PLANS'
//SYSPRINT  DD DUMMY
//SYSIN     DD DUMMY
//SYSUT2    DD SYSOUT=E,OUTPUT=*.OUT1
//SYSUT1    DD DISP=SHR,DSN=SALES.PROMOTION.TRAVEL.DATA
```

Using OUTPUT JCL Keywords to Specify PDF Conversion Parameters

The value of the PDFKWDS= keyword in the VPS/Email printer definition indicates which OUTPUT JCL statement keywords should be searched for the appropriate PDF conversion keywords.

The PDF conversion keywords that are obtained from these OUTPUT JCL statement values are:

PDFAUTH:	**Author of PDF file**
PDFFONT:	**Name and size of font**
PDFIXKWD:	**Indexing keywords for PDF file**
PDFPGSIZ:	**Page height and page width**
PDFSUBJ:	**Subject of PDF file**
PDFTITLE:	**Title of PDF file**

Each of these keywords may be specified once and should be the only value in the OUTPUT statement keyword. If any PDF keyword is specified more than once, the first will be used and the duplicates ignored.

PDFAUTH represents the author of the PDF document and can be up to 60 bytes of upper and lower case letters, numbers, and certain punctuation characters, such as dash, slash, underscore and period.

PDFDBCS is specified as 3 subfields within parentheses. The first subfield is the DBCS font name, the second subfield is the CMAP name, and the third subfield is the font size. If PDFDBCS is not specified, the values specified for the PDFDBCS printer keyword are used. For more information on the allowable values, see "PDFDBCS" on page 3.193.

PDFENCPY is specified as 2 subfields within parentheses to provide the COPY permissions for an encrypted PDF file. For more information on allowable values, see "PDFENCPY" on page 3.196.

PDFENMOD is specified as 4 subfields within parentheses to provide the MODIFY permissions for an encrypted PDF file. For more information on allowable values, see "PDFENMOD" on page 3.197.

PDFENMPW specifies the master password to be used to encrypt the PDF file.

PDFENPRT is specified as 2 subfields within parentheses to provide the PRINT permissions for an encrypted PDF file. For more information on allowable values, see "PDFENPRT" on page 3.199.

PDFENUPW specifies the user password required to open an encrypted PDF file.

PDFENTYP specifies the type of encryption to be used for a PDF file. PDF40 indicates 40-bit encryption and PDF128 specifies 128-bit encryption. PDF40 is more widely supported, but PDF128 encryption is recommended due to increased security.

PDFFONT is specified as 2 subfields within parentheses. The first subfield is the font name and the second subfield is the font size. If PDFFONT is not specified, the values specified for the PDFFONT printer keyword are used. For more information on the allowable values, see "PDFFONT" on page 3.202.

PDFIXKWD specifies the indexing keywords to be used when the file is opened. The value can be up to 60 bytes of upper and lower case letters, numbers, and certain punctuation characters, such as the dash, slash, underscore and period.

PDFPGSIZ is specified as 2 subfields within parentheses. The first subfield is the page height and the second subfield is the page width. Each is specified in hundredths of an inch. If PDFPGSIZ is not specified, the values specified for the PDFPGSIZ printer keyword are used. For more information on allowable values, see "PDFPGSIZ" on page 3.206.

PDFSUBJ represents the subject of the PDF document and can be up to 60 bytes of upper and lower case letters, numbers, and certain punctuation characters, such as dash, slash, underscore and period.

PDFTITLE specifies the title for the PDF document and can be up to 60 bytes of upper and lower case letters, numbers, and certain punctuation characters, such as dash, slash, underscore and period. If PDFTITLE is not specified, the PDF conversion programs create a title which includes the VPS job name, the OS/390 system ID, the VPS printer name, and the job name, JOB number, step name and DDNAME of the SYSOUT file.

The VPS PDF conversion keywords specified in the JCL are not case sensitive. The keywords and their values may be separated by colon ":" or by an equal sign "=". For example, all of the following keywords are equivalent:

PDFFONT:
Pdffont=
PDFfont:
pdffont=

The following OUTPUT JCL statement keywords can be used to provide the VPS PDF conversion keyword values:

USERDATA	**(Any or all 16 of the USERDATA fields)**
ADDRESS	**(Any of all 4 of the ADDRESS fields)**
BUILDING	
DEPT	
NAME	
PRTQUEUE	
ROOM	
TITLE	

The PDFKWDS printer keyword specifies which OUTPUT JCL statement keywords should be searched. The default is PDFKWDS=FFFF0000, which specifies that VPS should search all 16 USERDATA fields on the OUTPUT JCL statement.

JCL Examples

The following VPS printer definition uses the default of PDFKWDS=FFFF0000.

```
*-----------------------------------------------------*
* VPS Printer Definition for PDF Conversion          *
*-----------------------------------------------------*
 CLASS=M,
 DEST=U3999,
 MAILKWDS=FFFF0000,
 NLSEQ=0D0A,
 PDFFONT=(TIMES-ROMAN,10),
 PDFKWDS=FFFF0000,
 PDFPGSIZ=(1100,1400),
 PRTXLATE=(Y,VPSSXASC),
 REQLIMIT=99,
 TCPHOST=192.1.1.1,
 TCPPRTR=LOSTMAIL,
 TCPRPORT=25
```

The following JCL would send the dataset “SALES.RESULTS.DATA” as a PDF file to the primary recipient “president@sample.com” and to the secondary recipient “salesman@sample.com”. The PDF file name would be “results.pdf” and the subject of the email message would be “Sales results for November”. The subject and title of the PDF file would be “November Sales Results”. The following lines of text would appear in the email message before the ICON that represents the PDF file:

This is the sales report for November.
Give me a call on Monday to discuss.

```
//    job card
//*
//STEP1  EXEC     PGM=IEBGENER
//OUT1   OUTPUT DEST=U3999,
//          USERDATA=('TO:president@sample.com',
//            'cc=salesman@sample.com',
//            'FILENAME:results.pdf',
//            'Subject=Sales results for November',
//            'PDFTITLE=November Sales Results',
//            'pdfsubj:November Sales Results',
//            'FILEDESC:This is the sales report for November.',
//            'FILEDESC:Give me a call on Monday to discuss.')
//SYSPRINT DD DUMMY
//SYSIN    DD DUMMY
//SYSUT2   DD SYSOUT=M,OUTPUT=*.OUT1
//SYSUT1   DD DISP=SHR,DSN=SALES.RESULTS.DATA
```

Generating a VPS/Email Address Book

Using an address book for VPS/Email address substitution is optional. If the MAILBOOK= keyword is specified, the MAILBOOK module will be loaded by VPS when the printer is activated. When VPS/Email is preparing to deliver the SYSOUT file or the NOTIFY message to an email user, the mail address book module is searched for alias names which match the sender and recipient values. The alias value will be replaced by one or more email addresses. A optional user name can also be specified to be used in the message header to better identify the sender or recipient.

For the sender email address, the TSO user ID of the owner of the job can be specified as the alias name or the entire sender address as generated by VPS can be specified as the alias. For example, the alias name might be TSO001 or it might be TSO001@HOST1.EXAMPLE.COM, which includes both the TSO userid of the owner of the job and the TCP/IP host name of the OS/390 system. If an alias is found in the address book which matches either of these sender values, the first email address listed for that alias will be used to replace the email address generated for the sender.

If the recipient value specified as TO:, CC: or BCC: in the JCL is located as an alias name in the table, all the email addresses associated with that alias will be used to replace the recipient value specified in the JCL.

It is possible to define many users for one alias name to create a distribution list. A maximum of 4 alias names may be associated with one user or one distribution list.

LRMAILBK Macro

The LRMAILBK macro is used to create the VPS/Email address book. The macros should be assembled and linkedited into a library that is accessible to VPS, such as a load library in the STEPLIB or in the LINKLIST concatenation. The name of the module is specified on the MAILBOOK= keyword in the VPS/Email printer definition.

The TYPE=INITIAL macro instruction is required to begin the mailbook table.

Each TYPE=ALIAS macro instruction should be followed by one or more TYPE=USER macros. These macros describe each alias and the user(s) associated with that alias name. The TYPE=USER must have the EADDR= keyword specified. The NAME= keyword is optional.

The TYPE=FINAL macro instruction is required to end the mailbook table.

The proper sequence for coding the LRMAILBK macro instructions is as follows:

```
LRMAILBK TYPE=INITIAL

LRMAILBK TYPE=ALIAS
LRMAILBK TYPE=USER

LRMAILBK TYPE=ALIAS
LRMAILBK TYPE=USER

LRMAILBK TYPE=ALIAS
LRMAILBK TYPE=USER
LRMAILBK TYPE=USER
LRMAILBK TYPE=USER
LRMAILBK TYPE=USER

LRMAILBK TYPE=FINAL
```

A sample mailbook is provided as member VPSSMLBK in LRS.VPS.V1R80.ASM. Sample JCL to assemble and linkedit a mailbook is provided as member ASMMLBK in LRS.VPS.V1R80.CNTL.

The LRMAILBK macro is written as follows:

```
B                       ONE OR MORE BLANKS MUST PRECEDE LRMAILBK

LRMAILBK

B                       ONE OR MORE BLANKS MUST FOLLOW LRMAILBK

TYPE=INITIAL|ALIAS|USER|FINAL

,ALIAS=                 ONLY APPLICABLE TO TYPE=ALIAS

,EADDR=                 ONLY APPLICABLE TO TYPE=USER

  {,NAME=}              ONLY APPLICABLE TO TYPE=USER
```

Brackets, {}, are used to enclose optional parameters, which may or may not be coded. The parameters of the LRMAILBK macro are explained below.

TYPE= INITIAL|ALIAS|USER|FINAL

INITIAL Identifies the start of the mail address book. If TYPE=INITIAL is coded, no other parameters can be specified. This must be the first LRMAILBK macro coded.

ALIAS Creates an alias entry in the mail address book. This entry must be followed by one or more TYPE=USER entries.

USER Creates a user entry in the mail address book. This entry must follow the TYPE=ALIAS entry.

FINAL Identifies the end of the mail address book. If TYPE=FINAL is coded, no other parameters can be specified. This must be the last LRMAILBK macro coded.

ALIAS= Identifies an alias name that should be associated with one or more users. This parameter is only applicable if TYPE=ALIAS was specified. Up to four alias values may be specified. Each value can be 1 - 60 bytes in length.

EADDR= Identifies the email address of a user that should be associated with the ALIAS name which it follows. This parameter is only applicable if TYPE=USER was specified. Each value can be 1 - 60 bytes in length and can be specified in upper or lower case.

NAME= Identifies the name of a user that should be associated with the ALIAS name which it follows. This parameter is optional. This parameter is only applicable if TYPE=USER was specified. Each value can be 1 - 60 bytes in length and can be specified in upper or lower case.

Adding VPS/Email printers to Activation List

If you are using the Printer Activation List to automatically start VPS printers at system initialization, you should add the member names of the VPS/Email printers to that list. For more information, see "Building the Printer Activation Inclusion List" on page 3.77.

Installing User Exit 28

VPS User Exit 28 is an optional exit that will be called for VPS/Email printers. This exit allows modification of the VPS Email parameters which were built based upon the SYSOUT characteristics of the JES dataset and the VPS printer definition.

VPS builds the VPS/Email parameter area based on the OUTPUT JCL statement keywords which were specified using the MAILKWDS keyword. VPS searches those keywords for TO:, CC: BCC:, SUBJECT:, and FILENAME: values and places them in the appropriate fields in the VPS/Email parameter area. The sender name is set in the VPS/Email parameter area based on the user ID of the creator of the job and the host name of the OS/390 system where VPS is running. VPS sets the DATE: value using the current time and date.

VPS User Exit 28 can modify the sender's name and/or email address (FROM:), the date format (DATE:), the recipient values (TO:, CC:, BCC:), the subject value (SUBJECT:) and the name of the file (FILENAME:). Additional recipients can be added or recipients can be removed. At least one primary recipient (TO:) value is required.

Flags are set in the VPS/Email parameter area to indicate if the MAILOPTS keyword specified in the dataset should be sent in MIME format, if it should be sent as an attachment, and if the dataset should be encoded. These flags may be modified by VPS User Exit 28 to change the way VPS processes the dataset.

For more information about installing user exits, see “User Exits” on page 5.1.

Date and Time on Email Notes

VPS uses the STCK (store clock) instruction to get the current time from the system's TOD clock. This should always be Greenwich Mean Time (GMT). VPS then retrieves the offset from GMT from the system, and adjusts the time by that offset to get the local time. The result is then converted into the various date formats (name of the month, day of the week, day of the month, year, hours, minutes, seconds, etc.), and the appropriate information is sent in the "DATE" header record.

This date and time should be what is displayed as the "sent" date and time of the email when the recipient sees it. This is the only date and time information supplied by VPS/Email. For example, any "received" date and time that is displayed has NOT been supplied by VPS, but has been retrieved from a header record inserted by a mail server. Mail servers that forward an email note may insert (or possibly modify) header records. The receiving mail server (MicroSoft OUTLOOK, for example) might change the "sent time" so that it is represented in the "local" time of the recipient.

To see what VPS is sending in the DATE header record, the VPS/Email printer's trace keyword can be set to TRACE=(Y,FF) and GTF can be used to capture a trace. The EMAL trace record shows the entire email control block, where the date and time information begins at offset +64. There will also be a TBUF trace record which shows the contents of the actual "DATE" header record. Here is an example of what a TBUF trace record might look like:

```
(+0000) 44415445 3A204D4F 4E2C2032 36204E4F  *DATE: MON, 26 NO*
(+0010) 56203230 30312031 313A3139 3A353720  *V 2001 11:19:57 *
(+0020) 2D303630 30204353 5420200D 0A        *-0600 CST  ..   *
```

The date and time have already been adjusted, so they represent the local time, not GMT. The value '-0600' indicates that local time is 6 hours behind GMT.

The "time zone" information that VPS inserts into the header record for some time zones may be confusing. The abbreviation "EST", "CST", "MST", "PST", or "GMT" (for Eastern Standard Time, Central Standard Time, Mountain Standard Time, Pacific Standard Time, or Greenwich Mean Time) appears at offset +26 in the TBUF when the offset from GMT is -0500, -0600, -0700, -0800, or -0000. When daylight savings time is in effect, the values for U.S. time zones are "off" by one time zone. For example, the time in Illinois would be flagged as EST rather than CST, because the offset from GMT is only 5 hours during daylight savings time rather than six hours. However, if a mail server is calculating anything based on the offset and the local time, the calculation would still be correct.

Problem Determination for VPS/Email Devices

VPS provides facilities to aid in problem determination. These are described in “Problem Determination” on page 15.1.

For more information on problem diagnosis for TCP/IP devices, see “Problem Determination” on page 10.15.

VPS/Email TSO Interface

The VPS/Email TSO interface (TSO/Email) is an ISPF application that provides an easy method of emailing a DASD dataset. TSO/Email copies the specified DASD dataset to a SYSOUT dataset on the JES spool with the characteristics specified on the TSO/Email command or panel. The SYSOUT dataset can then be selected by a VPS/Email printer and sent to the recipient(s). Options on the command or panel allow specification of multiple recipients, delivery via an attachment, and data conversion (PDF or RTF).

TSO/Email Installation

TSO/Email can be invoked from an ISPF panel or as a TSO command. Executing TSO/Email from an ISPF panel allows it to take advantage of ISPF services (split screen mode, executing TSO commands, etc.).

Either method requires that you first identify a specific VPS/Email printer that is to select and deliver the SYSOUT datasets generated by TSO/Email. Values from the keywords in the printer definition for that VPS/Email printer will be used when generating the TSO/Email parameter options module.

Installing TSO/Email as an ISPF application:

1. Make the following changes to your primary ISPF panel or any other ISPF panel from which you wish to invoke TSO/Email. Add the following line to the panel)PROC section in the proper place under the setting of the '&SEL' or '&ZSEL' variable:

   EMAIL,'PGM(VPSMAIL) NEWAPPL(VE80) NOCHECK'

   This assumes that option "EMAIL" is not already in use for some other function. If it is, use any other available option in place of "EMAIL".

2. Add the following members from LRS.VPS.V1R80.CNTL to an installation ISPF panel library:

   - EMAILPNL
   - VEHLP001
   - VEHLP002
   - VEHLP003
   - VEHLP004
   - VEHLP005

3. Add the following members from LRS.VPS.V1R80.CNTL to an installation ISPF message library:

   - VE00

4. Copy the following modules from LRS.VPS.V1R80.LOAD to a load library accessible to the TSO environment, or concatenate LRS.VPS.V1R80.LOAD with other load libraries accessible to the TSO environment.

   VE80MAIL
   VE80OJCL
   VE80RCV
   VE80RTM
   VE80SEND
   VE80SV99
   VPSEMAIL
   VPSMAIL

5. Generate the TSO/Email parameter options module (see "Generating the TSO/Email Parameter Options" on page 11.27.)

Installing TSO/Email as a TSO Command:

1. Copy the following modules from LRS.VPS.V1R80.LOAD to a load library accessible to the TSO environment, or concatenate LRS.VPS.V1R80.LOAD with other load libraries accessible to the TSO environment.

   VE80MAIL
   VE80OJCL
   VE80RCV
   VE80RTM
   VE80SEND
   VE80SV99
   VPSEMAIL
   VPSMAIL

2. Generate the TSO/Email parameter options module (see "Generating the TSO/Email Parameter Options" on page 11.27.)

Generating the TSO/Email Parameter Options

The $$EMAIL macro is used to generate the TSO/Email parameter options module (module VE80PARM). This module contains installation-specific information about the characteristics of SYSOUT datasets that TSO/Email places on the JES spool. These values must be set based on values that are coded in a specific VPS/Email printer definition.

The $$EMAIL macro is written as follows:

```
$$EMAIL CLASS=A,       SYSOUT CLASS.                          *
      DEST=,           DESTINATION FOR SYSOUT SELECTION.      *
      FORM=,           FORM NAME FOR SYSOUT SELECTION.        *
      WRITER=,         WRITER NAME FOR SYSOUT SELECTION.      *
      RTFOPT=,         RTF OPTION (DEST OR WRITER).           *
      TRNCLASS=,       TRANSPARENCY CLASS.                    *
      MAILKWDS=,                                              *
      PDFKWDS=
END
```

Selection criteria specified must match the selection criteria of the email printer. One of the following, CLASS, DEST, FORM or WRITER, must be specified. All other parameters are optional.

Skeleton source code for the TSO/Email Parameter Options module is provided as member VE80PARM in file LRS.VPS.V1R80.ASM. Sample JCL to assemble the TSO/Email Parameter Options module is provided as member ASMTSOML in file LRS.VPS.V1R80.CNTL.

The parameters of the $$EMAIL macro are explained below:

CLASS= Specifies the SYSOUT class to be used when TSO/Email creates a SYSOUT dataset. This value must be a class that is selected by the VPS/Email printer. Note that this keyword is only applicable if the VPS/Email printer is selecting by class. Default is class ‘A’.

DEST= Specifies the destination to be used when TSO/Email creates a SYSOUT dataset. This destination must match the destination that is selected by the VPS/Email printer. If not specified, the SYSOUT dataset will contain a destination of ‘IP:’ followed by the primary email recipient.

FORM= Specifies the form name to be used when TSO/Email creates a SYSOUT dataset. This value must match the form name that is selected by the VPS/Email printer. Note that this keyword is only applicable if the VPS/Email printer is selecting by form name.

WRITER= Specifies the writer name to be used when TSO/Email creates a SYSOUT dataset. This value must match the writer name that is selected by the VPS/Email printer. Note that this keyword is only applicable if the VPS/Email printer is selecting by writer name.

RTFOPT= Specifies whether the SYSOUT destination or writer name is to contain the RTF formatting command module name. Valid values are DEST and WRITER. Default is WRITER. Note that this value cannot conflict with the VPS/Email printer's selection criteria fields. That is, if RTFOPT=WRITER is specified, then the VPS/Email printer cannot select by writer name. If RTFOPT=DEST is specified, then the VPS/Email printer cannot select by destination. Refer to “RTF Conversion for VPS/Email” on page 11.7 for more information.

TRNCLASS= Specifies the SYSOUT class to be used when TSO/Email creates a SYSOUT dataset that will be sent with a file type of binary (BIN). (This value will override the value specified in the CLASS= keyword when delivering binary attachments.) This value should match the first value in the TRNCLASS of the VPS/Email printer that will select the SYSOUT datasets created by TSO/Email. Default is class 'T'.

MAILKWDS= Specifies which OUTPUT JCL statement keywords will be searched for VPS/Email parameters. Valid values are ADDRESS, BUILDING, DEPT, NAME, PRTQUEUE, ROOM, TITLE, and USERDATA. Note that multiple values can be specified. For example, MAILKWDS=(ADDRESS,USERDATA). The value of this parameter should be based on the value of the MAILKWDS keyword in the VPS/Email printer definition that will select the SYSOUT dataset.

PDFKWDS= Specifies which OUTPUT JCL statement keywords will be searched for VPS/PDF conversion parameters. Valid values are ADDRESS, BUILDING, DEPT, NAME, PRTQUEUE, ROOM, TITLE, and USERDATA. Note that multiple values can be specified. For example, PDFKWDS=(DEPT,ROOM,USERDATA). The value of this parameter should be based on the value of the PDFKWDS keyword in the VPS/Email printer definition that will select the SYSOUT dataset.

If the VE80PARM module cannot be found when TSO/Email is invoked, processing will continue and the default values listed above will be used.

Invoking TSO/Email

Invoking TSO/Email as a TSO Command

Enter VE80MAIL, VPSMAIL, or VPSEMAIL on the ISPF command line.

Invoking TSO/Email from an ISPF Panel

Select the TSO/Email option on the ISPF panel and enter values into the appropriate fields.

Section 12
VPS/CONNECT:Direct Interface

Overview

VPS/CDI allows users to automatically transfer SYSOUT datasets from the JES2 or JES3 spool to the CONNECT:Direct product from Sterling Commerce, Inc. VPS/CDI works in conjunction with Sterling's JES Spool Transfer Option, which utilizes standard CONNECT:Direct information transportation capabilities, including automation, reliability, management, interoperability, and security.

With VPS/CDI, you can use VPS® to route SYSOUT datasets from the JES2 or JES3 spool to any remote system running CONNECT:Direct.

Installation

The steps required to install the VPS/CDI product are:

1. **Install VPS.** (See “Installation” on page 3.1.)
2. Update the VPS execution JCL with the following CONNECT:Direct DD statements:

   ```
   //DMNETMAP DD DISP=SHR,DSN=... (default CONNECT:Direct NETMAP dataset)
   ```

   Note that this dataset may be overridden by specifying the CDNETMAP= keyword in the VPS printer definition.

   ```
   //DMPUBLIB DD DISP=SHR,DSN=... (default CONNECT:Direct PROCESS library)
   ```

   Note that this dataset may be overridden by specifying the CDPLIB= keyword in the VPS printer definition.

   ```
   //DMMSGFIL DD DISP=SHR,DSN=... (CONNECT:Direct message file)
   ```

   ```
   //SYSUT1 DD UNIT=V10,SPACE=(TRK,(2,1))
   ```

   Also, if the CONNECT:Direct load library is not a LINKLIST dataset, it must be named on the STEPLIB DD in the VPS execution JCL.
3. **Add VPS/CDI keywords to the System Initialization Member.** (See “Adding System Keywords for VPS/CDI” on page 12.4.)
4. **Build the VPS Printer Definition Members for the VPS/CDI printers.** (See “Building VPS/CDI Printer Definitions” on page 12.5.)
5. **Add the VPS/CDI printer to the Printer Activation list** (optional). (See “Adding VPS/CDI Printers to the Printer Activation List” on page 12.6.)
6. **Assemble and linkedit module VPSSCDI** (sample JCL is provided as member ASMCDI in file LRS.VPS.V1R80.CNTL on the distribution cartridge).

VPS/CDI System Requirements

- VPS Release 6.2 or later
- CONNECT:Direct for MVS Release 2.1.00 or later
- CONNECT:Direct for MVS JES Spool Transfer Option Release 2.1 or later
- MVS/ESA 4.2.0 or later

Adding System Keywords for VPS/CDI

The KEYCDI system keyword specifies the trial/license code for the VPS/CDI product. This keyword MUST be added to the VPS System Initialization Member in order to use the VPS/CDI product. This key is generated by LRS and is supplied in file 8 of the VPS distribution cartridge (LRS.VPS.V1R80.CNTL).

Building VPS/CDI Printer Definitions

The following keywords are used when defining VPS/CDI printers:

CDNETMAP= Specifies the alternate CONNECT:Direct Network Map dataset name. This dataset identifies the local CONNECT:Direct node and the nodes with which it can communicate.

CDPLIB= Specifies the alternate CONNECT:Direct Process library dataset name.

CDPMBR= Specifies the alternate member name of the CONNECT:Direct process that is to be submitted.

CDSNODE= Specifies the CONNECT:Direct secondary node ID to receive the SYSOUT dataset. This name must be specified in the CONNECT:Direct Network Map dataset.

COMMTYPE= COMMTYPE=(DUMMY,CDI) is reserved for VPS/CDI printers using the VPS/CDI product.

DDSNPFX= Specifies the DASD dataset high-level qualifier.

DSPACE= Specifies, via three positional parameters, the amount of DASD space to be allocated to the DASD dataset.

The first of the three parameter values specifies whether the DASD dataset should be allocated in cylinders (C) or tracks (T).

The second of the three parameter values specifies the primary allocation amount.

The third of the three parameters values specifies the secondary allocation amount.

The default value is DSPACE=(T,30,15)

DUNIT= Specifies the unit type of the device on which the DASD dataset is to be allocated and how many devices to assign. The default value is DUNIT=(SYSDA,1).

DVOLUME= Specifies the volume on which the DASD dataset is to be allocated. If this parameter is not specified, VPS will allocate the DASD dataset on any available public or storage volume.

Note that in addition to the keywords unique to VPS/CDI printers, you will also need to specify the keywords necessary to define the selection criteria for the VPS/CDI printers (i.e., CLASS, DEST, FORM, and/or WRITER). Also, you may wish to specify the requeueing keywords, because VPS/CDI will request that the dataset be requeued when certain errors are detected during processing.

Since VPS/CDI printers are not actually sending output to a printer, you will not need to specify the VTAM-related or TCP/IP-related keywords. The LUNAME= keyword will default to the printer's member name, but will not actually be used (i.e., VPS will not attempt session establishment for VPS/CDI printers). If you do specify a value for the LUNAME= keyword, it must be unique within the VPS system. Since the LUNAME= keyword is not used for by VPS/CDI, we recommend that you do not specify it and allow it to default to the printer's member name.

You may also wish to specify the VPS/PCL printer keywords in order to have VPS convert the SYSOUT dataset to PCL prior to delivery via CONNECT:Direct. By specifying COMMTYPE=(DUMMY,CDI) and CONVTYPE=PCL, VPS will convert all appropriate datasets to PCL prior to delivery to VPS/CDI.

Adding VPS/CDI Printers to the Printer Activation List

If you are using the Printer Activation Inclusion list (MLISTMEM) to automatically activate VPS printers at system initialization, you should add the member name of the VPS/CDI printers to that list. For more information, see "Building the Printer Activation Inclusion List" on page 3.77.

VPS Exits and VPS/CDI Processing

This section indicates which VPS user exits are invoked for VPS/CDI printers, as well as which VPS user exits are bypassed for VPS/CDI printers. Note that there are no special considerations for those user exits which are invoked for VPS/CDI printers.

Exits that are invoked for VPS/CDI printers (if installed and enabled):

VPSSUE00	Pre-selection
VPSSUE02	Start Dataset
VPSSUE03	End Dataset
VPSSUE04	Command
VPSSUE05	WTO
VPSSUE06	TPUT
VPSSUE07	SMF
VPSSUE08	Error Retry
VPSSUE09	VPS Startup
VPSSUE10	VPS Shutdown
VPSSUE11	Printer Activation
VPSSUE12	Printer Inactivation
VPSSUE13	Requeue Limit
VPSSUE15	JES Xmemory
VPSSUE16	Pooling
VPSSUE20	SVC34
VPSSUE21	Internal Reader
VPSSUE22	Staging
VPSSUE24	Subsystem Request
VPSSUE26	AFP Resource
VPSSUE27	ACIF Parameter File

Exits that are NOT invoked for VPS/CDI printers:

VPSSUE01	Print Line
VPSSUE14	Dataset Add
VPSSUE17	Session Startup
VPSSUE18	Session Termination
VPSSUE19	Session Error
VPSSUE23	IPDS
VPSSUE25	TCP/IP Control File
VPSSUE28	VPS/Email Parameter

Also, VPS separator routines are not invoked for VPS/CDI printers.

Operation

VPS/CDI executes as an extension to the base VPS product. VPS/CDI uses standard VPS facilities for retrieving SYSOUT from the JES spool. As the SYSOUT is retrieved, it is placed into a newly created DASD dataset and then passed to the VPS/CONNECT:Direct Interface. Note that VPS will convert the SYSOUT dataset to PCL, prior to invoking VPS/CDI, if the VPS/PCL product is available and the printer definition specifies COMMTYPE=(DUMMY,CDI) and CONVTYPE=PCL. VPS/CDI then transfers the SYSOUT through the CONNECT:Direct network.

The attributes of the DASD dataset created by VPS are determined from the SYSOUT characteristics along with information specified on the following printer keywords:

DDSNPFX=

DSPACE=

DUNIT=

DVOLUME=

Note that VPS will never attempt to establish either a VTAM or TCP/IP connection, since it is never sending the SYSOUT to a printer. The LUNAME= keyword should therefore NOT be specified in the printer definition and should be allowed to default to the printer's member name. If the LUNAME= keyword is specified, it must be unique within the VPS system.

Standard VPS commands apply to VPS/CDI printers with the following exceptions:

INTERRUPT

REPOSITION

RESTART

These commands are rejected for VPS/CDI, since there is no actual printing taking place.

Multiple copy SYSOUT datasets are processed as a single entity. That is, VPS will only pass a single copy (along with the copy count) of a multiple copy dataset to VPS/CDI. If the SYSOUT is processed successfully, then VPS will delete all subsequent copies.

Errors detected by VPS/CDI will result in the printer being EDRAINED or the current SYSOUT dataset (or output group) being requeued. If requeue is requested, then the standard VPS printer requeue parameters will be used to requeue the dataset.

VPS/CDI printers are monitored and controlled through VMCF in the same manner as any other VPS VTAM or TCP/IP printer.

Section 13
VPS/Secure

Overview

VPS/Secure allows users to distribute output over open TCP/IP networks, including the Internet while maintaining confidentiality and integrity of sensitive data.

Using the Rijndael encryption algorithm, VPS/Secure enables users to encrypt output retrieved from the JES spool and route the output to AnyQueue, to DRS or to a printer equipped with decrypting hardware or software.

The encrypted output can be decrypted by LRS products such as AnyQueue/Secure and DRS/Secure.

The encrypted output can be decrypted by HP LaserJet printers if they are equipped with the SecureDIMM or SecureDIMM II from Capella Technologies. SecureDIMM products install easily in the memory expansion socket of most DIMM-based HP LaserJet model printers.

The encrypted output can be decrypted by Lexmark printers if they are equipped with a Lexmark PrintCryption card and if the CryptLib software distributed by Lexmark is available to VPS.

The encrypted output can be decrypted by PJL-compatible printers that have a card from LCI Intermate which supports the Intermate Secure Printing Protocol.

If you have any questions about which printers support decryption, please contact LRS marketing.

Installation

The steps required to install VPS/Secure are:

3. Install VPS®. (See “Installation” on page 3.1.)
4. Add the KEYVSECR keyword to the System Initialization Member. (See “Adding System Keywords for VPS/Secure” on page 13.4.)
5. Build the VPS printer definition members for the VPS/Secure printers. (See “Building VPS/Secure Printer Definitions” on page 13.5.)
6. Add the VPS/Secure printer to the Printer Activation List (optional). (See “Adding VPS/Secure Printers to the Printer Activation List” on page 13.6.)

VPS/Secure System Requirements

- VPS Release V1 R8.0.246 or higher (for Lexmark printers, V1R8.0.341 or higher) and
- for Lexmark printers using dynamic encryption keys, the Lexmark CryptLib software and the LRS.V1R12.LOAD library must be in the VPS PROC SYSLIB concatenation or the LINKLST.
- Printers equipped with appropriate decrypting hardware; or
- AnyQueue/Secure (V1.1.10 or higher); or
- DRS/Secure™ (with DRS V1R3.4).

Adding System Keywords for VPS/Secure

The KEYVSECR system keyword specifies the trial/license code for the VPS/Secure product. This keyword MUST be added to the VPS System Initialization Member in order to use the VPS/Secure product. This key is generated by LRS and is supplied in file 8 of the VPS distribution cartridge (LRS.VPS.V1R80.CNTL).

Building VPS/Secure Printer Definitions

The following keywords are used when defining VPS/Secure printers:

EKEY= Specifies the encryption key to be used if ENCRYPT=Y is specified for this printer. This key must match the decrypting key used at the receiving device unless positional parameter 4 of the ENCRYPT= printer keyword specifies that VPS should create a dynamic key for each connection.

ENCRYPT= Specifies whether encryption should be performed for this printer, the type of encryption, the type of device that will do the decryption, and whether the encryption key should be dynamically generated by VPS.

Adding VPS/Secure Printers to the Printer Activation List

If you are using the Printer Activation Inclusion list (MLISTMEM) to automatically activate VPS printers at system initialization, you should add the member name of the VPS/Secure printers to that list. For more information, see "Building the Printer Activation Inclusion List" on page 3.77.

If you are simply adding the VPS/Secure keywords to an existing VPS printer definition, this step is not needed.

VPS Exits and VPS/Secure Processing

There are no special considerations for exits invoked in VPS with regard to the VPS/Secure product. All exits will be invoked to perform required functions prior to the encryption process.

Operation

VPS/Secure executes as an extension of the base VPS product. VPS/Secure uses standard VPS facilities for retrieving SYSOUT from the JES spool. As the SYSOUT is retrieved, it is encrypted using the Rijndael encryption algorithm and the encryption key provided by the hardware manufacturer who supplied the DIMM for the printer.

Positional parameter 4 of the ENCRYPT keyword specifies whether the encryption key should be dynamically generated for each connection to the printer. If this value is specified as "N" or allowed to default, then the EKEY= printer keyword value MUST specify the same value as the key that will be used by the printer to decrypt the buffers received. If these key values do not match, the printer may 'hang' and not print anything.

If positional parameter 4 of the ENCRYPT keyword is specified as "Y", VPS will connect to the printer to obtain the printer certificate and generate a key that will be used only for the current connection. In this case, the EKEY= printer keyword value is ignored. Dynamic session encryption keys are currently supported for Lexmark printers. TCPRPORT=9152 must be specified to allow connection to the Lexmark printer when using dynamic keys.

Section 14
Messages and Codes

VPS® Message General Information

Messages are issued via OS/MVS WTO with the routing code specified in the fourth positional parameter value of the WTO parameter in the VPSSTART System Initialization Member. If the message is in response to a VPS command, the message will be issued to the console from which the command was issued

Error or Action messages will be displayed with a WTO Descriptor Code of 2 (MVS Action), unless "N" is specified in the second positional parameter value of the WTO parameter in the VPSSTART System Initialization Member.

Informational VPS messages will be bypassed if "N" is specified in the third positional parameter value of the WTO parameter in the VPSSTART System Initialization Member.

VPS Message Format

All VPS messages will begin with a seven character message identifier formatted as follows:

```
Characters 1-3 - Always VPS
Characters 4-6 - Message number uniquely identifying the message
Character    7 - One character identifying the message importance level
```

The possible message importance levels (the last character of the message identifier) are as follows:

```
I - Informational Message
N - Normal Message
E - Error or Action Message
R - Responding Message (responses to VPS Commands)
```

The VPS started task name will follow the message identifier, unless “N” is specified in the first positional parameter value of the WTO parameter in the VPSSTART System Initialization Member.

Note: VPS Release 5.0 and earlier put the VPS started task name ahead of the VPS message identifier. If you need to retain this format, the sample VPS WTO Exit (VPS User Exit 05) will reverse the sequence of the two fields, so that the resulting message is formatted as it would have been in VPS Release 5.0 and earlier.

VPS Message Text

Following the message identifier is the WTO message text. Many messages have the following within the individual message descriptions:

PRTR-ID: This is included in the message text of all messages that are related to a specific printer. PRTR-ID will be the VTAM network name of the printer unless IDTYPE=M or IDTYPE=B is specified in the VPSSTART System Initialization Member, in which case it will be the VPSLIB member name defining that particular printer.

JOBNAME: Is the name of the job to which the message applies.

JOBID: Is the jobid of the job to which the message applies.

EDRAINED: Refers to a VPS printer state of drained due to unrecoverable error. VPS will no longer service the printer unless the operator issues a VPS START command or the Error Retry User Exit clears the EDRAINED status.

VPS Message Return Code and Sense

Many VPS messages contain the return code that VPS received from an operating system request.

Some VPS messages VPS3xx indicate errors encountered during a request to VTAM. The following acronyms can be found in these messages. Refer to the appropriate ACF/VTAM Programming or SNA reference manual for a definition of the actual values.

R15: The general return code from the request.

R0: The specific error code.

This information is given in messages for manipulative requests.

AC: The ACB ERROR CODE field “ACBERFLG”.

This information is given in messages for ACB requests (OPEN and CLOSE).

RC: The RPL return code field “RPLRTNCD”.

This information is given in messages for RPL requests.

F2: The RPL feedback 2 field “RPLFDB2”.

This information is given in messages for RPL requests.

SNS: The sense data received as defined by SNA. For LU-0 devices, the four hex bytes are two bytes of SNA sense and two bytes of 3270 sense/status. For other LU types, all four bytes are the SNA sense.

REASON: The lost terminal reason code.

VPS Messages

VPS000N VPS INITIALIZATION SUCCESSFUL SUBSYSTEM=jesn VERSION=r.r.fff CUSTID=xxxxxx SSITYPE=PSO|SAPI

jesn:	Job Entry Subsystem name (JES2 or JES3).
r.r.fff:	VPS version, release and distribution fix level.
xxxxxx:	Six character customer ID

Message Meaning: The VPS System has been successfully initialized.
System Action: None.
Required Action: None.

VPS001N USER EXITnn LOADED NAME=aaaaaaaa LENGTH=llllll EP=eeeeeeee ENABLED|DISABLED RECOVERY=ON|OFF TRACE=ff LANGUAGE=ASM|C

nn:	Exit number.
aaaaaaaa:	Name of the user exit module.
llllll:	Length of the user exit module.
eeeeeeee:	Entry point of the user exit module.
ff:	Indicates trace types for this exit.

Message Meaning: The VPS System has successfully loaded a user exit module.
System Action: None.
Required Action: None.

VPS002N aaaaaaaaaaaaaaaa KEY - CUSTID (bbbbbb,cccccc) COPY(d) CPUCHK (DISABLED|ENABLED)

aaaaaaaaaaaaaaaa KEY - CPUID(eeeee) STATUS(ffffffff) ggg…ggg

aaa..aaa:	Name of product represented by key.
bbbbbb:	Customer ID from the product.
cccccc:	Customer ID from the key.
d:	Number of copies from the key (if any).
eeeeee:	CPU serial number from the key or “ANY” if CPU checking is disabled in the key.
ffffffff:	Status of the key (TRAP, LICENSE, INVALID).
ggg…ggg:	Any error or warning message pertaining to the key.

Message Meaning: A product key was processed by VPS at VPS initialization.
System Action: None.
Required Action: If the message indicates an invalid or expired key, correct the key and restart VPS.

VPS003N CPUID (sssss)

sssss:	CPU serial number.

Message Meaning: Identifies the CPU serial number of the machine where VPS is executing.
System Action: None.
Required Action: None.

VPS004E VPSLIB OPEN FAILED

Message Meaning: An error occurred during OPEN processing for the VPSLIB dataset.
System Action: VPS will abend with U005 abend.
Required Action: Determine the cause for the OPEN failure. If the reason cannot be determined, contact VPS technical support.

VPS005E VPSLIB DCB ABEND CODE=xxx-xx

xxx-xx: Abend/return codes.

Message Meaning: An error occurred during OPEN/CLOSE/EOV processing for the VPSLIB dataset.
System Action: VPS will abend with a U005 abend.
Required Action: Determine the reason for the abend. If the reason cannot be determined, contact VPS technical support.

VPS006E VPSLIB I/O ERROR xxxxxxxxxx

xxxxxxxxxx SYNAD message text.

Message Meaning: I/O error while reading the VPSLIB dataset.
System Action: VPS will abend with a U005 abend.
Required Action: Determine the cause of the I/O error and correct it.

VPS007E VPS TERMINATED - ATTACH ERROR modulenm RC=rc

modulenm: The name of the module VPS attempted to attach.
rc: Return code from attach macro (see OS/VS2 MVS Supervisor Services).

Message Meaning: VPS failed attempting to attach a support subtask.
System Action: VPS will abend with a U005 abend.
Required Action: Contact VPS technical support.

VPS008E INVALID listtyp LIST MEMBER (mbrname) VALUE: keywordval

listtyp: INCLUDE or EXCLUDE.
mbrname: Name of inclusion or exclusion list member.
keywordval: Invalid member name specification within member.

Message Meaning: The contents of either the MLISTMEM or XLISTMEM member is invalid. An example would be a member name in the list that is longer than 8 characters.
System Action: VPS will abend with a U005 abend.
Required Action: Correct the member name in the MLISTMEM or XLISTMEM.

VPS009E MUTUALLY EXCLUSIVE KEYWORDS SPECIFIED: MLISTMEM/XLISTMEM

Message Meaning: Both MLISTMEM and XLISTMEM keywords were specified in the VPSSTART member. Since the keywords are mutually exclusive, only one of the keywords can be specified.
System Action: VPS will abend with a U005 abend.
Required Action: Specify either MLISTMEM or XLISTMEM as desired.

VPS010E VPS INITIALIZATION FAILURE

Message Meaning: VPS initialization has failed. This message will be preceded by a message giving the reason that initialization failed.
System Action: VPS will terminate.
Required Action: Refer to the preceding message(s) to determine the cause of the initialization failure.

VPS011N *SYSTEM STORAGE(REGN(aaaaaaa,bbbbbbb) PRIV(ccccccc,ddddddd)

aaaaaaa: VPS region requested below the 16M line.
bbbbbbb: VPS region requested above the 16M line.
ccccccc: Private area available below the 16M line.
ddddddd: Private area available above the 16M line.

Message Meaning: This message gives information pertaining to the storage requested and available after VPS initialization is complete.
System Action: None.
Required Action: None.

VPS012E xxxxxxxxxxx PRODUCT WILL EXPIRE IN nn DAYS

xxxxxxxxxxx: The name of the product which is about to expire (VPS, VPS/CDI, VPS/IPDS, VPS/PC, VPS/PCL, or VPS/TCPIP).
nn: The number of days before the product will expire (01 to 14).

Message Meaning: The copy of the product which is being executed will reach its expiration date in “nn” days. At that time, the product will terminate, and attempts to start the product will fail. This message will begin to appear fourteen days before the expiration date.
System Action: VPS will continue processing.
Required Action: Contact LRS marketing personnel.

VPS013E xxxxxxxxxxx PRODUCT HAS EXPIRED

xxxxxxxxxxx: The name of the product which has expired (VPS, VPS/CDI, VPS/IPDS, VPS/PC, VPS/PCL, or VPS/TCPIP).

Message Meaning: The copy of the product which is being executed has reached its expiration date.
System Action: The product will terminate. Attempts to start the product will fail.
Required Action: Contact LRS marketing personnel.

VPS014E VPS TERMINATED - ERROR LOADING mmmmmmmm R1=xxxxxxxx R15=yy

mmmmmmmm: The name of a VPS load module.
xxxxxxxx: The contents of Register 1.
yy: The contents of Register 15.

Message Meaning: VPS attempted to LOAD a VPS module, but the LOAD macro gave a non-zero return code.
System Action: VPS will terminate.
Required Action: Verify that all necessary VPS load modules are in either a linklist library or a library named in the STEPLIB DD in the VPS JCL.

VPS015E JES SUBSYSTEM IS NOT ACTIVE. REPLY R TO RETRY, E TO END

Message Meaning: The JES subsystem specified in the SUBSYS keyword of the VPS initialization member is not active.
System Action: If the reply is R, VPS will retry the subsystem request. If the reply is E, VPS will terminate normally.
Required Action: Reply with R or E.

VPS016E VPS AUTHORIZATION FAILURE - MODULES LOADED FROM: xxxxxxxx LIBRARY(yy)

xxxxxxxx: The type of library: UNKNOWN JOB/STEP LINKLIST.
yy: The concatenation number of the library.

Message Meaning: A module which VPS is attempting to load resides in an unauthorized library.
System Action: VPS will terminate.
Required Action: Put all VPS modules into an authorized library.

VPS017N VPS SSI INITIALIZED - NAME=aaaa SSCVT=bbbbbbbb SSVT=cccccccc USR1=dddddddd USR2=eeeeeeee

aaaa: VPS subsystem name.
bbbbbbbb: VPS SSCVT address.
cccccccc: VPS SSVT address.
dddddddd: VPS SSCVT user word 1.
eeeeeeee: VPS SSCVT user word 2.

Message Meaning: VPS has been successfully initialized as a subsystem.
System Action: None.
Required Action: None.

VPS018E VPS SSI INITIALIZATION FAILURE - reason(s)

reason(s):	One or more of the following reasons: VPCMDCHR='x' ALREADY IN USE BY SUBSYSTEM xxxx. IEFSSREQ FAILURE R15=xx. IEFSSREQ FAILURE SSOBRETN=xx. VPS SUBSYSTEM xxxx IS ALREADY ACTIVE. GETMAIN FAILURE (SSCT). GETMAIN FAILURE (SSVT). GETMAIN FAILURE (SSI CMD QUEUE).
Message Meaning:	VPS detected an error while attempting to initialize the VPS subsystem interface.
System Action:	The VPS address space will terminate.
Required Action:	Correct the error, based on the reason.

VPS019E REQUIRED KEYWORD aaaaaaaa or aaaaaaaa WAS NOT SPECIFIED, WAS INVALID OR HAS EXPIRED - VPS WILL TERMINATE

aaaaaaaa:	VPS product key name (e.g., KEYVPS or KEYTCP).
Message Meaning:	The VPS product key was either not specified in the VPS Initialization member or was specified incorrectly. The VPS product keys are supplied in file 1 of the VPS distribution cartridges.
System Action:	The VPS address space will terminate. Attempts to start VPS will fail.
Required Action:	Ensure that the product key has been entered correctly in the VPS Initialization member. If you are unable to locate the product key, contact LRS marketing personnel.

VPS020E NO VALID CPUID KEYWORD FOR aaaaaa PRODUCT - info

aaaaaa:	Name of product requiring a CPUID keyword.
info:	Additional information, for example: PRODUCT WILL BE DISABLED TRIAL WILL CONTINUE
Message Meaning:	The KEY for the product named requires a valid CPUID keyword, but no valid CPUID value has been specified.
System Action:	The named product will be disabled, unless the product key is a TRIAL key.
Required Action:	Contact LRS to obtain a valid CPUID value.

VPS021E prtrid INVALID VPSSRTAB|MAILBOOK MODULE NAME=aaaaaaaa reason

aaaaaaaa: The name of the VPSSRTAB load module.
reason: A description of why the table is invalid:

INVALID TABLE PREFIX DETECTED
INVALID TABLE ENTRY DETECTED
CODE PAGE XLATE TABLE XXXXXXXX NOT FOUND

Message Meaning: The AFP resource table named in the message is invalid.
System Action: The printer is EDRAINED.
Required Action: Correct the source code for the invalid AFP resource table, and re-assemble and linkedit the corrected source code.

VPS022E vpsstc VPS PRODUCT WILL EXPIRE IN aa DAYS DUE TO UNAUTHORIZED CPUID.

vpsstc: The started task name of the VPS product.
aa: The number of days before the VPS product will expire.

Message Meaning: The copy of the product which is being executed will reach its expiration date in "nn" days. At that time, the product will terminate, and attempts to start the product will fail.
System Action: VPS will continue processing.
Required Action: Contact LRS marketing personnel.

VPS023E vpsstc aaaaaaaa PRODUCT HAS EXPIRED DUE TO UNAUTHORIZED CPUID

vpsstc: The started task name of the VPS product.
aaaaaaaa: Product name that is executing on unauthorized CPU.

Message Meaning: The copy of the product that was executing on an unauthorized CPU has expired.
System Action: VPS will continue processing, unless the product that has expired is the VPS product.
Required Action: Contact LRS Marketing personnel.

VPS029E PRTID IAZXJSAB ERROR - FUNCTION=func R15=rc
func: IAZXJSAB function (READ, CREATE or DELETE)
rc: IAZXJSAB return code.

Message Meaning: An unexpected error occurred while attempting to READ, CREATE or DELETE the JSAB control block.
System Action: If **FUNCTION=READ**, then message VPS029E will be issued and VPS initialization will be terminated.

If **FUNCTION=CREATE**, then message VPS029E will be issued and the printer will be EDRAINED.

If **FUNCTION=DELETE**, and using the PSO interface, then message VPS029E will be issued and VPS will terminate with a U007 abend.

If **FUNCTION=DELETE**, and using the SAPI interface, then message VPS029E will be issued and the printer will be EDRAINED.

Required Action: Contact VPS technical support.

VPS030E CONNECT:DIRECT SYSTEM INITIALIZATION REQUEST FAILED R15=rc - INTERFACE DISABLED

rc: VPS/CDI return code.

Message Meaning: The VPS/CDI system initialization request failed.
System Action: VPS will disable the VPS/CDI interface and will not allow any VPS/CDI printers (i.e., printers with COMMTYPE=(DUMMY,CDI) to be activated.
Required Action: Determine the cause of the failure based on the return code. The MVS system log may contain messages indicating the reason for the failure.

VPS040E AUTOMATIC RESTART MANAGEMENT armrqst REQUEST FAILED R15=rc RSN=info

armrqst: Automatic Restart Management Request Type:
- **REGISTER=** Requests that the system restart this VPS when VPS itself or the system it was running on unexpectedly fails.
- **WAITPRED=** Requests that when a restart occurs, the system suspend this VPS until all predecessors indicate that they are ready to accept work.
- **READY=** Requests that the system consider this VPS ready to accept work.
- **DEREGISTER=** Notifies the system that restarts are no longer required for this VPS.

rc: IXCARM macro return code.
rsn: IXCARM macro reason code.
info: Text describing error.

Message Meaning: A request was made to the MVS Automatic Restart Manager and the request failed unexpectedly.
System Action: If the failing request type was REGISTER, processing continues but VPS cannot subsequently be restarted by ARM.
If the failing request type was WAITPRED, processing continues but other subsystems may not be ready when VPS needs them to complete initialization.
If the failing request type was READY, processing continues but other subsystems which are waiting for VPS will not be informed that VPS is ready for work and will continue to wait until timed out.
If the failing request type was DEREGISTER, VPS has initiated normal termination and, since the DEREGISTER failed, this may result in ARM restarting VPS.
Required Action: Using the description of the IXCARM macro in the IBM publication titled MVS/ESA Sysplex Services Reference, determine the cause of the failure and correct it. If unable to resolve the problem, contact VPS technical support.

VPS050E OPERATING SYSTEM RELEASE NOT COMPATIBLE WITH VPS - xxxxxxxxxx

xxxxxxxxxx:	Reason why the operating system release is not compatible.
Message Meaning:	The operating system must be ESA 4.2.0 or higher, so that the HBB4420 functions are available and the access methods support buffers above the 16 MB line. Also, the "C" runtime libraries must be available to VPS, either via the linklist or via the STEPLIB DD on the VPS JCL.
System Action:	VPS will terminate.
Required Action:	Contact VPS technical support to see if an earlier version of VPS that is compatible with your operating system level is still available and supported.

VPS051E prtrid C LANGUAGE ENVIRONMENT ERROR R15=r15 REQ=req TYPE=type reason-text

r15:	Value returned in R15.
req:	Request code.
type:	Environment request type.
reason-text	Reason text.
Message Meaning:	An error occurred when VPS attempted to invoke a C language program.
System Action:	If the request is for a system task, VPS will terminate. If the request was for a printer task, the printer will be EDRAINED.
Required Action:	If unable to determine the cause of the error, contact VPS technical support.

VPS052E prtrid C ENVIRONMENT LOAD FAILED MODULE=modname

modname	Name of module.
Message Meaning:	An error occurred when VPS attempted to process a load request for a C language program.
System Action:	None.
Required Action:	None.

VPS053E prtrid C ENVIRONMENT GETMAIN FAILED SIZE=size SP=subpool LOC=location

size:	Size of area to be obtained.
subpool:	Subpool of area to be obtained.
location:	Location of area to be obtained.
Message Meaning:	An error occurred when VPS attempted to acquire storage for a C language program.
System Action:	None.
Required Action:	None.

VPS054E prtrid C ENVIRONMENT FREEMAIN FAILED ADDRESS=address SIZE=size SP=subpool.

address:	Address of area to be released.
size:	Size of area to be released.
subpool:	Subpool of area to be released.
Message Meaning:	An error occurred when VPS attempted to release storage for a C language program.
System Action:	None.
Required Action:	None.

VPS055E prtrid message-text

message-text:	Message text from C language program.
Message Meaning:	A C language program requested that VPS issue a message.
System Action:	None.
Required Action:	None.

VPS070E vpsstc STIMERM FAILURE RC=rc REASON=rsn

vpsstc:	The started task name of the VPS product.
rc:	Return code.
rsn:	Interval type.
Message Meaning:	VPS failed attempting to establish a timer interval with the STIMERM macro.
System Action:	VPS will abend with a U004 abend.
Required Action:	Contact VPS technical support.

VPS071E EXPIRATION SUBTASK DISABLED DUE TO UNRECOVERABLE ERROR

Message Meaning:	An unexpected error occurred while the VPS expiration subtask was processing the retained SYSOUT files.
System Action:	All SYSOUT retention and file expiration processing will be disabled.
Required Action:	Contact VPS technical support.

VPS072E SAPI PUT/GET REQUEST FAILURE R15=rc SSOB=ss REASON=rsn

rc:	Return code from SAPI request.
ss:	SSOB Return code from SAPI request.
rsn:	Reason code from SAPI request.
Message Meaning:	An unexpected error occurred when VPS attempted a SAPI request.
System Action:	All SYSOUT retention and file expiration processing will be disabled.
Required Action:	Contact VPS technical support.

VPS099N VPS TERMINATION COMPLETE

Message Meaning:	VPS has completed termination processing.
System Action:	The VPS address space will terminate.
Required Action:	None.

VPS100E prtr-id JES DYNAMIC ALLOCATION FAILURE R15=rc EC=eeee IC=iiii NEWS WRITER=xxxxxxxx

rc:	Dynamic allocation return code.
eeee:	Dynamic allocation error code.
iiii:	Dynamic allocation info code.
xxxxxxxx:	Name of separator news writer, if dynamic allocation failed for that dataset.
Message Meaning:	JES SYSOUT dynamic allocation has failed. See OS/VS2 SPL: Job Management.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Correct error causing dynamic allocation failure, and issue a START command for the printer.

VPS101E prtr-id JES DYNAMIC UNALLOCATION FAILURE R15=rc EC=eeee IC=iiii NEWS WRITER=xxxxxxxx

rc:	Dynamic unallocation return code.
eeee:	Dynamic unallocation error code.
iiii:	Dynamic unallocation info code.
xxxxxxxx:	Name of separator news writer, if dynamic unallocation failed for that dataset.
Message Meaning:	JES SYSOUT dynamic unallocation has failed. See OS/VS2 SPL: Job Management.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Correct the error causing the dynamic unallocation failure, and issue a START command for the printer.

VPS102E prtr-id SUBSYSTEM REQUEST FAILURE(s) SSOB=sr R15=rc NEWS WRITER=xxxxxxxx

s:	Subsystem request type: **A** = SYSOUT request by selection criteria. **J** = SYSOUT request by jobname/jobid. **C** = Subsystem control request.
sr:	Subsystem request SSOB return code.
rc:	Subsystem request R15 return code.
xxxxxxxx:	Name of separator news writer, if subsystem request failed for that dataset.
Message Meaning:	Subsystem request failure has occurred.
System Action:	VPS will abend with a U003 abend.
Required Action:	Contact VPS technical support.

VPS103N JOB jobname(jobid) DSN(dataset name) MAXIMUM LINE|PAGE LIMIT OF nnn,nnn EXCEEDED

nnn,nnn:	The line or page limit allowed for this printer.
Message Meaning:	A SYSOUT dataset exceeded the line or page limit (REQLIMIT) for this printer.
System Action:	Message VPS104N or VPS105N will follow.
Required Action:	None.

VPS104N prtr-id JOB jobname (jobid) REQUEUED TO JOB reqjobname reqparameters

reqjobname: If REQROUTE=Y was specified, the original jobname of the job which created the SYSOUT dataset. If REQROUTE=N was specified, the VPS started task name.

reqparameters: The requeue parameters specified for this printer (C=requeue class, D=requeue destination, F=requeue form, W=requeue writer), followed by the word "HELD" if REQHOLD=Y was specified.

Message Meaning: A dataset which exceeded the line limit (REQLIMIT) for this printer has been requeued, based on the requeue parameters specified for this printer.

System Action: None.

Required Action: None.

VPS105N prtr-id DSN(dataset name) DELETED

Message Meaning: A dataset which exceeded the line limit (REQLIMIT) for this printer has been deleted from the JES spool because the REQDELT=Y was specified in the printer definition.

System Action: None.

Required Action: None.

VPS106I prtr-id QUEUEING JOB jobname (jobid) NEWS WRITER=xxxxxxxx

Message Meaning: VPS has begun staging the first dataset of a job to be printed on this printer.

System Action: None.

Required Action: None.

VPS107N prtr-id I/O ERROR PROCESSING DATASET datasetname NEWS WRITER=xxxxxxxx

datasetname: SYSOUT dataset on which VPS had I/O error.

xxxxxxxx: Name of separator news writer, if I/O error occurred processing that dataset.

Message Meaning: I/O error occurred retrieving SYSOUT from JES spool. Message VPS108E will follow.

System Action: VPS will either put this printer in EDRAINED status, or will print as much of the dataset as it was able to read and then delete the dataset from the JES spool, depending on the value of the USEROPTS parameter in the VPS System Initialization member.

Required Action: Refer to message VPS108E.

VPS108E prtr-id jes i/o error synad message NEWS WRITER=xxxxxxxx

Message Meaning: This is the I/O error synad message for VPS107N above. The contents of this message are retrieved via the SYNADAF macro. VPS appends four fields to the message. They are the record size, block size, and record format from the DCB of the dataset, and the number of records that VPS was able to read before it encountered the I/O error. (VPS increases the block size value by 1024 after opening the dataset to avoid many "wrong length record" errors).

System Action: See message VPS107N.

Required Action: If VPS put the printer in EDRAINED status, you should either delete the offending dataset from the JES spool or change it to HELD status before issuing a VPS START command for the printer.

If the USEROPTS parameter in the VPS System Initialization member indicated that VPS was to print what it could read of the dataset and then delete the dataset from the JES spool, no further action is necessary.

If the VPS107N message that preceded this message indicates "WRONG LENGTH RECORD", VPS has attempted to read a record from the spool that is longer than the DCB LRECL specified when the JES dataset was created. JES is able to write these records to and read them from the spool, because it does not use a standard access method. However, VPS, like any other program using standard access methods, cannot process datasets containing this type of error. Datasets spooled in this manner can be printed by JES on a local or RJE supported printer. (The external writer, like VPS, is unable to print a dataset with a wrong length record). If this problem occurs repeatedly for output from a particular application, the program and/or JCL that created the SYSOUT dataset should be corrected to eliminate the problem. This problem sometimes occurs if a SYSOUT dataset is being created at the same time that an abnormal abend occurs in JES.

VPS109E prtr-id SYSOUT DATASET OPEN FAILURE NEWS WRITER=xxxxxxxx

Message Meaning: VPS attempted to open a SYSOUT dataset on the JES spool, but the open failed.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Contact VPS technical support.

VPS110E prtr-id SYSOUT DATASET ABEND CODE=xxx-xx

xxx-xx: Abend/return codes.

Message Meaning: An abend occurred while VPS was processing a SYSOUT dataset.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Contact VPS technical support.

VPS111E prtr-id SCHEDULER ATTACH FAILURE RC=rc

rc: Return code from attach macro (see OS/VS2 MVS Supervisor Services).

Message Meaning: VPS failed attempting to attach a printer subtask.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Contact VPS technical support.

VPS112E UNABLE TO IDENTIFY TERMINATED SCHEDULER SUBTASK

Message Meaning: VPS was unable to associate a terminated scheduler subtask with an active printer.
System Action: The subtask is detached.
Required Action: Notify VPS technical support personnel.

VPS113E UNABLE TO RETRIEVE NEWS DATASET FOR WTR(aaaaaaaa) JOB(jobname) - DUPLICATE JOBNAMES

aaaaaaaa: Writer name specified for the NEWS dataset.
jobname: Job name specified for the NEWS dataset.

Message Meaning: Two or more jobs exist on the JES spool with the same jobname/writer name combination.
System Action: VPS will disable the NEWS entry containing the jobname/writer name combination.
Required Action: Ensure that only one job exists on the JES spool with the jobname and writer name combination specified as a VPS NEWS dataset. After the duplicate jobnames have been deleted from the JES spool, issue the VPS REFRESH commands to refresh the NEWS dataset.

VPS114I MAXIMUM ACTIVE PRINTERS HAS BEEN REACHED (nn,nnn)

nn,nnn: The maximum active printers defined by the 2nd positional parameter of MAXPRTS.

Message Meaning: The maximum active printers, defined by MAXPRTS, has been reached.
System Action: None.
Required Action: None.

VPS115E prtr-id PRINTER DRAINED DUE TO INVALID DEST dest

dest: Destination selection criteria.

Message Meaning: The destination selection criteria supplied to VPS via the logon data is not valid to JES.
System Action: The printer is drained and the session is terminated.
Required Action: Perform the logon with the correct data.
Note: This error message applies only to printers with both DIAL=Y and LOGDATA=D specified.

VPS116E prtr-id PRINTER DRAINED DUE TO SELECTION CONFLICT WITH REQUEUE PARAMETERS
or
prtr-id PRINTER DRAINED DUE TO SELECTION OVERLAP WITH prtrid

Message Meaning: The selection criteria specified for this printer conflict with either the requeue parameters for this printer or with the selection criteria of another printer identified by prtrid.
System Action: The printer is put in DRAINED status.
Required Action: Correct the selection criteria for this printer.

VPS117E prtr-id PRINTER EDRAINED DUE TO INSUFFICIENT VIRTUAL STORAGE FOR name SP|LENGTH=nnnnnnnn

name: Name of area to be obtained.
nnnnnnnn: Subpool and length of area to be obtained.

Message Meaning: There is insufficient virtual storage within the VPS address space for the printer to function.
System Action: The printer is put in EDRAINED status.
Required Action: Increase the REGION parameter in the VPS execution JCL and reinitiate VPS.

VPS118I prtr-id SELECTED JOB jobname(jobid) PROC(procname) STEP(stepname) DD(ddname)

procname: The name of the procedure that created the SYSOUT dataset.
stepname: The name of the step in the procedure that created the SYSOUT dataset.
ddname: The DDNAME of the SYSOUT dataset.

Message Meaning: VPS has selected the dataset.
System Action: None.
Required Action: None.

VPS119I prtr-id SELECTION CRITERIA CHANGED TO selection criteria

Message Meaning: The scheduled selection criteria for this printer have been put into effect.
System Action: VPS will use the new selection criteria to select work for this printer.
Required Action: None.

VPS120I prtr-id WAITING FOR WORK selection criteria

Message Meaning: There is no more work available for this printer.
System Action: The printer will now be in IDLE status.
Required Action: None.

VPS122E VPS TERMINATED DUE TO TPEND QUICK/CANCEL

Message Meaning: VTAM has been terminated with Z NET,QUICK/CANCEL, or the VPS applid has been varied inactive with immediate or force.
System Action: VPS will abend with a U002 abend.
Required Action: Either vary the applid active or wait for VTAM to be started. Then start the VPS task.

VPS123N prtr-id NOW INACTIVATED

Message Meaning: Printer has been inactivated (removed from VPS) in response to an earlier inactivate command.
System Action: Printer no longer exists in the VPS network.
Required Action: If desired, issue an activate command to bring the printer back into the VPS network.

VPS124I prtr-id PURGING OUTPUT FOR JOB jobname(jobid)

Message Meaning: The Session Termination Exit (user exit 18), Session Error Exit (user exit 19), or Error Retry Exit (user exit 08) has indicated that output for this printer should be purged from the JES spool.
System Action: VPS deletes all output for the given jobname/jobid from the JES spool.
Required Action: None.

VPS126I xxxx REQUESTS=nnn,nnn,nnn AVERAGE=aaaa.aa HIGH=(hhhh.hh,DATE=mm/dd/yy,TIME=hh.mm.ss)

xxxx:	Request type.
nnn,nnn,nnn:	Number of requests.
aaaa.aa:	Average amount of time used to process this request type, in hundredths of seconds.
hhhh.hh:	Highest amount of time used to process this request type, in hundredths of seconds.
mm/dd/yy:	Date that highest amount of time was used to process this request type.
hh.mm.ss:	Time of day that highest amount of time was used to process this request type.
Message Meaning:	VPS has logged statistical information concerning requests.
System Action:	None.
Required Action:	None.
Note:	This message appears only in the VPS log. This information can be used as a diagnostic tool for performance problems.

VPS127I xxxx HISTORY=(nnnn.nn nnnn.nn ... nnnn.nn)

xxxx:	Request type
nnnn.nn:	Amount of time used to process this request type, in hundredths of seconds (this field will appear from 1 to 16 times in this message).
Message Meaning:	VPS has logged statistics concerning the timing of the last 16 occurrences of a particular request type.
System Action:	None.
Required Action:	None.
Note:	This message appears only in the VPS log. This information can be used as a diagnostic tool for performance problems.

VPS128I SYSTEM STATISTICS SUCCESSFULLY LOGGED

Message Meaning:	VPS has entered statistical messages into the VPS log.
System Action:	None.
Required Action:	None.

VPS129I SYSTEM STATISTICS SUCCESSFULLY RESET

Message Meaning:	VPS has reset the statistical information fields used in VPS messages VPS126I and VPS127I and will begin accumulating those statistics from this point.
System Action:	None.
Required Action:	None.

VPS130N prtr-id REQUEUE PARAMETERS CHANGED - REQOPTS=nn reqparms

nn:	The RQAOPTS flag byte from the VPSSRQAT DSECT.
reqparms:	The values specified for requeue class, destination, form, writer, and output reference in the REQOUTP parameter.
Message Meaning:	The requeue exit has overridden the requeue parameters specified for this printer.
System Action:	The system will use the overriding requeue values.
Required Action:	None.

VPS131N prtr-id REQUEUE PARAMETERS CONFLICT WITH xxxxxxxxxxx

xxxxxxxxxxx:	The selection criteria or scheduled selection criteria for this printer.
Message Meaning:	The requeue parameters returned by the requeue exit conflict with either the selection criteria or the scheduled selection criteria for this printer.
System Action:	The REQLIMIT for this printer is ignored.
Required Action:	None.
Note:	This message can only appear when the Requeue Exit is in effect.

VPS132N prtr-id REQUEUE PARAMETERS INVALID - REQOPTS=nn reqparms

nn:	The RQAOPTS flag byte from the VPSSRQAT DSECT.
reqparms:	The values specified for requeue class, destination, form, writer, and output reference in the REQOUTP parameter.
Message Meaning:	The requeue parameters returned by the requeue exit are invalid.
System Action:	None. Message VPS131N indicates the reason for the failure.
Required Action:	None.

VPS133E prtr-id REQUEUE DATASET ALLOCATION FAILURE R15=rc EC=eeee IC=iiii

rc:	Dynamic allocation return code.
eeee:	Dynamic allocation error code.
iiii:	Dynamic allocation info code.
Message Meaning:	Requeue dataset allocation has failed. See OS/VS2 SPL: Job Management.
System Action:	VPS will ignore the REQLIMIT and print the dataset on the VPS printer which originally queued the dataset.
Required Action:	Correct the error causing dynamic allocation failure.

VPS134N prtr-id I/O ERROR PROCESSING REQUEUE DATASET

Message Meaning: An I/O error occurred while writing to the requeue dataset.
System Action: VPS will put this printer in EDRAINED status.
Required Action: If possible, correct the problem which caused the I/O error. Then issue a START command for the printer.

VPS135E prtr-id i/o error synad message

Message Meaning: This is the I/O error synad message for VPS134E above.
System Action: See message VPS134E above.
Required Action: See message VPS134E above.

VPS136E prtr-id REQUEUE DATASET OPEN FAILURE

Message Meaning: An error occurred opening the requeue dataset.
System Action: VPS will put this printer in EDRAINED status.
Required Action: If possible, correct the problem which caused the OPEN error. Then issue a START command for the printer.

VPS137E prtr-id REQUEUE DATASET ABEND CODE=xxx-xx

xxx-xx: Abend/return codes.

Message Meaning: An abend occurred during OPEN/CLOSE/EOV processing for the requeue dataset.
System Action: VPS will put this printer in EDRAINED status.
Required Action: If possible, correct the problem which caused the abend. Then issue a START command for the printer.

VPS138E prtr-id JOB jobname(jobid) DSN(dataset name) EXIT22 REQUESTS REQUEUE

Message Meaning: VPS User Exit 22 has requested that the original SYSOUT dataset be requeued.
System Action: VPS will requeue the SYSOUT dataset, using the requeue options specified for the printer.
Required Action: None.

VPS140I prtr-id EXPIRED|KEPT|PURGED|RETAINED JOB(jobname) PROC(procname) STEP(stepname) DDNAME(ddname)

jobname: Job name for retained SYSOUT file.
procname: Procedure name for retained SYSOUT file.
stepname: Step name for retained SYSOUT file.
ddname: DD name for retained SYSOUT file

RETAINED Dataset retained on JES spool after processing.
EXPIRED Dataset deleted due to retention period expiration.
PURGED Dataset deleted due to EXPIRE console command.
KEPT Dataset not deleted as retention SYSOUT attributes have changed.

Message Meaning: VPS has processed a SYSOUT file for which retention was requested.
System Action: None.
Required Action: None.

VPS141E prtr-id DATASET NOT RETAINED - rsn

rsn:	Reason that file was not retained, such as: ERROR WRITING RETENTION RECORD JES CTOKEN NOT AVAILABLE
Message Meaning:	VPS encountered an error processing a SYSOUT file for which retention was requested.
System Action:	The SYSOUT file will not be retained.
Required Action:	Contact VPS technical support.

VPS142I prtr-id OUTPUT STATEMENT RETAINS=retains INVALID - IGNORED

retains:	The value of the RETAINS keyword on the OUTPUT JCL statement.
Message Meaning:	VPS encountered a value that was not supported in the RETAINS keyword that was specified on the OUTPUT JCL statement.
System Action:	The value from the second positional parameter of the RETAIN keyword in the VPS printer definition will be used for the number of hours to retain the SYSOUT file.
Required Action:	Correct the JCL OUTPUT statement.

VPS143E prtr-id INTRDR DATASET ALLOCATION FAILURE RC=rc EC=eeee IC=iiii

rc:	Dynamic allocation return code.
eeee:	Dynamic allocation error code.
iiii:	Dynamic allocation info code.
Message Meaning:	Internal reader dataset allocation has failed. See OS/VS2 SPL: Job Management.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	If possible, correct the problem which caused allocation to fail. Then issue a START command for the printer.

VPS144N prtr-id I/O ERROR PROCESSING INTRDR DATASET

Message Meaning:	An I/O error occurred while writing to the internal reader dataset.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	If possible, correct the problem which caused the I/O error. Then issue a START command for the printer.

VPS145E prtr-id INTRDR i/o error synad message

Message Meaning:	This is the I/O error synad message for VPS144E above.
System Action:	See message VPS144E above.
Required Action:	See message VPS144E above.

VPS146E prtr-id INTRDR DATASET OPEN FAILURE

Message Meaning: VPS attempted to open a SYSOUT dataset to submit a job to the internal reader, but the open failed.
System Action: The inbound READER datastream from the printer is discarded.
Required Action: Contact VPS technical support.

VPS147E prtr-id INTRDR DATASET ABEND CODE=xxx-xx

xxx-xx: Abend/return codes.

Message Meaning: An abend occurred during OPEN/CLOSE/EOV processing for the internal reader dataset.
System Action: VPS will put this printer in EDRAINED status.
Required Action: If possible, correct the problem which caused the abend. Then issue a START command for the printer.

VPS148E prtr-id SYSOUT EVENT NOTIFICATION REQUEST FAILED - rsn

rsn: Error text to describe the reason for the request failure, such as:

ABEND PROCESSING REQUEST

ENFREQ REQUEST FAILED RC=rc

INSUFFICIENT STORAGE

Message Meaning: VPS encountered an unexpected error while attempting to process an Event Notification request.
System Action: VPS will not be able to notify other systems, such as DRS and DMCF, that the file was printed successfully.
Required Action: Contact VPS technical support.

VPS150E prtrid DASD DATASET ALLOCATION FAILURE R15=rc EC=eeee IC=iiii desc

rc: Dynamic allocation return code.
eeee: Dynamic allocation error code.
iiii: Dynamic allocation info code.
desc: Description of dataset.

Message Meaning: A DASD dataset allocation has failed.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Correct the error that caused the dynamic allocation failure, and issue a START command for the printer.

VPS151E prtrid DASD DATASET UNALLOCATION FAILURE R15=rc EC=eeee IC=iiii desc

rc:	Dynamic allocation return code.
eeee:	Dynamic allocation error code.
iiii:	Dynamic allocation info code.
desc:	Description of dataset.

Message Meaning:	A DASD dataset unallocation has failed.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Correct the error that caused the dynamic unallocation failure, and issue a START command for the printer.

VPS152E prtrid DASD DATASET OPEN FAILURE desc

desc:	Description of dataset.

Message Meaning:	An error occurred opening a DASD dataset.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Correct the error that caused the OPEN error, and issue a START command for the printer.

VPS153E prtrid DASD DATASET CLOSE FAILURE desc

desc:	Description of dataset.

Message Meaning:	An error occurred closing a DASD dataset.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Correct the error that caused the CLOSE error, and issue a START command for the printer.

VPS154N prtrid I/O ERROR PROCESSING DASD DATASET desc

desc:	Description of dataset.

Message Meaning:	An I/O error occurred while processing a DASD dataset.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Correct the error that caused the I/O error, and issue a START command for the printer.

VPS155E prtrid I/O ERROR SYNAD MESSAGE

Message Meaning:	This is the I/O error synad message for the VPS154N message.
System Action:	See message VPS154N.
Required Action:	See message VPS154N.

VPS156E prtrid DASD DATASET ABEND CODE=xxx-xx desc

xxx-xx: DCB abend/return codes.
desc: Description of dataset.

Message Meaning: An error occurred during OPEN/CLOSE/EOV processing for the DASD dataset.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Correct the problem which caused the abend, and issue a START command for the printer.

VPS157E prtrid DASD DATASET DEVTYPE FAILURE R15=rc RSN=rsn desc

rc: DEVTYPE return code.
rsn: DEVTYPE reason code.
desc: Description of dataset.

Message Meaning: An error occurred attempting to obtain the device characteristics of the DASD dataset.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Correct the problem which caused the DEVTYPE failure, and issue a START command for the printer.

VPS158E prtrid DASD DATASET SCRATCH FAILURE R15=rc STATUS=aaaa desc

rc: SCRATCH return code.
aaaa: SCRATCH status.
desc: Description of dataset.

Message Meaning: An error occurred attempting to delete the DASD dataset.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Correct the problem which caused the SCRATCH failure, and issue a START command for the printer.

VPS159E prtrid DASD DATASET UNCATALOG FAILURE R15=rc desc

rc: CATALOG return code.
desc: Description of dataset.

Message Meaning: An error occurred attempting to uncatalog the DASD dataset.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Correct the problem which caused the UNCATALOG failure, and issue a START command for the printer.

VPS160E prtrid SAPI SSI FAILURE TYPE=type R15=rc SSOB=ssobrc info REASON=rsn

type:	Type of SAPI request which failed
rc:	Return code
ssobrc:	SSOB return code
rsn:	Reason code
info:	Optional additional information.
Message Meaning:	A SAPI request to JES failed.
System Action:	If processing a printer request, VPS will put this printer in EDRAINED status. If processing a NEWS dataset, VPS will disable the NEWS entry.
Required Action:	Contact VPS technical support.

VPS161E prtrid SAPI SWB RETRIEVAL ERROR SSS2WRTN=rc SSS2WRSN=rsn

rc:	Return code
rsn:	Reason code
Message Meaning:	A SAPI SWB retrieval request failed.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Contact VPS technical support.

VPS180E CSVINFO REQUEST FAILED R15=rc reason

rc:	CSVINFO return code
reason:	CSVINFO reason
Message Meaning:	An unexpected return code was received when the CSVINFO macro was used to locate a module loaded at a specific address.
System Action:	VPS continues with DISPLAY command processing with 'UNKNOWN' as the name of the module.
Required Action:	If unable to determine the cause of the error, contact VPS technical support.

VPS199E xxxxxxxxxxxxxxxxx

xxxxxxxxxx...	The SVC 99 text unit in error, including the DDNAME, the text unit key, the text unit number, and, depending on the error code, the text unit length and text unit parm.
Message Meaning:	An invalid text unit was specified when attempting to use SVC 99 to allocate a dataset.
System Action:	Dependent upon the dataset which had the allocation failure.
Required Action:	Refer to VPS messages preceding/following this message to determine the appropriate action.

VPS200I prtr-id DATASET|JOB CANCELED BY OPERATOR PRINTER

Message Meaning: Printing of SYSOUT has been canceled by an operator command (OPERATOR) or by use of the cancel print key (PRINTER).
System Action: The dataset or job will be deleted.
Required Action: None.

VPS201I DATASET RESTARTED BY OPERATOR|PRINTER|P-ERROR

Message Meaning: Printing of SYSOUT has been restarted by an operator command (OPERATOR), use of the PA-1 key (PRINTER), or recovery from an error when ERRACTN=RST (P-ERROR).
System Action: The SYSOUT dataset will be restarted.
Required Action: None.

VPS202I prtr-id DATASET FORWARD|BACKWARD SPACED nn,nnn LINE(S)|PAGE(S)

nn,nnn: The number of lines or pages.

Message Meaning: Operator has issued a reposition command or the printer operator has requested repositioning via the PA-2 key.
System Action: The SYSOUT dataset will be repositioned.
Required Action: None.
Note: This message appears on the console, not on the affected printer.

VPS203I prtr-id DATASET REPOSITIONED TO LINE|PAGE nn,nnn

nn,nnn: The line or page number.

Message Meaning: Operator has issued a reposition @ command.
System Action: The SYSOUT dataset will be repositioned.
Required Action: None.
Note: This message appears on the console, not on the affected printer.

VPS204I prtrid DATASET REPOSITIONED BY OPERATOR|PRINTER|P-ERROR

Message Meaning: The printer has been repositioned as the result of an operator command or a recoverable error (such as “intervention required”).
System Action: The SYSOUT dataset will be repositioned, depending upon specification of the ERRACTN keyword.
Required Action: None.
Note: This message appears on the printer, not on the console.

VPS205I prtr-id PRINTING JOB jobname (jobid)

Message Meaning: VPS has begun printing the first dataset of a job.
System Action: None.
Required Action: None.

VPS206I prtr-id DATASET RESTARTED AT PAGE|LINE n,nnn,nnn

n,nnn,nnn: Page or line number.

Message Meaning: VPS has repositioned a dataset according to its stored checkpoint data.
System Action: VPS will begin printing the data at the point of the last checkpoint.
Required Action: None.

VPS207I prtr-id DATASET INTERRUPTED BY OPERATOR

Message Meaning: Printing of SYSOUT has been interrupted by an operator command.
System Action: VPS will request another job from JES.
Required Action: None.

VPS208I prtr-id NOW DRAINED

Message Meaning: Printer has been drained due to an earlier VPS STOP request or because the WFWACTN keyword is set to D (drain when waiting-for-work occurs).
System Action: No more work will be printed on this printer until a VPS START command is issued.
Required Action: Issue a START command, if desired.

VPS209I prtr-id ENCRYPTING JOB jobname(jobid)

Message Meaning: VPS has begun encrypting the first dataset of a job.
System Action: None.
Required Action: None.

VPS210E prtr-id QUEUE DSNAME RETRIEVAL FAILURE R15=rc EC=eeee IC=iiii

rc: Dynamic allocation return code.
eeee: Dynamic allocation error code.
iiii: Dynamic allocation info code (see OS/VS2 SPL: Job Management).

Message Meaning: A dynamic allocation error occurred while attempting to retrieve the dataset name of the staging dataset.
System Action: The MVS DEQ macro for the staging dataset is bypassed.
Required Action: Contact VPS technical support.

VPS211E prtr-id QUEUE DYNAMIC UNALLOCATION FAILURE R15=rc EC=eeee IC=iiii

rc: Dynamic unallocation return code.
eeee: Dynamic unallocation error code.
iiii: Dynamic unallocation info code (see OS/VS2 SPL: Job Management).

Message Meaning: Dynamic unallocation of VPS staging dataset has failed.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Correct error causing dynamic unallocation failure, and issue a START command for the printer.

VPS212E prtr-id EDRAINED BY aaaaaaaa KEYWORD PROCESSING - RSN=bb cccc...cccc

aaaaaaaa:	Keyword that caused the problem (PCMDSTRT or PCMDEND)
bb:	Reason number.
cccc...cccc:	Reason description.
Message Meaning:	A problem was encountered while processing the values of the PCMDSTRT or PCMDEND keyword.
System Action:	VPS will put the printer in EDRAINED status.
Required Action:	Correct the error that caused the problem, and issue a START command for the printer.
Note:	• PCMDACTN EDRAIN FOR MODULE LOAD ERROR • NO PRINTER COMMANDS LOCATED IN MODULE LOADED • MODULE ADDRESS MODIFIED BY EXIT 14 • LOAD FAILED FOR MODULE NAMED BY EXIT 14 • STRING LENGTH EXCEEDS MAXIMUM • OVERLAPPING PCMD FLAGS - START MODULE/STRING • OVERLAPPING PCMD FLAGS - END MODULE/STRING • DYNAMIC NAME RESOLUTION FAILED

VPS215I NOTIFY SENT FOR prtr-id jobname(jobid) U=addr

prtr-id	Member name of VPS printer.
jobname	Job name.
jobid	Job ID.
addr	Email address of user notified.
Message Meaning:	Processing for a print dataset has ended or the printer was EDRAINED. The printer NOTIFY keyword indicated that the user be notified by email at the address from the NOTMAIL printer keyword. The VPS216I or VPS217I message was sent to the user indicated.
System Action:	VPS has notified the requested user.
Required Action:	None.

VPS216I prtr-id EDRAINED jobname (jobid) SYS=sss userid

ssss:	System ID where VPS is running.
userid:	Userid to be notified.
Message Meaning:	The printer was EDRAINED and the userid in the message was notified.
System Action:	VPS will issue a subsystem request to notify the specified user.
Required Action:	None.

VPS217I prtr-id PRINT REQUEST COMPLETED|CANCELED|INTERRUPTED jobname(jobid) SYS=ssss userid

ssss: System ID where VPS is running.
userid: Userid to be notified.

Message Meaning: Processing for a print dataset has ended. The dataset has been printed, canceled, or interrupted, as indicated in the message.
System Action: VPS will issue a subsystem request to notify the specified user.
Required Action: None.

VPS218I prtr-id SUBSYSTEM REQUEST FAILURE FOR NOTIFY REQ=reg SSOB=sr R15=rc RSN=rsn NOTIFY=node.user

req: Subsystem request function (004B).
sr: Subsystem request SSOB return code.
rc: Subsystem request R15 return code.
rsn: Subsystem reason code for NOTIFY request.
node: Node name of user who was to be notified.
user: Userid of user who was to be notified.

Message Meaning: Subsystem request failure has occurred when attempting to notify a user that a print request is complete.
System Action: The user will not be notified.
Required Action: If unable to determine the cause of the error by examining the SSOB return code, the R15 return code, and the NOTIFY RSN code, contact VPS technical support.

Possible R15 and SSOB values:

R15	SSOB	RSN	
04			Subsystem does not support this function.
08			Subsystem is not available.
0C			Subsystem does not exist.
10			Function completed, disastrous error.
14			Logic error. Contact VPS technical support.
	04	04	Notify successful, but message truncated.
	08	08	Installation exit canceled notify request.
	08	0C	No userid specified.
	08	10	Invalid destination.
	08	14	Invalid SSNU extension ID.
	08	18	Invalid SSNU version.
	08	1C	No storage available to process request.
	08	20	No authorization.
	08	24	Error in message specification.
	0C		No extension found.

VPS219E prtr-id PRINT LINE OVERFLOW DETECTED - EXITID=xxxxx REQ=yy DATA=zzzzzzzzzzzzzzzz

xxxxx:	Exit ID.
yy:	Exit request code.
zzzzzzzzzzzzzzzz:	Eight bytes of data that caused the overflow.
Message Meaning:	VPS detected that the user exit overlayed the data following the print line.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Examine the source code for the offending user exit and correct the error.

VPS220E prtr-id SEVERE SEPARATOR|USER EXIT FAILURE - NAME=name R15=rc CALLER=modname

name:	Name of user exit or separator.
modname:	Module name of caller.
Message Meaning:	Page separator routine or user exit has returned a return code signifying a severe error.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Dependent on separator routine or user exit.

VPS221I prtr-id CNTRL CHAR. cc INVALID ON LINE n,nnn,nnn DSN=dataset name

cc:	Hex representation of invalid control character.
n,nnn,nnn	Approximate dataset line number.
Message Meaning:	SYSOUT dataset contains an invalid machine or ASA control character.
System Action:	VPS will continue to print the dataset, substituting a single space for all invalid carriage control characters. Only one message VPS221I will be issued per dataset.
Required Action:	Check SYSOUT dataset for invalid control characters and correct the problem.

VPS222I prtr-id FCB CHANNEL cc UNDEFINED ON LINE n,nnn,nnn DSN=dataset name

cc:	Hex representation of control character.
n,nnn,nnn	Approximate dataset line number
Message Meaning:	The FCB image being used does not have the requested channel defined.
System Action:	VPS will continue to print the dataset, substituting a single space for all invalid carriage control characters. Only one message VPS222I will be issued per dataset.
Required Action:	Make sure the correct FCB image was specified on the SYSOUT DD statement.

VPS223E prtr-id MOUNT FORM form FOR JOB jobname (jobid)

form: The form that needs to be mounted.

Message Meaning: Automatic form handling is requesting a new form be mounted.
System Action: VPS will wait for appropriate response.
Required Action: After mounting the requested form, issue a VPS START command for the printer or use the PA-1 key. If the form is not to be printed now, issue a VPS STOP IMMEDIATE command or press PA-2 to drain the printer.

VPS224I prtr-id PRINT BUFFER OVERRUN

Message Meaning: RUSIZE is not large enough to contain the number of repetitive write no-space lines in dataset (DSC only).
System Action: Overprinted lines may not overprint.
Required Action: Increase the VPS RUSIZE parameter specification or reduce the number repetitive write no-space lines.

VPS225I prtr-id NOW RELEASED

Message Meaning: VPS has terminated its session with the printer as the result of a RELEASE command or a request from another VTAM application.
System Action: None.
Required Action: None.

VPS226I prtr-id NOW ACQUIRED
or
prtr-id ACQUIRE FAILED

Message Meaning: Indicates the success or failure of an attempt to establish a session with the printer due to an ACQUIRE command.
System Action: None.
Required Action: If the acquire failed, see the previous VPS message for this printer.

VPS227E prtr-id FCB xxxx IS INCOMPATIBLE WITH MAXLPG=nnn

xxxx: FCB name.
nnn: Value of the MAXLPG keyword.

Message Meaning: The specified FCB has channel 1 on a line number which is greater than the maximum line number specified in the MAXLPG keyword.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Correct either the MAXLPG value or the FCB in SYS1.IMAGELIB, or specify a different FCB.

VPS229E prtrid PRINT LINE OVERFLOW - xxx...xxx

xxx...xxx: NO ROOM IN PRINT LINE FOR LENGTH FIELD FOR LCDS PRINTER

NO ROOM IN PRINT LINE FOR REPETITIVE NEW LINE SEQUENCES

Message Meaning: A print line for an LCDS printer is too long to allow room for the two byte length field to be added, or there is no room in the line area for the number of new line sequences required to position the next print line to the correct line on the page.

System Action: The printer is EDRAINED.

Required Action: Attempt to circumvent the problem by using either or both of these keyword values in the VPS printer definition member:

PRTROPTS=4xxxxxxx
FCB=N

If the printer is still EDRAINED, put the offending sysout dataset on hold, so other datasets can be printed, and contact VPS technical support.

VPS230E prtr-id RU SIZE OVERFLOW

Message Meaning: The request unit size specified with the RUSIZE parameter is not large enough to contain the SYSOUT dataset line.

System Action: VPS will put this printer in EDRAINED status.

Required Action: Specify a larger value for the RUSIZE parameter, use shorter print lines, or specify PRTROPTS=02, which will cause VPS to split the records into multiple send buffers.

VPS231E prtr-id INVALID DBCS DATA DETECTED RSN=reason

reason:
01 - odd number of bytes detected within a pure DBCS print line
02 - unpaired SOSI codes

Message Meaning: VPS detected invalid DBCS data while attempting to perform DBCS translation.

System Action: VPS will put this printer in EDRAINED status.

Required Action: Correct the data based on the reason code.

VPS233E prtr-id SESSION ENCRYPT KEY ERROR RC=rc RSN=rsn MODULE=modname text

rc: Error code from session key routine.
rsn: Reason code from session key routine.
modname: Module name that detected the error.
text: Additional text to describe error code.
Message Meaning: When attempting to generate a dynamic session key for encryption, an unrecoverable error was encountered.
System Action: The printer will be EDRAINED.
Required Action: If the reason for the error cannot be determined, contact VPS technical support.

Reason Code	Description
01	Bad argument, parameter 1
02	Bad argument, parameter 2
03	Bad argument, parameter 3
04	Bad argument, parameter 4
05	Bad argument, parameter 5
06	Bad argument, parameter 6
07	Bad argument, parameter 7
10	Out of memory
11	Data has not been initialized
12	Data has already been initialized
13	Not available at requested security level
14	No reliable random data available
15	Operation failed
20	Type of operation not available
21	No permission for this operation
22	Incorrect key used to decrypt data
23	Operation incomplete or in progress
24	Operation complete; cannot continue
25	Resource in use by async operation
26	Invalid or inconsistent information
27	Resource destroyed by external event
30	Resources or space exhausted
31	Not enough data available
32	Bad or unrecognized data format
33	Signature or integrity check failed
40	Cannot open object
41	Cannot read item from object
42	Cannot write item to object
43	Requested item not found in object
44	Item already present in object
50	Need resource to proceed

VPS234E prtr-id ENCRYPT ERROR CODE=ec CMD=cmd TYPE=cmdtype STATE=state reason

ec:	NACK returned from ISPP device.
cmd:	CI command sent to ISPP device (if any).
cmdtype:	Text to describe CI command (if any).
state:	Current connection state.
reason:	Error text to describe NACK.
Message Meaning:	VPS received a NACK from the ISPP device when sending a Line Initialization or Communications Initialization packet for a printer with ENCRYPT=Y.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	If unable to determine the cause of the error, contact VPS technical support.

VPS239E prtr-id ERROR RETURNED FROM ANYQUEUE|RMTQUEUE|VPSPC RC=rc RSN=rsn reason-text

rc:	Return code from LRSQUEUE product.
rsn:	Reason code from LRSQUEUE product.
reason-text:	Reason text (optional).
Message Meaning:	A LRS product returned an acknowledgement with an error code.
System Action:	The VPS printer will be EDRAINED.
Required Action:	If the reason for the error cannot be determined, call VPS technical support.

VPS250E prtr-id OPEN FAILED FOR SYS1.IMAGELIB

Message Meaning:	VPS was unable to open SYS1.IMAGELIB to get the required FCB.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Contact VPS technical support.

VPS251E prtr-id BLDL FAILED FOR SYS1.IMAGELIB RC=rc FCBnmmmm

rc:	BLDL return code (see OS/VS2 MVS Data Mgt Macros).
n:	4 or 2.
mmmm:	Name of FCB image that was not found.
Message Meaning:	VPS was unable to find requested FCB image. Either that FCB does not exist or an I/O error occurred when reading the dataset. VPS has tried to find both FCB4xxxx and FCB2xxxx in SYS1.IMAGELIB.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Make sure the correct FCB image was specified on the SYSOUT DD statement.

VPS252I prtr-id FAILURE ON SEND OF xxxxxxxx

xxxxxxxx: Type of formatting command which VPS attempted to send.

Message Meaning: The SEND of a particular type of formatting command (begin dataset FMH, end dataset FMH, SAS format, etc.) failed. The previous message for this printer will indicate the particular return code, feedback and sense codes for determining the cause of the error.

System Action: VPS will put this printer in EDRAINED status.

Required Action: Refer to the preceding message for this printer.

VPS253I prtr-id BLDL FAILED FOR xxxxxxxx - SUBSTITUTING DEFAULT yyyyyyyy

xxxxxxxx: Name of the FCB specified on the SYSOUT dataset.

yyyyyyyy: Name of the default FCB named on the FCB keyword.

Message Meaning: The FCB specified on a dataset does not exist on SYS1.IMAGELIB, and the FCB keyword specifies that the default FCB is to be used if the specified FCB cannot be found.

System Action: VPS will use the default FCB for printing the dataset.

Required Action: None.

VPS254E prtr-id FCB VALIDATION ERROR FOR FCB4xxxx

FCB4xxxx: Name of the FCB.

Message Meaning: VPS found the FCB named FCB4xxxx in SYS1.IMAGELIB, but the FCB was not in the appropriate format for a 4248 FCB. (The fourth byte is checked to verify that it contains X'7E').

System Action: VPS will put this printer in EDRAINED status.

Required Action: Correct the specified FCB or specify a different FCB.

VPS255E prtrid FCB CHANNEL nn NOT FOUND

nn: FCB channel number

Message Meaning: The FCB workarea no longer contains the channel number located when the FCB was validated.

System Action: VPS will put this printer in EDRAINED status.

Required Action: Contact VPS technical support.

VPS260E prtr-id COLOR LOGIC ERROR EC=lec

lec: The logic error code.
The first digit of the error code identifies the printer LU type (0, 1 or 3). The last two digits specify the actual error code. The error codes are:

- **01** Reserved
- **02** The VPS RUSIZE is too small to contain a single logical record of the dataset. The minimum RUSIZE for SAS/GRAPH output is 512.
- **03** Bind parameters are incorrect for color. They do not allow a function management header to be sent.
- **04** The color data stream header record is missing. This record identifies the dataset requirements of the printer. This is probably the result of putting a non-SAS dataset in a SYSOUT class which is a SASCLASS.
- **05** The data stream is out of sequence or missing some logical records.
- **06** The data stream contains unrecognizable command codes.
- **07** The record count in the dataset trailer record does not match the number of records read.
- **08** Logical record segmenting error. Part of a logical record is missing.
- **20** The printer does not have the required programmed symbols sets to print this graph.
- **21** A specific symbol set is not a triple plane set required by the graph.
- **22** Color key is not recognized.
- **23** The printer does not have the required colors to print this graph.
- **24** The requested NODENAME does not match the VPS LUNAME.
- **25** The expected end of dataset was not found.
- **81** Invalid data stream received from the printer. The expected FMH is not found.
- **82** Invalid data stream received from the printer. The expected 3270 AID is not found.

Message Meaning: VPS has detected some condition that prevents it from printing the color dataset. The error code will indicate the specific reason.

System Action: VPS will put the printer in EDRAINED status.

Required Action: Use the error code to determine and correct the condition.

VPS261E prtr-id PROCESSING LOGIC ERROR IN MODULE name REASON=text

name:	The name of the VPS module which encountered the error.
text:	Text which describes the logic error.
Message Meaning:	A logic error was encountered in a VPS module while attempting to process a print file.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Contact VPS technical support.

VPS262E prtr-id LOGIC ERROR DURING VPIO CLEANUP - VPIO IN CHAIN FOR info

info:	Type of file located, with text to indicate if the file is open and/or allocated.
Message Meaning:	The VPIO control block was located which represents a file which may be allocated and open.
System Action:	VPS will continue.
Required Action:	Contact VPS technical support.

VPS265E prtr-id CONNECT:DIRECT SUBTASK INITIALIZATION REQUEST FAILED R15=rc

rc:	VPS/CDI return code.
Message Meaning:	The VPS/CDI printer initialization request failed.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Determine the cause of the failure, based on the return code. The MVS system log may contain messages indicating the reason for the failure.

VPS266E prtr-id CONNECT:DIRECT SYSOUT PROCESSING REQUEST FAILED R15=rc

rc:	VPS/CDI return code.
Message Meaning:	The VPS/CDI SYSOUT processing request failed.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Determine the cause of the failure, based on the return code. The MVS system log may contain messages indicating the reason for the failure.

VPS270E prtr-id GDDM OPEN CALL FAILED R15=xx

Message Meaning:	The VPS open call to GDDM has failed.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Correct the error which caused the open call to fail.
Note:	If message VPS273E does not contain the error reason, check syslog to see if the GDDM modules issued a message which describes the problem.

VPS271E prtr-id GDDM PRINT CALL FAILED R15=xx

Message Meaning: The VPS call to GDDM to print a dataset has failed.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Correct the error which caused the print call to fail.
Note: If message VPS273E does not contain the error reason, check syslog to see if the GDDM modules issued a message which describes the problem.

VPS272E prtr-id GDDM CLOSE CALL FAILED R15=xx

Message Meaning: The VPS call to GDDM to close a dataset has failed.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Correct the error which caused the close call to fail.
Note: If message VPS273E does not contain the error reason, check syslog to see if the GDDM modules issued a message which describes the problem.

VPS273N prtr-id TEXT=/ xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx /

Message Meaning: This message may follow messages VPS270E, VPS271E or VPS272E. It gives additional information about the error given to VPS by GDDM.
System Action: None.
Required Action: None.

VPS274E prtr-id GDDM - xxxxxxxxxxxxxxxxx R15=xx

Message Meaning: GDDM has failed, due to the reason indicated in the message. The three possible reasons are:
- ALL APPLIDS IN USE
- ENQ HAS FAILED
- DEQ HAS FAILED

System Action: VPS will put this printer in EDRAINED status.
Required Action: If the reason is ALL APPLIDS IN USE, wait until a VTAM applid is available and start the printer. If the reason is ENQ HAS FAILED or DEQ HAS FAILED, contact VPS technical support.

VPS275N prtr-id GDDM PRINT REQUEST FAILED - MODULE ADMOPUJ NOT LOADED.

Message Meaning: Processing a GDDM request requires that VPS be able to load the ADMOPUJ module, but that module is not available.
System Action: VPS will put the printer in EDRAINED status.
Required Action: Locate and make available the ADMOPUJ module or contact VPS technical support.

VPS276I prtr-id PJL WARNING - RESPONSE UNEXPECTED - rsn

rsn:	Text to describe the reason for the warning.
Message Meaning:	An unexpected PJL response was received.
System Action:	The VPS277I message is issued to display the text of the PJL response returned, if requested. VPS will continue processing.
Required Action:	If the warnings persist, contact LRS technical support.

VPS277I prtr-id aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa

aaaa...:	PJL response text received from the printer.
Message Meaning:	PJL response text is displayed because the printer definition indicated that the PJL response should be written to the VPS log. Multiple messages will be issued if the length of the response text exceeds 98 bytes.
System Action:	VPS will continue processing or the printer will be EDRAINED, based on the value of the PJL response. If the printer is EDRAINED, other VPS messages, for example VPS278E or VPS279E, will indicate the reason for the error.
Required Action:	See the VPS log for error or warning messages associated with the PJL response.

VPS278E prtr-id PJL RESPONSE INDICATES PRINTER ERROR - rsn

rsn:	Text to describe the reason for the error.
Message Meaning:	An error indication was received in the PJL response.
System Action:	The printer will be EDRAINED.
Required Action:	Correct the condition at the printer and restart the printer.

VPS279E prtr-id PJL command conflict - rsn.

rsn:	Text to describe the reason for the error.
Message Meaning:	A PJL command was requested by the PJL keywords in the VPS printer member but the printer does not support the command.
System Action:	The printer will be EDRAINED.
Required Action:	Change the VPS printer definition and re-activate the printer.

VPS280N prtr-id IPDS NACK RECEIVED, ID=aaaaaa CID=bbbb ACTION=cc PAGE=dddddddd - eeeeeeeeeeeeeee…

aaaaaa:	NACK identifier.
bbbb:	Correlation identifier of IPDS command.
cc:	NACK action code.
dddddddd:	Page identifier.
eeeee…:	Variable NACK information.
Message Meaning:	An IPDS NACK (negative acknowledgment) was received from the printer.
System Action:	VPS will try to attempt to recover from the NACK by changing the error handling control options and re-sending the page or resource in error.
Required Action:	Correct the IPDS dataset.

VPS281E prtr-id IPDS INVALID COMMAND, CMD=cccccccc PREVIOUS CID=iiii CMD=dddd LENGTH=llll

ccccccc:	Command that was found to be invalid.
iiii:	Correlation ID of previous command.
dddd:	Previous IPDS command.
llll:	Length of previous IPDS command.
Message Meaning:	VPS has detected an IPDS command that is not valid.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Correct the IPDS datastream. If the IPDS datastream was generated by VPS/IPDS, contact VPS technical support.
Note:	The previous CID, CMD and LENGTH fields are provided to aid in problem determination. When an invalid IPDS command is detected, it is sometimes the length field of the previous command which is in error.

VPS282E prtr-id IPDS INVALID COMMAND, CMD=cccc

cccc:	Command that was found to be invalid.
Message Meaning:	VPS has detected an IPDS command that did not begin with X'D6'.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Correct the IPDS datastream. If the IPDS datastream was generated by VPS/IPDS, contact VPS technical support.

VPS283E prtr-id IPDS INVALID COMMAND LENGTH, LENGTH=llll

llll:	Command length that was found to be invalid.
Message Meaning:	VPS has detected an IPDS command with a length that is smaller than 5 bytes or larger than 32k.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Correct the IPDS datastream. If the IPDS datastream was generated by VPS/IPDS, contact VPS technical support.

VPS284E prtr-id IPDS UNKNOWN ACK/NACK
nnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnnn

nn..nn: ACK/NACK that was not recognized.

Message Meaning: VPS has received an ACK or NACK from the IPDS printer that it cannot interpret.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Contact VPS technical support.

VPS285E prtr-id IPDS ERROR PROCESSING MULTIPLE RU ACK/NACK

Message Meaning: The printer has transmitted an ACK or NACK in more than one VTAM request unit (RU). VPS has encountered an error processing these RUs.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Contact VPS technical support.

VPS286N prtr-id aaaaaaaaaaaaaaa…

aaaaa…: Description of the NACK.

Message Meaning: This message describes the NACK.
System Action: None.
Required Action: None.

VPS287E prtr-id NACK MESSAGE LIMIT (PIMSG COUNT) EXCEEDED

Message Meaning: The IPDS NACK limit (defined in the second positional parameter of the PIMSG printer definition or OUTPUT statement keyword) has been exceeded.
System Action: VPS/IPDS will end processing.
Required Action: Correct the errors causing the NACKs or increase the PIMSG count.

VPS288I prtr-id IPDS/IP STATE=state CODE=code reason

state: Current printer state, such as:

- INTERVENTION REQUIRED
- ONLINE/READY

code: Exception code returned from printer.
reason: Text to describe intervention required state.

Message Meaning: VPS received a STATE INFORMATION buffer from the IPDS printer.
System Action: If the state indicates INTERVENTION REQUIRED, VPS will wait until the printer returns to ONLINE/READY state. If the state indicates the printer is READY and ONLINE, VPS will resume sending the print file.
Required Action: None.

VPS289E prtr-id IPDS/IP COMMAND PROCESSING ERROR - COMMAND=cmd TYPE=type

cmd:	Command code sent to the printer.
type:	Text to describe current command.
Message Meaning:	VPS was attempting to send an IPDS/IP command to the printer, but was unsuccessful.
System Action:	VPS will put the printer in EDRAINED status.
Required Action:	If the reason for the error cannot be determined, contact VPS technical support.

VPS290E SAR INTERFACE INITIALIZATION ERROR - LOAD FAILED FOR MODULE mmmmmmmm R1=xxxxxxxx R15=yyyyyyyy

mmmmmmmm:	The name of the SAR interface module.
xxxxxxxx:	The contents of Register 1.
yyyyyyyy:	The contents of Register 15.
Message Meaning:	VPS attempted to load the SAR interface module, but the LOAD macro gave a non-zero return code.
System Action:	VPS will disable the SAR interface.
Required Action:	Verify that the SAR interface module is either in an authorized linklist library or an authorized library named in the STEPLIB DD in the VPS JCL.

VPS291E prtrid SAR INTERFACE MACRO ERROR TYPE=xxxxxxxx R15=yyyyyyyy

xxxxxxxx:	The type of macro which had the error. The possibilities are INIT, TERM, ACCESS, RETRIEVE or RELEASE.
yyyyyyyy:	The contents of Register 15.
Message Meaning:	VPS attempted to issue the SAREPI macro to request a service, but the macro gave a non-zero return code.
System Action:	VPS will disable the SAR interface if the request was INIT or TERM. If the request was ACCESS, RETRIEVE or RELEASE, VPS will put the printer in EDRAINED status.
Required Action:	For ACCESS or RETRIEVE calls, refer to message VPS292E for additional information. If the reason for the error cannot be determined, contact VPS or SAR technical support.

VPS292E prtrid xxxx....xxxx

xxxx....xxxx:	Message text supplied by SAR to describe a SAR interface error.
Message Meaning:	This message gives the error information returned by SAR for an invalid SAR interface macro call.
System Action:	Refer to VPS291E message.
Required Action:	Refer to VPS291E message.

VPS293E prtrid SAR INTERFACE LOGIC ERROR SAR PCBTOKEN INVALID
prtrid SAR INTERFACE LOGIC ERROR SAR LINE LENGTH ZERO

Message Meaning: VPS determined that there was an error while processing a SAR dataset.
System Action: VPS will put the printer in EDRAINED status.
Required Action: Contact VPS or SAR technical support.

VPS297E prtrid ACIF ERROR DURING CONVERSION - RETURN CODE = r15

Message Meaning: A non-zero return code was returned from ACIF when conversion was attempted. See VPS299I messages for more information about the error.
System Action: VPS will put the printer in EDRAINED status.
Required Action: Determine how to correct the error using the message text returned from ACIF as displayed in the VPS299I messages.

VPS298I prtrid WARNING: ACIF PARAMETER RECORD BYPASSED - reason

reason: The reason the ACIF parameter record was considered invalid.

Message Meaning: A record in the parameter file was determined by VPS to be invalid for input to the ACIF conversion program.
System Action: The record is not sent to ACIF.
Required Action: Determine what is invalid about the record and make corrections to VPS User Exit 27 to avoid creating the invalid parameter record.

VPS299I prtrid aaaaaaaaaaaaaaaaaaaaaaa

aaa...aaa: Message text returned from ACIF.

Message Meaning: VPS formats message text returned by ACIF and displays this text if the conversion failed or if PRTROPTS=00000080 was specified in the printer definition.
System Action: None.
Required Action: None.

VPS300E ACB OPEN FAILED R15=rc AC=ac

Message Meaning: VPS was unable to open its VTAM ACB.
System Action: VPS will abend with a U005 abend.
Required Action: Correct the error based upon R15 and AC. See the appropriate VTAM programming manual.

VPS301E SETLOGON START FAILED RC=rc F2=f2 SNS=snse R15=rrrr

Message Meaning: VPS was unable to inform VTAM (via SETLOGON RPL) that it is now accepting logons.
System Action: VPS will abend with a U005 abend.
Required Action: Correct the error based upon RC and F2. See the appropriate VTAM programming manual.

VPS302E ACB OPEN FAILED, (5A) APPLID NOT ACTIVE. REPLY R TO RETRY, E TO END

Message Meaning: The VPS APPLID defined to VTAM is not in a "connectable" state.
System Action: If reply is R, VPS will retry VTAM ACB open. If reply is E, VPS will terminate.
Required Action: Either issue the appropriate VTAM commands to ready the applid and reply R, or reply E to terminate VPS.

VPS303E ACB OPEN FAILED, (5C) VTAM NOT ACTIVE. REPLY R TO RETRY, E TO END

Message Meaning: VTAM is not active.
System Action: If reply is R, VPS will retry ACB open. If reply is E, VPS will terminate.
Required Action: Wait for VTAM and its application configurations to come active and reply R, or reply E to terminate VPS.

VPS304E GENCB BLK=ACB FAILED R15=rc R0=ec

Message Meaning: VTAM GENCB for the ACB failed.
System Action: VPS will terminate.
Required Action: Correct the error based upon R15 and R0. See the appropriate VTAM programming manual.

VPS305N ACB CLOSE FAILED R15=rc AC=ac

Message Meaning: VPS had an error closing its VTAM ACB.
System Action: Termination processing will continue.
Required Action: Correct the error based upon R15 and AC. See the appropriate VTAM programming manual.

VPS306N RECEIVE ANY FAILED RC=rc F2=F2 SNS=snse|R15=rrrr

Message Meaning: A VTAM RECEIVE for any session has failed.
System Action: The RECEIVE is not performed.
Required Action: Correct the error causing the RECEIVE failure.

VPS307E SHOWCB BLK=ACB FAILED R15=rc R0=ec

Message Meaning: VTAM SHOWCB for the ACB failed.
System Action: VPS will terminate.
Required Action: Correct the error based upon R15 and R0. See the appropriate VTAM programming manual.

VPS309E prtr-id PRIMARY SIMLOGON RC=rc F2=f2 SNS=snse

Message Meaning: A primary luname and an alternate luname were specified to VPS. The VTAM SIMLOGON request for the primary LU failed. The LU is "not active", "not defined", or "inhibited for sessions".
System Action: VPS will attempt to establish a session with the alternate LU
Required Action: If this error was expected, none. Otherwise, correct the error based upon the RC, F2 and SNS. See the appropriate VTAM programming manual.

VPS310E prtr-id SIMLOGON FAILED R15=rc F2=f2 SNS=snse

Message Meaning: VTAM SIMLOGON for the specified printer failed.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Correct the error based upon RC, F2 and SNS. See the appropriate VTAM programming manual.
Common Errors: R15=10 F2=00 SNS=0000 Logical unit not active to VTAM.
R15=14 F2=53 SNS=0000 Logical unit not defined to VTAM.

VPS311E prtr-id INQUIRE FAILED RC=rc F2=f2 SNS=snse|R15=rrrr

Message Meaning: VTAM INQUIRE for the specified printer failed.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Correct the error based upon RC, F2 and SNS or R15. See the appropriate VTAM programming manual.

VPS312E prtr-id OPNDST FAILED RC=rc F2=f2 SNS=snse|R15=rrrr

Message Meaning: VTAM OPNDST for the specified printer failed.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Correct the error based upon RC, F2 and SNS or R15. See the appropriate VTAM programming manual.
Common Errors: RC=10 F2=01 SNS=080A = printer is powered off.
RC=10 F2=01 SNS=0821 or SNS=0835 = incorrect session parameters.

VPS313N prtr-id SESSION PARAMETERS session parms

session parms: Session parameters in hex.

Message Meaning: When message VPS312E indicates a SNS=0821 or 0835, the session parameters are also displayed.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Correct the error based upon RC, F2 and SNS from corresponding VPS312E message.

VPS315E prtr-id SESSION PARAMETERS ARE INVALID

Message Meaning: VPS does not recognize the session parameters to be valid for any LU type supported by VPS.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Supply a valid set of session parameters to VPS through the VTAM definition of the printer or the VPS ALOGMODE parameter.

VPS316E prtr-id SESSION REJECTED - LOGON DATA ERROR

Message Meaning: A printer attempted to establish a session with VPS without the required logon data or too much logon data. See LOGDATA= parameter specification.
System Action: The session is rejected by VPS.
Required Action: Retry the logon with the correct logon data.

VPS317E prtr-id CLSDST FAILED RC=rc F2=f2 SNS=snse

Message Meaning: VTAM CLSDST for this printer failed.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Correct the error based upon RC, F2 and SNS. See the appropriate VTAM programming manual.

VPS318N prtr-id SESSION REJECTED FOR xxxxxxxx

xxxxxxxx: Terminal name.

Message Meaning: VPS could not connect to the printer.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Check the VPS log for messages preceding the VPS318N message which give more information about why VPS could not connect to the printer.
Note: For a VTAM printer, if the printer is allowed to logon to VPS, but the printer is not defined to VPS, define the printer to VPS and specify DIAL=Y in the VPS Printer Definition member. If the printer is not allowed to logon to VPS but has the VPS applid on its LU definition, remove the VPS applid from the definition. If someone has issued a LOGON command to the VPS applid, inform the person who issued the LOGON command of the problem.

VPS319N SPECIAL CLSDST FAILED RC=rc F2=f2 SNS=snse|R15=rrrr

Message Meaning: A special VTAM CLSDST request to reject a session with a device not defined to VPS has failed.
System Action: None.
Required Action: Correct the error which caused the CLSDST to fail.

VPS320E prtr-id RECEIVE FAILED RC=rc F2=f2 SNS=snse|R15=rrrr

Message Meaning: VTAM RECEIVE for this printer failed.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Correct the error based upon RC, F2 and SNS or R15. See the appropriate VTAM programming manual.

VPS324E prtr-id RESETSR FAILED RC=rc F2=f2 SNS=snse

Message Meaning: VTAM RESETSR for the specified printer failed.
System Action: VPS will put the printer in EDRAINED status.
Required Action: Correct the error based upon the RC, F2 and SNS. See the appropriate VTAM Programming Manual.

VPS325N prtr-id UNDEFINED WORK ELEMENT TYPE=xxxx

Message Meaning: VPS has received an SNA command or data from the printer or VTAM which it does not recognize.
System Action: The command or data is discarded. VPS will take a snap dump of the work element containing the command or data prior to discarding it.
Required Action: Use the snap dump to identify the command or data for which the message was issued and determine its validity.

VPS328N prtr-id LU-0 STATUS RECV RC=rc F2=f2 SNS=snse

Message Meaning: The 3270 sense/status received from the printer is unexpected.
System Action: Sense is ignored.
Required Action: None.

VPS331E prtr-id SEND BBI FAILED RC=rc F2=f2 SNS=snse|R15=rrrr

Message Meaning: VTAM SEND of a NULL RU with Begin Bracket Indicator failed for this printer.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Correct the error based upon RC, F2 and SNS or R15. See the appropriate VTAM programming manual.

VPS332E prtr-id SEND DATA ERROR RC=rc F2=f2 SNS=snse|R15=rrrr

Message Meaning: VTAM SEND-data for the specified printer failed.
System Action: VPS will retry if the error is recoverable. If the error is not recoverable or the retries are exhausted, VPS will put this printer in EDRAINED status.
Required Action: Correct the error based upon RC, F2 and SNS or R15. See the appropriate VTAM programming manual.
Common Errors: RC=04 F2=04 SNS=081C Printer hardware failure.
RC=04 F2=04 SNS=1005 Printer doesn't support the value of an SCS command sent to the printer.
(See "SCS Command Usage by VPS" on page 6.50.)

VPS334E prtr-id SEND CANCEL FAILED RC=rc F2=f2 SNS=snse

Message Meaning: VTAM SEND of SNA CANCEL for the specified printer failed.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Correct the error based upon RC, F2 and SNS. See the appropriate VTAM programming manual.

VPS335E prtr-id SEND CLEAR FAILED RC=rc F2=f2 SNS=snse

Message Meaning: VTAM SEND of SNA CLEAR for the specified printer failed.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Correct the error based upon RC, F2 and SNS. See the appropriate VTAM programming manual.

VPS336E prtr-id SEND SDT FAILED RC=rc F2=f2 SNS=snse|R15=rrrr

Message Meaning: VTAM SEND of SNA SDT for the specified printer failed.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Correct the error based upon RC, F2 and SNS or R15. See the appropriate VTAM programming manual.

VPS337E prtr-id SEND RESP FAILED RC=rc F2=f2 SNS=snse

Message Meaning: VTAM SEND of a response for this printer failed.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Correct the error which caused the SEND to fail.

VPS340E prtr-id INTERVENTION REQUIRED

Message Meaning: Intervention has been detected for this printer (out of paper or a paper jam).
System Action: VPS will wait for a printer ready condition.
Required Action: Ready printer.
Common Errors: Printer configured in control unit for local print only on non-SNA control units (LU Type-0).

VPS342E prtr-id POWERED OFF OR DISCONNECTED

Message Meaning: Power-off has been detected for this printer.
System Action: VPS will wait for a printer power-on.
Required Action: Power on printer.

VPS345E prtr-id RECOVERY NOT ATTEMPTED - ERRACTN=EDR

Message Meaning: A retriable error occurred on the printer, but the ERRACTN keyword indicated that VPS should put the printer in EDRAINED status rather than resending data.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Determine if you want to reprint all or part of the job or delete it from the JES spool and recreate it before issuing a START command for the printer.

VPS346E prtr-id VTAM ERROR ROUTINE HAS FAILED RSN=xx

xx: The specific reason for the failure. If you contact VPS technical support, they will ask for this reason code.

Message Meaning: The routines within VPS which analyze and process VTAM and VTAM-related errors have discovered an internal logic error.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Contact VPS technical support.

VPS347E prtr-id RECOVERY TABLE ENTRY NOT FOUND

Message Meaning: VPS cannot find the required entry in the internal recovery table for an LU-1 printer using SNA chaining.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Contact VPS technical support.
Note: This error can be cause by large PACING or VPACING values in the session parameters. If either value is larger than 4, reduce the value to 4. If the values are already 4 or less, contact VPS technical support.

VPS348N prtr-id BRACKET ERROR - RETRY TO BE ATTEMPTED

Message Meaning: VPS detected a bracket error on a SEND to an LU-0 printer. VPS will attempt to retry.
System Action: None.
Required Action: None.

VPS349E prtr-id RETRY LIMIT EXCEEDED

Message Meaning: The number of retriable VTAM SEND failures specified for the printer in the RETRIES parameter has been exceeded for this dataset.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Correct the problem which is causing the SEND to fail.

VPS350E tpend-type TPEND ACKNOWLEDGED

tpend-type: QUICK, CANCEL OR NORMAL.

Message Meaning: VPS has been notified that VTAM is terminating.
System Action: If tpend quick/cancel, VPS will abend with U002. If normal, VPS will begin normal shutdown.
Required Action: None.

VPS351N prtr-id RELEASE REQUEST ACKNOWLEDGED

Message Meaning: Another VTAM application has requested a printer that is currently in session with VPS.
System Action: VPS will release (CLSDST) the printer at end-of-job or waiting-for-work, depending on RELREQ specification.
Required Action: None.

VPS352E prtr-id LOST TERMINAL REASON=rc

rc: Lost terminal reason code.

Message Meaning: VPS has been notified that printer has been lost.
System Action: VPS will take the appropriate action based upon the reason code. The action can be EDRAIN the printer or terminate the current session and attempt a new session.
Required Action: Correct the error based upon the lost terminal reason code. (The VTAM Programming manual lists the possible reason codes in its discussion of the LOSTERM Exit).

VPS353N prtr-id RELEASE REQUEST REJECTED

Message Meaning: Another VTAM application has requested a printer that is currently in session with VPS. VPS has been instructed to not release the printer (RELREQ=N).
System Action: VPS will not release the printer.
Required Action: None.

VPS354E prtr-id SESSION CLEANUP REQUESTED

Message Meaning: VTAM has requested VPS to cleanup its end of an active session with a printer. This is probably the result of a network failure or an operator command.
System Action: VPS will put this printer in EDRAINED status, unless DIAL=Y is specified for this printer. In that case, the printer will be released (VTAM CLSDST) and DRAINED.
Required Action: Resolve the network problem with the printer and/or determine the operator command.

VPS355E prtr-id SESSION SETUP FAILED

Message Meaning: VTAM has requested VPS to cleanup its end of a queued session with a printer. This is probably the result of an operator command while the printer was in W-CONNECT status.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Determine why the operator command was issued.

VPS356N prtr-id INVALID RU RECEIVED IN NSEXIT

Message Meaning: An invalid or unexpected RU was passed to the NSEXIT by VTAM.
System Action: None.
Required Action: Refer to message VPS362N to identify the invalid RU information.

VPS357N prtr-id SESSION REQUEST REJECT, VTAM TERM NORMAL

Message Meaning: VTAM informed VPS that it was terminating when VPS was attempting to establish a session.
System Action: VPS will put this printer in EDRAINED status.
Required Action: None.

VPS358N prtr-id xxxxxxxxxxxxxxx REJECT, VTAM TERM QUICK

xxxxxxxxxxxxxxx: The type of VTAM request being attempted.

Message Meaning: VTAM informed VPS that it was terminating "quickly" when VPS was attempting a VTAM request.
System Action: VPS will put this printer in EDRAINED status.
Required Action: None.

VPS359N prtr-id xxxxxxxxxxxxxxx REJECT, SESSION TERMINATED

xxxxxxxxxxxxxxx: The type of VTAM request being attempted.

Message Meaning: The session between VPS and the printer was terminated when VPS was attempting a request for the printer.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Determine the reason for the termination of the VTAM session.

VPS360E prtr-id SEND/RECEIVE CHECK SNS=xxxx

xxxx:	SNA sense code.
Message Meaning:	An SNA protocol violation has been discovered in data sent to or received from this printer.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Correct the protocol violation.

VPS361E prtr-id SNA STATE ERROR FSM=ffff

ffff:	VTAM state name.
Message Meaning:	An SNA defined VPS internal state has an improper value.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Contact VPS technical support.

VPS362E prtr-id RU=ru bytes

ru bytes:	The first 24 bytes of the invalid RU.
Message Meaning:	An invalid or unexpected request unit was passed to the NSEXIT by VTAM. The first 24 bytes of the RU are displayed here. This message follows message VPS356N.
System Action:	None.
Required Action:	Use the displayed RU data to determine the validity of the RU.

VPS370E prtr-id RCV FMH FAILED RC=rc F2=f2 SNS=snse

Message Meaning:	VPS received an FMH from the device that it does not support. This could be a device attempting to use console support.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Check the values on the RJE keyword.

VPS371E prtr-id APPCCMD FAILED CONT=aaaaaaaa QUAL=bbbbbbbb RCPRI=cccc RCSEC=dddd RC=rc F2=F2 R15=r15 R0=r0 snse

aaaaaaaa: CONTROL= value from VTAM APPCCMD macro.
bbbbbbbb: QUALIFY= value from VTAM APPCCMD macro.
cccc: Primary return code from RPL extension.
dddd: Secondary return code from RPL extension.
dddd: Secondary return code from RPL extension.
Message Meaning: A VTAM APPCCMD macro failed for a VPS printer with COMMTYPE=(APPC,xxxx).
System Action: VPS will put this printer in EDRAINED status.
Required Action: Contact VPS technical support.

Possible values for the error message variables:

CONT=	QUAL=	Function
ALLOC	ALLOCD	Start a conversation
CHECK	N/A	Check RPL after macro completion
DEALLOC	CONFIRM	End a conversation
OPRCNTL	ACTSESS	Accept session with APPC device
OPRCNTL	CNOS	Set session limits
OPRCNTL	DACTSESS	Reject session with APPC device
OPRCNTL	DISPLAY	Display session limits
REJECT	N/A	Termination conversation and session
SEND	CONFIRM	Request confirmation
SEND	DATA	Send data
SEND	DATACON	Send data and request confirmation

Primary and Secondary return codes for the APPCCMD macros are described in the VTAM Programming for LU6.2 manual. The most common codes received by VPS when operating with VPS/PC are:

RCPRI	RCSEC	Description/Possible Reasons/Action
0004	0000	ALLOCATION ERROR; NO RETRY Path error; check physical connections Device not defined or not active Device not ready; start VPS/PC
0004	0001	ALLOCATION ERROR; RETRY IS ALLOWED Device not ready; start VPS/PC
0010	0004	PARTNER LU STARTING SESSION VPS/PC has issued CNOS
0020	0000	CNOS FAILURE, RETRY IS ALLOWED Device not ready; start VPS/PC
002C	0000	INVALID LU NAME LUNAME incorrect or not active
002C	0001	INVALID MODE Mode name not equal to ALOGMODE Mode name unknown or misspelled Mode name not in logon mode table
002C	0002	INVALID CONVERSATION Conversation has terminated abnormally
002C	0003	INVALID LL Invalid record length (logic error)

RCPRI	RCSEC	Description/Possible Reasons/Action
002C	0014	INVALID BIND PARAMETERS Mode name does not specify LU6 session parameters
002C	001E	CID INVALID ACTSESS specified unknown session ID DACTSESS specified unknown session ID
0048	0000	RESOURCE FAILURE, NO RETRY VPS/PC was terminated; restart VPS/PC
0054	0000	UNRECOGNIZED MODE NAME Mode name not equal to ALOGMODE Mode name not in logon mode table
0064	0000	ACTIVATION FAILURE APPC remote device not available VPS/PC APPC software not active; start VPS/PC VPS/PC using invalid mode name VPS/PC mode name not equal to ALOGMODE
0088	0000	CANCELED BY REJECT/ABNORMAL DEALLOC VPS/PC terminated abnormally; restart VPS/PC
0090	0000	APPLICATION NOT APPC CAPABLE APPL definition does not allow APPCCMD; check VPS APPL

VPS372E prtr-id UNKNOWN|UNSUPPORTED REQUEST RECEIVED IN VTAM ATTN EXIT FOR REQUEST TYPE=aaaa LUNAME=bbbbbbbb

aaaa: Type of request received in the VTAM ATTN exit.
bbbbbbbb: LU name of the printer.

Message Meaning: VPS has received an unknown or unsupported request in the VTAM ATTN exit for an APPC device.
System Action: The request will be ignored.
Required Action: Contact VPS technical support.

VPS373E prtr-id INVALID VTAM|TCPIP request aaaaaaaa bbbbbbbb

aaaaaaaa: Request code received by the processing module.
bbbbbbbb: Additional information about the request.
FOR APPC - VTAM request was made for APPC device

Message Meaning: VPS has received an unknown request code in its VTAM APPCCMD processing module or TCP/IP processing module. This is an internal logic error.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Contact VPS technical support.

VPS374N prtr-id APPC SESSION(LUNAME=aaaaaaaa MODE=bbbbbbbb LIMIT=cccc CURRENT=dddd)

aaaaaaaa:	LU name of APPC printer.
bbbbbbbb:	MODE name associated with session.
cccc:	Session limit.
dddd:	Number of current sessions.
Message Meaning:	VPS has encountered an error during session startup for an APPC device. The session information will be displayed to help diagnose the problem. Message VPS371E should also appear to describe the error encountered.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Contact VPS technical support.

VPS380N TCPIP CONNECTION SUCCESSFUL HOST=aaaaaaaa,PORT=bbb,TYPE=ttt

aaaaaaaa:	Indicates the fully-qualified name of the local host for TCP/IP.
bbb:	Indicates the PORT obtained to connect to TCP/IP.
ttt:	Indicates TCPTYPE value.
Message Meaning:	The VPS system has successfully connected to TCP/IP.
System Action:	None.
Required Action:	None.

VPS381E prtr-id TCPIP IBM MACRO ERROR TYPE=aaaaaaaa R15=r15 SOCKET=bbbb FUNCTION=cccc

aaaaaaaa:	Indicates the 16-byte descriptor provided for the IBM TCP/IP request.
bbbb:	Indicates the current socket value.
cccc:	Indicates the function requested or zero.
Message Meaning:	An error occurred when a TCP/IP IUCV macro was issued.
System Action:	The printer is EDRAINED.
Required Action:	If unable to determine the cause of the error, contact VPS technical support.

VPS382E prtr-id TCPIP ERROR=reason TYPE=aaa..aaa FUNCTION=bbbb ANS=ans1 ans2

reason:	The reason for the error, such as: • PC NUMBER INIT FAILED • CONNECTION TO TCPIP FAILED • NO PORT CURRENTLY AVAILABLE • SPECIAL REJECT ERROR DETECTED • INVALID ACKNOWLEDGEMENT • ERROR TEXT FROM REMOTE HOST
aaa..aaa:	Indicates the 16-byte descriptor provided for the TCP/IP IUCV request.
bbbb:	Indicates the function code requested or zero.
ans1:	The first word of the answer back area.
ans2:	The second word of the answer back area.
Message Meaning:	A TCP/IP IUCV request failed due to an error condition.
System Action:	The printer is EDRAINED.
Required Action:	If unable to determine the cause of the error, contact VPS technical support.
Note:	If the first word of the answer back area is FFFFFFFF (-1), the value of the second word of the answer back area contains a reason code. The "reason" value contains the error text which describes the reason code. If the "reason" value is "ERROR TEXT FROM REMOTE HOST", message VPS390E will supply the error text that was received.

VPS383E TCPIP CONNECTION SEVERED - REASON=aaaaaaaa bbbbbbbbbbbbbbbb

aaaaaaaa:	The reason code supplied by MVS TCP/IP, if applicable.
bbbbbbbbbbbbbbbb:	A description of why the connection was severed.

Reason Code	Description
IUCVCHECKRC	IUCV error detected before initial send
SHUTTINGDOWN	TCP/IP service is being shut down (during connect)
KILL -9	Fatal error in IUCV communications
KILL -37	A software error occurred in MVS TCP/IP
KILL -38	TCP/IP service is being shut down (after connect)

Message Meaning:	The MVS TCP/IP address space has severed the connection with VPS. VPS will attempt to reconnect to TCP/IP unless a SSET command is issued to disable the TCP/IP interface.
System Action:	All active TCP/IP printers are EDRAINED.
Required Action:	If unable to determine the cause of the error, contact VPS technical support.

VPS384E prtr-id TCPIP PROCESSING LOGIC ERROR - reason

reason: A description of the logic error, such as:
- API OPTIONS EXCEED MAX LENGTH
- API OPTIONS LENGTH ZERO
- CONFIRM/DISCONNECT MISSING
- CONTROL RECORDS INVALID
- DATA INDICATION MISSING
- DATA LENGTH LESS THAN MINIMUM
- DATA RECEIVED EXCEEDS BUFFER
- DIRSRV - HOST NAME ZERO LENGTH
- DIRSRV - INVALID ADDR LENGTH
- DOMAIN NAME SERVER UNAVAILABLE
- ENDPOINT STATE ERROR
- ERROR OBTAINING IP ADDRESS
- ERROR OBTAINING SOCKET NUMBER
- ERROR PROCESSING CONTROL FILE
- LOCAL HOST ADDR LEN IS ZERO
- REQUESTED SOCKET NOT OBTAINED
- TINFO RETURNED ZERO LENGTH
- TP OPTIONS LENGTH ZERO
- UNKNOWN TCPIP TYPE
- VPSSTCPI EOD ON UNALLOC CALL
- VPSSTCPI EOD ON WRITE CALL

Message Meaning: A logic error has occurred when processing a dataset for a TCP/IP printer.
System Action: The printer is EDRAINED.
Required Action: Contact VPS technical support.

VPS385E UNKNOWN|UNSUPPORTED|INVALID INTERRUPT TYPE aa RECEIVED IN TCPIP IUCV EXIT UWORD=bbbbbbbb EXTB=cccccccc

aa: The interrupt type received in the exit.
bbbbbbbb: The value of the user word passed to the exit.
cccccccc: The value of the first 8 bytes of the external interrupt buffer.

Message Meaning: The interrupt type received in the IUCV exit was unknown to VPS, was unsupported by VPS, or the external interrupt buffer contained invalid data.
System Action: The interrupt is ignored.
Required Action: Contact VPS technical support.

VPS386E VPS/TCPIP INTERFACE DISABLED - TCPIP IBM|ICS REQUEST TERMINATED ABNORMALLY

Message Meaning: An abend occurred while a system request to TCP/IP was in progress. The TCP/IP interface will be disabled.
System Action: All active TCP/IP printers are EDRAINED.
Required Action: If unable to determine the cause of the error, contact VPS technical support.

VPS387E prtr-id TCPIP CONNECTION NOT AVAILABLE - REASON=aaaaaaaa bbbbbbbbbbbb

aaaaaaaa: The reason code returned from MVS TCP/IP, if applicable.

bbbbbbbbbbbb: Text to explain why the connection cannot be made. The most common reasons are:

N/A VPS	NOT CONNECTED TO TCPIP
00000001	TRANSMISSION TIMEOUT
00000002	HOST IS UNREACHABLE
00000003	PORT IS UNREACHABLE
00000004	REMOTE ABORTED CONNECTION
00000005	LOCAL NETWORK IS DOWN
00000006	PROTOCOL IS UNREACHABLE
00000007	ACP CONNECTION ERROR
00000008	API CONNECTION ERROR

Message Meaning: Connection to the remote TCP/IP host is not possible at this time.
System Action: The printer is EDRAINED.
Required Action: Restart the printer when the connection is available.

VPS388I prtr-id TCPIP CONNECTION DELAYED - reason

reason: The reason code for the delay, such as:
- HOST ALREADY IN USE BY aaaaaaaa (where "aaaaaaaa" is the member name of the VPS printer connected at the same host address).

Message Meaning: Connection to the printer at the remote TCP/IP host is delayed until the connection for printer "aaaaaaaa" is released.
System Action: The printer will be placed in WCONNECT status.
Required Action: None.

VPS389E prtrid TCPIP DOMAIN NAME SERVICES CALL ERROR RC=rc RSN=rsn HOST=host text

rc: Return code.
rsn: Reason code.
host: Host name.
text: HOST NAME UNKNOWN
HOST ADDRESS ZERO
UNEXPECTED RC/RSN

Message Meaning: An error occurred when VPS called MVS TCP/IP to resolve a host name into an IP address.
System Action: The printer is EDRAINED.
Required Action: Correct the value of the TCPHOST keyword in the VPS printer definition.

VPS390E aaaaaaaaaaaaaaaaaaaaaaaaaa

aaaaaaa: Error message text supplied by the remote TCP/IP host.

Message Meaning: An error was detected by the remote TCP/IP host. The VPS382E message will also be issued to indicate the type of request that was made.
System Action: The TCP/IP printer is EDRAINED.
Required Action: Attempt to correct the error at the remote TCP/IP host. If unable to determine the cause of the error, contact VPS technical support.
Note: If any part of the text returned is unprintable, the entire message text returned is displayed in hexadecimal format.

VPS391E prtr-id TCPMRD INTERVAL EXPIRED - TCP/IP CONNECTION TIMED OUT

Message Meaning: No response was returned to an outstanding TCP/IP request during the interval specified by the TCPMRD keyword. VPS terminates the connection with the TCP/IP remote host.
System Action: The TCP/IP printer is EDRAINED.
Required Action: Determine the reason the printer did not respond and then restart the printer.

VPS392E VPS/TCPIP TIMER IRB EXIT UNABLE TO LOCATE VPS PRINTER CONTROL BLOCKS

Message Meaning: No response was returned to an outstanding TCP/IP request during the interval specified by the TCPMRD keyword; however, the timer exit could not locate the VPS printer control blocks associated with the request.
System Action: The timer interrupt is ignored.
Required Action: Contact VPS technical support.

VPS393E INVALID|UNKNOWN|UNSUPPORTED EXIT PARAMETER RECEIVED IN TCPIP ASYNCHRONOUS EXIT - TYPE=aaaa EVENT=bbbbbbbb

aaaa: The type of asynchronous exit parameter received.
bbbbbbbb: The event for which the exit was scheduled, such as:

Type	Type Description	Event	Event Description
0001	Protocol event	00	Connect indication
0001	Protocol event	04	Confirm indication
0001	Protocol event	08	Data indication
0001	Protocol event	12	Expedited data indication
0001	Protocol event	16	Datagram error indication
0001	Protocol event	20	Disconnect indication
0001	Protocol event	24	Release indication
0002	Endpoint completion		
0003	TPEND (shutdown)	00	Operator drained subsystem
0003	TPEND (shutdown)	04	Operator stopped subsystem
0003	TPEND (shutdown)	08	Subsystem abended
0004	Synchronous error		
0005	APEND (shutdown)	04	Operator drained subsystem
0003	APEND (shutdown)	04	Operator stopped subsystem
0003	APEND (shutdown)	08	Subsystem abended

Message Meaning: VPS has received an unknown request in the ICS asynchronous event exit.
System Action: The request will be ignored.
Required Action: Contact VPS technical support.

VPS394E prtr-id TCPIP ICS ERROR=reason TYPE=aaa..aaa R15=r15 R0=r0 RTNCD=rc

reason: The reason for the error, such as:
- API NOT CONFIGURED
- API NOT ACTIVE
- API NOT READY FOR SERVICE
- API SUBSYSTEM STOPPED
- API SUBSYSTEM DRAINING
- TIME LIMIT EXCEEDED
- REQUEST EXCEEDED TIME LIMIT
- HOST DOES NOT EXIST
- INSUFFICIENT DATA: NO HOST
- SUBSYSTEM NOT INITIALIZED
- DISCONNECT RECEIVED
- TCONNECT ADDRESS IN USE

aaa..aaa: The type of macro issued (AOPEN, TCLOSE, etc.)

Message Meaning: An ICS macro failed due to an error condition.
System Action: VPS will put this printer in EDRAINED status.
Required Action: If unable to determine the cause of the error, contact VPS technical support.

VPS395E prtr-id TCPIP ICS ERROR MESSAGE:aaaaaaa

aaaa...aaa: Error text supplied by Interlink Computer Sciences.

Message Meaning: An error was detected while attempting to use an ICS macro. Multiple VPS395E messages will be issued to display the error text supplied by ICS. The VPS394E message will also be issued for the error.

System Action: VPS will put this printer in EDRAINED status.

Required Action: If unable to determine the cause of the error, contact VPS technical support.

VPS396I prtr-id TCPIP RECONNECTION ATTEMPT IN PROGRESS

Message Meaning: An error was encountered on a TCP/IP connection when attempting to send the first buffer to the device. A new connection will now be established.

System Action: VPS will make an attempt to reconnect to the remote TCP/IP device. If that attempt fails, the printer will be EDRAINED.

Required Action: None.

VPS397E prtr-id VPS product OUTPUT JCL ERROR REASON=rsn

product: Name of the VPS extension product: EMAIL or PDF

rsn: Reason for the error on the OUTPUT JCL statement.

Message Meaning: An error was detected while searching the OUTPUT JCL statement keywords to obtain the VPS/Email or PDF conversion parameters.

System Action: If ERRACTN=(,,,EDR) was specified, the printer will be EDRAINED.

If ERRACTN=(,,,REQ) was specified, the print file will be requeued.

Required Action: If the printer was EDRAINED, the print file attributes should be corrected and the printer restarted.

VPS398E ERROR PROCESSING NOTIFY QUEUE - prtr-id jobname(jobid) rsn

prtr-id: Member name of VPS printer.

jobname: Job name.

jobid: Job ID.

rsn: Reason text to describe error, for example:

- LTCP ADDRESS IS ZERO
- VPSSEMAL ADDRESS IS ZERO
- MAXIMUM RETRY ATTEMPTS REACHED

Message Meaning: Processing for NOTIFY request was canceled due to an error. Other VPS error messages may be written to the VPS log dataset.

System Action: VPS will discard the NOTIFY request.

Required Action: If the reason for the error cannot be determined, call VPS technical support.

VPS399E VPS EMAIL NOTIFICATION DISABLED - TCP/IP SPECIAL REQUEST TASK TERMINATED ABNORMALLY

Message Meaning: An abend occurred while a VPS/Email notify request was in progress.
System Action: The email notify capability will be disabled. VPS will not queue or process any email NOTIFY requests.
Required Action: If the reason for the error cannot be determined, call VPS technical support.

VPS400E prtr-id I/O ERROR DURING QGET PROCESSING

Message Meaning: VPS had an I/O error reading the staging dataset. Message VPS401E will follow.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Determine and correct cause of I/O error.

VPS401E prtr-id i/o error synad message

Message Meaning: This is the I/O error SYNAD message for VPS400E above.
System Action: See message VPS400E above.
Required Action: See message VPS400E above.

VPS402E prtr-id QGET DCB ABEND CODE=sss-ss

sss-ss: System abend code - reason code.

Message Meaning: An abend occurred during OPEN/CLOSE/EOV processing for the staging dataset.
System Action: VPS will put this printer in EDRAINED status.
Required Action: If the abend is a 213 or 214, the staging dataset has been deleted while VPS is executing. This is generally caused when a "cleanup" job is run on a CPU other than the one on which VPS is running in a shared DASD environment.

VPS403E prtrid QGET OPEN FAILURE DDNAME=xxxxxxxx

Message Meaning: Open of VPS staging dataset DCB failed.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Contact VPS technical support.

VPS404E prtrid QGET INVALID DATASET DETECTED

Message Meaning: VPS detected that the staging dataset for the printer has been corrupted.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Determine if the staging dataset was deleted or overwritten by another CPU in the configuration. If not, contact VPS technical support.

VPS450E LOG ALLOCATION FAILURE R15=rc EC=eeee IC=iiii

rc:	Dynamic allocation return code.
eeee:	Dynamic allocation error code.
iiii:	Dynamic allocation info code (see OS/VS2 SPL: Job Management).
Message Meaning:	An error has occurred while allocating the SYSOUT dataset for the VPS log.
System Action:	Logging is disabled.
Required Action:	Determine the reason for the failure, based on the R15/EC/IC codes. If the reason cannot be determined, contact VPS technical support.

VPS451E LOG OPEN FAILURE

Message Meaning:	An error occurred opening the VPS log dataset.
System Action:	Logging is disabled.
Required Action:	If possible, correct the problem which caused the OPEN error. To enable logging, restart VPS.

VPS452E LOG CLOSE FAILURE

Message Meaning:	An error has occurred on a close for the VPS log dataset.
System Action:	Logging is disabled.
Required Action:	Determine the reason for the failure. If the reason cannot be determined, contact VPS technical support.

VPS453R LOG CLOSE COMPLETE

Message Meaning:	A CLOSELOG command has been processed.
System Action:	VPS has responded to a CLOSELOG command by closing the VPS log SYSOUT dataset and allocating a new SYSOUT dataset. Recording of log data will continue on the new dataset. The old SYSOUT dataset will be available for printing.
Required Action:	None.

VPS454R LOG DATASET IS FULL; LOGGING CONTINUES AT START OF DATASET

Message Meaning:	The DASD dataset being used for the VPS log is full.
System Action:	VPS will begin recording log data at the start of the dataset. Old data will be lost.
Required Action:	None.

VPS458E LOG DCB ABEND CODE=xxx-xx

xxx-xx:	Abend/return codes
Message Meaning:	An error occurred during OPEN/CLOSE/EOV processing for the VPS log dataset.
System Action:	Logging is disabled.
Required Action:	Determine the reason for the failure. If the reason cannot be determined, contact VPS technical support.

VPS459E LOG I/O ERROR xxxxxxxxxx

xxxxxxxxxx	SYNAD message text.
Message Meaning:	An I/O error occurred while writing to the VPS log dataset.
System Action:	Logging continues.
Required Action:	Determine the cause of the I/O error and correct it.

VPS470E ddname DD STATEMENT MISSING

ddname:	DDNAME missing from VPS JCL, such as: VPSCKPT
Message Meaning:	The required DD statement was not found.
System Action:	VPS initialization will fail.
Required Action:	Add the required DD statement to the VPS JCL and restart VPS.

VPS471E ddname DATASET INVALID RSN=rsn

ddname:	DDNAME of the invalid file, such as: VPSCKPT
rsn:	Reason the dataset is invalid.
Message Meaning:	The dataset associated with the named DD statement is not valid.
System Action:	VPS initialization will fail.
Required Action:	Ensure the dataset is a valid VSAM file and restart VPS.

VPS472N LOADING ddname DATASET

ddname:	DDNAME of the file being loaded, such as: VPSCKPT
Message Meaning:	The file named will be loaded.
System Action:	None.
Required Action:	None.

VPS473N ddname SUCCESSFULLY LOADED

ddname: DDNAME of the file being loaded, such as:

VPSCKPT

Message Meaning: The file named was successfully loaded.
System Action: None.
Required Action: None.

VPS474N ddname DATASET SUCCESSFULLY OPENED|CLOSED info

ddname: DDNAME of the file, such as:

VPSCKPT

info: Information about the successful operation.

Message Meaning: The dataset associated with the named DD statement was opened or closed successfully.
System Action: VPS processing will continue.
Required Action: None.

VPS475E ddname macro FAILED RC=rc RSN=rsn

ddname: DDNAME of the file, such as:

VPSCKPT

macro: The type macro that failed.
rc: The macro return code.
rsn: The macro reason code.

Message Meaning: An error occurred when processing a VSAM request for the VPS dataset named.
System Action: VPS will terminate.
Required Action: Correct the problem and restart VPS. If the reason for the error cannot be determined, contact VPS technical support.

VPS476E ddname DATASET I/O ERROR info

ddname: DDNAME of the file, such as:

VPSCKPT

info: I/O error information.

Message Meaning: An I/O error occurred when accessing the VPS dataset named.
System Action: VPS will terminate.
Required Action: Correct the problem and restart VPS. If the reason for the error cannot be determined, contact VPS technical support.

VPS477E ddname DATASET DISABLED DUE TO PREVIOUS ERROR

ddname: DDNAME of the file, such as:

VPSCKPT

Message Meaning: VPS detected an unrecoverable error when attempting to process the VPS dataset named.
System Action: VPS will attempt to continue processing.
Required Action: Contact VPS technical support.

VPS478N VPSCKPT INVALID KIT ENTRY DETECTED FOR PRODUCT prod

prod: Name of product with invalid key information.

Message Meaning: VPS detected an invalid key information table entry for the product named in the message.
System Action: VPS will attempt to continue processing the product keys and the VPS checkpoint dataset.
Required Action: Call VPS technical support.

VPS479N ddname INSUFFICIENT VIRTUAL STORAGE FOR RECORD WORKAREA

ddname: DDNAME of the file, such as:

VPSCKPT

Message Meaning: The dataset associated with the named DD statement could not be processed due to insufficient storage.
System Action: VPS will terminate.
Required Action: Increase the region size and restart VPS.

VPS480E VPS FAST TERMINATION IN PROGRESS DUE TO VPSCKPT ERROR(S)

Message Meaning: Errors occurred when attempting to access the VPS checkpoint dataset.
System Action: VPS will terminate.
Required Action: Correct the errors indicated by messages in the VPS log and restart VPS. If the reason for the errors cannot be determined, call VPS technical support.

VPS500E prtr-id I/O ERROR DURING QPUT PROCESSING

Message Meaning: An I/O error occurred while writing to the staging dataset. Message VPS501E will follow.
System Action: VPS will put this printer in EDRAINED status.
Required Action: If possible, correct the problem which caused the I/O error. Then issue a START command for the printer.

VPS501E prtr-id i/o error synad message

Message Meaning: This is the I/O error synad message for VPS500E above.
System Action: See message VPS500E above.
Required Action: See message VPS500E above.

VPS502E prtr-id QPUT DCB ABEND CODE=sss-ss

sss-ss: System abend code - reason code.

Message Meaning: An abend occurred during OPEN/CLOSE/EOV processing for the staging dataset.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Normally the abend will be an X37, in which case the staging dataset for this printer needs to be enlarged. If the abend is a 213 or 214, the staging dataset has been deleted while VPS is executing. This is usually caused when a "cleanup" job is run on CPU other than the one on which VPS is running in a shared DASD environment.

VPS503E prtr-id QPUT OPEN FAILURE DDNAME=xxxxxxxx

Message Meaning: An error occurred opening the staging dataset.
System Action: VPS will put this printer in EDRAINED status.
Required Action: If possible, correct the problem which caused the OPEN error. Then issue a START command for the printer.

VPS504E prtr-id QPUT INSUFFICIENT VIRTUAL STORAGE FOR BUFFERS

Message Meaning: There is insufficient virtual storage in the VPS address space for staging dataset buffers.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Increase the REGION parameter in the VPS execution JCL and reinitiate VPS.

VPS508E prtr-id QUEUE DYNAMIC ALLOCATION FAILURE R15=rc EC=eeee IC=iiii

rc: Dynamic allocation return code.
eeee: Dynamic allocation error code.
iiii: Dynamic allocation info code.

Message Meaning: Dynamic allocation for the staging dataset has failed. See OS/VS2 SPL: Job Management.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Correct error causing the dynamic allocation failure.
Note: This error can occur only when QALLDYN=Y is specified for this printer.

VPS509E prtr-id QBUFSIZE(nnnnn) TOO LARGE FOR DEVICE

nnnnn: Requested QBUFSIZE.

Message Meaning: The requested QBUFSIZE exceeds the allowable staging device maximum.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Change the QBUFSIZE value in the printer definition to a value not larger than the allowable maximum of your staging device.

VPS510E prtr-id LRECL EXCEEDS QBUFSIZE(qqqqqq) ON LINE nnnnnnnnnnn NEWS WRITER=xxxxxxxx

qqqqqq:	Value of the QBUFSIZE keyword.
nnnnnnnnnnn:	The line number of the first record which exceeded the QBUFSIZE.
xxxxxxxx:	Name of separator news writer, if that is the dataset being processed.
Message Meaning:	One or more records in a SYSOUT dataset had a record length which exceeded the value specified for the QBUFSIZE parameter.
System Action:	VPS EDRAINS the printer.
Required Action:	Increase the value of the QBUFSIZE parameter on the Printer Definition member to a value at least as large as the LRECL of the SYSOUT dataset, and reactivate the printer.

VPS520E prtr-id TCPIP QUEUE DYNAMIC ALLOCATION FAILURE RC=aa EC=eeee IC=iiii

rc:	Dynamic allocation return code.
eeee:	Dynamic allocation error code.
iiii:	Dynamic allocation info code.
Message Meaning:	Dynamic allocation for the TCPIP staging dataset has failed. See OS/VS2 SPL: Job Management.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Correct error causing the dynamic allocation failure.

VPS521E prtr-id TCPIP QUEUE DYNAMIC UNALLOCATION FAILURE RC=rc EC=eeee IC=iiii

rc:	Dynamic allocation return code.
eeee:	Dynamic allocation error code.
iiii:	Dynamic allocation info code.
Message Meaning:	Dynamic unallocation of the TCPIP staging dataset has failed. See OS/VS2 SPL: Job Management.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Correct error causing the dynamic unallocation failure.

VPS522E prtr-id TCPIP QUEUE OPEN|CLOSE FAILURE DDNAME=aaaaaaaa

aaaaaaaa:	DDname of the TCPIP staging dataset.
Message Meaning:	OPEN or CLOSE of the TCPIP staging dataset has failed.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Contact VPS technical support.

VPS523E TCPIP QUEUE DCB ABEND CODE=sss-ss

sss-ss: System abend code - reason code.

Message Meaning: An abend occurred during OPEN/CLOSE/EOV processing for the TCPIP staging dataset.
System Action: VPS will put this printer in EDRAINED status.
Required Action: If the abend is an S213 or S214, the TCPIP staging dataset has been deleted while VPS is executing. This is generally caused when a "cleanup" job is run on a CPU other than the one on which VPS is running, in a shared DASD environment.

VPS524E prtr-id I/O ERROR DURING TCPIP QUEUE PROCESSING

Message Meaning: An I/O error occurred while writing to the TCPIP staging dataset. Message VPS525E will follow.
System Action: VPS will put this printer in EDRAINED status.
Required Action: If possible, correct the problem which caused the I/O error. Then issue a START command for the printer.

VPS525E prtr-id i/o error synad message

Message Meaning: This is the I/O error synad message for VPS524E.
System Action: See message VPS524E.
Required Action: See message VPS524E.

VPS526E prtr-id INSUFFICIENT VIRTUAL STORAGE FOR TCPIP QUEUE BUFFERS

Message Meaning: There is insufficient virtual storage in the VPS address space for staging dataset buffers.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Increase the REGION parameter in the VPS execution JCL and reinitiate VPS.

VPS528E prtr-id TCPIP QUEUE INVALID DATSET DETECTED

Message Meaning: VPS/TCPIP detected that the staging dataset for the printer has been corrupted.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Determine if the staging dataset was deleted or overwritten by another CPU in the configuration. If not, contact VPS technical support.

VPS529E prtr-id TCPIP QUEUE OUTPUT BUFFER OVERRUN

Message Meaning: VPS/TCPIP determined that the queue output buffer was too small to contain a decompressed record.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Contact VPS technical support.

VPS540E prtr-id PAGECENTER REQUEST FAILED - R15=r15 RC=rc REQ=request PCIX=pcix ID=id

r15:	PageCenter R15.
rc:	PageCenter return code.
request:	PageCenter request code.
pcix:	PC index.
id:	Session identifier.

Message Meaning:	An error occurred attempting to send a SYSOUT dataset to the PageCenter product.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Contact VPS technical support.

VPS541E prtr-id PAGECENTER ERROR - REQUEST=request RC=rc REASON=reason

request:	PageCenter request code.
rc:	PageCenter return code.
reason:	PageCenter reason code.

Message Meaning:	An error occurred attempting to send a SYSOUT dataset to the PageCenter product.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Contact VPS technical support.

VPS542E prtr-id PAGECENTER ERROR - NOT CONNECTED TO SERVER errmsg

errmsg:

Message Meaning:	An error occurred attempting to send a SYSOUT dataset to the PageCenter product.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Contact VPS technical support.

VPS600N prtr-id PRINTER SUCCESSFULLY ACTIVATED|REACTIVATED

Message Meaning:	Printer has been activated in response to an ACTIVATE command, or reactivated in response to a REACTIVATE command.
System Action:	None.
Required Action:	None.

VPS601N prtr-id QUEUE DYNAMIC ALLOCATION FAILURE RC=rc EC=eeee IC=iiii

rc:	Dynamic allocation return code.
eeee:	Dynamic allocation error code.
iiii:	Dynamic allocation info code (see OS/VS2 SPL: Job Management).

Message Meaning:	In attempting to activate a VPS printer, dynamic allocation of the staging dataset has failed.
System Action:	The requested printer will not be activated. Message VPS603N will follow.
Required Action:	Correct error causing dynamic allocation failure and reattempt to activate the printer.
Note:	This error can occur only when QALLDYN=N is specified for this printer.

VPS602N INVALID CONTROL STATEMENT (mbrname) - descr

mbrname: For VPS, the name of the member in error. For batch execution of VPS/AFP, the ddname of the parameter file (PARMFILE).

descr: Error description:

- AFPRTAB - INVALID TABLE PREFIX DETECTED
- AFPRTAB - INVALID TABLE ENTRY DETECTED
- AFPRTAB - CODE PAGE XLATE TABLE XXXXXXXX NOT FOUND
- DUPLICATE KEYWORD: keyword
- INVALID DEFAULT DEST: keyword value
- INVALID KEYWORD VALUE: keyword=keyword value
- INVALID KEYWORD VALUE: JES CMD CHAR = VPS CMD CHAR
- INVALID KEYWORD VALUE: PSACTIVE=(,,Y) WITHOUT PS CRITERIA
- INVALID KEYWORD VALUE: PSSELECT=D REQUIRES PSDEST
- INVALID KEYWORD VALUE: PSSELECT=F REQUIRES PSFORM
- INVALID KEYWORD VALUE: PSSELECT=W REQUIRES PSWRITER
- UNKNOWN KEYWORD: keyword

Batch VPS/AFP error description:

- UNKNOWN KEYWORD: keyword
- DUPLICATE KEYWORD: keyword
- INVALID KEYWORD VALUE: keyword=kwvalue

Message Meaning: An invalid control statement was found.
System Action: VPS will not activate the printer.
Required Action: Correct the control statement and reattempt to activate the printer. For VPS/AFP, correct the control statement and rerun the job.

VPS603N PRINTER ADD FOR mbrname FAILED - failure reason

mbrname: The name of the member that was not added.

failure reasons: Control statement error (message VPS602N precedes this message).

- APPC COMMTYPE NOT SUPPORTED BY VTAM
- CHKPT LINE/PAGES MUST BOTH BE SPECIFIED
- COMMTYPE=TCPIP REQUIRES TCPHOST
- CONFLICTING REQUEUE SYSOUT SPECIFICATION
- CONFLICTING/UNEXPECTED COMMTYPE VALUE
- CONVTYPE CONFLICT WITH COMMTYPE KEYWORD
- GDMAPPL MUST BE SPECIFIED WITH GDMCLASS
- GDMCLASS IS INCOMPATIBLE WITH COMMTYPE
- INVALID END FIELD FOR TRNCLASS KWD
- INVALID START FIELD FOR TRNCLASS KWD
- INVALID MEMBER NAME (XXXXXXXX)
- KEYWORD PARSE FAILURE
- KEYWORD PARSE FAILURE - DEFAULT MEMBER
- LUNAME ALLOCATED TO: mbrname
- MAXIMUM NUMBER OF PRINTERS EXCEEDED
- MAXIMUM NUMBER OF VPS/PC PRINTERS EXCEEDED
- MBRNAME/LUNAME CONFLICT: XXXXXXX
- MEMBER ALREADY ACTIVATED
- NO SELECTION CRITERIA SPECIFIED
- OVERLAPPING SPECIAL CLASS SPECIFICATION
- PRINTER BUILD FAILURE
- PRINTER BUILD FAILURE - DEFAULT MEMBER
- QALLDYN=Y REQUIRES NON-ZERO QBUFSIZE
- QBUFSIZE INSUFFICIENT FOR RUSIZE
- QDSNAME ALLOCATED TO: mbrname
- QUEUE ALLOCATION ERROR
- REJECTED BY ACTIVATION EXIT - EXIT11
- SEL CRITERIA CONFLICT WITH: mbrname
- SEPAR NEWS JOBNAME REQUIRES NEWS WRITER
- VPS TERMINATION IN PROCESS
- XXXXXXXX PRODUCT EXPIRED OR UNAVAILABLE

Message Meaning: VPS printer activation has failed.
System Action: The requested printer will not be activated.
Required Action: Correct the error based upon the failure reason and reattempt to activate the printer.

VPS604N vpslib i/o error synad message

Message Meaning: This is the I/O error SYNAD message for VPS603N above.
System Action: The requested printer will not be activated.
Required Action: Correct the error based upon the I/O error SYNAD message and reattempt to activate the printer.

VPS605N VPS605N KEYWORD PARSE FAILURE (mbrname) - descr

mbrname: For VPS, the name of the member in error. For batch VPS/AFP, the ddname of the parameter file (PARMFILE).

descr: Error description:

- MISSING COMMA AFTER KWD=keyword
- EXPECTED CONTINUATION NOT RECEIVED
- CONTROL STMT(nnnn) STARTS AFTER POS 16
- MEMBER NOT FOUND
- INSUFFICIENT VIRTUAL STORAGE AVAILABLE
- VPSLIB OPEN FAILURE
- VPSLIB DCB LRECL NOT 80
- VPSLIB I/O ERROR
- VPSLIB DCB ABEND 000-00
- QUOTE NOT FOLLOWED BY COMMA OR SPACE KWD= keyword
- ENDING QUOTE MISSING KWD=keyword
- UNBALANCED PARENTHESES FOR KWD=keyword

Batch VPS/AFP error description:

- DCB LRECL NOT 80
- MISSING COMMA AFTER KWD=keyword
- CONTROL STMT(nnnn) POS 1 INVALID
- XPECTED CONTINUATION NOT RECEIVED
- CONTROL STMT(nnnn) STARTS AFTER POS 16
- QUOTE NOT FOLLOWED BY COMMA OR SPACE KWD= keyword
- ENDING QUOTE MISSING KWD=keyword
- UNBALANCED PARENTHESES FOR KWD=keyword
- PARENTHESIS NOT FOLLOWED BY COMMA OR SPACE KWD=keyword
- EQUAL SIGN EXPECTED AFTER KWD=keyword
- CONTROL STMT(nnnn) EXTENDS PAST POS 72

Message Meaning: An invalid keyword value has been specified.
System Action: VPS will not activate the printer.
Required Action: Correct the keyword value and reattempt to activate the printer. For batch VPS/AFP, correct the keyword value and rerun the job.

VPS606E BLDL FAILED FOR MODULE module WHEN PROCESSING KEYWORD keywd - RC=rc

keywd:	The VPS keyword that specified the module for which the BLDL was issued
rc:	Return code from BLDL macro
Message Meaning:	VPS issued the BLDL macro for a module named in the specified VPS keyword, but the BLDL ended with a non-zero return code.
System Action:	If processing a VPS SYSTEM keyword, then VPS initialization will fail. If loading a VPS User Exit keyword by using the default exit name, then the exit will be disabled. If processing a VPS PRINTER keyword, then the requested printer will not be activated.
Required Action:	Correct the module name in the specified keyword, or make that module available in a library accessible to VPS. The VPS log may give further information about the keyword that was in error.

VPS607E type DEVICE KWD=keywd MODIFIED FROM oldvalue TO newvalue RSN=reason

keywd:	The VPS keyword being processed.
oldvalue:	The original value specified for that keyword.
new value:	The modified value to be used for that keyword.
reason:	The reason the keyword value was modified.
Message Meaning:	VPS modified the value of the keyword from that specified in the VPS printer definition member.
System Action:	VPS processing will continue.
Required Action:	None.

VPS608I prtr-id product OUTPUT JCL KWD WARNING - reason

product:	Product, such as VPS/Email or VPS/PDF.
rsn:	Reason the warning was issued.
Message Meaning:	An unexpected VPS keyword was located when searching the OUTPUT JCL keywords for VPS/Email or VPS/PDF.
System Action:	The keyword will be ignored, and processing will continue.
Required Action:	None.

VPS611I prtr-id PERMISSIONS IGNORED WITH PDFENTYP=PDF40 aaaaaaaaa

aaaaaaaa: Permissions which were requested but which are not supported with 40-bit encryption for PDF files, such as:

NOACCESSIBLE
NOFORMFILL
NOASSEMBLE
NOHIRESPRINT

Message Meaning: VPS ignored the permissions requested because they were not supported for 40-bit PDF encryption.
System Action: VPS continues processing the PDF file.
Required Action: If these permissions are required, then PDFENTYP=PDF128 should be also specified.

VPS620E prtr-id SCB|S390 COMPRESSION|EXPANSION FAILED R15=r15

r15: Compression|Expansion service return code

Message Meaning: An error occurred attempting to either compress or expand a SYSOUT dataset record.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Contact VPS technical support.

VPS700E prtr-id SMFWTM FAILURE, SMF RECORDING INACTIVATED, R15=rc

rc: The SMFWTM return code (see OS/VS2 SPL: SMF).

Message Meaning: An error occurred writing an SMF record.
System Action: SMF recording will be inactivated for this printer.
Required Action: Correct the error, based on the return code.

VPS701E prtr-id XES QUEUE DYNAMIC ALLOCATION FAILURE RC=rc EC=eeee IC=iiii

rc: Dynamic allocation return code.
eeee: Dynamic allocation error code.
iiii: Dynamic allocation information code.

Message Meaning: An error occurred while allocating the secondary staging dataset for VPS/XES to AFP.
System Action: VPS will put this printer in EDRAINED status.
Required Action: Determine the reason for the failure, based on the RC/EC/IC codes. If the reason cannot be determined, contact VPS technical support.

VPS702E prtr-id XES QUEUE DYNAMIC UNALLOCATION FAILURE RC=rc EC=eeee IC=iiii

rc:	Dynamic allocation return code.
eeee:	Dynamic allocation error code.
iiii:	Dynamic allocation information code.
Message Meaning:	An error occurred while unallocating the secondary staging dataset for VPS/XES to AFP.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Determine the reason for the failure, based on the RC/EC/IC codes. If the reason cannot be determined, contact VPS technical support.

VPS703E prtr-id INVALID REQUEST CODE rc RECEIVED FOR ROUTINE routine

rc:	Request code received.
routine:	Name of the VPS routine in error.
Message Meaning:	A VPS/XES to AFP routine has received an invalid request code.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Contact VPS technical support.

VPS706E prtr-id errtype ERROR: DDNAME=ddname descr

errtype:	Type of error: OPEN, CLOSE, READ, WRITE or RDJFCB.
ddname:	DDname of the file in process.
descr:	Extra information.
Message Meaning:	VPS/XES to AFP has detected a file processing error.
System Action:	VPS will put this printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.
Required Action:	Contact VPS technical support.

VPS707E prtr-id LOAD ERROR OCCURRED FOR descr loadmodule

descr:	Load module description.
loadmodule:	Load module name.
Message Meaning:	A required VPS/XES to AFP load module could not be found.
System Action:	VPS will put this printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.
Required Action:	Contact VPS technical support.

VPS707I LOAD ERROR OCCURRED FOR MODULE=zzzzzzzz reason

zzzzzzzz: Name of module.
reason: Reason for error

Message Meaning: An error occurred when VPS attempted to load the module named by the SYSOUT keyword specified as the third parameter of the PCMDSTRT keyword.
System Action: VPS will continue or EDRAIN the printer based upon the PCMDACTN keyword.
Required Action: None.

VPS708E prtr-id Missing descr

descr: Missing information description.

Message Meaning: VPS/XES to AFP has detected that information required for further processing has not been received.
System Action: VPS will put this printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.
Required Action: Contact VPS technical support.

VPS712E prtr-id VPS/XESAFP SETUP setup NOT FOUND IN RESOURCE TABLE restable

setup: Setup definition name.
restable: VPS/XES to AFP resource table name (XESRTAB).

Message Meaning: VPS/XES to AFP could not find the setup definition name in the XES resource table. The XES resource table name is defined in the first parameter of the XESRTAB keyword; the setup definition name is defined in the second parameter of the XESRTAB keyword.
System Action: VPS will put this printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.
Required Action: Correct the XESRTAB source or the XESRTAB keyword specification.

VPS713E prtr-id XES COMMAND ERROR=errdesc CMD=cmdcode DESC=cmddesc LINE=line# COL=col#

errdesc: Error description.
cmdcode: XES command code in error.
cmddesc: XES command description.
line#: Input dataset line number.
col#: Position of XES command in line.

Message Meaning: VPS/XES to AFP has detected an error with the input XES command.
System Action: VPS will put this printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.
Required Action: Correct the XES command error or contact VPS technical support.

VPS714E prtr-id VPX/XESAFP ERROR PROCESSING XES FONT font

font: XES font name.

Message Meaning: VPS/XES to AFP has encountered an error with the specified XES font.
System Action: VPS will put this printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.
Required Action: Correct the XES font error or contact VPS technical support.

VPS715E prtr-id VPX/XESAFP ERROR PROCESSING INPUT RECORD - LENGTH EXCEEDS 256

Message Meaning: VPS/XES to AFP can only handle records with a length of 256 or less.
System Action: VPS will put this printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.
Required Action: Correct the XES dataset.

VPS716E prtr-id VPS/XESAFP ERROR PROCESSING DEFAULT FONT font# IN SETUP setup ERROR=error

font#: XES font number or null for hardware default.
setup: XESRTAB setup definition name.
error: Error description.

Message Meaning: VPS/XES to AFP has encountered an error with the default XES font.
System Action: VPS will put this printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.
Required Action: Correct the XESRTAB setup definition.

VPS717E prtr-id VPS/XESAFP ERROR COUNT EXCEEDED; FURTHER ERRORS WILL NOT BE DISPLAYED

Message Meaning: VPS/XES to AFP has encountered more than 10 errors in the XES data stream. No more warning messages will be issued.
System Action: VPS will continue processing the dataset, but no other XES non-fatal errors will be reported.
Required Action: Correct the XES data stream.

VPS718E prtr-id VPS/XESAFP ERROR PROCESSING FCB CHANNEL channel desc

channel: Channel number.
desc: Error description.

Message Meaning: VPS/XES to AFP has encountered an error with the FCB channel number.
System Action: VPS will put this printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.
Required Action: Correct the XES data stream or FCB specification.

VPS720E prtr-id VPS/PDF CONVERSION ERROR RC=rc ERR=ec RSN=rsn MODULE=modname

rc:	Return code from VPS/PDF conversion program.
ec:	Error code from VPS/PDF conversion program.
rsn:	Reason code from VPS/PDF conversion program.
modname:	Name of module that encountered the error.
Message Meaning:	VPS/PDF encountered an error while converting the file.
System Action:	The VPS printer will be EDRAINED.
Required Action:	If the reason for the error cannot be determined, call VPS technical support.

VPS730E prtr-id INVALID PCL COMMAND DETECTED - aaaa

aaaa:	PCL cmd data
Message Meaning:	VPS has detected an invalid PCl command in the outbound PCL datastream.
System Action:	VPS will place this printer in EDRAINED status.
Required Action:	Contact VPS technical support.

VPS731E prtr-id SECURITY ATTRIBUTES UNAVAILABLE FOR type AUTHORITY VERIFICATION

type:	Object type: USERLIB or DESTINATION
Message Meaning:	While attempting to verify the appropriate level of access privileges to either USERLIB resource libraries or a VPS printer, VPS has detected an invalid security token in the cross-memory attributes control block at label XMATOKEN. The data element contains binary zeroes. The most likely cause of this is erroneous modification to the VPS JES Xmemory Exit (Exit 15).
System Action:	For USERLIB authority verification, VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer. Batch VPS/AFP will abend with U0001.
Required Action:	Examine and correct the VPS JES Xmemory Exit. If unable to resolve the problem, contact VPS technical support.

VPS732E prtr-id DESTINATION ACCESS DENIED BY type USERID=userid SAF (R15=src RSN=srsn) RACF (R15=rrc RSN=rrsn)

type:	Type of module which denied access: EXT SECURITY USER EXIT
userid:	Creator userid of the SYSOUT dataset
src:	SAF return code.
srsn:	SAF reason code.
rrc:	RACF return code.
rrsn:	RACF reason code.
Message Meaning:	The userid identified in the message text was not authorized to send output to this printer. The message text also indicates if the installation's external security system (e.g. RACF) denied access or if access was denied by VPS user exit 2 (Start Dataset exit).
System Action:	Based on the values specified in the SAF printer keyword, VPS will either EDRAIN the printer or requeue the dataset.
Required Action:	None.

VPS735E prtr-id errtype ERROR: DDNAME=ddname descr

errtype:	Type of error: OPEN, CLOSE, READ, WRITE, FIND, or POINT
ddname:	DDname of the file in process.
descr:	Extra information.
Message Meaning:	VPS/AFP has detected a file processing error.
System Action:	VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.
Required Action:	Contact VPS technical support.

VPS736E prtr-id INVALID descr: DDNAME=ddname

descr:	Dataset attribute in error: RECFM
ddname:	DDname of the file in process.
Message Meaning:	An incorrect dataset attribute is defined for a VPS/AFP input or output dataset.
System Action:	VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.
Required Action:	Reallocate the dataset with the correct attributes.

VPS737E prtr-id synaderr

synadderr:	Synad error message.
Message Meaning:	A VPS/AFP dataset I/O error occurred. VPS735E will tell what error occurred for which dataset.
System Action:	VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.
Required Action:	Determine and correct the cause of the I/O error.

VPS738E prtr-id LOAD ERROR OCCURRED FOR loadmodule

loadmodule:	Name of load module not found.
Message Meaning:	A VPS/PCL load module could not be located. This load module may be an AFP resource table or a translate table.
System Action:	VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.
Required Action:	Make sure the table specified in the AFPRTAB parameter exists and that all XLATTAB translate tables specified for AFP code pages exist.

VPS739E prtr-id 4224/4230/4234 descr name NOT FOUND

descr:	Font resource type: • CHARACTER SET • CODE PAGE
name:	Font resource name.
Message Meaning:	VPS/AFP did not find the requested font character set or code page in the IBM 42xx series font table “APSRFTBL”.
System Action:	VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.
Required Action:	Make sure the requested font resource is specified in the “APSRFTBL” 42xx font table.

VPS740E prtr-id INVALID REQUEST CODE code RECEIVED FOR ROUTINE routine

code:	Routine request code.
routine:	Routine receiving the invalid request code.
Message Meaning:	An invalid request code has been received by a VPS/AFP routine.
System Action:	VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.
Required Action:	Contact VPS technical support.

VPS742E prtr-id AUTHORIZATION FAILED FOR resource name

resource:	Resource type: • FORM DEFINITION • PAGE DEFINITION • PAGE SEGMENT • OVERLAY • CODED FONT • FONT CHARACTER SET • CODE PAGE TABLE
name:	Resource name.
Message Meaning:	The requested resource is not authorized for use, as determined by VPS User Exit 26.
System Action:	VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.
Required Action:	None.

VPS743E prtr-id resource name NOT FOUND IN EITHER AN EXTERNAL LIBRARY OR INTERNAL RESOURCE

resource:	Resource type: • FORM DEFINITION • PAGE DEFINITION • PAGE SEGMENT • OVERLAY • CODED FONT • FONT CHARACTER SET • CODE PAGE TABLE
name:	Resource name.
Message Meaning:	The requested resource could not be found during VPS/AFP processing. VPS790I will tell which, if any, resource was in process. VPS791I will tell which AFP command was in process. VPS792I will tell which PAGEDEF/ DATA MAP was in use and which FORMDEF/ MEDIUM MAP was in use.
System Action:	VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.
Required Action:	Make sure the resource name is spelled correctly in the JCL or the AFP command and that the resource exists in a resource library or in an internal resource.

VPS744E prtr-id END OF DATA REACHED BEFORE LOGICAL END OF res/obj name

res/obj:	Resource or object type: • FORM DEFINITION • MEDIUM MAP • PAGE DEFINITION • DATA MAP • PAGE SEGMENT • OVERLAY • CODED FONT • FONT CHARACTER SET • CODE PAGE TABLE • IMAGE OBJECT • GRAPHICS OBJECT • BARCODE OBJECT
name:	Resource/object name
Message Meaning:	While processing a resource or object, VPS/AFP has encountered an end-of-data situation before finding an AFP end resource/object command. VPS790I will tell which resource was in process. VPS791I will tell which AFP command was in process. VPS792I will tell which PAGEDEF/DATA MAP was in use and which FORMDEF/MEDIUM MAP was in use.
System Action:	VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.
Required Action:	Make sure the appropriate commands (including begin and end commands) are coded for the resource or object. (Refer to IBM's Advance Function Printing: Data Stream Reference). Correct the AFP datastream.

VPS745E prtr-id THE LIMIT OF resources PER type WAS EXCEEDED

resources:	FONTS, OVERLAYS, or PAGESEGS
type:	OVERLAY, PAGESEG or JOB
Message Meaning:	Too many resources are defined for the print job for VPS/AFP. VPS790I will tell which resource was in process. VPS791I will tell which AFP command was in process. VPS792I will tell which PAGEDEF/DATA MAP was in use and which FORMDEF/MEDIUM MAP was in use.
System Action:	VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.
Required Action:	Decrease the amount of resources used for the print job.

VPS746I prtr-id OVERLAY name HAS NOT BEEN LOADED - IPO IGNORED: SEQ=seq#

name:	Overlay name
seq#:	AFP record sequence number
Message Meaning:	The overlay named in an AFP Include Page Overlay (IPO) record has not been loaded for use during VPS/AFP processing.
System Action:	The IPO record will be ignored.
Required Action:	Make sure the overlay name in the IPO record is spelled correctly and that an AFPDS Map Page Overlay (MPO) record naming the overlay is coded in the AFP document or PAGEDEF.

VPS747E prtr-id REQUESTED type name NOT FOUND IN CURRENT resource

type:	Object type: MEDIUM MAP or DATA MAP
name:	MEDIUM/DATA MAP name.
resource:	Resource type: FORMDEF or PAGEDEF
Message Meaning:	The PAGEDEF/FORMDEF does not contain the DATA MAP/MEDIUM MAP named in an AFP Invoke Data Map (IDM)/Invoke Medium Map (IMM) record in VPS/AFP processing. VPS790I will tell which resource was in process. VPS791I will tell which AFP IDM/IMM record was in process. VPS792I will tell which PAGEDEF/DATA MAP was in use and which FORMDEF/MEDIUM MAP was in use.
System Action:	VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.
Required Action:	Make sure the DATA MAP/MEDIUM MAP name in the IDM/IMM record is spelled correctly and that the correct PAGEDEF/FORMDEF is being used.

VPS748I prtr-id PRINTER STORAGE CAPACITY WAS EXCEEDED - ERRORS MAY OCCUR

Message Meaning:	VPS/AFP has detected a storage overflow condition resulting from a complex AFP document.
System Action:	VPS will issue the message as a warning, continue processing the dataset, and try to print the dataset. (Batch VPS/PCL will issue the message as a warning and will continue processing the dataset). This message is considered a warning because VPS/PCL can only estimate how much printer storage will be required for the PCL macro or font.
Required Action:	It may be necessary to reduce the complexity of the AFP document (i.e., reduce the number of fonts, overlays, and page segments). Another option may be to increase the printer storage specified for "MEMORY" of the AFP resource table (AFPRTAB).

VPS750E prtr-id INPUT RECORD IS INVALID OR OUT OF SEQUENCE - record DDNAME=ddname REC=rec#

record:	First 9 bytes of input record in hexadecimal.
ddname:	DDname of the file in process.
rec#:	Logical record number of the command in process.
Message Meaning:	During VPS/AFP processing, one of the following happened: • An AFP record was expected but not received • An AFP record was received out of place • An invalid record was received. VPS790I will tell which resource was in process. VPS792I will tell which PAGEDEF/ DATA MAP was in use and which FORMDEF/MEDIUM MAP was in use.
System Action:	VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.
Required Action:	Examine the invalid record and its placement in the AFPDS document or resource. (Refer to IBM's Advanced Function Printing: Data Stream Reference). Correct the AFP datastream.

VPS751I prtr-id UNSUPPORTED STRUCTURED FIELD CODE code WAS IGNORED: DDNAME=ddname SEQ=seq# REC=rec#

code:	Hexadecimal AFP command structured field code
ddname:	DDname of the file in process
seq#:	AFP record sequence number
rec#:	Logical record number of the command in process
Message Meaning:	VPS/AFP encountered one of the following: • An invalid AFP command • A valid AFP command which is unsupported by the current release
System Action:	The command will be ignored.
Required Action:	Examine the record and determine whether the structured field code is correct. (Refer to IBM's Advanced Function Printing: Data Stream Reference). If it is a valid AFP command, contact VPS technical support.

VPS752E prtr-id descr IS NOT SUPPORTED

descr:	Description of the AFP structure which is not currently supported.
Message Meaning:	The current VPS/AFP release does not support the specified AFP structure type.
System Action:	VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.
Required Action:	None. Contact VPS technical support for information on if and when the AFP structure will be supported.

VPS753E prtr-id USERLIB function ERROR: R15=rc DSNAME=dsname

function:	The USERLIB allocation function that failed: • CATALOG - The O/S CAMLST LOCATE to determine the dataset volume serial failed with the return code shown in the message. The most likely cause of this failure is the specification of an uncataloged USERLIB dataset.
rc:	The return code from the failing function.
dsname:	The dataset name for which USERLIB allocation failed.
Message Meaning:	While attempting to allocate USERLIB resource libraries, VPS/AFP has encountered an error in an O/S service.
System Action:	VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.
Required Action:	Examine the function and return code shown in the message and correct the error. If unable to resolve the problem, contact VPS technical support.

VPS754E prtr-id USERLIB ACCESS REJECTED BY component

component:	The component that rejected the USERLIB dataset access: • USER EXIT - The USERLIB access was rejected by the VPS/AFP Resource/Library Exit (Exit 26). • EXT SECURITY - The USERLIB access was rejected by the site external security product.
Message Meaning:	Access to the specified USERLIB resource library(s) was rejected.
System Action:	VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.
Required Action:	Determine the reason for the access violation and follow your installation's security procedures in response to this message.

VPS755I prtr-id product CONVERTING JOB jobname(jobid)

product:	VPS/IPDS, VPS/PCL, VPS/XESAFP or ACIF
Message Meaning:	VPS/AFP has begun converting the SYSOUT dataset to the required PDL.
System Action:	None.
Required Action:	None.

VPS756E prtr-id LRECL OR RDW DOES NOT AGREE WITH AFP COMMAND LENGTH: DDNAME=ddname SEQ=seq# REC=rec#

ddname:	DDname of the file in process.
seq#:	AFP record sequence number.
rec#:	Logical record number of the command in process.

Message Meaning: VPS/AFP has encountered an AFP command whose length field is greater than the logical record length minus 2 (for fixed-length records) or greater than the RDW minus 5 (for variable-length records).

If the input file contains fixed length records, the logical record length must be at least 1 bytes larger than any AFP command length.

If the input file contains variable length records, the RDW must be at least 5 bytes larger than any AFP command length.

Message VPS790I will tell which resource was in process. VPS791I will tell which AFP record was in process. VPS792I will tell which PAGEDEF/DATA MAP was in use and which FORMDEF/MEDIUM MAP was in use.

System Action: VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.

Required Action: Examine the invalid record and adjust the AFP command length according to the record length. Do not span an AFP command. A new dataset allowing for larger AFP commands may be required.

VPS757E prtr-id command INVALID DURING state STATE

command:	AFP structured field abbreviation.
state:	Current printer state.

Message Meaning: VPS/AFP has encountered an AFP command which is invalid during the current printer state. VPS790I will tell which resource was in process. VPS791I will tell which AFP command was in process. VPS792I will tell which PAGEDEF/DATA MAP was in use and which FORMDEF/MEDIUM MAP was in use.

System Action: VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.

Required Action: Examine the invalid record and its placement in the AFPDS document or resource. (Refer to IBM's Advanced Function Printing: Data Stream Reference). Correct the AFP datastream.

VPS758E prtr-id INVALID LENGTH: type CODE=code LENGTH=length

type:	Object type: • AFP COMMAND • AFP TRIPLET • SELF-DEFINING PARAMETER • PTX CONTROL • REPEATING GROUP
code:	Object code in error
length:	Object length
Message Meaning:	VPS/AFP has detected an invalid length field in an AFP record. VPS790I will tell which resource was in process. VPS791I will tell which AFP command was in process. VPS792I will tell which PAGEDEF/DATA MAP was in use and which FORMDEF/MEDIUM MAP was in use.
System Action:	VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.
Required Action:	Examine the invalid AFP record length fields. (Refer to IBM's Advanced Function Printing: Data Stream Reference). Correct the AFP record.

VPS759E prtr-id INSUFFICIENT DATA FOR command - TRIPLETS OR SELF-DEFINING PARAMETERS MAY BE MISSING

command:	AFP structured field abbreviation.
Message Meaning:	VPS/AFP has encountered an AFP record that is missing data. VPS790I will tell which resource was in process. VPS791I will tell which AFP record was in process. VPS792I will tell which PAGEDEF/DATA MAP was in use and which FORMDEF/MEDIUM MAP was in use.
System Action:	VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.
Required Action:	Examine the invalid AFP record and make sure all needed information is coded, including triplets and self-defining fields. (Refer to IBM's Advanced Function Printing: Data Stream Reference). Correct the AFP record.

VPS760E prtr-id MCF ERROR: FONT=font GRID=grid CHAR SET=charset CODE PAGE TBL=codepage

font:	Coded font name.
grid:	Font global resource identifier.
charset:	Font character set name.
codepage:	Code page table name.

Message Meaning: VPS/AFP has encountered an AFP MAP CODED FONT (MCF) record containing one of the following:

- No coded font name, no GRID, and no character set and/or code page table name.
- A coded font name and a character set and/or code page table name.
- A coded font name and a GRID.
- A GRID and a character set and/or code page table name.

VPS790I will tell which resource was in process. VPS791I will tell which AFP MCF1 or MCF2 record was in process. VPS792I will tell which PAGEDEF/DATA MAP was in use and which FORMDEF/MEDIUM MAP was in use.

System Action: VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.

Required Action: Examine the MCF record and look for missing or extraneous information. (Refer to IBM's Advanced Function Printing: Data Stream Reference). Correct the MCF record.

VPS761E prtr-id descr IS INCONSISTENT AMONG SUBGROUPS OF A MEDIUM MAP

descr: Error description:

- OFFSET STACKING
- SOURCE DRAWER
- PRINT QUALITY

Message Meaning: VPS/AFP has detected inconsistent values that must be the same among subgroups of a MEDIUM MAP. VPS790I will tell which resource was in process. VPS791I will tell which AFP MEDIUM MODIFICATION CONTROL (MMC) record was in process. VPS792I will tell which PAGEDEF/DATA MAP was in use and which FORMDEF/MEDIUM MAP was in use.

System Action: VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.

Required Action: Examine the MCC/MMC records in process and look for inconsistent information. (Refer to IBM's Advanced Function Printing: Data Stream Reference). Correct the AFP datastream.

VPS762E prtr-id MISSING descr

descr: Missing information description:
- DEFAULT GRAPHIC CHARACTER
- FDS RECORD
- FNC RECORD
- IID RECORD
- LNC RECORD
- LND RECORD(S)
- MCC RECORD
- RASTER DATA
- BFM RECORD
- BPM RECORD
- BO RECORD
- BPS RECORD
- BCF RECORD
- BCP RECORD
- BFN RECORD

Message Meaning: VPS/AFP has detected that information required for further processing has not been received. VPS790I will tell which resource was in process. VPS791I will tell which AFP record was in process. VPS792I will tell which PAGEDEF/DATA MAP was in use and which FORMDEF/MEDIUM MAP was in use.

System Action: VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.

Required Action: Examine the AFP record causing the error. (Refer to IBM's Advanced Function Printing: Data Stream Reference). Correct the AFP datastream.

VPS763E prtr-id INVALID descr code

descr: Invalid information description:
- BDM RECORD
- BMM RECORD
- BR OBJECT TYPE IDENTIFIER
- BSI 70 REQUIRED FIRST
- CARRIAGE CONTROL
- DATA FOR CONSTANT PAGE
- DUPLEX SIDE CODE
- FULLY QUALIFIED NAME ID
- IMAGE CELL SIZE
- IMAGE DEFAULT CELL SIZE
- IMAGE OBJECT AREA SIZE
- IMAGE RECTANGLE FILL SIZE
- INVALID IOCA DATA
- UNITS PER UNIT BASE
- PELS PER UNIT BASE
- PRINTER CANNOT DUPLEX
- PTX-cntl LENGTH
- PTX CONTROL
- SIMPLEX/DUPLEX CODE

code: Invalid hexadecimal field

Message Meaning: One of the following:
- VPS/AFP has detected that information required for further processing is invalid.
- VPS/AFP has encountered a record that is out of place or invalid.

VPS790I will tell which resource was in process. VPS791I will tell which AFP command was in process. VPS792I will tell which PAGEDEF/DATA MAP was in use and which FORMDEF/MEDIUM MAP was in use.

System Action: VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.

Required Action: Examine the AFP record causing the error. (Refer to IBM's Advanced Function Printing: Data Stream Reference). Correct the AFP datastream.

VPS764E prtr-id UNDEFINED descr code

descr: Undefined information description.
- CHANNEL CODE
- COPYGROUP IDENTIFIER
- FIXED DATA
- MEDIUM MODIFICATION CODE
- SUPPRESSION FIELD

code: Undefined hexadecimal field.

Message Meaning: VPS/AFP has detected that information required for further processing is undefined. VPS790I will tell which resource was was in process. VPS791I will tell which AFP command was in process. VPS792I will tell which PAGEDEF/DATA MAP was in use and which FORMDEF/MEDIUM MAP was in use.

System Action: VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.

Required Action: Examine the AFP record causing the error. (Refer to IBM's Advanced Function Printing: Data Stream Reference). Correct the AFP datastream.

VPS765E prtr-id PREVIOUSLY DEFINED descr code

descr: Previously defined information description: FONT LOCAL ID

code: Undefined hexadecimal field.

Message Meaning: VPS/AFP has detected that a certain code or identifier has already been defined. VPS790I will tell which resource was in process. VPS791I will tell which AFP command was in process. VPS792I will tell which PAGEDEF/DATA MAP was in use and which FORMDEF/MEDIUM MAP was in use.

System Action: VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.

Required Action: Examine the AFP record causing the error. (Refer to IBM's Advanced Function Printing: Data Stream Reference). Correct the AFP datastream.

VPS766E prtr-id ERROR PROCESSING CONSTANT descr

descr: Form in error: FRONT, BACK or FORMS

Message Meaning: VPS/AFP is unable to process duplexed page. VPS790I will tell which resource was in process. VPS791I will tell which AFP command was in process. VPS792I will tell which PAGEDEF/DATA MAP was in use and which FORMDEF/MEDIUM MAP was in use.

System Action: VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.

Required Action: Contact VPS technical support.

VPS767E prtr-id PEN POSITION LOST WHILE PROCESSING GOCA

Message Meaning: VPS/AFP has "lost" the current pen position, which is needed in calculations of an AFP Graphics Content Architecture drawing order.
System Action: VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.
Required Action: Contact VPS technical support.

VPS768I prtr-id UNSUPPORTED OR UNAVAILABLE INPUT TRAY aa – ALTERNATE INPUT TRAY SELECTED

aa: Input tray identifier.

Message Meaning: The input tray selected in the FORMDEF or on the INTRAY keyword is unsupported by the printer or is unavailable.
System Action: VPS/IPDS will select an alternate bin and continue processing.
Required Action: Select an input tray that is supported and available by the printer.

VPS769I prtr-id CHARACTER SET charset WAS SCALED TO 300 DOTS PER INCH

Message Meaning: VPS/AFP scaled the AFP 240-dpi font character set to 300-dpi for use on the 300-dpi printer.
System Action: None.
Required Action: It is strongly recommended that 240-dpi AFP font character sets be pre-scaled to 300-dpi (via LRS's VPSSAFNM utility or IBM's APSRCF30 utility) and stored in 300-dpi font libraries for use with 300-dpi printers. Font scaling is very resource-intensive, so pre-scaling the font character sets will significantly reduce AFP conversion time.

Please note that scaling a font will slightly alter the appearance of the characters. Bar code and optical character recognition fonts may not be readable to scanning devices after they are scaled. **These special fonts must be designed at 300-dpi for use on 300-dpi printers.** For more information about the VPSSAFNM utility, refer to page 8.91.

VPS770I prtr-id THE PRINTER DEFAULT FONT WAS USED ON AT LEAST 1 PAGE

Message Meaning: VPS/AFP did not encounter a font request in either the AFP print document, the PAGEDEF, or the JCL for the main input file print data.
System Action: None.
Required Action: If the printer default font is not the desired font, code an AFP Map Coded Font (MCF) record in the print document or the PAGEDEF, or code the JCL CHARS parameter.

VPS771E prtr-id THE REQUESTED CHARACTER ROTATION WAS NOT AVAILABLE FOR THE SPECIFIED FONT

Message Meaning: VPS/AFP encountered an AFP Map Coded Font (MCF) record requesting an unavailable character rotation for a certain font. VPS790I will tell which resource was in process. VPS791I will tell which MCF record was in process. VPS792I will tell which PAGEDEF/DATA MAP was in use and which FORMDEF/MEDIUM MAP was in use.

System Action: VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.

Required Action: Examine the MCF record in error. (Refer to IBM's Advanced Function Printing: Data Stream Reference.) Correct the AFP datastream.

VPS772E prt-id UNMAPPED GRID(aaaaaaaaaaaaaaaa) GCSGID=bbbbb CPGID=ccccc FGID=ddddd WIDTH=eeeee

aaaaaaaaaaaaaaaa: AFP GRID (global resource identifier).
bbbbb: GCSGIC (graphic character set global identifier).
ccccc: CPGID (code page global identifier).
ddddd: FGID (font global identifier).
eeeee: Font width value.

Message Meaning: The font GRID (global resource identifier) was not mapped to AFP font resource names in user exit 26, the AFP resource table (AFPRTAB), or internal VPS/PCL mapping tables. VPS/PCL cannot resolve the GRID.

System Action: VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.

Required Action: Either modify VPSSUE26 to map the 8-byte GRID value to an AFP coded font name, or modify the AFPRTAB to map the CPGID/GCSGID to an AFP code page table name and the GCSGID/FGID/width to an AFP font character set name. For more information, refer to chapter 8 'VPS/PCL GRID to AFP Font Resource Name Mapping'.

VPS775I prtr-id IM-IMAGE(S) WERE CONVERTED TO IOCA

Message Meaning: VPS/AFP is converting an im-image to an io-image (IOCA) because its resolution does not match the printer resolution.

System Action: None.

Required Action: This conversion is very time- and storage-consuming. Therefore, it is best to either use IM-images with resolutions that match the printer resolution or use IO-images.

VPS776E prtr-id IMAGE BLOCK BOUNDARIES WERE EXCEEDED

Message Meaning: VPS/AFP has detected invalid placement of raster data in an IM-image that is being converted to IOCA. VPS790I will tell which resource was in process. VPS791I will tell which AFP command was in process. VPS792I will tell which PAGEDEF/DATA MAP was in use and which FORMDEF/MEDIUM MAP was in use.

System Action: VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.

Required Action: Examine the AFPDS Image Raster Data (IRD) record in error and previous Image Object Content (IOC), Image Input Descriptor (IID), and Image Cell Position (ICP) records which establish the total size and the placement of this raster data. (Refer to IBM's Advanced Function Printing: Data Stream Reference.) Correct the AFP datastream.

VPS777E prtr-id MORE LND RECORDS WERE RECEIVED THAN EXPECTED

Message Meaning: VPS/AFP has encountered excessive AFP Line Descriptor (LND) records. VPS790I will tell which resource was in process. VPS791I will tell which LND record was in process. VPS792I will tell which PAGEDEF/DATA MAP was in process and which FORMDEF/MEDIUM MAP was in process.

System Action: VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.

Required Action: Examine the LNC/LND records and either adjust the LNC number of LND records or delete the extra LND record(s). (Refer to IBM's Advanced Function Printing: Data Stream Reference.)

VPS780E prtr-id RESOURCE TABLE ERROR; TABLE TYPE=ttttt REASON=rrrr

ttttt: Resource table type - FONT, OVERLAY or PAGE SEGMENT

rrrrr: Reason for failure - ENTRY NOT FOUND, TABLE FULL, or NOT ALLOCATED

Message Meaning: VPS/AFP has encountered an error attempting to reference one of the printer resource tables.

System Action: VPS will put this printer in EDRAINED status.

Required Action: ENTRY NOT FOUND - VPS logic error. Contact VPS technical support.
TABLE FULL - Restart printer.
NOT ALLOCATED - VPS logic error. Contact VPS technical support.

VPS781E prtr-id NO ttttttttt TABLE ENTRIES ELIGIBLE FOR DELETION

ttttttt:	Resource table type - FONT, OVERLAY, or PAGE SEGMENT
Message Meaning:	VPS has attempted to find a resource to delete in the named table. All resources in the table are in use, or there were no resources in the table.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	The dataset being printed is too complex. Decrease the amount of resources required.
Note:	VPS will attempt to delete a resource when the printer indicates it is out of storage for the resource type. If no resources can be found to delete, this error occurs.

VPS782E prtr-id IPDS STATE ERROR, COMMAND = cccc, STATES= vv,ss

cccc:	IPDS command being processed.
vv:	States in which this IPDS command is valid.
ss:	Current IPDS state.
Message Meaning:	The IPDS command issued is not valid in the current IPDS state.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Correct the IPDS datastream. If the IPDS datastream was generated by VPS/IPDS, contact VPS technical support. IPDS state flags: **80** OVERLAY STATE **40** PAGE SEGMENT STATE **20** FONT STATE **10** PAGE STATE **08** HOME STATE **04** BLOCK STATE **FF** ANY STATE

VPS783E prtr-id IPDS RECOVERY ERROR

Message Meaning:	VPS encountered a logic error attempting to reposition the IPDS datast.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Contact VPS technical support. The printer may be restarted.

VPS784E prtr-id AFPDS/IPDS CONVERSION FAILURE; VPS/AFP NOT AVAILABLE

Message Meaning:	The VPS/AFP product is not available.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Contact VPS technical support.

VPS785E prtr-id AFP QUEUE DYNAMIC ALLOCATION FAILURE RC=rc EC=eeee IC=iiii

rc:	Dynamic allocation return code.
eeee:	Dynamic allocation error code.
iiii:	Dynamic allocation information code.
Message Meaning:	An error occured while allocating the secondary staging dataset for VPS/AFP.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Determine the reason for the failure, based on the RC/EC/IC codes. If the reason cannot be determined, contact VPS technical support.

VPS786E prtr-id AFP QUEUE DYNAMIC UNALLOCATION FAILURE RC=rc EC=eeee EC=iiii

rc:	Dynamic allocation return code.
eeee:	Dynamic allocation error code.
iiii:	Dynamic allocation information code.
Message Meaning:	An error occured while unallocating the secondary staging dataset for VPS/AFP.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Determine the reason for the failure, based on the RC/EC/IC codes. If the reason cannot be determined, contact VPS technical support.

VPS788I prtr-id PROCESSING file FOR JOB jobname (jobid)

file:	AFP PRINTER MESSAGES or AFP SEPARATOR.
Message Meaning:	VPS/AFP has begun processing the printer message file or a separator page.
System Action:	None.
Required Action:	None.

VPS789E prtr-id AFP INTERNAL LOGIC ERROR reason

reason:	A description of the logic error.
Message Meaning:	A logic error has occurred when processing a dataset for a VPS/AFP printer.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	Contact VPS technical support.

VPS790I prtr-id AN ERROR OCCURRED WHILE PROCESSING resource name

resource: Resource type:
- FORM DEFINITION
- PAGE DEFINITION
- OVERLAY
- PAGE SEGMENT
- CODED FONT
- FONT CHARACTER SET
- CODE PAGE TABLE

name: Resource name

Message Meaning: This message assists in debugging AFP errors by naming the resource being processed by VPS/AFP at the time of an error.

System Action: VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.

Required Action: Use this message in conjunction with the other messages to correct the error.

VPS791E prtr-id AN ERROR OCCURRED WHILE PROCESSING THE command STRUCTURED FIELD: DD=ddname SEQ=seq# REC=rec#

command: AFP structured field abbreviation.
ddname: DDname of the file in process.
seq#: AFP record sequence number.
rec#: Logical record number of the command in process.

Message Meaning: This message assists in debugging AFP errors by naming the structured field, the ddname of the file, the sequence number of the AFP command, and the logical record number of the record being processed by VPS/AFP at the time of the error.

System Action: VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.

Required Action: Use this message in conjunction with the other messages to correct the error.

VPS792I prtr-id THE CURRENT object IN USE WAS name1 OF resource name2

object: Object type: DATA MAP or MEDIUM MAP
name1: DATA MAP/MEDIUM MAP name.
resource: Resource type: PAGEDEF or FORMDEF
name2: PAGEDEF/FORMDEF name

Message Meaning: This message assists in debugging AFP errors by naming the current PAGEDEF/DATA MAP and FORMDEF/MEDIUM MAP in use by VPS/AFP at the time of the error.

System Action: VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.

Required Action: Use this message in conjunction with the other messages to correct the error.

VPS793I prtr-id AN ERROR OCCURRED WHILE PROCESSING RECORD NUMBER rec# OF DDNAME ddname

rec#:	Logical record number of the record in process
ddname:	DDname of the file in process
Message Meaning:	This message assists in debugging AFP errors by giving the logical record number and the ddname of the file being processed by VPS/AFP at the time of the error.
System Action:	VPS will put the printer in EDRAINED status or will requeue the print job, depending on the ERRACTN values specified for the printer.
Required Action:	Use this message in conjunction with the other messages to correct the error.

VPS795I prtr-id product CONVERSION COMPLETE FOR JOB jobname(jobid)

product:	VPS/IPDS, VPS/PCL, VPS/XESAFP or ACIF
Message Meaning:	VPS/AFP has completed the conversion of the SYSOUT dataset to the required PDL.
System Action:	None.
Required Action:	None.

VPS796I prtr-id TOTAL AREA descr

descr:	Information description: • GETMAINED - ########. • FREEMAINED - ########.
Message Meaning:	This informational message tells the total amount of storage GETMAINed and FREEMAINed by VPS/AFP.
System Action:	None.
Required Action:	None.

VPS797I prtr-id ddname RECORDS descr

ddname:	DDname of a VPS/AFP I/O file.
descr:	Information description: • READ - ########. • WRITTEN - ########.
Message Meaning:	This informational message tells the number of records read and written for each file during VPS/AFP processing.
System Action:	None.
Required Action:	None.

VPS799E aaaaaaaa INITIALIZATION ERROR - LOAD FAILED FOR MODULE bbbbbbbb R1=cccccccc R15=dddddddd

aaaaaaaa:	Indicates the name of the product for which the LOAD failed.
bbbbbbbb:	Indicates the name of the load module for which the LOAD failed.
cccccccc:	The contents of Register 1.
dddddddd:	The contents of Register 15.
Message Meaning:	VPS attempted to LOAD a module, but the LOAD macro gave an unexpected return code.
System Action:	The product will be disabled.
Required Action:	Verify that the necessary load modules are in either a linklist library or a library named in the STEPLIB DD in the VPS JCL.

VPS800E DISPATCHER SUBTASK ABEND SYS-sss USR-uuu

sss:	System abend code.
uuu:	User abend code.
Message Meaning:	Dispatcher subtask has abended.
System Action:	VPS messages VPS809E, VPS813E and VPS810E will follow. VPS will abend with a U100 abend.
Required Action:	Contact VPS technical support.

VPS801E COMMUNICATIONS SUBTASK ABEND SYS-sss USR-uuu

sss:	System abend code.
uuu:	User abend code.
Message Meaning:	Operator communications subtask has abended.
System Action:	VPS messages VPS809E, VPS813E and VPS810E will follow. VPS will abend with a U100 abend.
Required Action:	Contact VPS technical support.

VPS802E LOG SUBTASK ABEND SYS-sss USR-uuu

sss:	System abend code.
uuu:	User abend code.
Message Meaning:	The VPS log subtask has abended.
System Action:	VPS messages VPS809E, VPS813E and VPS810E will follow. VPS logging will be disabled.
Required Action:	If logging is required, terminate and restart VPS.

VPS803E DRIVER SUBTASK ABEND SYS-sss USR-uuu

sss:	System abend code.
uuu:	User abend code.
Message Meaning:	The VPS driver subtask has abended.
System Action:	VPS messages VPS809E, VPS813E and VPS810E will follow. VPS will abend with a U100 abend.
Required Action:	Contact VPS technical support.

VPS804E MRD SUBTASK ABEND SYS-sss USR-uuu

sss: System abend code.
uuu: User abend code.

Message Meaning: The MRD (Missing Response Detector) subtask has abended.
System Action: VPS messages VPS809E, VPS813E and VPS810E will follow. VPS will abend with a U100 abend.
Required Action: Contact VPS technical support.

VPS805E TIMER SUBTASK ABEND SYS-sss USR-uuu

sss: System abend code.
uuu: User abend code.

Message Meaning: The timer subtask has abended.
System Action: VPS messages VPS809E, VPS813E and VPS810E will follow. VPS will abend with a U100 abend.
Required Action: Contact VPS technical support.

VPS806E TCPIP MAIN SYSTEM SUBTASK ABENDED SYS-sss USR-uuu

sss: System abend code.
uuu: User abend code.

Message Meaning: The TCP/IP main system subtask has abended.
System Action: VPS messages VPS809E, VPS813E and VPS810E will follow. The TCP/IP interface will be disabled.
Required Action: Contact VPS technical support.

VPS807E prtr-id SCHEDULER SUBTASK ABEND SYS-sss USR-uuu

sss: System abend code.
uuu: User abend code.

Message Meaning: The scheduler subtask has abended.
System Action: VPS messages VPS809E, VPS813E and VPS810E will follow. VPS will put the printer in EDRAINED status.
Required Action: Contact VPS technical support.

VPS808E prtr-id USER EXIT ABEND - EXITID=nn SYS-sss USR-uuu, EXIT DISABLED

nn:	User exit number.
sss:	System abend code.
uuu:	User abend code.
Message Meaning:	The VPS user exit module identified in the message has abended.
System Action:	VPS messages VPS809E, VPS813E and VPS810E will follow. VPS will disable the exit, and the printer will continue to process work, but without using this exit.
Required Action:	If the exit is required, correct the error in the exit and terminate and restart VPS to put the corrected version of the exit into effect.
Note:	This message will only appear if the exit has recovery on. If recovery is off, message VPS807E will appear, and the printer will be put in EDRAINED status.

VPS809E prtr-id PSW=pppppppp pppppppp MODULE = mmmmmmmm + nnnnnnnn

pppppppp	PSW at time of abend.
pppppppp:	
mmmmmmmm:	Name of the abending module.
nnnnnnnn:	Hex offset into abending module.
Message Meaning:	A VPS module has abended. This message and message VPS810E give debugging information about the abend.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	None.

VPS810E prtr-id R0-R7 xxxxxxxx xxxxxxxx (etc.)
prtr-id R8-R15 xxxxxxxx xxxxxxxx (etc.)

xxxxxxxx:	The contents of a register at the time of an abend.
Message Meaning:	A VPS module has abended. This message and message VPS809E give debugging information about the abend.
System Action:	None.
Required Action:	Contact VPS technical support.

VPS811E prtr-id aaaaaaaa ABEND - SYS=sss USR=uuu REQ=req

aaaaaaaa:	The name of the interface (e.g., CONNECT:DIRECT).
ssss	System abend code.
uuu	User abend code.
req	Request code.
Message Meaning:	The product interface identified in the message text has abended.
System Action:	VPS will put the printer in EDRAINED status.
Required Action:	Determine the cause of the failure, based on the abend code. The MVS system log may contain messages indicating the reason for the failure.

VPS812E SERVER CONNECT SUBTASK ABEND SYS=sss USR=uuu

sss:	System abend code
uuu:	User abend code
Message Meaning:	The VPS Server connection subtask has abended.
System Action:	VPS messages VPS809E, VPS813E, and VPS810E will follow. VPS will abend with a U100 abend.
Required Action:	Contact VPS technical support.

VPS813E prtr-id pswmsg

pswmsg:	DATA AT PSW IS UNAVAILABLE AT THIS TIME DATA AT PSW IS INACCESSIBLE BY USER DATA AT PSW XXXXXXXX XXXXXXXX - XXXXXXXX XXXXXXXX
Message Meaning:	A VPS module has abended. This message provides additional debugging information about the abend.
System Action:	VPS will either abend (if a VPS system task abended) or EDRAIN the printer (if a VPS printer task abended.
Required Action:	None.

VPS814E TCPIP SPECIAL REQUEST TASK ABEND SYS=sss USR=uuu

sss:	System abend code
uuu:	User abend code
Message Meaning:	The TCP/IP special request subtask has abended.
System Action:	VPS messages VPS809E, VPS810E and VPS813E will follow. VPS/Email notification will be disabled.
Required Action:	VPS must be restarted to enable VPS/Email notification. Call VPS technical support.

VPS815E VPS SYSOUT RETAIN/EXPIRE TASK ABEND SYS=sss USR=uuu

sss:	System abend code.
uuu:	User abend code.
Message Meaning:	The VPS SYSOUT retention and expiration task has abended.
System Action:	VPS will continue with SYSOUT retention disabled.
Required Action:	Contact VPS technical support.

VPS825E prtr-id MISSING RESPONSE DETECTED ON DEVICE luname - INTERVALS=nnnnn

luname:	LU name of the printer.
nnnnn:	The number of times that this device has exceeded the Missing Response Interval since VPS last sent data to the device.
Message Meaning:	VPS has been waiting for a response from the printer for a period of time longer than the MRDINTVL specification.
System Action:	None.
Required Action:	If these messages persist, the device hardware is probably hung up. Reset the device.

VPS830E INTERNAL LOGIC ERROR - MESSAGE ID ### IS UNDEFINED

###:	A VPS message number.
Message Meaning:	A VPS module has attempted to issue a VPS message with an undefined message number.
System Action:	The message is ignored.
Required Action:	Contact VPS technical support.

VPS840E VPSSSRVC TASK SUBSYSTEM DYNAMIC request FAILURE R15=rc EC=ec IC=ic

request:	Type of request (ALLOCATION/UNALLOCATION)
rc:	SVC99 return code.
ec:	SVC99 error code.
ic:	SVC99 info code.
Message Meaning:	The task which connects to the LRS/MVS Server address space encountered an error.
System Action:	VPS will continue.
Required Action:	Contact VPS technical support.

VPS841E VPSSSRVC TASK SERVER PC CALL ERROR R15=rc reason

rc:	Call return code.
reason:	Reason for error.
Message Meaning:	The task which connects to the LRS/MVS Server address space encountered an error.
System Action:	VPS will continue.
Required Action:	Contact VPS technical support.

VPS850E prtr-id SNAP ALLOCATION FAILURE R15=rc EC=eeee IC=iiii

rc:	Dynamic allocation return code.
eeee:	Dynamic allocation error code.
iiii:	Dynamic allocation info code (see OS/VS2 SPL: Job Management).
Message Meaning:	An error has occurred while attempting to allocate a snap dump dataset.
System Action:	The snap request is ignored.
Required Action:	Correct the error causing the allocation failure, based on the R15, EC, and IC values.

VPS851E prtr-id SNAP OPEN FAILURE

Message Meaning:	An error occurred opening the snap dump dataset.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	If possible, correct the problem which caused the OPEN error. Then issue a START command for the printer.

VPS858E prtr-id SNAP DCB ABEND CODE=xxx-xx

xxx-xx:	Abend/return codes.
Message Meaning:	An abend occurred during OPEN/CLOSE/EOV processing for the snap dump dataset.
System Action:	VPS will put this printer in EDRAINED status.
Required Action:	If possible, correct the problem which caused the abend. Then issue a START command for the printer.

VPS859E prtr-id SNAP I/O ERROR xxxxxxxxxxxxxxxx

xxxxxxxxxxxxxxxx	SYNAD message text.
Message Meaning:	An I/O error occurred while writing to the snap dataset.
System Action:	The snap request is ignored.
Required Action:	Contact VPS technical support.

VPS860N prtr-id $$CBSET SUCCESSFUL|UNSUCCESSFUL FOR KEYWORDS=(keyword ids) EXITID=nn

keyword ids: IDs of the keyword(s) for which the $$CBSET was issued.

nn: User exit number (00 - 27).

Message Meaning: A user exit attempted to modify a printer parameter.
System Action: None.
Required Action: If successful, no action is necessary. If unsuccessful, determine the reason for the failure and correct the exit.

VPS861N prtr-id $$CBSET INVALID SELECTION CRITERIA - error type - EXITID=nn

error type: The reason the modified selection criteria were invalid:
- NO SELECTION CRITERIA
- CONFLICT WITH REQUEUE PARAMETERS
- OVERLAP WITH prtrid

nn: User exit number (00 - 27).

Message Meaning: A user exit attempted to modify the selection criteria for a printer.
System Action: The request is ignored.
Required Action: Correct the exit, based on the error.

VPS862N prtrid $$CBSET REQUEUE|RETAIN PARAMETERS CONFLICT WITH type - EXITnn

type: The criteria with which the modified requeue or retain parameters conflict:

SELECTION CRITERIA

SCHEDULED SELECTION CRITERIA

nn: User exit number (00 - 28).

Message Meaning: A VPS user exit attempted to modify the requeue or retain parameters for a printer, but the new values conflict with either the current printer selection criteria or the scheduled selection criteria.
System Action: The request is ignored.
Required Action: Correct the exit, based on the error.

VPS863E prtrid $$CBSET LOGIC ERROR DURING PROCESSING - rsn

rsn: Text to describe the error, such as:

MODULE LOAD ERROR

Message Meaning: A VPS user exit attempted to modify printer parameters, but an unexpected error occurred during processing.
System Action: The request is ignored.
Required Action: Contact VPS technical support.

VPS900R COMMAND INVALID - command

command: The VPS command that was issued.

Message Meaning: An unknown VPS command was issued.
System Action: The command is ignored.
Required Action: Verify that the correct command was issued.

VPS901R COMMAND AMBIGUOUS - command

command: The VPS command that was issued.

Message Meaning: Insufficient characters were entered to make the command unique to VPS.
System Action: The command is ignored.
Required Action: Enter additional command characters.

VPS902R PARAMETER LENGTH ERROR

Message Meaning: A parameter exceeded 50 characters.
System Action: The command is ignored.
Required Action: Shorten parameter as required.

VPS903R COMMAND HAS TOO MANY PARAMETERS

Message Meaning: Too many command parameters were specified.
System Action: The command is ignored.
Required Action: Remove unneeded parameters.

VPS904R PARAMETER INVALID - parameter

Message Meaning: A parameter on a command was invalid.
System Action: The command is ignored.
Required Action: Issue the command with valid parameters.

VPS905R NON-SPECIFIC PRINTER-ID NOT ALLOWED

Message Meaning: Either a generic PRTR-ID or group name was specified, but the command requires a specific PRTR-ID.
System Action: The command is ignored.
Required Action: Specify a specific PRTR-ID.

VPS906R REQUIRED PRINTER-ID NOT SPECIFIED

Message Meaning: Required PRTR-ID was not specified.
System Action: The command is ignored.
Required Action: Specify PRTR-ID.

VPS907R SPECIFIED PRINTER-ID NOT FOUND - prtr-id

Message Meaning: Specified PRTR-ID was not found.
System Action: The command is ignored.
Required Action: Specify a valid PRTR-ID.

VPS908R SPECIFIED PRINTER STATUS INVALID - status

status: Status that was specified.

Message Meaning: An invalid status request was made.
System Action: The command is ignored.
Required Action: Correct the status request.

VPS909R NO PRINTERS CURRENTLY DEFINED IN SYSTEM

Message Meaning: A generic or group command request was made, but there are no printers defined in VPS.
System Action: The command is ignored.
Required Action: None.

VPS910R NO PRINTERS WITH REQUESTED STATUS FOUND - S=status

status: Status that was specified.

Message Meaning: No printers with the status specified in the command currently exist in VPS.
System Action: The command is ignored.
Required Action: None.

VPS911R NO PRINTERS WITH REQUESTED GROUP NAME FOUND - groupname

groupname: Group name that was specified.

Message Meaning: No printers exist that belong to requested group.
System Action: The command is ignored.
Required Action: None.

VPS912R NO PRINTERS WITH REQUESTED PARTIAL NAME FOUND - generic name

generic name: Generic name that was specified.

Message Meaning: No printers exist that match the partial name.
System Action: The command is ignored.
Required Action: None.

VPS913R prtr-id INACTIVATION REQUEST SCHEDULED

Message Meaning: Inactivation has been scheduled in response to an inactivate command.
System Action: None.
Required Action: None.

VPS914R prtr-id REQUIRED SET PARAMETER(S) NOT SPECIFIED

Message Meaning: A SET command was issued, but no parameters were specified on the command.
System Action: The command is ignored.
Required Action: Issue the command with the required parameters.

VPS915R prtr-id SET PARAMETER AMBIGUOUS - set type

set type: The requested set parameter.

Message Meaning: Insufficient characters were entered to uniquely identify the set type.
System Action: The command is ignored.
Required Action: Enter more characters of the set type.

VPS916R prtr-id REQUIRED SEL PARAMETER(S) NOT SPECIFIED

Message Meaning: A SEL command was issued without the required parameters.
System Action: The command is ignored.
Required Action: Enter the command with required SEL parameters.

VPS917R prtr-id INVALID SELECTION CRITERIA - criteria

criteria: The requested selection criteria.

Message Meaning: Invalid selection criteria specified.
System Action: The command is ignored.
Required Action: Correct the selection criteria.

VPS918R REQUIRED SSET PARAMETER(S) NOT SPECIFIED

Message Meaning: The SSET command was issued without the required parameters.
System Action: The command is ignored.
Required Action: Enter the required parameters on the SSET command.

VPS919R SSET PARAMETER AMBIGUOUS - parameter

Message Meaning: Insufficient characters were entered to uniquely identify the SSET parameter.
System Action: The command is ignored.
Required Action: Enter more characters of the SSET parameter.

VPS920R cmdtarget cmdtype COMMAND ACKNOWLEDGED

cmdtarget: The “target” of the command, such as a printer ID, SYSTEM, a printer status, etc.
cmdtype: The type of command, such as SNAP, DISPLAY, etc.

Message Meaning: VPS has acknowledged the command.
System Action: VPS will schedule and process the command.
Required Action: None.

VPS921R DISPLAY PARAMETER AMBIGUOUS - parameter

parameter: The requested display parameter.

Message Meaning: Insufficient characters were entered to uniquely identify the display parameter.
System Action: The command is ignored.
Required Action: Enter more characters of the display parameter.

VPS922R DISPLAY, CPUID COMMAND IGNORED - NO CPUID KEYWORDS WERE SPECIFIED AT VPS INITIALIZATION

Message Meaning: A display command was issued for all CPUID keywords, but no CPUID keywords were specified.
System Action: The command will be ignored.
Required Action: None.

VPS923R prtr-id STOP FORCE CHANGED TO STOP IMMEDIATE

Message Meaning: A STOP command with a FORCE operand was issued to a printer while that printer was attempting to establish a VTAM session. Since FORCE is not allowed while establishing a session, it was changed to IMMEDIATE.
System Action: The command is processed as a STOP IMMEDIATE.
Required Action: None.

VPS924R MESSAGE NOT LOGGED, LOGGING NOT ACTIVE

Message Meaning: A log command was issued, but VPS logging is not currently active.
System Action: The log command is ignored.
Required Action: If desired, activate VPS logging.

VPS925R MESSAGE SUCCESSFULLY LOGGED

Message Meaning: Requested message was successfully logged in response to a log command.
System Action: None.
Required Action: None.

VPS926R REQUIRED SSTAT PARAMETER(S) NOT SPECIFIED

Message Meaning: Neither LOG nor RESET was specified on the SSTAT command.
System Action: The command is ignored.
Required Action: Issue the command with the correct type.

VPS927R SSTAT PARAMETER AMBIGUOUS - xxxxx

Message Meaning: A parameter of the SSTAT command was entered without enough characters to uniquely identify the parameter.
System Action: The command is ignored.
Required Action: Enter more characters of the SSTAT parameter.

VPS928R REQUIRED REFRESH PARAMETER(S) NOT SPECIFIED

Message Meaning: The REFRESH command was issued without the required parameter(s).
System Action: The command is ignored.
Required Action: Enter the command with the required REFRESH parameter(s).

VPS929R REFRESH PARAMETER AMBIGUOUS - parameter

parameter: The requested REFRESH parameter.

Message Meaning: Insufficient characters were entered to uniquely identify the requested REFRESH parameter.
System Action: The command is ignored.
Required Action: Enter more characters of the REFRESH parameter.

VPS930R prtr-id START COMMAND REJECTED, reject reason

reject reason: One of the following:
- VPS TERMINATION IN PROGRESS
- INACTIVATION PENDING
- PRINTER IS EDRAINED
- PRINTER ALREADY IN SESSION

Message Meaning: A START command was issued for a printer, but was rejected due to one of the reasons listed above.
System Action: The START command is ignored.
Required Action: None.

VPS935R prtr-id ACQUIRE REQUEST SCHEDULED

Message Meaning: An ACQUIRE command was issued to establish a session with a printer.
System Action: The request is scheduled.
Required Action: None.

VPS936R prtr-id ACQUIRE COMMAND REJECTED, reject reason

reject reason: One of the following:
- VPS TERMINATION IN PROGRESS
- INACTIVATION PENDING
- PRINTER IS EDRAINED
- PRINTER ALREADY IN SESSION

Message Meaning: An ACQUIRE command was issued for a printer, but was rejected due to one of the reasons listed above.
System Action: The ACQUIRE command is ignored.
Required Action: None.

VPS937R prtr-id RELEASE REQUEST SCHEDULED

Message Meaning: An RELEASE command was issued to terminate a session with a printer.
System Action: The request is scheduled.
Required Action: None.

VPS938R prtr-id RELEASE COMMAND REJECTED, PRINTER NOT IN SESSION

Message Meaning: A release command was issued for a printer which is not currently in session.
System Action: The command is ignored.
Required Action: None.

VPS939R prtr-id COMMAND IGNORED - PRINTER ENDING AFP MODE

Message Meaning: The CANCEL, INTERRUPT, REPEAT, REPOSITION, or RESTART was issued for the printer, but VPS/IPDS or VPS/PCL was in the process of ending AFP mode.
System Action: The command is ignored.
Required Action: None.

VPS940R prtr-id IS NOT CURRENTLY PRINTING

Message Meaning: A cancel, reposition, repeat, restart, or interrupt was issued to PRTR-ID, but it was not printing.
System Action: The command is ignored.
Required Action: None.

VPS941R prtr-id INTERRUPT COMMAND REJECTED, PRINTING xxxxxxxx DATASET

xxxxxxxx: Reason for command reject, for example:

MULTIPLE COPY
PAGECENTER
TCPIP/LPD
VPS/CDI
VPS/PC

Message Meaning: The command is rejected to prevent the possible loss of the dataset(s).
System Action: The interrupt command will be rejected, and the multiple copy dataset will continue to print.
Required Action: None.

VPS942R prtr-id RESTART COMMAND REJECTED, NOT ALLOWED FOR xxxxxxxx DATASET

xxxxxxxx: Reason for command reject, for example:

PAGECENTER
TCPIP/LPD
VPS/PC

Message Meaning: A restart command was issued for a dataset printing on an APPC printer.
System Action: The command will be rejected, and the dataset will continue to print.
Required Action: None.

VPS943R prtrid EXPIRE COMMAND REJECTED - rsn

rsn:	Reason for command reject, such as: EXPIRATION TASK DISABLED INSUFFICIENT STORAGE STATUS NOT SUPPORTED
Message Meaning:	The VPS EXPIRE command cannot be processed at this time or the parameters specified are not supported.
System Action:	The command is ignored.
Required Action:	If the expiration task is not enabled, restart VPS with a non-zero value in the second positional parameter of the INTERVAL keyword in the VPS system initialization member. If the EXPIRE command was issued with S=, re-issue the command with a partial or complete VPS printer name. If the reason for the error cannot be determined, contact VPS technical support.

VPS944R prtrid DELETED(aaaaa) KEPT(bbbbb) NON-SELECTABLE(ccccc)

aaaaa:	Number of files deleted from the JES spool.
bbbbb:	Number of files kept on the JES spool.
ccccc:	Number of files which were not selectable.
Message Meaning:	This message is in response to the EXPIRE command and indicates the number of files which were deleted, kept or which were not selectable.
System Action:	None.
Required Action:	None.

VPS946R prtr-id REPOSITION COMMAND REJECTED, NOT ALLOWED FOR xxxxxxx DATASET

xxxxxxxx:	Reason for command reject, for example: GRAPHICS PAGECENTER TCPIP/LPD TRNCLASS VPS/CDI VPS/PC
Message Meaning:	A reposition command was issued for a graphic dataset from SAS or GDDM or for a dataset printing on an APPC printer.
System Action:	The command is ignored.
Required Action:	None.

VPS947R prtr-id LINE REPOSITION COMMAND REJECTED FOR xxxx DATASET

xxxx: The type of page dataset for which the line reposition command was issued (PCL or IPDS).

Message Meaning: A reposition command was issued for a page dataset.
System Action: The command is ignored.
Required Action: None.

VPS948R prtr-id aaaaaa COMMAND REJECTED - reason

aaaaaa: Name of command.
reason: Reason command was rejected.

Message Meaning: A command was issued which is not supported for this device.
System Action: The command is ignored.
Required Action: None.

VPS950R xxxx SDUMP|SNAP COMPLETE

xxxx: Prtr-id or System

Message Meaning: A snap or system dump has been successfully completed for the requested printer(s) in response to a SNAP or SDUMP command.
System Action: None.
Required Action: None.

VPS951R xxxx SDUMP|SNAP NOT SUCCESSFUL R15=rc

xxxx: Prtr-id or System
rc: Snap or system dump return code (see OS/VS2 MVS Supervisor Services).

Message Meaning: VPS attempted to create a snap or system dump in response to a SNAP or SDUMP command, but an error occurred in processing. The error occurred either allocating the dataset, opening the dataset, or issuing the macro. If allocation failed, message VPS850E will precede this message. If open failed, message VPS851E will precede this message.
System Action: The SNAP or SDUMP command is ignored.
Required Action: Contact VPS technical support.

VPS952R CLOSELOG COMMAND REJECTED, LOGGING NOT ACTIVE

Message Meaning: A closelog command was issued, but logging is not currently active.
System Action: The command is rejected.
Required Action: None.

VPS953R CLOSELOG COMMAND REJECTED, LOG DATASET WAS PRE-ALLOCATED

Message Meaning: A CLOSELOG command was issued, but the log dataset is a pre-allocated DASD dataset rather than a SYSOUT dataset.
System Action: The CLOSELOG command is ignored.
Required Action: None.

VPS954R LOG=Y REJECTED, LOG SUBTASK HAS TERMINATED

Message Meaning: An SSET command with LOG=Y was issued, but the log subtask has terminated.

System Action: The LOG=Y option is ignored.
Required Action: None.

VPS955R TCPIP=t REJECTED,VPS/TCPIP CONNECTED|NOT INSTALLED

t: The value specified in the TCPIP= parameter on the SSET command

Message Meaning: The VPS SSET command for TCPIP was rejected, either because TCPIP is not installed, or because TCPIP is already connected.
System Action: The command is ignored.
Required Action: Issue the correct command.

VPS957R *SYSTEM MODULE=aaaaaaaa LDPT=bbbbbbbb EPA=cccccccc LENGTH=dddddddd COUNT=ee...ee ff...ff

aaaaaaaa: Module name
bbbbbbbb: Module load point
cccccccc: Module entry point
dddddddd: Module length
ee...ee: Module entry count
ff...ff: Module error information (if any)

Message Meaning: Response to DISPLAY,SYSTEM,MODULE command.
System Action: None.
Required Action: None.

VPS958R *SYSTEM MODULE=aaaaaaaa bbbbbbbb - cccccccc dddddddd eeeeeeee ffffffff gggggggg hhhhhhhh iiiiiiii jjjjjjj

aaaaaaaa:	Module name
bbbbbbbb:	Module address
cccccccc:	1st offset address
dddddddd:	2nd offset address
eeeeeeee:	3rd offset address
ffffffff:	4th offset address
gggggggg:	5th offset address
hhhhhhhh:	6th offset address
iiiiiiii:	7th offset address
jjjjjjj:	8th offset address

Message Meaning: Response to DISPLAY,SYSTEM,MODULE command.
System Action: None.
Required Action: None.

VPS959R *SYSTEM TASK=aaaa for bbbbbbbb PSW=cccccccc cccccccc WLIC=dddddddd MODULE=ee...ee + ffffffff

aaaa:	VPS subtask name
bbbbbbbb:	SYSTEM or printer member name
cccccccc:	PSW of subtask
dddddddd:	WLIC of subtask
ee...ee:	Module name
ffffffff:	Module offset

Message Meaning: Response to DISPLAY,SYSTEM,TASK command.
System Action: None.
Required Action: None.

VPS960R VPS FAST TERMINATION REQUEST ACKNOWLEDGED

Message Meaning: VPS has acknowledged a “P VPS” command
System Action: All printers are drained via a “STOP FORCE” command.
Required Action: None.

VPS961R VPS TERMINATION REQUEST ACKNOWLEDGED

Message Meaning: VPS has acknowledged an END command.
System Action: VPS will terminate when all printers have finished printing their current job.
Required Action: None.
Note: Printers waiting for some action (WCONNECT, POWEROFF, INTVRQD, etc.) will delay shutdown.

VPS962R VPS ABNORMAL TERMINATION REQUESTED

Message Meaning: VPS has acknowledged an abend command.
System Action: VPS will terminate with a U001 abend.
Required Action: None.

VPS963R *SYSTEM CPUID=cpuid

Message Meaning: Response to DISPLAY, CPUID command.
System Action: None.
Required Action: None.

VPS964R *SYSTEM CPU (cpu, VALID|INVALID) CUSTID (custid, VALID|INVALID) PRODUCT (product, VALID|INVALID)

cpu: CPU serial number encoded in CPUID keyword
custid: Customer ID encoded in CPUID keyword
product: Products valid with CPUID keyword

Message Meaning: Response to DISPLAY,CPUID command. The VPS963R message above this message contains the actual CPUID keyword value. The VPS964R message shows the cpu serial number, customer ID in the CPUID key and whether they match (VALID) or do not match (INVALID) the current CPU serial number and customer ID. In addition, the valid products for the CPUID keyword are displayed.
System Action: None.
Required Action: None.

VPS965R *SYSTEM aaaaaaaaaaaaaaa KEY - CUSTID (bbbbbb,cccccc) COPY(d) CPUCHK (DISABLED|ENABLED)
*SYSTEM aaaaaaaaaaaaaaa KEY - CPUID(eeeee) STATUS(ffffffff) ggg…ggg

aaa..aaa: Name of product from the key.
bbbbbb: Customer ID from the product.
cccccc: Customer ID from the key.
d: Number of copies from the key (if any).
eeeeee: CPU serial number from the key or "ANY" if CPU checking is disabled in the key.
ffffffff: Status of the key (TRAP, LICENSE, INVALID).
ggg…ggg: Any error or warning message pertaining to the key.

Message Meaning: This message is issued in response to the DISPLAY,KEYS command.
System Action: None.
Required Action: None.

VPS966R *SYSTEM VERSION=V1R8.0.xxxxx CUSTID=cccccc INIT(mm/dd-hh.mm) APPLID=applid CPU=cpu# CROPTS=X'dddddddd'

xxxxx: VPS maintenance and fix level.
cccccc: Six character customer ID.
mm/dd-hh.mm**:** VPS initialization date and time.
applid: VTAM application ID.
cpu#: CPU serial number.
dddddddd: C runtime options for system tasks.

Message Meaning: Response to DISPLAY-SYSTEM command.
System Action: None.
Required Action: None.

VPS967R *SYSTEM INTERVAL(aaaa,bbbb) MRDI=cccc SAFCLASS=dddddddd STAINTVL=eeee SWAP=Y|N USEROPTS=X'ffff' VPS/AFP=Y|N

aaaa:	Wait time for VPS timer requests (mm.ss).
bbbb:	Wait time for VPS SYSOUT expiration (hh.mm).
cccc:	Maximum amount of time that a SEND can be outstanding before VPS is to consider the printer to have had a missing response (mm.ss).
dddddddd:	SAFCLASS keyword value.
eeee:	Time between logging system statistics (hh.mm).
ffff:	User option flags.

Message Meaning: Response to DISPLAY-SYSTEM command.
System Action: None.
Required Action: None.

VPS968R *SYSTEM DISPATCHER(aaaaaa,NXDS=bbbb.bb,NXJB=cccc.cc, TIMR=dddd.dd, SQUE=eeee.ee,QUEA=ffff.ff) RLRQ=ggggggggggg

aaaaaa:	Status of dispatcher (ACTIVE or IDLE).
bbbb.bb:	Average time to process next dataset requests for all printers.
cccc.cc:	Average time to process next job requests for all printers.
dddd.dd:	Average time to locate work for all idle printers.
eeee.ee:	Average time to queue a dataset.
ffff.ff:	Average time to allocate a staging dataset.
ggggggggggg:	Number of times other VTAM applications have requested that VPS release a printer.

Message Meaning: Response to DISPLAY-SYSTEM command.
System Action: None.
Required Action: None.
Note: All times are in hundredths of seconds.

VPS969R *SYSTEM JES(TYPE=aaaa,NAME=bbbb,CMD=c,DESTVAL=d, SSITYPE=PSO|SAPI, SSI(NAME=eeee,CMD=f,BUFNO=ggg))

aaaa:	Type of JES subsystem (JES2 or JES3).
bbbb:	Name of JES subsystem.
c:	JES command character.
d:	Value of DESTVAL keyword.
eeee:	Subsystem name used for VPS.
f:	Subsystem command character used for VPS.
ggg:	Number of command buffers for subsystem commands.

Message Meaning: Response to DISPLAY-SYSTEM command.
System Action: None.
Required Action: None.

VPS970R *SYSTEM LOG(c,ddddddd,ffffffff,wwwwwwww,oooooooo, HOLD|NOHOLD, ACTIVE|INACTIVE)

c:	Log class.
ddddddd:	Log destination.
ffffffff:	Log form.
wwwwwwww:	Log writer.
oooooooo:	Log OUTPUT JCL statement name.

Message Meaning: Response to DISPLAY-SYSTEM command.
System Action: None.
Required Action: None.

VPS971R *SYSTEM MAXPRTS(a/b/c) MAXBUSY(d/e/f)

a:	Maximum defined printers.
b:	Current defined printers.
c:	Highest defined printers.
d:	Maximum active printers.
e:	Current active printers.
f:	Highest active printers.

Message Meaning: Response to DISPLAY-SYSTEM command.
System Action: None.
Required Action: None.

VPS972R *SYSTEM PSSELECT(c,d,f,w,ACTIVATE=(Y|N,Y|N,Y|N),TYPE=D|W|F)

c:	Preselection class(es).
d:	Preselection destination(s).
f:	Preselection form.
w:	Preselection writer.

Message Meaning: Response to DISPLAY-SYSTEM command.
System Action: None.
Required Action: None.

VPS973R *SYSTEM SERVER (VPDESC(description))

description:	Value of VPDESC keyword.

Message Meaning: Response to DISPLAY-SYSTEM command.
System Action: None.
Required Action: None.

VPS973R *SYSTEM SERVER (CONNECTED,NAME=name,PRINTERS(aa,bb), SUBSYS=subsys,VERSION=ver)

name:	LRS/MVS Server name.
aa:	Number of activated VPS printers.
bb:	Number of printers connected to the LRS/MVS Server.
subsys:	Subsystem name.
ver:	VPS maintenance and fix level.

Message Meaning: Response to DISPLAY-SYSTEM command.
System Action: None.
Required Action: None.

VPS974R *SYSTEM SNAP(c,ddddddddd,ffffffff,wwwwwwww,ooooooooo, HOLD|NOHOLD, AUTO=Y|N)

c:	Snap class.
ddddddddd:	Snap destination.
ffffffff:	Snap form.
wwwwwwww:	Snap writer.
ooooooooo:	Output reference.

Message Meaning: Response to DISPLAY-SYSTEM command.
System Action: None.
Required Action: None.

VPS975R *SYSTEM SREQ(ACTIVE IDLE,SRQx,TIME=hh.mm.ss),SRQA=99.99, SRQJ=99.99, SRQC=99.99,JDYA=99.99,JDUK=99.99,JDUD=99.99

SRQx:	Type of subsystem request.
hh.mm.ss:	Time of subsystem request entry.
99.99:	Average time, in hundredths of seconds, for processing each of the particular subsystem request types.

Message Meaning: Response to DISPLAY-SYSTEM command.
System Action: None.
Required Action: None.

VPS976R *SYSTEM STORAGE (REGN(aaaaaaa,bbbbbbb) PRIV(ccccccc,ddddddd) CURRENT(eeeeeee,fffffff) MAX(ggggggg,hhhhhhh))

aaaaaaa:	VPS region requested below the 16M line.
bbbbbbb:	VPS region requested above the 16M line.
ccccccc:	Private area available below the 16M line.
ddddddd:	Private area available above the 16M line.
eeeeeee:	Current storage used below the 16M line.
fffffff:	Current storage used above the 16M line.
ggggggg:	Maximum storage used below the 16M line.
hhhhhhh:	Maximum storage used above the 16M line.

Message Meaning: Response to DISPLAY-SYSTEM command.
System Action: None.
Required Action: None.

VPS977R *SYSTEM TCPIP(ABENDED|CONNECTED|DISABLED|INACTIVE| SEVERED, DMN=aaaaa...,host=bbbbb...

aaaaa...:	Domain name for the TCPIP host.
bbbbb...:	Local host name for TCPIP.

Message Meaning: Response to DISPLAY-SYSTEM command.
System Action: None.
Required Action: None.

VPS977R *SYSTEM TCPIP(ID=aaaaaaaa,PORT=bbbbb,TYPE=IBM310|IBM320|IBM340|ICS)

aaaaaaaa:	ID of the TCPIP address space.
bbbbb:	Port number used by VPS for TCPIP.

Message Meaning: Response to DISPLAY-SYSTEM command.
System Action: None.
Required Action: None.

VPS977R TCPIP(MAILHOST=aaaa...,PORT=nnnnn,TYPE=IBM310|IBM320|IBM340|ICS)

aaaa...:	Mailhost name or address of the remote TCP/IP host.
nnnnn:	Port number used by VPS for TCPIP.

Message Meaning: Response to DISPLAY-SYSTEM command.
System Action: None.
Required Action: None.

VPS978R *SYSTEM TRACE(FMID=aaaa,SIZE=bbbK,TYPES=X'cc')WTO(ACTN=Y|N, IDTYPE=M|L|B,INFO=Y|N,RTCDE=dd, STCPFX=Y|N)

aaaa:	GTF format id.
bbb:	Size of VPS trace table.
cc:	System trace types.
dd:	Route code to be used for WTOs.

Message Meaning: Response to DISPLAY-SYSTEM command.
System Action: None.
Required Action: None.

VPS979R *SYSTEM VPSLIB(DEFLT=aaaaaaaa,MLIST=bbbbbbbb,MSGS=cccccccc, START=dddddddd,XLIST=eeeeeeee)

aaaaaaaa:	Default printer member name.
bbbbbbbb:	Include member list member name.
cccccccc:	Message modification member name.
dddddddd:	VPS initialization member name.
eeeeeeee:	Exclude list member name.

Message Meaning: Response to DISPLAY-SYSTEM command.
System Action: None.
Required Action: None.

VPS980R *SYSTEM EXITnn NAME=aaaaaaaa LENGTH=bbbbbb EP=cccccccc ACTIVE|INACTIVE RECOVERY=ON|OFF TRACE=dd LANGUAGE=ASM|C

nn:	Exit number.
aaaaaaaa:	Name of the exit module.
bbbbbb:	Length of the exit module.
cccccccc:	Entry point address of the exit module.
dd:	Trace type flags

Message Meaning: Response to DISPLAY-SYSTEM command.
System Action: None.
Required Action: None.

VPS981R prtr-id status info code

status: The current status of the printer. Possible status values include:

ABENDED	Printer task abended.
BUSY	Printer task is busy (connect/disconnect).
EDRAINED	Printer was drained for an error condition.
DRAINED	Printer was drained by command.
DRAINING	Printer will be drained (command).
FORMWAIT	Printer is waiting for form to be mounted.
IDLE	Printer is idle (waiting for work).
INTVREQD	Printer needs intervention.
QUEUING	Print file is being staged.
POWEROFF	Printer has the power off.
PRINTING	Print file is being converted or delivered.
WCONNECT	Printer is waiting for connection.

info: The additional information depends on the status of the printer. For EDRAINED printers, the info value will show the error message text. For ABENDED printers, the system and user abend codes will be displayed. For other printer status values, the job name, job ID, line and page count will be displayed if the printer is actively printing. Otherwise, the selection criteria will be displayed.

code: If PJLCMDS=Y is specified for the printer, the latest PJL status code received from the printer will be displayed, along with a short description of that PJL status code.

Message Meaning: Response to DISPLAY-STATUS or START command.
System Action: None.
Required Action: None.

VPS982R prtr-id SELECTION CRITERIA select criteria

select criteria: Selection criteria for this printer.

Message Meaning: Response to DISPLAY-SELECTION command.
System Action: None.
Required Action: None.

VPS983R prtr-id SCHEDULED SEL CRITERIA sched criteria

sched criteria: Scheduled change in printer selection criteria for this printer.

Message Meaning: Response to DISPLAY-SELECTION command.
System Action: None.
Required Action: None.

VPS984R prtr-id INIT(mm/dd-hh.mm) JOBS=jj,jjj,jjj D/S=dd,ddd,ddd PAGES=pp,ppp,ppp LINES=ll,lll,lll SMF=ss,sss,sss

mm/dd-hh.mm:	Printer initialization date and time.
jj,jjj,jjj:	Total # jobs printed since initialization.
dd,ddd,ddd:	Total # datasets printed since initialization.
pp,ppp,ppp:	Total # pages printed since initialization.
ll,lll,lll:	Total # lines printed since initialization.
ss,sss,sss:	Total # SMF records written since initialization.

Message Meaning: Response to DISPLAY-PROCESS command.
System Action: None.
Required Action: None.

VPS985R prtr-id AFP(AFPADJ(aaa,aaa,bbb,bbb), AFPKEYWD='cccccccc', AFPMSGS(dddddd,eeeeee,ffff))

aaa,aaa:	AFP OVERLAY x and y margins.
bbb,bbb:	Logical page x and y adjustments.
cccccccc:	VPS/AFP keyword conversion option flags.
dddddddd:	FORMDEF to use to print VPS/AFP messages.
eeeeeeee:	PAGEDEF to use to print VPS/AFP messages.
ffff:	Font to use to print VPS/AFP messages.

Message Meaning: Response to DISPLAY-AFP command.
System Action: None.
Required Action: None.

VPS985R prtr-id AFP(AFPOPTS=X'aaaaaaaa',AFPRTAB=bbbbbbbb, CHARS(cccc,cccc,cccc,cccc))

aaaaaaaa:	VPS/AFP processing option flags.
bbbbbbbb:	Name of the VPS/PCL AFP resource mapping table.
cccc,…:	Default VPS/AFP coded fonts.

Message Meaning: Response to DISPLAY-AFP command.
System Action: None.
Required Action: None.

VPS985R prtr-id AFP(AFPSEPE(aaaaaa,bbbbbb,cccc),AFPSEPS(aaaaaa,bbbbbb,cccc)

aaaaaa:	AFP form definition.
bbbbbb:	AFP page definition.
cccc:	AFP coded font.

Message Meaning: Response to DISPLAY-AFP command.
System Action: None.
Required Action: None.

VPS985R prtr-id AFP(CONVTYPE=IPDS|MODCA|PCL|PDF, DCKACTN(BLKALL|BLKCHAR|BLKPOS|BLOCK|UNBLOCK, NOPCACT|PCACT,NOEPPACT|EPPACT,HLIGHT|NOHLIGHT), DUPLEX=NO|NORMAL|TUMBLE)

Message Meaning: Response to DISPLAY-AFP command.
System Action: None.
Required Action: None.

VPS985R prtr-id AFP(FDEFDD=aaaaaaaa,FONTDD=bbbbbbbb, FORMDEF=cccccc,INTRAY=ddd,IPDOPTS=X'eeeeeeee')

aaaaaaaa:	DDNAME of the VPS PROC FORMDEF library to use.
bbbbbbbb:	DDNAME of the VPS PROC font library to use.
cccccc:	Default VPS/AFP FORMDEF.
ddd:	Default input tray number.
eeeeeeee:	VPS/IPDS processing option flags.

Message Meaning: Response to DISPLAY-AFP command.
System Action: None.
Required Action: None.

VPS985R prtr-id AFP(OUTBIN=aaaaa,OVERLAYB=bbbbbbbb,OVERLAYF=cccccccc, OVLYDD=dddddddd)

aaaaa:	Default output tray number.
bbbbbbbb:	Name of OVERLAY to print on all back pages of duplex documents.
cccccccc:	Name of OVERLAY to print on all front pages.
dddddddd:	DDNAME of the VPS PROC OVERLAY library to use.

Message Meaning: Response to DISPLAY-AFP command.
System Action: None.
Required Action: None.

VPS985R prtr-id AFP(PAGEDEF=aaaaaa,PCLOPTS=X'bbbbbbbb', PDEFDD=cccccccc)

aaaaaa:	Default VPS/AFP PAGEDEF.
bbbbbbbb:	VPS/PCL processing option flags.
cccccccc:	DDNAME of the VPS PAGEDEF library.

Message Meaning: Response to DISPLAY-AFP command.
System Action: None.
Required Action: None.

VPS985R prtr-id AFP(PDFDBCS(name,cmap,size))

name:	Name of DBCS font.
cmap:	CMAP of DBCS font.
size:	Size of DBCS font.

Message Meaning: Response to DISPLAY-AFP command.
System Action: None.
Required Action: None.

VPS985R prtr-id AFP(PDFENCD=aaaaaaaa,PDFENCPY(COPY|NOCOPY ACCESSIBLE|NOACCESSIBLE)

aaaaaaaa:	Name of AFP-to-PDF encoding table.

Message Meaning: Response to DISPLAY-AFP command.
System Action: None.
Required Action: None.

VPS985R prtr-id AFP(PDFENMOD(MODIFY|NOMODIFY,
ANNOTATE|NOANNOTATE,FORMFILL|NOFORMFILL,
ASSEMBLE|NOASSEMBLE),PDFENMPW=password

password:	Master password value if USEROPTS=0008 was specified, or '*** ACCESS SECURED ***'.
Message Meaning:	Response to DISPLAY-AFP command.
System Action:	None.
Required Action:	None.

VPS985R prtr-id AFP(PDFENPRT(PRINT|NOPRINT,HIRESPRINT|NOHIRESPRINT),
PDFENTYP=PDF40|PDF128,PDFENUPW=password

password:	User password value if USEROPTS=0008 was specified, or '*** ACCESS SECURED ***'.
Message Meaning:	Response to DISPLAY-AFP command.
System Action:	None.
Required Action:	None.

VPS985R prtr-id AFP(PDFFONT(name,size),PDFKWDS=X'aaaaaaaa')

name:	Name of font to use for PDF.
aaaaaaaa:	PDF keyword flags from PDFKWDS.
Message Meaning:	Response to DISPLAY-AFP command.
System Action:	None.
Required Action:	None.

VPS985R prtr-id AFP(PDFOPTS=X'aaaaaaaa',PDFPGSIZ(height,width),
PDFRTAB=mbrname)

aaaaaaaa:	PDF option flags from PDFOPTS.
height:	PDF page height.
width:	PDF page width.
mbrname:	PDF resource member name.
Message Meaning:	Response to DISPLAY-AFP command.
System Action:	None.
Required Action:	None.

VPS985R prtr-id AFP(PIMSG=(Y|N,aaa),PSEGDD=bbbbbbbb)

aaa:	Number of recoverable NACKs to allow for VPS/IPDS.
bbbbbbbb:	DDNAME of the VPS PAGESEG library to use.
Message Meaning:	Response to DISPLAY-AFP command.
System Action:	None.
Required Action:	None.

VPS985R prtr-id AFP(TRN(CLASS=aaaaaaaa,TYPE=B|C|S|T,BEGIN=X'bbbbbbbb', END=X'cccccccc',Y|N))

aaaaaaaa: Transparency SYSOUT classes.
bbbbbbbb: Character(s) to use to begin transparency.
cccccccc: Character(s) to use to end transparency.

Message Meaning: Response to DISPLAY-AFP command.
System Action: None.
Required Action: None.

VPS985R prtr-id AFP(XES(XESCLASS=nnnnnnnn,XESOPTS=X'00000000', XESRTAB(name,entry))

nnnnnnnn: XESCLASS value.
name: XESRTAB name.
entry: XESRTAB entry name.

Message Meaning: Response to DISPLAY-AFP command.
System Action: None.
Required Action: None.

VPS986R prtr-id EMAIL(MAILBOOK=aaaaaaaa,MAILCSET=bbbbbbbb)

aaaaaaaa: Name of email address book.
bbbbbbbb: Name of email character set for text messages.

Message Meaning: Response to the DISPLAY-EMAIL command.
System Action: None.
Required Action: None.

VPS986R prtr-id EMAIL(MAILFNAM(aaaaaa,bbb,ccc),MAILKWDS=X'dddddddd', MAILOPTS= X'eeeeeeee'

aaaaaa: Prefix of file name for email attachment.
bbb: Suffix for file name for text email attachment.
ccc: Suffix for file name for text binary attachment.
dddddddd: VPS/Email keyword flags from MAILKWDS.
eeeeeeee: VPS/Email options flags.

Message Meaning: Response to the DISPLAY-EMAIL command.
System Action: None.
Required Action: None.

VPS986R prtr-id EMAIL(MAILSTAT(NONE|FULL|HDRS,DELAY|NDELAY, FAILURE|NFAILURE,SUCCESS|NSUCCESS))

Message Meaning: Response to the DISPLAY-EMAIL command.
System Action: None.
Required Action: None.

VPS987R prtr-id GRAPH(GDDM(APPL=aaaaaaaa,CLS=bbbbbbbb,OPTS=X'cc'), SAS(CLS=ddddddddd,OPTD=X'ee',OPTP=X'ff',PLEN=gg))

aaaaaaaa:	GDDM applid name.
bbbbbbbb:	GDDM SYSOUT class(es).
cc:	GDDM options.
ddddddddd:	SYSOUT class(es) to be processed as SAS/GRAPH output by this printer.
ee:	Bits representing how this printer is to modify the SAS/GRAPH datastream prior to sending it to the VPS printer.
ff:	Bits representing how this printer is to function when printing a SAS/GRAPH dataset.
gg:	The number of lines (at 8 LPI) on a page for SAS graphs.

Message Meaning: Response to DISPLAY-GRAPH command.
System Action: None.
Required Action: None.

VPS988R prtr-id HARDWARE(ALARM=Y|N,AUTONL=Y|N,CPI=aa, CRCHAR=0D|15, FF=(Y|N,bbbbbb),MPP=ccc,NLSEQ=dddddd)

aa:	Number of characters per horizontal inch.
bbbbbb:	Form feed sequence to be used.
ccc:	Maximum print position.
ddddddddd:	New line sequence to be used.

Message Meaning: Response to DISPLAY-HARDWARE command.
System Action: None.
Required Action: None.

VPS989R prtr-id MISC(CDI(NETMAP=aaaaa...))

aaaaa...:	CONNECT:Direct Network Map dataset name.

Message Meaning: Response to DISPLAY-MISC command.
System Action: None.
Required Action: None.

VPS989R prtr-id MISC(CDI(PLIB=aaaaa...,PMBR=bbbbbbbb, SNODE=ccccc...))

aaaaa...:	CONNECT:Direct Process Library dataset name.
bbbbbbbb:	CONNECT:Direct Process Member name.
ccccc...:	CONNECT:Direct Secondary Node ID.

Message Meaning: Response to DISPLAY-MISC command.
System Action: None.
Required Action: None.

VPS989R prtr-id MISC(CROPTS=X'aaaaaaaa')

aaaaaaaa:	C runtime options for printer.

Message Meaning: Response to DISPLAY-MISC command.
System Action: None.
Required Action: None.

VPS989R prtr-id MISC(DASD(DSNPFX=aaa,(TRK|CYL,bbb,ccc,ddd,eee)))

aaa:	DASD dataset high-level qualifier
bbb:	Primary allocation quantity for DASD dataset
ccc:	Secondary allocation quantity for DASD dataset
ddd:	Unit name for DASD dataset
eee:	Volume serial number for DASD dataset.

Message Meaning: Response to DISPLAY-MISC command.
System Action: None.
Required Action: None.

VPS989R prtr-id MISC(DEFLTMEM=aaaaaaaa,DEVTYPE=bbbbb..., DIAL=Y|N)

aaaaaaaa:	Default printer definition name.
bbbbb...:	Information about the printer.

Message Meaning: Response to DISPLAY-MISC command.
System Action: None.
Required Action: None.

VPS989R prtr-id MISC(DJDEIDEN(aa,bbbbbbbb,cc,dddddddd))

aa:	Offset of first DJDE identifier.
bbbbbbbb:	Value of first DJDE identifier.
cc:	Offset of second DJDE identifier.
dddddddd:	Value of second DJDE identifier.

Message Meaning: Value of second DJDE identifier
System Action: None.
Required Action: None.

VPS989R prtr-id MISC(FCB(Y|N|FORM,aaaa,D|E),GRPNAME=bbbbbbbb, LOGDATA=N|W|D)

aaaa:	Default FCB name.
bbbbbbbb:	User-specified group name.

Message Meaning: Response to DISPLAY-MISC command.
System Action: None.
Required Action: None.

VPS989R prtr-id MISC(NOTIFY(Y|N,Y|N,Y|N,Y|N,aaaaaaaa,bbbbbbbb))

aaaaaaaa:	TSO ID of user to notify.
bbbbbbbb:	Email address of user to notify.

Message Meaning: Response to DISPLAY-MISC command.
System Action: None.
Required Action: None.

VPS989R prtr-id MISC(PCMDACTN(TRN|NOTRN,DEF|EDR|IGN))

Message Meaning: Response to DISPLAY-MISC command.
System Action: None.
Required Action: None.

VPS989R prtr-id MISC(PCMDDSNE=X'aaaaaaaa')

aaaaaaaa: String of printer command data to send after normal dataset.

Message Meaning: Response to DISPLAY-MISC command.
System Action: None.
Required Action: None.

VPS989R prtr-id MISC(PCMDDSNS=X'aaaaaaaa')

aaaaaaaa: String of printer command data to send before normal dataset.

Message Meaning: Response to DISPLAY-MISC command.
System Action: None.
Required Action: None.

VPS989R prtr-id MISC(PCMDEND(name1,name2),PCMDOPTS=X'aaaaaaaa')

name1: Name of module for printer commands for end of separator module.
name2: Name of module for printer commands for end of normal dataset.
aaaaaaaa: Printer command options.

Message Meaning: Response to DISPLAY-MISC command.
System Action: None.
Required Action: None.

VPS989R prtr-id MISC(PCMDSEPE=X'aaaaaaaa')

aaaaaaaa: String of printer command data to send after separator.

Message Meaning: Response to DISPLAY-MISC command.
System Action: None.
Required Action: None.

VPS989R prtr-id MISC(PCMDSEPS=X'aaaaaaaa')

aaaaaaaa: String of printer command data to send before separator.

Message Meaning: Response to DISPLAY-MISC command.
System Action: None.
Required Action: None.

VPS989R prtr-id MISC(PCMDSTRT(name1,name2,syskwd))

name1: Name of module for printer commands for start of separator module.
name2: Name of module for printer commands for start of normal dataset.
syskwd: JCL keyword for name of dynamic module to use for printer commands for normal dataset.

Message Meaning: Response to DISPLAY-MISC command.
System Action: None.
Required Action: None.

VPS989R prtr-id MISC(PRTROPTS=X'aaaaaaaa',POOL=Y|N,RJE(Y|N,Y|N,Y|N,Y|N)

aaaaaaaa: Printer option flags.

Message Meaning: Response to DISPLAY-MISC command.
System Action: None.
Required Action: None.

VPS989R prtr-id MISC(SEPAR(E|B|N|S,aaaaaaaa,JOB|OUTGRP|DATASET|COPYDS, bbbbbbbb,cccccccc,dd),SEPINFO=eeeeeeee,SEPTYPE(STD|AFP,EDR|IGN))

aaaaaaaa: Separator module name.
bbbbbbbb: VPS news writer name.
cccccccc: VPS news job name.
dd: Trace type flags.
eeeeeeee: Separator information.

Message Meaning: Response to DISPLAY-MISC command.
System Action: None.
Required Action: None.

VPS989R prtr-id MISC(SERVER=aaaaaaaa,SMF=Y|N,SNAP=Y|N)

aaaaaaaa: Server name.

Message Meaning: Response to DISPLAY-MISC command.
System Action: None.
Required Action: None.

VPS989R prtr-id MISC(SVFACTN(Y|N,Y|N,Y|N|F),TPUT=aaaaaaaa, TRACE(Y|N,X'bb',X'cccccccc'),WFWACTN=D|I|N)

aaaaaaaa: TSO ID of the TSO user who should receive messages for this printer.
bb: Trace types.
cccccccc: Trace option for VPS/PDF.

Message Meaning: Response to DISPLAY-MISC command.
System Action: None.
Required Action: None.

VPS989R prtr-id MISC(UDATA(cccc...))

ccccc...: User-specified information.

Message Meaning: Response to DISPLAY-MISC command.
System Action: None.
Required Action: None.

VPS990R prtr-id OPER(APLCLASS=aaaaaaaa,AUTOEJCT(Y|N,Y|N,Y|N,Y|N), CKPT(bbbbb,ccccc),COMPRESS(Y|N,Y|N,T|N,0-10))

aaaaaaaa: APL SYSOUT class list.
bbbbb: Checkpoint line value.
ccccc: Checkpoint page value.

Message Meaning: Response to DISPLAY-OPER command.
System Action: None.
Required Action: None.

VPS991R prtr-id OPER(DBCCLASS=aaaaaaaa,DCACLASS=bbbbbbbb, DRAIN=Y|N, DSBATCH(Y|N,Y|N,Y|N)

aaaaaaaa: DBCS SYSOUT class list.
bbbbbbbb: DCA SYSOUT class list.

Message Meaning: Response to DISPLAY-OPER command.
System Action: None.
Required Action: None.

VPS992R prtr-id OPER(EKEY=xxxxxxxxxxxxxxxx|***ACCESS SECURED *** |***DYNAMIC KEY ***)

xxxxxxxxxxxxxxxx: Value of EKEY keyword.

Note: The EKEY value is displayed only when the key is not dynamically generated and USEROPTS=0040 is specified.

Message Meaning: Response to DISPLAY-OPER command.
System Action: None.
Required Action: None.

VPS992R prtr-id OPER(ENCRYPT(Y|N,AES16|AES24|AES32,HP|ISPP|LEXMARK| LRSQUEUE,Y|N)

Message Meaning: Response to DISPLAY-OPER command.
System Action: None.
Required Action: None.

VPS992R prtr-id OPER(ERRACTN(STD|BUF|RST,Y|N,IPDCLASS=aaaaaaaa, MAXLPG(bbb,ALL,JES), MERGE=Y|N,NCCSPACE=0|1|2|3, PRTRMSGS=Y|N)

aaaaaaaa: IPDS SYSOUT class list.
bbb: Maximum lines per page.

Message Meaning: Response to DISPLAY-OPER command.
System Action: None.
Required Action: None.

VPS992R prtrid OPER(PRTXDBCS(Y|N,aaaaaaaa,KEEP|DELETE|REPL,bb,cc,
EDR|REQ),PRTXLATE(Y|N,dddddddd,eeeeeeee,ffffffff,gggggggg)

aaaaaaaa:	DBCS translate table name.
bb:	SO replacement character.
cc:	SI replacement character.
dddddddd:	Non-APL translate table name.
eeeeeeee:	APL translate table name.
ffffffff:	VPS/Email command translate table name.
gggggggg:	Translate table name.

Message Meaning: Response to DISPLAY-OPER command.
System Action: None.
Required Action: None.

VPS992R prtrid OPER(RETAIN(Y|N,aaaa),RETHOLD=Y|N|S,
RETOUTP(c,dddddddd,ffffffff,wwwwwwww))

aaaa:	Default SYSOUT retention period.
c:	Class for SYSOUT retention.
dddddddd:	Destination for SYSOUT retention.
ffffffff:	Form name for SYSOUT retention.
wwwwwwww:	Writer name for SYSOUT retention.

Message Meaning: Response to DISPLAY-OPER command.
System Action: None.
Required Action: None.

VPS992R prtr-id OPER(SAF(Y|N,EDR,REQ),TRAILBLK=Y|N,
TRUNCATE=Y|N)

Message Meaning: Response to DISPLAY-OPER command.
System Action: None.
Required Action: None.

VPS993R prtr-id REQUEUE(a,bbbbbbbb,cccccccc,dddddddd,oooooooo,eeeeee,f,
ggggggg,LIMIT=(hhhh,iiii))

a:	Requeue class for this printer.
bbbbbbbb:	Requeue destination for this printer.
cccccccc:	Requeue form for this printer.
dddddddd:	Requeue writer for this printer.
oooooooo:	Requeue output statement for this printer.
eeeeee:	Requeue hold option (HOLD or NOHOLD).
ffffff:	Requeue delete option for this printer (NODELT or DELETE)
ggggggg:	Requeue route option for this printer (ROUTE or NOROUTE).
hhhh:	Requeue line limit for this printer in hundreds of lines (non-AFP datasets only).
iiii:	Requeue page limit for this printer in tens of pages (AFP datasets only).

Message Meaning: Response to DISPLAY-OPER command.
System Action: None.
Required Action: None.

VPS994R prtr-id STAGING(aaaaaaaa,bbbbbbb,DSN=datasetname)

aaaaaaaa:	Indicates the type of allocation used for the staging dataset for this printer (ALLOC, NOALLOC, or PREALLOC).
bbbbbbb:	Indicates if the allocation of the staging dataset for this printer should occur at printer initialization (NODYNAM) or when needed (DYNAM).

Message Meaning: Response to DISPLAY-QUEUE command.
System Action: None.
Required Action: None.

VPS995R prtr-id STAGING((aaa,bbb,ccc,ddddddd,eeeeee),BUFSZ=fffff, I/O=ggg,ggg,ggg)

aaa:	Allocation type for staging dataset (TRK or CYL).
bbb:	Primary allocation quantity for staging dataset.
ccc:	Secondary allocation quantity for staging dataset.
ddddddd:	Unit name for staging dataset.
eeeeee:	Volume serial number for staging dataset.
fffff:	Buffersize to be used for staging dataset.
ggg,ggg,ggg:	Total I/O count for staging dataset.

Message Meaning: Response to DISPLAY-QUEUE command.
System Action: None.
Required Action: None.

VPS996R prtr-id VTAM(ALOGMODE=aaaaaaaa,ALUNAME=bbbbbbbb, BIND=(ccccc...)

aaaaaaaa:	Name of the alternate logmode table entry to be used when VPS connects to the printer.
bbbbbbbb:	Alternate printer LU to receive the output if the primary LU is unavailable.
ccccc...:	Bind image used.

Message Meaning: Response to DISPLAY-VTAM command.
System Action: None.
Required Action: None.

VPS996R prtr-id VTAM(CHNSIZE=aaa,COMMTYPE(VTAM|APPC|DUMMY, PAGECENT|ANYQUEUE|RMTQUEUE|VPSPC,LRSQUEUE), CONNECTED=Y|N)

aaa:	Number of data buffers that should be sent before waiting for a response.

Message Meaning: Response to DISPLAY-VTAM command.
System Action: None.
Required Action: None.

VPS996R prtr-id VTAM(FMHCLASS(aaaaaaaa,bbbbb...,ccccc...))

aaaaaaaa:	FMH SYSOUT class list.
bbbbb...:	Begin dataset FMH data.
ccccc...:	End dataset FMH data.

Message Meaning: Response to DISPLAY-VTAM command.
System Action: None.
Required Action: None.

VPS996R prtr-id VTAM(FMHJOB(aaaaa...,bbbbb...))

aaaaa...:	Begin job FMH data.
bbbbb...:	End job FMH data.

Message Meaning: Response to DISPLAY-VTAM command.
System Action: None.
Required Action: None.

VPS996R prtr-id VTAM(LUa,LUNAME=bbbbbbbb,PPM=ccccc...,
RELREQ(A|W|E|I|N,dddddddd), RETRY=eee,RUSIZE=fffff)

a:	LU type.
bbbbbbbb:	LU name by which this printer is defined to VTAM.
ccccc...:	Page presentation media command to be used.
dddddddd:	Number of release requests.
eee:	Number of times a failed send should be retried.
fffff:	Maximum buffer size.

Message Meaning: Response to DISPLAY-VTAM command.
System Action: None.
Required Action: None.

VPS996R prtr-id VTAM(USERBIND=X'aaaaaaaa...')

aaaaaaaa...:	User bind data.

Message Meaning: Response to DISPLAY-VTAM command.
System Action: None.
Required Action: None.

VPS996R prtr-id TCPIP(CHNSIZE=aaa,COMMTYPE(TCPIP,ANYQUEUE|EMAIL|
LPD|RMTQUEUE|SOK|VPSPC,LCDS|LRSQUEUE), CONNECTED=Y|N,
DISC(Y|N,Y|N,bbbb))

aaa:	Number of data buffers that should be sent before waiting for a response (TCPTYPE=ICS).
bbbb:	Time to wait between connections.

Message Meaning: Response to DISPLAY-VTAM command.
System Action: None.
Required Action: None.

VPS996R prtr-id TCPIP(HOST=aaaaa...,IPADDR=bbb.bbb.bbb.bbb)

aaaaa...: TCPIP remote host name.
bbb.bbb...: IP address associated with the remote host. (This value will be 0.0.0.0 until VPS connects to the remote host for the first time.)

Message Meaning: Response to DISPLAY-VTAM command.
System Action: None.
Required Action: None.

VPS996R prtr-id TCPIP(LPORT=aaaaa...)

aaaaa...: Local port number to which this printer is currently connected, or a range or multiple ranges of local port numbers to which VPS should attempt to connect.

Message Meaning: Response to DISPLAY-VTAM command.
System Action: None.
Required Action: None.

VPS996R prtr-id TCPIP(MRD=aa,OPTS=X'bbbbbbbb')

aa: Time interval in minutes for VPS to wait for a TCP/IP request to complete.
bbbbbbbb: VPS/TCPIP processing option flags.

Message Meaning: Response to DISPLAY-VTAM command.
System Action: None.
Required Action: None.

VPS996R prtr-id TCPIP(PJLCMDS(Y|N,JOB|NOJOB,LANG|NOLANG),
PJLINFO(CONFIG|NOCONFIG,FILES|NOFILES,ID|NOID,
MEMORY|NOMEMORY,PAGECT|NOPAGECT,VARB|NOVARB))

Message Meaning: Response to DISPLAY-VTAM command.
System Action: None.
Required Action: None.

VPS996R prtr-id TCPIP(PJLUSTAT(DEVOFF|DEVON|DEVVERB,
JOBOFF|JOBON,PAGEOFF|PAGEON,aaa))

aaa: Time interval in seconds for PJL USTATUS TIMED.

Message Meaning: Response to DISPLAY-VTAM command.
System Action: None.
Required Action: None.

VPS996R prtr-id TCPIP(PJL(CODE(aaaaa,bbbbbbbb),DATE=date,TIME=time

aaaaa:	PJL status code last received from printer.
bbbbbbbb:	PJL status code short description text.
date:	Date last status code was received.
time:	Time last status code was received.

Message Meaning: Response to DISPLAY-VTAM command.
System Action: None.
Required Action: None.

VPS996R prtr-id TCPIP(PJL(DISPLAY=aaaa...))

aaaa:	Display value returned by printer.

Message Meaning: Response to DISPLAY-VTAM command.
System Action: None.
Required Action: None.

VPS996R prtr-id TCPIP(PJL(ID=aaaa...))

aaaa:	ID value returned by printer.

Message Meaning: Response to DISPLAY-VTAM command.
System Action: None.
Required Action: None.

VPS996R prtr-id TCPIP(PJL(JOB(ACTIVE|CANCELED|INACTIVE),name))

name:	Job name sent by VPS to printer.

Message Meaning: Response to DISPLAY-VTAM command.
System Action: None.
Required Action: None.

VPS996R prtr-id TCPIP(PJL(ONLINE=aaaaa,PAGE(JOBSTART=bbbb, JOBTOTAL=cccc)))

aaaaa:	Online status (TRUE/FALSE).
bbbb:	Total number of pages printed before current job.
cccc:	Total number of pages printed in current job.

Message Meaning: Response to DISPLAY-VTAM command.
System Action: None.
Required Action: None.

VPS996R prtr-id TCPIP(PRTR(aaaa....))

aaaa:	Value of the TCPPRTR keyword.

Message Meaning: Response to DISPLAY-VTAM command.
System Action: None.
Required Action: None.

VPS996R prtr-id TCPIP(RELREQ=A|W|E|I|N,RPORT=aaaaaaaa,RUSIZE=bbbbb)

aaaaaaaa:	Port number at which to connect at the remote host.
bbbbb:	Maximum buffer size.

Message Meaning: Response to DISPLAY-VTAM command.
System Action: None.
Required Action: None.

VPS999R prtrid XCB(aa-aa-aa-aa) XCBC(bb-bb-bb-bb) XCBV(cc-cc-cc-cc) VSTATE(ddddddddddd)

aa-aa-aa-aa:	XCB status bytes
bb-bb-bb-bb:	XCB communication bytes
cc-cc-cc-cc:	XCB VTAM status bytes
ddddddddddd:	XCB state bytes

Message Meaning: Response to DISPLAY-DIAG command.
System Action: None.
Required Action: None.

VPS User Abend Codes

CODE	DUMP?	REASON FOR ABEND	CORRESPONDING MESSAGE
U001	YES	Requested by an abend command	VPS965R
U002	NO	VTAM has been terminated with Z,NET,QUICK or Z,NET,CANCEL	VPS122E
U003	YES	A request to the Job Entry Subsystem (JES) has failed	VPS102E
U004	YES	Unable to locate VPS SSCT control block	None
U005	YES	A critical error has occurred during VPS initialization	VPS005E VPS006E VPS007E VPS008E VPS009E VPS300E VPS301E VPS304E
U006	YES	A critical error has occurred in the TCP/IP interface; unable to locate VPS control blocks	None
U007	YES	A critical error has occurred while attempting to delete the JSAB control block during a requeue operation. This abend will only be issued if using the PSO interface.	VPS029E
U100	NO	The communications, dispatcher, or timer subtask has abended. The user abend itself will not create a dump. However, a dump will be available from the subtask abnormal termination.	VPS800E VPS801E

Table 14-1: VPS User Abend Codes

Section 15
Problem Determination

Introduction

This section gives a basic description of problem determination and resolution for VPS®. The VPS service aids, problem types, and some specific problems, as well as documentation required to resolve a problem, are discussed.

VPS has several service aids to assist you in problem determination. They include:

- LRS Web Site
- Error messages
- VPS log
- Missing response detector
- Internal trace table
- External trace recording in GTF trace files
- Snap dumps
- System dumps from VPS abends
- DISPLAY command

This section is designed to supply sufficient information for the VPS user to diagnose and resolve most problems. However, if the information provided here does not lead to a resolution, the LRS Product Support staff is always ready to help you.

Service Aids

LRS Web Site

Customers can get information about LRS products via the Internet. The company's home page address is *http://www.lrs.com.*

Inside the Enterprise Print Management (EPM) "Product Support Area" on the LRS web page you will find product support information and other facts of interest to VPS customers. The address for support information is *www.lrs.com/epm/epmsuppt.htm.*

The Product Support Area includes:

- Announcements of new products and releases, as well as current fix levels of supported releases
- Technical information such as questions and answers for common problems
- Documentation
- Descriptions of fixes that have been applied to each product, and files to allow you to download those fixes
- Source code (for example, sample user exits and macros) which you can download.
- Executable code that you can download to get the most current version of our PC-based products

Only registered users will be allowed to access this information, so you will need to complete the "New User Registration" form to request a user ID and password. This registration form can be accessed by pressing the "Request Access" button. You should receive your user ID and password within one business day.

Error Messages

When VPS detects an exception condition, it issues a message to the operator. This message contains information about what VPS was attempting to do at the time of the failure. The message also gives some indication of the reason for the failure. For example, if VPS receives an unexpected error from VTAM, the message will contain the type of request (e.g. SEND, SEND-BID, OPNDST), the return code and feedback (e.g. 04-04, 10-00), and the network sense code (e.g. 0821, 080A, 2003). When examining a message, look for this type of information. This will give you a general idea of the cause of the error. A return code which is found in an error message will be documented in the operating system manual related to the type of function that failed, such as the VTAM programming manual for RPL requests that fail or the MVS Job Management SPL for dynamic allocation failures.

The VPS messages are documented in "Messages and Codes" on page 14.1. The error and the return codes will be explained, and any user action which might correct the problem will be provided. Often, you will need to look no further to determine the cause of the error and its resolution.

Many times, the MVS syslog will contain other information helpful in determining the cause of an error. For example, the MVS syslog might indicate that a communication line failed, which might be reflected in VPS as a failure in communicating with a particular VTAM printer.

If the message is still not understood and you plan to call VPS technical support, please have the following documentation:

- the message number and complete wording of the message, including any return codes, sense data, etc.
- the VPS log
- the portion of the syslog from the time of the error
- the printer definition statements for the printer which had the error (if it is a printer-related error message)

It is possible to suppress messages or to change their "type" via a Message Modification member (see "Message Modification Member" on page 3.2 and "Using a Message Modification Member" on page 6.21). We do not recommend suppressing messages that contain diagnostic information about error conditions. If you want a particular error message to roll off the operator console without the need for any operator action, you can use the Message Modification member to change the message type from "A" (action) to "N" (normal).

VPS Log

The VPS log is an audit trail of all commands and messages processed by VPS. The log is date and time stamped to help correlate an event with the messages associated with that event. We recommend that logging always be active in the VPS system. (See "Building the System Initialization Member" on page 3.16 for information about the VPS System Initialization member keywords that affect the VPS log).

If the VPS log is defined as a SYSOUT dataset (rather than a pre-allocated DASD dataset), a "CLOSELOG" command can be issued to make the VPS log immediately available for printing. This allows problem determination without shutting down VPS. If the VPS log is a pre-allocated DASD dataset, it can be browsed via any normal browse utility, even while VPS is executing, if a disposition of "SHR" is specified on the VPSLOG DD statement in the VPS execution JCL.

The VPS log is a sequential dataset, so the records are not written to the dataset until a buffer is full. For this reason, you may not see the last few messages in the log until a CLOSELOG command is issued or until VPS is stopped. If you do not wish to issue a CLOSELOG command or shut down VPS, you can issue a command that will cause enough messages to be issued to fill the buffer, such as F VPS,DISPLAY,EXITS.

Missing Response Detector (MRD)

The Missing Response Detector facility issues warning messages when a printer has not acknowledged the data that has been sent to it. The MRD does not take any action to correct the problem, but does allow the user to diagnose a “hung” printer without the need for snap dumps or network traces.

This facility can be useful when hardware or network problems are frequent. It is activated by specifying a value other than zero for the MRDINTVL system initialization parameter. The value specified is the time interval between scans by the MRD for “hung” printers. When doing a scan, the MRD looks for printers that are in the process of doing a VTAM send or a TCP/IP send or receive. When one is found, it is flagged as having an outstanding send. If, on a subsequent scan, the printer is still flagged, this printer is considered to have a missing response, and a message is issued.

A good interval between scans would be about eleven minutes, which is the default. This value is recommended because many printers wait ten minutes before notifying VPS of an “intervention required” situation.

The normal sequence of events for sending data to a VTAM printer is:

1. The buffer is built.

2. The buffer is given to VTAM via a SEND macro request.

3. VTAM sends the buffer to the printer.

4. The printer prints the buffer of data.

5. The printer sends a RESPONSE to VTAM to indicate the data has been printed.

6. VTAM posts the SEND macro request started in Step 2 as complete.

The normal sequence of events for sending data to a TCP/IP printer is:

1. A buffer of print data is built.

2. The buffer is given to TCP/IP via a SEND macro request.

3. TCP/IP sends the buffer to the TCP/IP device.

4. TCP/IP notifies VPS the SEND is complete.

5. If an acknowledgment is expected, VPS issues a RECEIVE request and waits.

6. The device receives the buffer and spools or prints the data.

7. If an acknowledgment was requested, the device sends it to TCP/IP.

8. TCP/IP notifies VPS the RECEIVE is complete.

9. VPS verifies the acknowledgment is valid.

The MRD routine scans for printers that are waiting for TCP/IP to notify VPS that a SEND or a RECEIVE is complete.

If the VTAM or TCP/IP request has been outstanding for longer than the MRDINTVL specified in the VPS System Initialization member, missing response status is set and a VPS825E message is issued. When the printer status indicates a missing response, it is possible that there has been a network failure. However, a missing response is usually the indication of a failing printer. Problem determination should begin with the printer.

The MRD interval applies to both VTAM and TCP/IP printers. However, for TCP/IP printers, the TCPMRD keyword can be used to specify the time interval that VPS should wait for a TCP/IP request to complete. If the request does not complete within this interval, the connection will be terminated and the printer will be EDRAINED.

Internal Trace Table

The internal trace table is an area of storage in the VPS address space where VPS records information about the events which occur during VPS execution. The trace table entries are recorded in a "wrap around" mode so the trace table will not fill up and terminate tracing. The size of the trace table is specified in 4K pages via the TRACE system initialization parameter.

When an event occurs, VPS records the event type, a time-stamp, the return code, and information relevant to the particular event.

Certain system-related and printer-related events are always traced. This basic set of trace entries provides a good representation of VPS' processing, but is not detailed. If more detailed tracing is needed, additional system-related events can be traced via the TRACE parameter in the VPS System Initialization member, or additional printer-related events can be traced via the TRACE parameter in the Printer Definition member. We recommend that the internal trace always be turned on for all printers, so you would not want to specify TRACE=N as a printer default.

The information in the internal trace table can be captured in a snap dump (see "Snap Dumps" on page 15.9) or can be viewed via the trace table screens in the VPS Monitor and Control Facility (VMCF).

External Trace Recording in GTF Trace Files

The TRACE and EXITnn keywords in the System Initialization member and the TRACE and SEPAR keywords in the Printer Definition member allows you to indicate that you want VPS to record its trace entries in your GTF trace dataset, in addition to entering them in the VPS internal trace table. VPS' internal trace table is in existence only while VPS is executing and leaves no permanent record of events. Also, each time the VPS trace table is filled, recording continues at the beginning of the trace table, effectively "covering up" previously recorded information. Depending on the size of the trace table, the trace types specified, and the number of printers active to VPS for which tracing is in effect, the trace table can fill up in a very short time. GTF tracing allows you to make a complete and permanent record of VPS events, which can then be investigated even when VPS is not executing.

GTF trace entries created by VPS will have a record ID of 80 (X'50'). When you request GTF tracing, you might want to specify a GTF format appendage ID (via the third positional parameter value on the TRACE keyword in the System Initialization member), unless the default value which VPS uses for this parameter is acceptable at your installation. A program for printing VPS' GTF trace entries is supplied as member LRSPRGTF in the LRS/OS/API load library (LRS.V1R12.LOAD) on file 5 of the distribution cartridge. Sample JCL for executing this program is supplied as member PRINTGTF in distribution file LRS.VPS.V1R80.CNTL.

You can also request that VPS record its VTAM or TCP/IP buffer contents in your GTF file via the TRACE keyword. This trace type is only effective if the TRACE keyword has a value that also indicates that GTF tracing is on for the printer, for example, TRACE=(Y,05).

To use GTF tracing for a VPS printer, perform these steps:

1. Set the printer's trace types to the desired value by specifying TRACE=(Y,nn) in the printer definition member, where "nn" is the appropriate value for the type of events you wish to trace. Be sure that "nn" includes the X'01' bit to indicate that the trace records are to be recorded in the GTF trace file.
2. Issue a REACTIVATE command for the printer, so the modified printer definition is used by VPS. (After you finish tracing, you should set the TRACE keyword back to its original value and REACTIVATE the printer again).
3. Start GTF tracing. For example, issue the following console command:

   ```
   S GTF.xxx
   ```

   When prompted for the options, be sure that USR is specified. If it is, you can respond to the message with U. If it is not, respond to the message with:

   ```
   TRACE=USR
   ```

4. Create the situation which you are trying to trace. For example, put a job on the JES spool so the VPS printer being traced can pick it up and attempt to print it. Once the output has been processed or the error condition has occurred, you can stop GTF tracing. For example, issue this command:

   ```
   P GTF.xxx
   ```

5. Modify the JCL provided as member PRINTGTF in file LRS.VPS.V1R80.CNTL to match your standards for JOB card, etc. Also, modify the PARM on the EXEC statement to reflect the LUNAME of the device for which the trace was performed. For a TCP/IP printer that has no LUNAME keyword, use the member name of the printer definition member as the value of the LUNAME parameter. Also, for a TCP/IP LPD or SOK printer, add OPTION=ASCII to the PARM.

Be sure that the STEPLIB refers to the library (LRS.V1R12.LOAD) that contains the LRSPRGTF program, and that the SYSUT1 DD statement refers to the trace file that was used by GTF when you started it.

The report created by running the LRSPRGTF program will contain formatted VPS trace entries. The trace entries with a type of “VBUF” or “TBUF” show the data buffers being sent to devices. For more information about trace entries, contact LRS Product Support.

Please be aware that GTF will only record trace entries in the primary extent allocated for the trace dataset. If you do not get any trace entries from VPS, you may need to reallocate the trace dataset with a larger primary extent.

Snap Dumps

The snap dump facility of VPS captures a “picture” of certain VPS control blocks at the time the SNAP dump is created. If SNAP=Y is specified for a VPS printer, VPS will automatically create a snap dump for most error conditions which cause a printer to be EDRAINED. If you do not want these automatic snap dumps, specify SNAP=N. You will still be able to get a snap dump for a printer by issuing a SNAP command.

Each snap dump will dynamically create a SYSOUT dataset. Upon completion of the snap dump, the requested information is available for printing. This allows problem determination to begin immediately. VPS does not have to be shut down to print these dumps. The SYSOUT class, destination, class, form, output reference, and whether or not the snap dump is a held SYSOUT dataset are determined by the SNAPOUTP and SNAPHOLD keywords from the VPS System Initialization member.

When you have a problem with a printer and intend to call VPS support for assistance, it can be helpful to have a snap dump available. It is good documentation to have for printers which are “hung up” or which have been put into EDRAINED status by VPS. The various portions of the snap dump are not documented for users, but VPS support personnel can guide you to particular portions of the dump to answer questions about your problem. Some problems may require that you mail the dump to VPS support for diagnosis.

The SNAP command can also be performed for the VPS system rather than for an individual printer. The resulting snap dump will contain information about VPS system control blocks rather than control blocks for an individual printer.

System Dumps

The system dump is an operating system service aid. The dumps are automatically created by the system when a task within the VPS address space has an abend. This dump is extremely valuable for resolving abend type problems. We recommend that you include a SYSUDUMP DD statement in your VPS execution JCL.

A system dump is usually created by the operating system. However, you can request that VPS create a system dump via the ABEND command. This type of dump is usually required when all of the VPS system appears to be “hung up”. The ABEND command will terminate the VPS address space.

When you have a system dump from VPS, you can call VPS support for assistance. Some problems of this type can be resolved in a phone conversation. In most cases, you will be asked to mail the dump to VPS support for diagnosis. You can choose to send in the dump on tape (6250 bpi), on cartridge, or in hardcopy format. (We prefer not to try to debug a dump recorded on microfiche).

All VPS system dumps are written to a single dataset. For this reason, these dumps are not available until VPS is terminated.

If you use the Abend-Aid product on your system, we recommend that you turn it off for the VPS address space.

SDUMP

This command is used to obtain an unformatted dump of the VPS address space. It should only be issued at the request of the VPS Support staff to obtain documentation to assist in diagnosing a particular problem.

The command will invoke the MVS SVC dump processor to obtain an unformatted dump of the VPS address space. The following storage areas will be included in the dump:

CSA	-	The CSA and ECSA subpools (227, 228, 231 and 241).
GRSQ	-	The GRS control blocks.
LSQA	-	The LSQA and ELSQA subpools (203-205, 213-215, 223-225, 233-235 and 253-255).
PSA	-	The PSA for either the processor at the time of the error or the processor at the time of the dump.
RGN	-	The allocated pages in the VPS private area.
SUM	-	A summary dump will be included with the SVC dump output.
TRT	-	The system trace table.

See “SDUMP” on page 7.12 for more information.

Display Command

The VPS DISPLAY command can be used to gather information about a printer or group of printers. The DISPLAY command has several formats for specifying which printers are to be displayed, as well as what information is to be displayed about them. "The START, STOP, and MODIFY Commands" on page 7.2 describes the various formats of this command. The discussion of the MODIFY command at the beginning of that section describes all of the different formats of the "prtrid" field in commands. These formats allow a command to be issued for a single printer, a group of printers, or all printers currently in a certain status. The types of information to be displayed about a printer are described in the discussion of the DISPLAY command later in that section.

The DISPLAY command is also a good starting point for most types of problem determination. If a printer or many printers seem to be "hung" or not printing properly, the DISPLAY command can be used to find out their status. The DISPLAY command alters nothing within VPS, so it can be used at the first indication of a problem. Repeated DISPLAY commands help substantially in providing an accurate problem description.

The DIAG parameter of the DISPLAY command gives the most detailed information about the status of a VPS printer. Each bit shown by a diagnostic display is significant. The meaning of each bit is described in "Diagnostic Display" on page 15.31.

Types of Problems

There are many types of problems that can occur in a system as complex as VPS. The most common problem types are:

- a printer in EDRAINED status
- a printer “stuck” in WCONNECT status
- an IDLE printer does not select available work
- a printer that is “hung up”
- incorrect output on a printer
- an abend in a VPS subtask or of the entire VPS address space
- a VPS address space that is “hung up” and not responding to commands

These problem types are discussed here to provide a starting place for problem determination and resolution. The service aids to use and the documentation to collect before contacting VPS support will be covered.

Not all problems fit into the categories mentioned. Since VPS is a user of the VTAM network, many non-VPS problem conditions can arise. Also, VPS/TCPIP must make calls to the MVS TCP/IP product to connect to and send data to printers. VPS attempts to display information about a network failure at the application program interface. For most common network problems, this information is sufficient to resolve the error.

EDRAINED Printers

When VPS encounters an unrecoverable error while communicating with a printer, it will issue an error message and put the printer into EDRAINED status. The first step in determining the cause for the EDRAINED status is to find the associated error message in the VPS log and/or the syslog. In most cases, this error message will give you all the information necessary to resolve the problem.

Most of the errors which can cause a printer to be placed in EDRAINED status are "outside" of VPS. For example, VPS may have received information from VTAM indicating that an OPNDST failed, or allocation of a staging dataset may have failed due to unavailability of DASD space. Even though these problems are outside of VPS, they can often be resolved by changing the specification of some VPS parameter. For example, changing the ALOGMODE parameter in a printer definition might correct problems in communicating with the printer via VTAM. Changing the QVOLUME parameter in a printer definition might allow staging dataset allocation to succeed.

If SNAP=Y is specified for the printer or as a default for all printers, VPS will also create a snap dump when the printer is EDRAINED. This snap dump will contain information about pertinent VPS control blocks at the time of the error.

If a snap dump is not available and you cannot determine the cause of the error from the contents of the error message, the DISPLAY command with the DIAG parameter and the SNAP command can be used to obtain information about the printer at the current time. If a great deal of time has elapsed since the error occurred, VPS' internal trace table may have "wrapped", so that area in the snap dump may no longer have all of the necessary information.

If you call VPS Support for help in solving the problem, please have the output of the various diagnostic tools available when you call.

Once you have resolved the problem, issue a START command for the printer to clear the EDRAINED status and to allow VPS to select work for the printer again. Alternatively, VPS User Exit 08 can be used to automatically retry EDRAINED printers, based on a table of error codes in the exit.

Some of the most common VTAM return codes, feedback code, and sense codes found in error messages are documented in "Sense Codes in VTAM-Related Error Messages" on page 15.22. Explanations of some of the more common TCP/IP-related errors are documented in "EDRAINED TCP/IP Printers" on page 15.27.

WCONNECT Status

Definition of WCONNECT status for VTAM printers

VPS shares network printers with other applications using the network. To share properly, certain VTAM requests (with specific options) must be made in the correct sequence. This sequence begins with a SIMLOGON request and completes with a successful OPNDST request. All VPS printers are obtained from the network through the same sequence of events.

This sequence of events is the timeframe encompassing the status WCONNECT. VPS is WAITING FOR CONNECTION to the network printer. Every printer is WCONNECT for some period of time while VPS is obtaining that printer from the network.

There are some valid reasons for a printer to remain in a WCONNECT status for an extended period of time. They are:

- The printer is allocated to some other application that has not yet or may never give the printer back to the network.
- The printer is powered off or in some way disconnected from its control unit. Some of the newer control units contain additional intelligence to notify VTAM of this situation. VTAM will then disable session establishment for that printer LU and will enable sessions when the printer is powered on or reconnected to the control unit.

As mentioned above, there is a sequence of events that must occur before the printer is connected to VPS:

- VPS discovers work for a printer.
- VPS asks the network for the printer with a SIMLOGON request.
- VTAM processes the SIMLOGON request. (If the printer is not defined to the network, VTAM posts the request with RC=14 F2=53. Message VPS310E SIMLOGON FAILED RC=14 F2=53 SNS=0000 will be issued, and the printer will be EDRAINED. If the printer is not currently active in the network, VTAM posts the request with RC=10 F2=00. Message VPS310E SIMLOGON FAILED RC=10 F2=00 SNS=0000 will be issued, and the printer will be EDRAINED) If all appears OK, VTAM builds and queues a CINIT for a VPS-to-printer session. VTAM posts the VPS SIMLOGON request with a zero return code.
- VPS receives a successful completion of the SIMLOGON request, so VPS sets the printer status to WCONNECT and waits for the session to be established.
- VTAM processes the queued CINIT. If the printer LU is not allocated to another application and the printer is enabled for sessions, VTAM will give the queued CINIT to VPS via its logon exit. If the printer is allocated to some other application, VTAM will notify that application via its RELREQ EXIT (if it has one) that the printer is being requested by a different application. If the application has no RELREQ EXIT, the printer will remain in WCONNECT in VPS until the application terminates. If the application chooses to ignore the request, the printer will remain in WCONNECT in VPS until the application terminates. If the printer is disabled for sessions, the printer will remain in WCONNECT status until the printer is enabled for sessions.
- Assuming the printer is available, the LOGON EXIT of VPS is scheduled by the network. VPS will then do the following through a series of RPL requests and RPL exits:
  - Inquire the network for any logon message.
  - Inquire the network for the session parameters.
  - Perform an OPNDST request for the printer.

- VTAM will process the OPNDST request, send the SNA bind to the printer, wait for a response to the bind from the printer, and post the VPS OPNDST request with the results from the SNA bind response.
- VPS waits for VTAM to post the OPNDST request as complete with the results from the SNA BIND response. VPS will then post the main task waiting for the printer with the completion information.
- The VPS main task (and printer) are removed from the WCONNECT status. If the printer was obtained successfully, VPS will begin to print the dataset. If the printer was not obtained successfully, VPS will issue an appropriate error message and EDRAIN the printer.

Some additional processing is performed in a multiple domain network.

The first step in diagnosing a VTAM printer that is in WCONNECT status is to issue a VTAM network display of the printer, via this command:

```
D NET,ID=luname,E
```

Message IST082I will indicate to which application (if any) the printer is allocated. If the printer is allocated to some application other than VPS, all further efforts should be directed toward determining why the other application is not releasing the printer.

Message IST597I will indicate whether the printer (SLU) is enabled for or disabled from sessions. If the printer is disabled from sessions, the problem is probably at the printer or printer control unit. The printer may be powered off or disconnected from the control unit. If the printer appears to be in a ready state, additional network problem determination must be done to diagnose this problem. Until the printer is enabled for sessions, VTAM cannot allow VPS to acquire the printer.

A printer becomes enabled for and disabled for sessions by SNA NOTIFY requests from the printer's control unit. These NOTIFY requests from the control unit to the VTAM SSCP contain an SNA control vector X'0C'. When the printer is powered off, the printer's control unit will send a NOTIFY that says disable sessions. When the printer is powered on, the printer's control unit will send a NOTIFY that says enable sessions. The further problem determination mentioned would probably encompass network traces where the NOTIFY request units could be examined.

If the printer is enabled for sessions, the problem is within VTAM. This means that VTAM has queued a request but is not processing it. Further problem determination should be directed toward VTAM.

For multiple domain networks, this step must be repeated for the owning domain as well.

Sometimes the source of the WCONNECT problem cannot readily be identified. While a VPS printer is WCONNECT, the network has a queued session that is not being processed. The best solution is to free the VPS printer and cancel the queued session within the network. The best command for both purposes is the VTAM command:

```
V NET,INACT,F,ID=luname
```

The "vary net inactivate force" will allow VTAM to clean up its control blocks and notify VPS of the session setup failure. The NSEXIT within VPS will be scheduled and VPS will clean up its control blocks.

After the VTAM vary inactivate of the LU is complete, the printer should be reactivated by the following command:

```
V NET,ACT,ID=luname
```

The printer must then be started within VPS to remove the EDRAINED status. This can be accomplished by issuing the following command:

```
F VPS,START,prtrid
```

Definition of WCONNECT status for TCP/IP printers

VPS sends print data to remote devices in the TCP/IP network using VPS/TCPIP and TCP/IP for MVS. The sequence of events necessary for a VPS printer task to connect to the remote TCP/IP device requires several TCP/IP macro calls. The type and number of calls is based on the TCPTYPE keyword specified in the VPS System Initialization member. Before VPS can connect to the remote device, the printer task must be identified to the MVS TCP/IP address space. The steps required are:

1. Locate the TCP/IP address space using the TCPIPID value from the VPS System Initialization member.
2. Identify the printer task to MVS TCP/IP using a unique name.
3. Bind the printer task to a local port number using a value specified in the TCPLPORT keyword in the VPS printer definition.

After the VPS printer task has connected to the MVS TCP/IP address space, the following steps are performed to connect the task to the remote TCP/IP device:

1. Obtain the IP address associated with the VPS printer, if a name was specified in the TCPHOST printer keyword.
2. Issue a sockets CONNECT call to start the connection with the remote device. The remote device is located in the TCP/IP network based on the address obtained from the TCPHOST printer keyword and the port obtained from the TCPRPORT keyword.
3. If the connection fails due to an 'ADDRESS IN USE' error, the process is repeated using each port defined in the TCPLPORT keyword.

During the time between making the first call to the MVS TCP/IP address space and the completion of the CONNECT call which establishes the connection to the remote device, the printer is WAITING FOR CONNECTION. If the printer is in WCONNECT status for an extended period of time, it is likely that VPS is waiting for a response from the remote device for the CONNECT call. This may indicate that the device is not responding or that there is a network problem.

If you find it necessary to diagnose a problem with a TCP/IP printer that is in WCONNECT status, you may want to ensure that the printer is connected to the TCP/IP network and ready for connections. A VPS STOP command with the FORCE option can be used to interrupt most calls made during the connection process. Then a VPS START command can be used to remove the printer from DRAINED status and allow VPS to attempt to reconnect. If the printer is now available, the connection attempt should be successful.

If the printer is often in WCONNECT status for extended periods of time, it may be necessary to obtain additional information. A VPS SNAP command can be issued for the printer to obtain a dump of the control blocks. VPS technical support can identify the most recent request made by VPS during the connection process, which will help determine whether the connection attempt is waiting for MVS TCP/IP to complete the identification process, or whether the remote device is not responding to the CONNECT request.

Idle Printer Not Selecting Output

There are several conditions which can cause a printer to remain IDLE while there is output on the JES spool.

- All of the output on the JES spool that matches this printer's selection criteria is held or non-selectable.
- The VPS address space is restricted from having UPDATE access to the JES spool via some external security package.
- There are already as many busy printers as the second value specified in the MAXPRTS keyword, so VPS cannot allow the IDLE printer to begin printing until a busy printer completes its work.
- The VPS Pre-selection Exit (User Exit 00) is enabled, but the pre-selection criteria specified in the VPS initialization member (PSCLASS, PSDEST, PSFORM, and/or PSWRITER) do not encompass the selection criteria for this printer (only if using the PSO interface).
- The printer is a pooled printer (POOL=Y), but the VPS Pooling Exit (User Exit 16) is not enabled or is failing to locate work on the JES spool (only with SAPI=N).
- The printer is a TCP/IP printer, but the connection between the VPS address space and the MVS TCP/IP product has been lost or has never been successfully established. When using VPS/TCPIP with IBM's MVS TCP/IP for OS/390 2.5 or higher (Open Edition), the user ID associated with the VPS address space must be defined to the external security manager as a "superuser" or must have READ authority to the BPX.SERVER profile in the FACILITY class of the external security manager. Failure to establish this type of authority can result in message "VPS382E ANS WORD NEGATIVE TYPE=GETHOSTNAME FUNC=0B ANS=FFFFFFFF 0000009C" when VPS/TCPIP attempts to connect to MVS TCP/IP.

If none of these reasons seems to explain the situation, please contact the LRS Product Support group.

Printer Wait

The printer wait or “hung up” condition is defined as a printer that is not IDLE, but is stuck in some other state and is not completing its printing.

The first step in problem determination is the DISPLAY command.

If the DISPLAY command shows the printer in PRINTING status, but the line and page counts do not change, get a snap dump for the printer before issuing any other commands. This will capture information about the printer while it is still “hung up”. Check the log to see if the missing response detector has been issuing messages for the printer. If it has, the problem is most likely the printer itself. You can issue a STOP FORCE command for the printer to see if the printer will successfully change to DRAINED status. If it does, you can issue a START command for the printer and see if it resumes printing successfully.

The display command (STATUS) might also indicate that the printer is in a status other than PRINTING, such as INTVREQD (intervention required) or POWEROFF. If you take the appropriate action to clear the unusual status, such as hitting the start button on the printer, and the status does not change, you should issue a SNAP command for the printer. This will capture information about the printer while it is still “hung up.” Then issue a STOP FORCE command for the printer to see if the printer will successfully change to DRAINED status. If it does, you can issue a START command for the printer and see if it resumes printing successfully.

If the printer does not change to DRAINED status after the STOP FORCE command, the DISPLAY command may show a status such as DRAINING. If the missing response message has previously been issued for the printer, the status will be displayed as DRAINING-M. For a VTAM printer, you can issue a VTAM command to inactivate the LU. This should cause the printer to be released by VTAM, and the printer status should change to EDRAINED in VPS.

If this sequence does not resolve the problem, a diagnostic display will allow you to get detailed information about the status of the printer, including which communication steps it has successfully completed.

If after examining the above documentation, you plan to call VPS technical support, please have the following documentation available:

- the DISPLAY command output
- the snap dump
- the VPS log
- the printer definition
- the printer device type
- the printer attachment method (control unit type, control unit protocol)

Incorrect Output

There are many possible reasons for printed output that does not have the desired appearance.

Problems with vertical spacing of printed output can occur when using special forms with a “non-standard” form length or channel stops. You can usually solve these problems by checking the values in the parameters related to FCB support. “FCB Support” on page 6.8 describes VPS’ use of the FCB for both VTAM and TCP/IP printers.

Page printers that use PC emulation or protocol converters to provide the VTAM 3270 emulation may have erratic page lengths or extraneous skips to a new page if the emulation software has a page length setting that causes it to insert formfeeds into the data. Whenever possible, these options should be turned off, so VPS can be in control of vertical spacing.

Page printers using one of the VPS/AFP products can have problems with vertical spacing if the AFP resources request a page length that does not match the characteristics of the data being printed. Resolution of these problems requires knowledge of the attributes specified in the various AFP resources (PAGEDEF, FORMDEF, OVERLAY, etc.), as well as the carriage control specified in the SYSOUT dataset.

When calling VPS Support for a problem with the format of output, please have this information:

- The brand and model of printer.
- The VPS printer definition member and any default printer definition members that apply to this printer (or screen prints of the six “VPS Printer Summary” screens from a VMCF summary display).
- Information about how the printer is connected (for VTAM printers, the type of controller, protocol converter, and/or 3270 emulation package and the type of bind; for TCP/IP printers using LPR/LPD protocol, the type of software that provides the LPD function).
- The type of dataset being printed.
  - Type of carriage control (if any).
  - FCB specified when the dataset was created (if any).
  - AFP resources requested for the dataset via the OUTPUT JCL statement or via the VPS printer definition, if AFP conversion is being performed.
- An example of the incorrect output, and an example of how the output should look.

Abend in VPS

Abends are operating system or hardware detected errors within the VPS system. When they are detected, a dump is taken by the operating system. Some abends can be anticipated by VPS. VPS will handle these and issue an appropriate message to inform the operator. If a main task abends, VPS will terminate itself. If a printer task abends, VPS will continue to process. Only the abended printer will be unavailable. A display command would show an abended printer task with a status of ABENDED.

The service aid used here is the system dump. The dump is written to the SYSUDUMP dataset. A dump in this dataset is not available until VPS is terminated. If your system has a dump formatting system, please disable it for VPS. Past experience has shown that the normal operating system dump is best for problem determination.

S80A and S878 abends are caused by a lack of virtual storage for the VPS address space. The amount of virtual storage is indicated by the “REGION” parameter on the EXEC JCL statement. If no “REGION” parameter is specified, there is a default established by the Job Entry Subsystem (JES).

“Virtual Storage Requirements” on page 2.4 gives the formula for estimating of the amount of virtual storage required. If the VPS address space or an individual VPS printer gets an S80A or S878 abend, and you have determined that the REGION value should be large enough to accommodate all of the VPS printers, the dump will contain information about the amount of storage that VPS has acquired and released since initialization.

If technical support is required, please have the following:

- The system dump.
- Any snap dump created by VPS at the time of the error.
- The VPS log.

VPS System Wait

A VPS system wait is a situation in which no printer in VPS is printing. VPS may or may not be accepting commands. This situation could occur if one of the main tasks in VPS has abended, or if one of the main VPS tasks is waiting on an event that did not complete because of some other error. In either case, a VPS system wait becomes apparent quickly.

If VPS is accepting commands, issue a DISPLAY command for all printers and look for printers in an unexpected status. If your system has only a few printers, a snap dump on all printers might be feasible. Make certain that other address spaces in the system are running and this is not an operating system problem.

You can request that VPS system control blocks be dumped by issuing a SNAP command for SYSTEM rather than for a particular printer.

If no exceptional condition can be seen and resolved, the only recourse is to terminate VPS and restart it. The proper way to terminate VPS would be with a dump. This can be done in one of two ways. The first is through VPS with the SDUMP command (F VPS,SDUMP). However, if the VPS is not responding to commands, this is not possible. In this case, use the operating system cancel command (C VPS,DUMP). This dump will help determine the cause of the problem.

If VPS technical support is required, please have the following documentation:

- The system dump.
- The DISPLAY command output.
- The VPS log.

Sense Codes in VTAM-Related Error Messages

Many of the VTAM-related error messages which VPS displays contain sense data and/or return codes and feedback codes which VPS has received from VTAM. Some of the more common codes and possible reasons for the error are listed here. Refer to VTAM manuals for a more detailed explanation of any code.

SENSE CODE MEANING

0801 **Resource not available**

3174 or 3274 printer port not customized for host printing.

Outbound pacing value has been exceeded.

3276 pacing not specified.

Emulation package/protocol converter not ready.

0809 **Mode inconsistency**

Usually, the controller has lost track of the VTAM session for the printer. It either thinks it is in session when it isn't or vice versa. IMLing the controller will usually fix it.

080A **Permission rejected**

This sense code means "powered off" on a 3274. Conditions which look like a power off but are not include coax errors, coax disconnected, and coax in the wrong port.

On some intelligent devices such as an 8100 or Series/1, an 080A can mean the printer is not allocated to the 3270 emulation on that processor.

081C **Request not executable**

Hardware error at the controller or terminal.

0821 **Invalid session parameters**

Using wrong LU type (trying to use LU-1 on bisync, etc.).

Using wrong modetab in VTAM (defaulting to an LU-2, etc.).

No pacing or a pacing value the device doesn't support (using a VPS internal logmode such as VPSLU1 when NCP gen has no pacing coded).

See "OPNDST Failure" on page 15.25 for more information about this problem.

0822 **Link procedure error**

The communication controller cable is not plugged into the modem or DSU. Specifically, when the communication controller brought up data terminal ready (DTR), it did not detect dataset ready (DSR) from the modem or DSU. A similar sense code is 8002.

0825 **Component not available**

The printer selected by an FMH is not available. This is more common on 3770 type devices. It could be anything from "powered off" to "allocated to some other function."

082B **Presentation space integrity lost**

The device has suffered a recoverable error, and the current screen or print buffer should be re-sent.

082C **Resource sharing limit exceeded**

The PU is active on another VTAM (SSCP).

0835 **Invalid parameter**

This is the same as sense code 0821, except the user sense field (083500xx) gives you an index into the bind to the byte which the LU found invalid. For example, 08350009 means that the LU rejected the ninth byte of the BIND, which is a PACING value. Using different PACING values might solve the problem. See "OPNDST Failure" on page 15.25 for more information about this problem.

087D **Session services path error**

The most common occurrence of 087D is when VTAM looks for the LU in another domain and can't find it. This is probably a cross-domain coding problem, although the sense code can show up in a single domain network. There are numerous user codes that can occur with this sense code.

1002 **RU length error**

The RU is either 0 or it is longer than the value agreed upon at session initialization via the BIND command. Use the RUSIZE parameter to decrease the length. Most local SNA controllers will only handle a maximum RUSIZE of 1536. Some machines, such as a DPCX 8100, will only allow a RUSIZE of 256.

1003 **Function not supported**

The device received a command it couldn't handle. If it's an LU-1, turning off some or all of the SCS functions will fix it.

Sometimes a device will accept an LU-1 bind, but does not really support SCS. Try changing to an LU-3 bind.

1005 **Parameter error**

The printer received a command that it recognized, but it could not handle the value in the command. For instance, an SCS "set vertical format command" attempted to set the page length to 100, but the printer's maximum page length was 88.

1008 **Invalid FMH**

The printer did not understand the FMH (Function Management Header) sent to it.

2001 **Sequence number**

Data received out of sequence. Most likely a network problem.

2003 **Bracket**

Bracket error of some sort. The printer thought VPS didn't use bracket protocol properly.

400F **Incorrect use of format indicator**

An FMH was sent when the bit in the BIND that specifies support for FMHs was not turned on.

8002 **Link procedure error**

The modem or DSU connected to the communication controller is powered off.

8004 **Unrecognized destination address field (DAF)**

The control unit (3274/3276) doesn't know about the printer, even though it is "gen"ed at the host (NCPGEN). Shows up on a 3276 when a terminal is added, but the 3276 doesn't have a device adapter card for it.

8013 **COS not available**

If the class of service (COS) is not available, it is a network error. Possible causes include using the wrong LOGMODE or use of an inoperative virtual route.

RC/F2 **MEANING**

04/04 **Negative response received**

The LU rejected a request. The SNA sense code will give more detail.

10/00 **LU not available**

The printer was not active to VTAM. This is probably a network problem. It could be a failure, or an activate command may need to be issued for the LU.

10/01 **OPNDST failed**

There is usually a sense code with this. VTAM was able to locate the LU and send a bind to it, but the bind failed. See the detailed explanation of OPNDST failure later in this section for more information.

14/4B **LOGMODE invalid**

VTAM (the NCP or local definition) has an invalid value specified for LOGMODE. Even if the ALOGMODE parameter is used in VPS, the VTAM definitions must point to a valid table entry.

14/53 **LU not found**

VTAM can't find the printer. This is most likely a network definition problem, such as a MAJOR NODE being inactive.

14/55 **APPL not authorized**

AUTH=ACQ was not specified on the APPL statement for VPS in application major node in SYS1.VTAMLST.

OPNDST Failure

Message VPS312E prtr-id OPNDST FAILED RC=10 F2=01 SNS=0821xxxx or SNS=0835xxxx appears in the log. This message will be followed by message VPS313E, which displays the session parameters in hex. Both messages are recorded in the VPS log.

The network or the printer has rejected the session parameters which VPS has sent as a result of the OPNDST. This error is usually the result of an improper definition in the network or in VPS. The following text will explain what the session parameters are and where VPS gets the values which it uses.

Session parameters are the rules by which VPS sends print lines to the printers. These rules state how the data is sent, how much data is sent in each buffer, how fast it can be sent and what VPS or the printer can do if it discovers an error. Session parameters are required in a VTAM environment, and different printer types require different parameters.

The session parameters are referred to by many names. These parameters are also called bind parameters, bind images, mode entries, logon mode entries, default log mode entry (DLOGMOD) and many other names. Different names are used depending on the manual referenced. They all refer to the same thing.

The session parameters come from the mode table entry. The mode table entry can be the default or a specific one. The default entry comes from the network definition. The specific one comes from the VPS definition via the “ALOGMODE” specification. The “ALOGMODE” specification overrides the network default specification. If nothing is specified for “ALOGMODE”, the network default is used.

The network default comes from the VTAM definition or lack of VTAM definition parameters. The two VTAM parameters involved are “MODETAB” and “DLOGMOD”. The “MODETAB” parameter specifies the name of the logon mode table. If a “MODETAB” is not specified, the IBM default table “ISTINCLM” is used. The “DLOGMOD” parameter specifies which entry in the logon mode table is to be used. If a “DLOGMOD” is not specified, the first entry in the mode table is used. Details on how to build the logon mode table are explained in the VTAM installation manual.

Within VPS, the “ALOGMODE” parameter can be specified to tell VPS to use a different entry within the mode table. This entry must be in the mode table specified by the VTAM “MODETAB” parameter. (There are also several special names which can be specified in the “ALOGMODE” parameter. “VPS-Supplied VTAM Log Modes” on page 6.14 describes these special entries. When one of these special names is used, VPS will generate the session parameters. These names are provided to reduce the need for updating the existing mode tables).

The session parameters are specified through network or VPS definitions. If the session parameters are incorrect, the definition must be incorrect. As mentioned previously, different printer types require different session parameters. The printer type should be known before deciding which session parameters are correct. VPS supports three printer types: LU-0 (DSC), LU-1 (SCS) and LU-3 (DSC). LU-0 printers are those that are attached to a local non-SNA control unit, a remotely attached bisync control unit or an SDLC PU Type-1 control unit.

Once the printer type is known, the correct session parameters can be chosen and specified. This can be accomplished by updating VTAM and/or VPS definitions. Since VPS definitions are easier to update, this is the recommended action to follow.

The “ALOGMODE” parameter in the Printer Definition Member that defines the printer to VPS should be updated to specify one of the special VPS ALOGMODE names or the name of an existing mode table entry that has the correct session parameters. Examples of the correct session parameters can be found in “VTAM Definition Requirements” on page 2.7. These examples are taken from the IBM default mode table. The names are “S3270” for LU-0, “SCS” for LU-1 and “DSC2K” for LU-3 type printers. After the member is updated, it must be inactivated and re-activated to VPS to make the change effective.

The second choice is to update the VTAM definitions. The “MODETAB” and “DLOGMOD” parameters must be updated to reflect the correct mode table and mode table entry names. After the update, the major node that contains the printer definition must be inactivated and reactivated to VTAM to make the change effective.

Note: The internal VPS logmodes which can be specified in the ALOGMODE parameter (VPSLU0, VPSLU1, VPSLU3, VPSDCA, and VPSCOL) do not have any pacing values.

EDRAINED TCP/IP Printers

TSO LPR Command as Debugging Tool

When debugging a problem with a TCP/IP printer that uses LPR/LPD protocol on a system that uses IBM's MVS TCP/IP product, the TSO LPR command can be used as a diagnostic tool. The format of the TSO LPR command is:

```
LPR 'dataset.name' (HOST hhh.hhh.hhh.hhh PRINTER pppppppp TRACE)
```

dataset.name Name of any catalogued DASD dataset. A member name can be specified by including it in parentheses, as in 'dataset.name(member)'.

hhh....hhh The remote IP address. This should be the same value as is used in the TCPHOST keyword in the VPS printer definition member.

pppppppp The remote printer or "queue" name. This should be the same value as is used in the TCPPRTR keyword in the VPS printer definition member. If no TCPPRTR keyword is specified in the VPS printer definition member, VPS uses the member name, so that value should be specified here.

If the LPR command succeeds in sending the dataset to the printer, VPS/TCPIP should be able to send a dataset to the printer. However, certain special TCPOPTS keyword values may be necessary to reproduce the same environment as is used by the LPR command.

2xxxxxxx The LPR command sends the data file before the control file. By setting the 2xxxxxxx option, VPS/TCPIP will send those files in that order.

xxx8xxxx Some LPD implementations will not accept leading zeroes in the byte count fields in the data file, control file, or subcommand records. The LPR command does not send these leading zeroes. By setting the xxx8xxxx bit, VPS/TCPIP will not send leading zeroes in those fields.

Also, most LPD implementations require that the printer or "queue" name requested by VPS (via the TCPPRTR keyword) match the value specified as the printer or "queue" name at the LPD. If the value is defined as lowercase characters at the remote LPD, it must be specified as lowercase characters in the TCPPRTR keyword.

VPS382E Message Contents

When a TCP/IP printer is EDRAINED, the error message in the VPS log and/or the syslog will indicate what type of error occurred. The most common error message received for a TCP/IP printer is the VPS382E message. The text portion of this message varies, depending on the type of request that failed and the reason for the failure. Some of the most common failure reasons for printers using LPR/LPD protocol are listed here.

Host Address In Use

This message indicates that the remote LPD considers the address that VPS is trying to use to connect to the printer to be "busy".

If VPS can print one dataset successfully, but this failure occurs when VPS attempts to connect for the second dataset, there are certain VPS printer definition member keyword values that might help to alleviate the problem.

Some LPD implementations have a period of time after a connection is closed that a new connection from the same address is not accepted. Also, IBM's MVS TCP/IP has a "TIME_WAIT" state that occurs after a normal close of a connection, during which VPS will not be allowed to connect to the remote host to send another print file. TCPOPTS=x2xxxxxx tells VPS to wait 10 seconds after closing a connection.

Specifying a range of port numbers in the TCPLPORT keyword will allow VPS to attempt a connection from a different address than was used for the previous connection. For example, if TCPLPORT=721-731 is specified, VPS will first connect from port 721. If it attempts to connect from port 721 for the next dataset, but is notified that the address is in use, it will then attempt from port 722. (See "How VPS/TCPIP Uses TCP/IP Ports" on page 10.19 for more information).

For HP LaserJet printers with the JetDirect card providing the LPD function, or for an LPD implementation that does not require that VPS connect through a port in the range 721 through 731, TCPLPORT=2000-3000 is recommended.

Connection Refused

This message text indicates that the remote LPD refused to accept VPS's attempt to connect to the printer. If this occurs every time that VPS attempts to send a dataset to the printer, and nothing is ever printed successfully via VPS, verify that the values of the TCPHOST and TCPPRTR keywords are correct.

Some LPD implementations include a table of remote host addresses from which they will accept connections. If the address of the host where VPS is running is not in the table, the table should be updated to include that host address.

If using IBM's MVS TCP/IP product, the TSO LPR command (see "TSO LPR Command as Debugging Tool" on page 15.27) can be used to help diagnose this problem.

Connection Timed Out

This message text indicates that a timeout occurred somewhere in the network and VPS's connection to the device has been lost. If this is an intermittent problem, VPS User Exit 08 can be used to automatically restart these printers.

If it occurs every time VPS attempts to send a dataset to the printer, it could be due to some timeout value specified in the remote LPD. For example, VPS may have sent a very large file to the LPD. If the printer is powered off, out of paper, or slow in printing the output, so much time may elapse before the printing process completes that a network timeout occurs before the LPD can send an acknowledgment back to VPS.

VPS has no automatic "timeout" value that would cause a printer to be EDRAINED with message VPS382E. If a TCPMRD value is specified in the VPS printer definition member and that amount of time elapses without an acknowledgment, VPS will issue the VPS391E message before the printer is EDRAINED.

Error Text From Remote Host

This message text indicates that the remote LPD sent some text data back to VPS to explain why an error occurred. The text can be found in the VPS log in message VPS390E, which will appear twice to display the text data both in hexadecimal and in EBCDIC form. Sometimes this text data will be completely understandable, such as "PRINTER NAME IS INVALID". However, it will frequently be a single hex byte with a value of 01. The documentation for the remote LPD might give the meaning of the text data.

If this error occurs every time VPS attempts to connect to the printer, verify that the values of the TCPHOST and TCPPRTR keywords are correct. If the TSO LPR command can send the same type of dataset to the printer successfully, review the TCPOPTS keyword values as described in "TSO LPR Command as Debugging Tool" on page 15.27.

Invalid Acknowledgment

This message text indicates that VPS received an acknowledgment with a length of zero from the remote TCP/IP device. When a receive request is completed with a length of zero, the connection has been lost to the remote device.

Some LPD implementations drop the connection when they reject the previous data, rather than send an indication of why the data was rejected. That data may have been a command or a subcommand or a request for acknowledgment following the print file or control file. If this error occurs every time VPS tries to send a dataset to the printer, the values of the TCPHOST and TCPPRTR keywords should be verified. If it occurs only when a certain type of dataset is sent to the printer, such as datasets containing PCL commands, VPS might need to send a special filter record to the printer to allow passing these control sequences to the printer. This can be accomplished by specifying TCPOPTS=xx2xxxxx in the VPS printer definition member.

Broken Pipe

This message text indicates that the connection between VPS and the remote LPD was lost. This is probably due to some sort of network failure or a timeout in the network. If it occurs repeatedly for datasets over a certain size, resolve it as you would for "CONNECTION TIMED OUT".

Connection Reset By Peer

This message text indicates that the remote LPD broke the connection. If this is an intermittent problem, VPS User Exit 08 can be used to automatically restart the printer. If it occurs repeatedly for datasets over a certain size, resolve it as you would for “CONNECTION TIMED OUT”.

If this error occurs for a printer using a direct socket connection, check the value of the RELREQ keyword for this printer. RELREQ=W, RELREQ=E, and RELREQ=N should not be used; RELREQ=A or RELREQ=I are recommended.

Diagnostic Display

The diagnostic display (requested via the “DIAG” parameter on the DISPLAY command) gives more detailed information about a printer than is included for any of the other display options. It displays critical flag bytes within VPS.

The contents of the diagnostic display response are explained here.

VPS999R nnnnnnnn XCB(X1-X2-X3-X4) XCBC(C1-C2-C3-C4) XCBV(V1-V2-V3-V4) VSTATE(sssssssss)

nnnnnnnn - Printer ID
XCB - General Status Bytes
XCBC - Communication Status Bytes
XCBV - VTAM Status Bytes
VSTATE - State Bytes

General Status Bytes

- X1
  - X’80’ - Printer is busy
  - X’40’ - Within a job
  - X’20’ - Within a dataset
  - X’10’ - Dispatcher is queueing a job
  - X’08’ - Printer is printing a job
  - X’04’ - No more work
  - X’02’ - AFP conversion in progress
  - X’01’ - Secondary selection criteria active
- X2
  - X’80’ - Scheduler subtask attached
  - X’40’ - Scheduler subtask has exited
  - X’20’ - (Not used)
  - X’10’ - (Not used)
  - X’08’ - (Not used)
  - X’04’ - (Not used)
  - X’02’ - (Not used)
  - X’01’ - Connected to Server
- X3
  - X’80’ - Copies in progress
  - X’40’ - Checkpoint/restart is required
  - X’20’ - Current dataset has been requeued
  - X’10’ - Job has been interrupted
  - X’08’ - Job has been resumed
  - X’04’ - Reader stream has control
  - X’02’ - (Not used)
  - X’01’ - (Not used)
- X4
  - X’80’ - DRAINED or DRAINING
  - X’40’ - DRAINED due to error
  - X’20’ - DRAIN IMMEDIATE requested
  - X’10’ - DRAIN FORCE requested
  - X’08’ - (Not used)
  - X’04’ - (Not used)
  - X’02’ - (Not used)
  - X’01’ - (Not used)

Communication Status Bytes

- C1
  - X’80’ - Cancel dataset has been requested
  - X’40’ - Cancel job has been requested
  - X’20’ - Restart has been requested
  - X’10’ - Cancel message issued
  - X’08’ - Reposition field is valid
  - X’04’ - Interrupt has been requested
  - X’02’ - (Not used)
  - X’01’ - (Not used)
- C2
  - X’80’ - Scheduler termination requested
  - X’40’ - Release the printer to VTAM
  - X’20’ - Scheduler exit requested
  - X’10’ - VTAM work to be done
  - X’08’ - Process first dataset of job request
  - X’04’ - Process middle dataset of job request
  - X’02’ - Process end job request
  - X’01’ - Dispatcher post required by scheduler
- C3
  - X’80’ - Inactivation requested
  - X’40’ - Selection criteria change requested
  - X’20’ - Acquire requested
  - X’10’ - Release requested
  - X’08’ - Purge all output requested
  - X’04’ - Reactivation requested
  - X’02’ - (Not used)
  - X’01’ - (Not used)
- C4
  - X’80’ - STOP FORCE is not allowed
  - X’40’ - Waiting on form mount
  - X’20’ - Horizontal format changed via CBM
  - X’10’ - Vertical format changed via CBM
  - X’08’ - PPM format changed via CBM
  - X’04’ - Inbound data available for processing
  - X’02’ - (Not used)
  - X’01’ - (Not used)

VTAM Status Bytes

- V1
  - X'80' - XCB has VWE to process
  - X'40' - Session in Cont. Any Mode
  - X'20' - Session in Cont. Spec Mode
  - X'10' - Job FMH is loaded
  - X'08' - Logon Exit driven w/CINIT
  - X'04' - RELREQ Exit has been driven
  - X'02' - LOSTERM Exit has been driven
  - X'01' - CLSDST is required
- V2
  - X'80' - POWER-OFF
  - X'40' - Permanent error or PSL
  - X'20' - Set recovery (CLEAR + SDT) needed
  - X'10' - PA KEY 1
  - X'08' - PA KEY 2
  - X'04' - Change direction required
  - X'02' - Missing Response has been detected
  - X'01' - Intervention-required
- V3
  - X'80' - HORZ format is loaded
  - X'40' - VERT format is loaded
  - X'20' - PPM is loaded
  - X'10' - COMP FMH is loaded
  - X'08' - RJE FMH is loaded
  - X'04' - IPDS FMH is loaded
  - X'04' - PCL dataset in progress. Removed.
  - X'02' - DCA FMH is loaded
  - X'01' - DSET FMH is loaded
- V4
  - X'80' - AFP resources have been loaded
  - X'40' - Doing a SEND BEGIN BRKT IND
  - X'20' - Doing a SEND DATA
  - X'10' - Doing a SEND NULL RU
  - X'08' - Waiting for Ready-to-receive
  - X'04' - Waiting for PA-Key RCV
  - X'02' - Doing some other VTAM request
  - X'01' - Missing Response Bit

VTAM State Bytes

- S1
  - C'1' - Reset State
  - C'2' - Queued state after SIML/BEF LGX
  - C'3' - Pending active after LGX/BEF ODST
  - C'4' - Active
  - C'5' - Pending reset
  - C'6' - On hold
  - C'7' - Ripped out
  - X'01' - HTSNA state number
- S2 - Not used.
- S3 - Not used.
- S4 - Not used.

Appendix A
Converting from VPS V1 R7.0 to VPS V1 R8.0

What's New in this Release

Version 1 Release 8 of VPS implements the new SYSOUT Application Programming Interface (SAPI) to obtain print data from JES. SAPI is a multi-tasking interface which allows obtaining SYSOUT datasets from the JES2 or JES3 spool. When using SAPI, VPS normally does not need to copy the dataset into a staging area or a disk file, but can read the dataset directly from the JES spool for printing. JES marks the dataset as 'ACTIVE' and will not allow any other program to obtain that dataset while VPS is printing it.

By default, VPS will use SAPI to obtain SYSOUT datasets from JES if the JES version supports SAPI. If the JES version does not support SAPI, or if SAPI=N is specified in the VPS system initialization member, then VPS will use the Process SYSOUT (PSO) interface to obtain files from the JES spool.

With SAPI, many of the JES-related VPS user exits are no longer required. This eliminates the need to re-assemble these exits each time maintenance is applied to the JES libraries. For example, VPS user exits 16 (Pooling) and 24 (JES2 OUTPUT) are not called by VPS when using SAPI. VPS user exit 15 is called, but the LRS version of this exit returns immediately to VPS, since all the information obtained by VPS user exit 15 when using the JES PSO interface is automatically provided by to VPS by the JES SAPI interface.

Because MVS/SP and MVS/XA are not supported by VPS V1R8.0, VPS now implements some ESA-only functions, including using the linkage stack. All input/output requests are done in 31-bit mode, which reduces the amount of storage VPS requires below the 16M line. Other changes were made to reduce storage usage, including loading only those modules which are required, based on product keys.

Improvements have been made in diagnostic capability, including changes to the $$VPSERV macro which allow requests to obtain and release storage from user exits and separator routines. VPS can track all storage acquired by any exits and separators which use the $$VPSERV macro for those requests. All LRS sample exits and separators now use $$VPSERV for GETMAIN and FREEMAIN requests.

VPS/Email (Host product)

VPS/Email allows sending print datasets from the JES spool to an e-mail address using Simple Mail Transfer Protocol (SMTP) and the TCP/IP network. VPS/Email requires VPS/TCPIP.

VPS/LCDS (Host product)

VPS/LCDS sends print data to printers which support the LCDS datastream. VPS/LCDS uses VPS/TCPIP and the TCP/IP network to deliver the print data.

VPS/PDF (Host products)

VPS/PDL creates the output in Adobe Acrobat Portable Document Format (PDF).

VPS/Secure™ (Host product)

VPS/Secure allows users to distribute output over open TCP/IP networks, including the Internet, while maintaining confidentiality and integrity of sensitive data.

Installation

Refer to "Using the Convert Program" on page B.1 to convert from VPS V1 R6.2 to VPS V1 R8.0.

If you are already using VPS V1 R7.0 and are planning to implement VPS V1 R8.0, there are several factors to be taken into consideration before beginning installation. In this appendix, we will address each of the steps listed in "VPS Installation Steps" on page 3.7.

1. **Code required JES parameters**

   -and -

2. **Code required VTAM parameters**

   Unlike the first-time VPS user, you will not have to be concerned with JES or VTAM parameters. Any JES or VTAM parameters which you established for VPS V1 R7.0 will still be correct for VPS V1 R8.0.

3. **Restore the distribution cartridge**

   You will probably want to set up new libraries for VPS V1 R8.0 so you can keep VPS V1 R8.0 information separate from VPS V1 R7.0. "Restoring the Distribution Cartridge" on page 3.8 lists the names of the datasets on the distribution cartridge. Sample JCL for restoring the files can be found on the first file of the distribution cartridge, which has a dataset name of LRS.PRODUCT.JCL. (This is a sequential file of 80-byte records. You may wish to use IEBGENER to restore it to a sequential file or to a member of a PDS).

4. **Copy VPS load modules to appropriate libraries**

   You will need to move the VPS load modules into an authorized user library, an authorized linklist library, or SYS1.LPALIB before attempting to execute VPS V1 R8.0. The "basic" VPS product has no duplication of load module names between VPS V1 R7.0 and VPS V1 R8.0. **However, as distributed, the user exits have the same member names in VPS V1 R8.0 as in VPS V1 R7.0. Even though we do not distribute load modules for user exits, you will probably want to put all modules for VPS V1 R8.0 into a different library than the one which you have used for VPS V1 R7.0, at least until you have tested it and determined that you are ready to convert your production VPS system to V1 R8.0.**

5. **Define the VPS Checkpoint Dataset.** This step is required for VPS V1 R80.

6. **Define the VPS execution Job Control Language**

   "Defining the VPS Execution JCL" on page 3.14 gives an example of JCL for executing VPS V1 R8.0. Note that the "C" runtime libraries must be available to VPS, either via the linklist or via the STEPLIB DD of the VPS JCL.

7. **Define the System Initialization Member**

   There are some new System Initialization parameters. See "New System Initialization Keywords" on page A.6 for a description of these parameters. Also, the product keys for VPS V1 R8.0 are different than those used for prior releases. The new keys must be copied into the System Initialization member.

8. **Build the Printer Activation Inclusion List or the Printer Activation Exclusion list**

   You can use the same Printer Activation List, whether it is an inclusion list or exclusion list, in VPS V1 R8.0 as in VPS V1 R7.0. (If you choose to use the "CONVERT" program and IEBUPDTE to build the control library for VPS V1 R8.0, it will copy the inclusion or exclusion list member to the output dataset).

9. **Build the Printer Default Member(s)**

   You can copy the "master" default member which you used in VPS V1 R7.0 into your VPS V1 R8.0 control library and modify it to take advantage of VPS V1 R8.0 keywords. (If you choose to use the "CONVERT" program and IEBUPDTE to build the control library for VPS V1 R8.0, it will copy the member to the output dataset and modify the keywords to conform to VPS V1 R8.0 standards).

10. **Build the Printer Definition Members**

    There are some changes and additions to printer definition keyword values in VPS V1 R8.0. See "New and Changed Printer Keywords" on page A.7 for the details of these changes. If you do not wish to check each printer definition member in the VPS control library to see if changes are required, you can use the "CONVERT" program and IEBUPDTE, as described in "The Convert Program and IEBUPDTE" on page B.1, to assist in the process.

In addition to these installation steps, you will need to review your use of User Exits and separator routines. File LRS.VPS.V1R80.ASM contains source code for sample user exits, as well as source code for six versions of the VPS separator routines. It is important that you review each user exit which you have implemented to determine if it is still necessary and will still function with VPS V1 R8.0.

Some users applied fixes to VPS V1 R7.0 which were specific to their operating environment. If you have a user fix which you cannot support via a keyword value in VPS V1 R8.0, please call VPS Support to discuss the particular needs of your installation. **Do not attempt to apply VPS V1 R7.0 fixes to VPS V1 R8.0.**

Compatibility of User Exits

Although user exits coded for VPS V1 R7.0 should be compatible with VPS V1 R8.0 after reassembly, you should review each user exit in effect at your installation. Some of the control blocks passed to exits have a slightly different format in VPS V1 R8.0, and some additional control blocks are passed to some of the exits.

If a user exit has hardcoded references to undocumented control blocks, those references will no longer be valid, due to changes in control block formats. Those exits should be modified to use the $$CBINQ and $$CBSET macros (see "Control Block Inquire and Modification Macros" on page 5.82). The sample source code for user exits supplied in the distribution cartridge gives examples of the use of these macros.

VPS V1 R8.0 does not automatically enable an exit at VPS initialization simply because it finds a load module of the correct name in the VPS load module library. The default is that the exit be loaded but initialized in DISABLED status, unless you indicate that you want the exit to be initialized in ENABLED status via the EXITnn parameter in the VPS System Initialization Member.

All exits are given control in problem state, storage protect key 8, and are authorized. The exits are invoked in 31-bit mode. It is the responsibility of the code in the exit to switch to 24-bit mode when necessary.

All sample exits supplied on the VPS distribution cartridge use the linkage stack (BAKR and PR instructions). They also use the $$VPSERV macro for issuing messages (WTO), obtaining storage (GETMAIN), releasing storage (FREEMAIN), and generating VPS trace records (TRACE).

The use of SAPI to select datasets from JES eliminates the need for several exits, and new printer keywords may eliminate the need for VPS User Exit 14 (Dataset Add Exit).

A new exit (VPS User Exit 28) is provided to allow modification of the VPS/Email parameters before the SYSOUT dataset is sent to the mail server for delivery.

Some previously supported return codes from exits are no longer supported, and some new return codes are provided in some exits to request new functions.

- VPS User Exit 05 (WTO Exit) has a new return code to indicate that a message should be written to the VPS log, but should not be issued via WTO or written to SYSLOG.
- A return code of 04 from VPS User Exit 13 (Requeue Exit) is now ignored if the request code passed to the exit was 04.
- Return codes of 16 and 20 from VPS User Exit 19 (Session Error Exit) are now ignored. They are treated as if the return code was 00.

Separator Routine

Although the Separator Routine is not really an "exit," we do distribute the source code for it and allow you to modify it. See "Separator Routine" on page 5.2 for a description of the six separator routines shipped with VPS V1 R8.0. Also see "VPS® Separators" on page E.1 for a sample of each separator.

Some separator routines use values like the programmer name and room number fields from the JCL. If VPS is using the JES SAPI interface these fields are provided to VPS by JES. If VPS is using the JES PSO interface, VPS user exit 15 (JES Xmemory exit) must be enabled or the fields will be blank. Both JES2 and JES3 versions of the VPS User Exit 15 are supplied.

VPS Operation

VPS V1 R8.0 allows several new options on the VPS “DISPLAY,SYSTEM” command. These options allow you to display the value of the CPUID keyword, display information about a VPS module, and display information about each VPS task.

The format of the command to display the value of product keys has been changed. It is now:

F VPS,DISPLAY,SYSTEM,KEYS

The VPS “DISPLAY,prtrid” command now allows an option of “TCPIP” to request messages containing the parameter values for a TCP/IP printer.

A new VPS command “SDUMP” requests an unformatted dump of the VPS address space.

All VPS commands are documented in “Operation” on page 7.1.

New System Initialization Keywords

The following system initialization keywords are new to VPS V1 R8.0.

CROPTS Specifies the “C” language run time options to be used for VPS system tasks.

KEYEMAIL Specifies the trial/license code for the VPS/Email product. This keyword MUST be present in order to use the VPS/Email product.

KEYLCDS Specifies the trial/license code for the VPS/LCDS product. This keyword MUST be present in order to use the VPS/LCDS product.

KEYPDF Specifies the trial/license code for the VPS/PDF product. This keyword MUST be present in order to use the VPS/PDF product.

KEYVSECR Specifies the trial/license code for the VPS/Secure product. This keyword MUST be present in order to use the VPS/Secure product.

KEYXSAFP Specifies the trial/license code for the VPS/XES to AFP product. This keyword MUST be present in order to use the VPS/XES to AFP product. (Some customers used this keyword in VPS V1R7.0, but it was not available at all fix levels).

MAILHOST Specifies the name or IP address for email notification.

SAPI This keyword allows using the PSO or SAPI interface to JES.

TCPLHOST This keyword allows specifying a specific local host IP address for VPS to use if the MVS system has multiple IP addresses associated with it.

The following system initialization keywords are changed for VPS V1R8.0:

EXITnn A fifth positional parameter allows specifying the programming language used for a particular user exit module.

TCPTYPE IBM340 can now be specified to use the V3R4 API macros to communicate with TCP/IP for MVS from IBM.

USEROPTS A new option specifies that a “C” program should be used to perform the TCP/IP get_host_by_name call.

New and Changed Printer Keywords

The following printer keywords are new to VPS V1R8.0:

CROPTS	This keyword allows specifying the “C” language run time options to be used for this VPS printer task.
EKEY	Specifies the encryption key to be used if ENCRYPT=Y is specified for this printer.
ENCRYPT	This keyword specifies whether encryption should be performed for this printer.
NOTIFY	This keyword allows specifying whether the user(s) should be notified when the print completes, and the name of one user who should be notified in addition to any user(s) specified on the NOTIFY keyword of the OUTPUT statement associated with the SYSOUT dataset.
NOTMAIL	Specifies the email address of a user that should be notified when the print is complete or the printer is EDRAINED.
NOTTSO	Specifies the TSO ID of a user that should be notified when the print is complete or the printer is EDRAINED.
TCPDISC	The TCPDISC keyword allows specifying the disconnection options for this VPS/TCPIP printer.
XESCLASS	Specifies the SYSOUT class(es) of datasets that should be processed by VPS/XES to AFP.
XESOPTS	Specifies special options to be used for a VPS/XES to AFP printer.
XESRTAB	Specifies the name of the VPS/XES to AFP control table to be used for a printer.

The VPS/Email product is now available with VPS V1R8.0. The following keywords have been added to support VPS/Email. For more information about email connections, see “VPS/EMAIL” on page 11.1.

MAILBOOK	This keyword specifies the name of the VPS/Email address book for this printer. This keyword is only used for VPS/Email printers (those with COMMTYPE=(TCPIP,EMAIL)). If this keyword is specified, VPS will attempt to load a module with the specified name when the printer is activated. If a module of that name cannot be found in a library accessible to VPS, or if the module found fails validity checking, the printer will not be activated.
MAILFNAM	This keyword specifies the default file name to be used if no FILENAME: value is located in the OUTPUT statement JCL associated with the SYSOUT file. This keyword is only used for VPS/Email printers when VPS is sending the SYSOUT file as an attachment.
MAILKWDS	This keyword specifies which OUTPUT JCL statement keywords will be searched for VPS/Email parameters. This keyword is ignored unless COMMTYPE=(TCPIP,EMAIL) is specified.
MAILOPTS	This keyword specifies special user options to be used for a VPS/Email printer. This keyword is ignored unless COMMTYPE=(TCPIP,EMAIL) is specified.

MAILSTAT This keyword specifies whether VPS should request delivery status notification for the SYSOUT file which is being sent to an email user. This keyword is only used for VPS/Email printers (COMMTYPE=(TCPIP,EMAIL).

Using delivery status notification requires that every server in the path between VPS and the recipient supports the Simple Mail Transfer Protocol Extensions (SMTPE) for Delivery Status Notification (DSN). If any server in the path does not support SMTPE/DSN, the sender may not receive the notification response.

Support has been added for VPS/AFP for barcode structures. For more information about AFP support see "AFP" on page 8.1.

New printer keywords have been added to reduce or eliminate the need for VPS User Exit 14. For more information, see "Installation" on page 3.1 where these printer keywords are defined or see "Special Topics" on page 6.1.

PCMDACTN This keyword specifies the action VPS should take when processing the printer commands to be sent at the start and end of each dataset and/or separator.

PCMDDSNE This keyword specifies the default printer command data that should be sent to the printer at the end of each print dataset.

PCMDDSNS This keyword specifies the default printer command data that should be sent to the printer at the start of each print dataset.

PCMDEND This keyword specifies what special printer commands VPS should send at the end of a separator or print dataset.

PCMDOPTS This keyword specifies the special printer command options to be in effect when processing the PCMDACTN, PCMDEND, PCMDDSNE, PCMDDSNS, PCMDSEPE, PCMDSEPS, or PCMDSTRT keywords.

PCMDSEPE This keyword specifies the default printer command data that should be sent to the printer at the end of the separator.

PCMDSEPS This keyword specifies the default printer command data that should be sent to the printer at the start of the separator.

PCMDSTRT This keyword specifies what special printer commands VPS should send at the start of each separator or print dataset.

New printer keywords have been added for VPS to use when converting a print file to PDF format. For more information, see "Installation" on page 3.1 where these printer keywords are defined.

PDFDBCS This keyword specifies the DBCS font name, CMAP name and size for VPS to use when converting a print file to PDF format.

PDFFONT This keyword specifies the font name and size for VPS to use when converting a print file to PDF format.

PDFKWDS This keyword specifies which OUTPUT JCL statement keywords will be searched for VPS PDF conversion parameters.

PDFOPTS This keyword specifies special user options to be used for VPS PDF conversion.

PDFPGSIZ This keyword specifies the height and width of the page to be used when converting the print file to PDF format.

New printer keywords have been added for VPS/TCPIP to use if printer job language (PJL) commands should be sent to the printer. For more information, see "Installation" on page 3.1 where these printer keywords are defined.

PJLCMDS This keyword specifies whether VPS should send printer job language (PJL) commands to the printer.

PJLINFO This keyword specifies whether VPS should send printer job language (PJL) INFO commands to the printer to obtain information about the printer.

PJLOPTS This keyword specifies special user options to be used when VPS is sending PJL commands.

PJLUSTAT This keyword specifies whether VPS should send printer job language (PJL) USTATUS commands to the printer to obtain unsolicited status from the printer.

The following printer keywords were changed for VPS V1R8.0:

COMMTYPE A third positional parameter value specifies connection to an LCDS printer, VPS/PC, AnyQueue, or VPS/RemoteQueue.

COMPRESS This keyword can now be used to specify compression for devices connected via AnyQueue or VPS/RemoteQueue. Also, positional parameter 4 was added to specify the level of compression for data converted from AFP to PDF by the VPS/PDF product.

CONVTYPE The valid values for CONVTYPE now include PDF to specify conversion using the VPS/PDF product.

DEST The valid values for DEST now include <IP> to indicate to VPS to obtain datasets from JES which have an IP address in the DESTINATION field. This option is only available if SAPI=Y is specified at VPS initialization.

DSPACE The second and third positional parameters can now have a maximum value of 9999.

ERRACTN A fourth subfield was added to indicate what VPS should do if an error occurs when trying to connection to a remote TCP/IP printer when DEST=<IP> was specified. The printer can be EDRAINED or the SYSOUT can be requeued.

MAXLPG The first subparameter value will be applied to datasets that do not have carriage control and to datasets that have RECFM=A|M, but do not have a form feed on the first line of the dataset. A new third subparameter value has been added to allow the user to request that the JES2 /*JOBPARM LINECT be used to determine the maximum number of lines on a page.

PRTXLATE A fifth positional parameter specifies the load module name of the translate table to be used to translate outbound EBCDIC data that must be translated to ASCII.

QALLDYN The default is now Y.

QSPACE The second and third positional parameters can now have a maximum value of 9999.

REQLIMIT A second positional parameter value allows the limit to be specified in pages for AFP datasets. Valid values can now be 0 - 65535.

RETRIES A value of 0 is now considered valid.

TCPHOST A host name up to 60 bytes in length can be used if a “C” program is used to perform the TCP/IP get_host_by_name. (See the system keyword USEROPTS).

TCPLPORT This keyword now defaults to a value of 721-731 rather than defaulting to the value of the system TCPPORT keyword.

TCPOPTS Some previously supported options have been moved to the new TCPDISC keyword. Additional options are available on the TCPOPTS keyword.

TCPPRTR The value of this keyword can be up to 60 bytes in length.

New AFPRTAB (VPS/PCL AFP Resource Table) Format

Two new TYPE parameters were added to the $$VRES macro used to build the AFPRTAB: PAPER and TRAY. These new TYPE parameters are intended to replace the ENVFEED, ENVFEE2, ENVFEE3, ENVMANF, LOWTRAY, MANFEED, MANFEE2, MANFEE3, OPTTRAY, OPTTRA2, and TOPTRAY options of the TYPE=INITIAL entry to allow more flexibility for VPS/PCL bin and page size support. The new versions of VPSSRTAB, VPSSRTB1, VPSSRTB2, VPSSRTB3, and VPSSRTB4 now use the TYPE=PAPER and TYPE=TRAY parameters, but these new versions will still give the same results as the previous versions of the AFPRTAB samples. If you have your own versions of the AFPRTAB, it is recommended that you recode your resource table to use these new TYPE parameters, but you can assemble the old version using the new $$VRES macro with the following results:

ENVFEED	keyword equates to	PCLTRAY=6
ENVFEE2	keyword equates to	PCLTRAY=6
ENVFEE3	keyword equates to	PCLTRAY=6
ENVMANF	keyword equates to	PCLTRAY=3
LOWTRAY	keyword equates to	PCLTRAY=4
MANFEED	keyword equates to	PCLTRAY=2
MANFEE2	keyword equates to	PCLTRAY=2
MANFEE3	keyword equates to	PCLTRAY=2
OPTTRAY	keyword equates to	PCLTRAY=5
OPTTRA2	keyword equates to	PCLTRAY=62
TOPTRAY	keyword equates to	PCLTRAY=1

A3	equates to	PAGECOD=27
A4	equates to	PAGECOD=26
A5	equates to	PAGECOD=25
B5	equates to	PAGECOD=100
COM10	equates to	PAGECOD=81
C5	equates to	PAGECOD=91
DL	equates to	PAGECOD=90
EXECUTIVE	equates to	PAGECOD=1
LEDGER	equates to	PAGECOD=6
LEGAL	equates to	PAGECOD=3
LETTER	equates to	PAGECOD=2
MONARCH	equates to	PAGECOD=80

Therefore, as an example, assume that the following TYPE=INITIAL statement was coded for a previous version:

```
TYPE=INITIAL,
  ENVFEED=(COM10,65),
  OPTTRAY=(A4,2),
  TOPTRAY=(LETTER,1)
```

The above will be translated as if the following TYPE=TRAY statements were coded:

```
TYPE=TRAY,AFPTRAY=65,PCLTRAY=6,PAGECOD=81
ENVFEED=(COM10,65)
TYPE=TRAY,AFPTRAY=2,PCLTRAY=5,PAGECOD=26 OPTTRAY=(A4,2)
TYPE=TRAY,AFPTRAY=1,PCLTRAY=1,PAGECOD=2  TOPTRAY=(LETTER,1)
```

For assistance in coding your AFPRTAB using the new TYPE=PAPER and TYPE=TRAY parameters, contact VPS technical support.

Appendix B
Using the Convert Program

The Convert Program and IEBUPDTE

The distribution cartridge for VPS® V1 R8.0 contains a source code member in file VPS.V1R80.ASM and a load module member in file VPS.V1R80.LOAD named "CONVERT." This program can be used to convert members from your current VPS control library to VPS V1 R8.0 standards.

The conversion program reads each member in your VPS current control library. If it determines that the member is a VPS system initialization member or a VPS printer definition member, it will convert the keywords to their VPS V1 R8.0 format.

The output of this program is a file of 80-character card images suitable for use as input to IEBUPDTE. The parameter cards for each member are preceded by a "./ ADD" card. This allows you to modify the output of this program to take advantage of new VPS parameters before using it as input to IEBUPDTE.

The CONVERT program also prints a report which lists the names of all members which were processed by the program.

To use the CONVERT program, perform these steps:

1. Run the CONVERT program to create a sequential file of VPS control information in VPS V1 R8.0 format. The JCL to execute the CONVERT program is:

```
//jobname   JOB  (your job card information)
//CONVERT   EXEC PGM=CONVERT,REGION=2048K,PARM=VPSRxx  <=== See Note 5
//STEPLIB   DD   DSN=VPS.V1R80.LOAD,DISP=SHR           <=== See Note 1
//SYSUDUMP  DD   SYSOUT=A
//SYSPRINT  DD   SYSOUT=A                              <=== See Note 2
//SYSLIB    DD   DSN=VPS.V1Rxx.CNTL,DISP=SHR           <=== See Note 3
//SYSUT2    DD   DSN=anydsn,DISP=SHR                   <=== See Note 4
```

Note 1: The STEPLIB DD should point to the library into which you restored the load modules (file VPS.V1R80.LOAD) from the VPS V1 R8.0 distribution cartridge. Be sure that you are using the CONVERT program supplied with VPS V1 R8.0, not an earlier version.

Note 2: The SYSPRINT DD statement is used for the report.

Note 3: The SYSLIB DD should refer to the VPS control library used by your current version of VPS (example: V1R62, V1R70).

Note 4: The SYSUT2 DD should refer to a dataset with a record size of 80, a block size which is a multiple of 80, and a record format of FB. This DD statement must NOT refer to the VPS V1 R8.0 control library or any other partitioned datasets, but must refer to a sequential file.

Note 5: The PARM on the EXEC statement must specify the version of VPS that you are currently running. If you are running VPS R7.0, the PARM should have a value of VPSR70. If you are running VPS R6.2, the PARM should have a value of VPSR62.

If you want to change the CONVERT program (for example, if you would like to insert some particular keyword value or keyword into particular members), feel free to modify the source code, assemble and link it, and execute it.

2. Allocate a control library for VPS V1 R8.0. It should be allocated as a partitioned dataset, with a record format of FB, a record size of 80, and a block size compatible with the record size. (You may have allocated this dataset as part of restoring the VPS V1 R8.0 distribution cartridge). This is the dataset that will be referred to in the VPSLIB DD statement in the VPS V1 R8.0 JCL.

3. Use program IEBUPDTE to read the sequential file created by the CONVERT program and create the members in the VPS V1 R8.0 control library. Sample JCL for IEBUPDTE is:

```
//jobname    JOB    (your job card information)
//IEBUPDTE   EXEC   PGM=IEBUPDTE
//SYSPRINT   DD     SYSOUT=A
//SYSIN      DD     DSN=anydsn,DISP=SHR               <=== See Note 6
//SYSUT1     DD     DSN=LRS.VPS.V1R80.CNTL,DISP=SHR   <=== See Note 7
//SYSUT2     DD     DSN=LRS.VPS.V1R80.CNTL,DISP=SHR   <=== See Note 7
```

Note 6: The SYSIN DD statement must refer to the sequential dataset that was created by the CONVERT program.

Note 7: The SYSUT1 and SYSUT2 DD statements should refer to the VPS V1 R8.0 control library. This library should be EMPTY when IEBUPDTE is run, because the ./ADD cards in the file created by the CONVERT program will not cause IEBUPDTE to replace a member of the same name that already exists in the VPS V1 R8.0 control library.

Appendix C
VPS/IPDS, VPS/PCL, and VPS/PDF Supported Functions

The following table shows what AFPDS/MODCA functions are and are not supported by VPS/IPDS, VPS/PCL, and VPS/PDF:

Form Definition Support	VPS/IPDS	VPS/PCL	VPS/PDF
Constant Forms	Y	Y	Y
Duplex Control	Y	Y	Y
Finishing Options	Y	Y	N/A
Input Tray	Y	Y	N/A
Media Names	N	Y	Y
Media Source Selection	Y	Y	Y
Medium Orientation[1]	Y	Y	Y
Medium Overlays	Y	Y	Y
N_UP	Y[3]	Y[3]	N
Offset Stacking	Y	Y[2]	N
Output Tray	Y	Y	N/A
Text Suppression	Y	Y	Y

[1] Medium orientation is only supported if the Cutsheet=Yes option is specified in the FORMDEF, or if AFPOPTS=0004 in the VPS® printer definition.

[2] VPS/PCL will issue the PCL 'job offset' command appropriately, but some newer PCL printers do not support this command.

[3] VPS/IPDS and VPS/PCL will support basic N-UP 1 functions. Enhanced N-UP is not supported.

Page Definition Support	VPS/IPDS	VPS/PCL	VPS/PDF
Bar Code Processing	Y	Y	N
Conditional Processing	Y	Y	N
Field/Printline Bar Code	Y	Y	N
Field/Printline Objects	N	N	N
Field/Printline Overlays	Y	Y	N
Field/Printline Page Segments	Y	Y	N
Fixed Data	Y	Y	N
Font Selection	Y	Y	N
Page Overlays	Y	Y	N
Page Segments	Y	Y	N
Print Direction	Y	Y	N
Table Reference Characters (TRCs)	Y	Y	N
Text Color	Y	Y	N

Overlay Support	VPS/IPDS	VPS/PCL	VPS/PDF
Bar Code Objects	Y	Y	Y
Graphics Objects	Y	Y	N
Image Objects	Y	Y	Y
Include Objects	N	N	N
Include Page Segments	Y	Y	Y
Object Containers	N	N	N
Presentation Text Objects	Y	Y	Y

Page Segment Support	VPS/IPDS	VPS/PCL	VPS/PDF
Bar Code Objects	Y	Y	Y
Graphics Objects	Y	Y	N
Image Objects	Y	Y	Y
Presentation Text Objects	Y	Y	Y

Bar Code Object (BCOCA) Support	VPS/IPDS	VPS/PCL	VPS/PDF
Mapping Options [4]			
Position	Y	Y	Y
Types [4]			
Codabar, 2-of-7, AIM USS-Codabar			
Modifier 01	Y	Y	Y
Modifier 02	Y	Y	Y
Code 39 (3-of-9 Code), AIM USS-39			
Modifer 01	Y	Y	Y
Modifier 02	Y	Y	Y
Code 128, AIM USS-128			
Modifier 02	Y	Y	Y
EAN 8			
Modifier 00	Y	Y	Y
EAN 13			
Modifier 00	Y	Y	Y
EAN Two-Digit Supplemental			
Modifier 00	Y	Y	Y
Modifier 01	Y	Y	Y
EAN Five-Digit Supplemental			
Modifier 00	Y	Y	Y
Modifier 01	Y	Y	Y
Industrial 2-of-5			
Modifier 01	Y	Y	Y
Modifier 02	Y	Y	Y
Interleaved 2-of-5, AIM USS-I 2/5			
Modifier 01	Y	Y	Y
Modifier 02	Y	Y	Y
Japan Postal Bar Code			
Modifier 00	Y	N	N
Modifier 01	Y	N	N
Matrix 2-of-5			
Modifier 01	Y	Y	Y
Modifier 02	Y	Y	Y

Bar Code Object (BCOCA) Support	VPS/IPDS	VPS/PCL	VPS/PDF
MSI (Modified Plessey Code)			
Modifier 01	Y	Y	Y
Modifier 02	Y	Y	Y
Modifier 03	Y	Y	Y
Modifier 04	Y	Y	Y
Modifier 05	Y	Y	Y
Modifier 06	Y	Y	Y
Modifier 07	Y	Y	Y
Modifier 08	Y	Y	Y
Modifier 09	Y	Y	Y
POSTNET			
Modifier 00	Y	Y	Y
Modifier 01	Y	Y	Y
Modifier 02	Y	Y	Y
Modifier 03	Y	Y	Y
RM4SCC			
Modifier 01	Y	Y	Y
Modifier 00	Y	Y	Y
UPC/CGPC Version A			
Modifier 00	Y	Y	Y
UPC/CGPC Version E			
Modifier 00	Y	Y	Y
UPC Two-Digit Supplemental			
Modifier 00	Y	Y	Y
Modifier 01	Y	Y	Y
Modifier 02	Y	Y	Y
UPC Five-Digit Supplemental			
Modifier 00	Y	Y	Y
Modifier 01	Y	Y	Y
Modifier 02	Y	Y	Y

Bar Code Object (BCOCA) Support	VPS/IPDS	VPS/PCL	VPS/PDF
Australia Post Bar Code			
Modifier 00	Y	Y	Y
Modifier 01	Y	Y	Y
Modifier 02	Y	Y	Y
Modifier 03	Y	Y	Y
Modifier 04	Y	Y	Y
Modifier 05	Y	Y	Y
Modifier 06	Y	Y	Y
Modifier 07	Y	Y	Y
Modifier 08	Y	Y	Y
Data Matrix			
Modifier 00	Y	N	N
Maxi Code			
Modifier 00	Y	N	N
PDF417			
Modifier 00	Y	Y	N
Modifier 01	Y	Y	N

[4] VPS/IPDS does not alter the BCOCA data in any way (except to wrap the data in IPDS commands), so support depends on the printer.

Graphics Object (GOCA) Support		VPS/IPDS	VPS/PCL	VPS/PDF
Color		Y	Y	N
Grayscale		Y	Y	N
Mapping Options [5]				
Position and Trim		Y	Y	N
Scale to Fit		Y	Y	N
Center and Trim		Y	Y	N
Replicate and Trim		Y	Y	N
Scale to Fill		Y	N	N
Orders [5]				
GARC	Arc	Y	Y	N
GBAR	Begin Area	Y	Y	N
GBBLT	Bitblt	Y	N	N
GBEL	Begin Element	Y	Y	N
GBEZ	Bezier Curve	Y	Y	N
GBIMG	Begin Image	Y	Y	N
GBOX	Box	Y	Y	N
GBOX	Box at Current Position	Y	Y	N
GBPTH	Begin Path	Y	N	N
GCALLS	Call Segment	Y	Y	N
GCARC	Arc at Current Position	Y	Y	N
GCBEZ	Bezier Curve at Current Position	Y	Y	N
GCBIMG	Begin Image at Current Position	Y	Y	N
GCHSTE	Character String Extended	Y	Y	N
GCCHST	Character String at Current Position	Y	Y	N
GCCHSTE	Character String Extended at Current Position	Y	Y	N
GCCHSTM	Character String Move at Current Position	Y	Y	N
GCFARC	Full Arc at Current Position	Y	Y	N
GCFLT	Fillet at Current Position	Y	Y	N
GCHST	Character String	Y	Y	N
GCHSTM	Character String Move	Y	Y	N
GCLFIG	Close Figure	Y	N	N
GCLINE	Line at Current Position	Y	Y	N

Graphics Object (GOCA) Support		VPS/IPDS	VPS/PCL	VPS/PDF
GCMARK	Marker at Current Position	Y	Y	N
GCOMT	Comment	Y	Y	N
GCPARC	Partial Arc at Current Position	Y	Y	N
GCRLINE	Relative Line at Current Position	Y	Y	N
GCSFLT	Sharp Fillet at Current Position	Y	N	N
GCSPTH	Set Clip Path	Y	Y	N
GEAR	End Area	Y	Y	N
GEEL	End Element	Y	Y	N
GEIMG	End Image	Y	Y	N
GEPROL	End Prolog	Y	Y	N
GEPTH	End Path	Y	N	N
GESD	End of Symbol Definition	Y	N	N
GFARC	Full Arc	Y	Y	N
GFLT	Fillet	Y	Y	N
GFPTH	Fill Path	Y	N	N
GIMD	Image Data	Y	Y	N
GLBL	Label	Y	Y	N
GLINE	Line	Y	Y	N
GMPTH	Modify Path	Y	N	N
GMRK	Marker	Y	Y	N
GNOP1	No Operation	Y	Y	N
GPARC	Partial Arc	Y	Y	N
GPOP	Pop	Y	Y	N
GPSAP	Push-and-Set Arc Parameters	Y	Y	N
GPSBCOL	Push-and-Set Background Color	Y	Y	N
GPSBICOL	Push-and-Set Background Indexed Color	Y	Y	N
GPSBMX	Push-and-Set Background Mix	Y	N	N
GPSCA	Push-and-Set Character Angle	Y	Y	N
GPSCC	Push-and-Set Character Cell	Y	Y	N

Graphics Object (GOCA) Support		VPS/IPDS	VPS/PCL	VPS/PDF
GPSCD	Push-and-Set Character Direction	Y	Y	N
GPSCH	Push-and-Set Character Shear	Y	Y	N
GPSCOL	Push-and-Set Color	Y	Y	N
GPSCP	Push-and-Set Current Position	Y	Y	N
GPSCR	Push-and-Set Character Precision	Y	Y	N
GPSCS	Push-and-Set Character Set	Y	Y	N
GPSECOL	Push-and-Set Extended Color	Y	Y	N
GPSFLW	Push-and-Set Fractional Line Width	Y	Y	N
GPSIA	Push-and-Set Individual Attribute	Y	Y	N
GPSICOL	Push-and-Set Indexed Color	Y	Y	N
GPSLE	Push-and-Set Line End	Y	Y	N
GPSLJ	Push-and-Set Line Join	Y	Y	N
GPSLT	Push-and-Set Line Type	Y	Y	N
GPSLW	Push-and-Set Line Width	Y	Y	N
GPSMC	Push-and-Set Marker Cell	Y	Y	N
GPSMP	Push-and-Set Marker Precision	Y	Y	N
GPSMS	Push-and-Set Marker Set	Y	Y	N
GPSMT	Push-and-Set Marker Symbol	Y	Y	N
GPSMX	Push-and-Set Mix	Y	N	N
GPSPIK	Push-and-Set Pick Identifier	Y	N	N
GPSPRP	Push-and-Set Pattern Reference Point	Y	Y	N
GPSPS	Push-and-Set Pattern Set	Y	Y	N
GPSPT	Push-and-Set Pattern Symbol	Y	Y	N
GPSSLW	Push-and-Set Stroke Line Width	Y	Y	N
GPSTM	Push-and-Set Model Transform	Y	N	N
GPSVW	Push-and-Set Viewing Window	Y	N	N

Graphics Object (GOCA) Support		VPS/IPDS	VPS/PCL	VPS/PDF
GRLINE	Relative Line	Y	Y	N
GSAP	Set Arc Parameters	Y	Y	N
GSBCOL	Set Background Color	Y	Y	N
GSBICOL	Set Background Indexed Color	Y	Y	N
GSBMX	Set Background Mix	Y	N	N
GSCA	Set Character Angle	Y	Y	N
GSCC	Set Character Cell	Y	Y	N
GSCD	Set Character Direction	Y	Y	N
GSCH	Set Character Shear	Y	Y	N
GSCP	Set Current Position	Y	Y	N
GSCR	Set Character Precision	Y	Y	N
GSCS	Set Character Set	Y	Y	N
GSECOL	Set Extended Color	Y	Y	N
GSFLT	Sharp Fillet	Y	N	N
GSFLW	Set Fractional Line Width	Y	Y	N
GSGCH	Segment Characteristics	Y	Y	N
GSIA	Set Individual Attribute	Y	Y	N
GSICOL	Set Indexed Color	Y	Y	N
GSLE	Set Line End	Y	Y	N
GSLJ	Set Line Join	Y	Y	N
GSLT	Set Line Type	Y	Y	N
GSLW	Set Line Width	Y	Y	N
GSMC	Set Marker Cell	Y	Y	N
GSMP	Set Marker Precision	Y	Y	N
GSMS	Set Marker Set	Y	Y	N
GSMT	Set Marker Symbol	Y	Y	N
GSMX	Set Mix	Y	N	N
GSPCOL	Set Process Color	Y	Y	N
GSPIK	Set Pick Identifier	Y	N	N
GSPRP	Set Pattern Reference Point	Y	Y	N
GSPS	Set Pattern Set	Y	Y	N
GSPT	Set Pattern Symbol	Y	Y	N
GSSB	Set Segment Boundary	Y	N	N
GSSLW	Set Stroke Line Width	Y	Y	N
GSTM	Set Model Transform	Y	N	N
GSTV	Set Viewing Transform	Y	N	N
GSVW	Set Viewing Window	Y	N	N

5 VPS/IPDS does not alter the GOCA data in any way (except to wrap the data in IPDS commands), so support depends on the printer.

IM-Image Object Support	VPS/IPDS	VPS/PCL	VPS/PDF
Complexed (Celled) Images	Y	Y	Y
Color	Y	Y	Y
Image Point-to-Pel	Y	Y	Y
Image Point-to-Two-Pel (Double-Dot)	Y	Y	Y
Simple (Non-Celled) Images	Y	Y	Y

IO-Image Object (IOCA) Support	VPS/IPDS	VPS/PCL	VPS/PDF
Compression Algorithms [6]			
IBM MMR-Modified Modified Read	Y	Y	Y
No Compression	Y	Y	Y
RL4 (Run-Length 4)	Y	N	N
ABIC (Bilevel Q-Coder)	Y	N	N
Color Compression - OS/2 Image Support	Y	N	N
G3 MH-Modified Huffman (CCITT T.4			
Group 3 1-D Facsimile Coding)	Y	N	N
G3 MR-Modified READ (CCITT T.4			
Group 3 2-D Facsimile Coding)	Y	N	N
G4 MMR-Modified Modified READ (CCITT			
T.6 Group 4 2-D Facsimile Coding)	Y	Y	Y
JPEG Algorithms	Y	N	N
Mapping Options [6]			
Position and Trim	Y	Y	Y
Scale to Fit	Y	Y	Y
Center and Trim	Y	Y	Y
Image Point-to-Pel	Y	Y	Y
Image Point-to-Two-Pel	Y	Y	Y
Replicate and Trim	Y	Y	Y
Scale to Fill	Y	N	Y
Parameters [6]			
Band Image Content	Y	N	N
Band Image Data	Y	N	N
Begin Image Content	Y	Y	Y
Begin Segment	Y	Y	Y
End Image Content	Y	Y	Y
End Segment	Y	Y	Y

IO-Image Object (IOCA) Support	VPS/IPDS	VPS/PCL	VPS/PDF
External Algorithm Specification	Y	N	N
Image Data	Y	Y	Y
Image Data Element Size	Y	N	N
Image Data Element Structure	Y	N	N
Image Encoding	Y	Y	Y
Image Look-Up Table ID	Y	N	N
Image Size	Y	Y	Y
Image Subsampling	Y	N	N
Numbered Image Data	Y	N	N
Tile Table	Y	N	N
Tiling Method	Y	N	N

6 VPS/IPDS does not alter the IOCA data in any way (except to wrap the data in IPDS commands), so support depends on the printer.

Presentation Text Object (PTOCA) Support	VPS/IPDS	VPS/PCL	VPS/PDF
Control Sequences [7]			
AMB Absolute Move Baseline	Y	Y	Y
AMI Absolute Move Inline	Y	Y	Y
BLN Begin Line	Y	Y	Y
BSU Begin Suppression	Y	Y	Y
DBR Draw Baseline Rule	Y	Y	Y
DIR Draw Inline Rule	Y	Y	Y
ESU End Suppression	Y	Y	Y
NOP No Operation	Y	Y	Y
OVS Overstrike	Y	Y[8]	N
RMB Relative Move Baseline	Y	Y	Y
RMI Relative Move Inline	Y	Y	Y
RPS Repeat String	Y	Y	Y
SBI Set Baseline Increment	Y	Y	Y
SCFL Set Coded Font Local Identifier	Y	Y	Y
SEC Set Extended Color	Y	Y	Y
SIM Set Inline Margin	Y	Y	Y
SIA Set Intercharacter Adjustment	Y	Y	Y
STC Set Text Color	Y	Y	Y
STO Set Text Orientation	Y	Y	Y
SVI Set Variable Space Increment	Y	Y	Y
TBM Temporary Baseline Move	Y	Y	Y
TRN Transparent Data	Y	Y	Y
USC Underscore	Y	Y	N

[7] VPS/IPDS does not alter the PTOCA data in any way (except to wrap the data in IPDS commands), so support depends on the printer.

[8] VPS/PCL support for the OVS control sequence is limited; only characters and spaces (or variable space characters) will be overstruck.

Font Object (FOCA) Support	VPS/IPDS	VPS/PCL	VPS/PDF
Double-Byte Character Set (DBCS) Fonts	N	Y	N
Fixed Metric Fonts	Y	Y	Y
MICR Fonts	N	N	N
Outline Fonts	Y	Y	N
Relative Metric Fonts	Y	Y	Y

When AFPOPTS=0010 in the VPS printer definition, VPS/IPDS and VPS/PCL will map AFP outline fonts to AFP raster fonts by changing the second character of the character set name from 'Z' to '0'. The seventh and eighth characters of the target character set name is set based on the point size requested as follows:

POINT SIZE	LAST 2 CHARACTERS OF TARGET CHARACTER SET NAME
4	40
5	50
6	60
7	70
8	80
9	90
10	00
11	A0
12	B0
13	C0
14	D0
15	E0
16	F0
17	G0
18	H0
19	I0
20	J0
21	K0
22	L0
23	M0
24	N0
25	O0
26	P0
27	Q0
28	R0
29	S0
30	T0
31	U0
32	V0
33	W0
34	X0
35	Y0
36	Z0

For example, if AFP outline font character set CZABCD with point size 22 has been selected, VPS/PCL will look for raster character set C0ABCDL0 in the font libraries. Note that the horizontal scaling factor will not apply; the raster font will be used ‘as is’. This default AFP outline font character set to AFP raster font character set mapping can be overridden in VPSSUE26.

VPS/PCL will also support AFP outline font to PCL printer resident font mapping via the AFPRTAB (AFP Resource Table). To do this, omit the ‘pitch’ and ‘size’ parameters from the $$VRES ‘TYPE=CHARSET’ entry, and VPS/PCL will select the appropriate size based on the point size specified. Again, the horizontal scaling factor will not apply.

VPS/PDF will support AFP outline font to Adobe core font mapping via the PDFRTAB (PDF Resource Table). To do this, omit the ‘SIZE’ parameter from the $$VPDF ‘TYPE=CHARSET’ entry, and VPS/PDF will select the appropriate size based on the point size specified.

Appendix D
UDK Commands Supported

Xerox command	Format	Support Y/N	Comments
Assign Ink Color	**@f***palette*	No	
Baseline Placement Absolute	**@za***X,Y*	Yes	
Bold Start	**@b**	Yes	The AFP font defined by the IBMBOLD keyword in the XESRTAB font definitions is selected.
Bold Stop	**@p**	Yes	The AFP font defined by the IBMFONT keyword in the XESRTAB font definitions is selected.
Bypass Paper Size	**@zyb***c*	No	
Center	**@q**	Yes	The AFP font metrics extracted during the generation of the XESRTAB are used to center text between the left and right margins. Blank characters at the beginning of the line are included in the centering calculations.
Character Reassignment at Job Boundaries	**@+T**	No	
Character Reassignment within a Job	**@zt**	No	
Character Spacing Absolute	**@zs***nc*	No	
Code Print	**@+G**	No	
Comment	**@zya***text*	Yes	
Complex Print Mode	**@zc**	No	
Cycleforms	**@zx***forms*	No	Command removed from print
Data Monitor	**@+D**	No	Command removed from print
Duplex Invert Start	**@zyf***n*	No	
Duplex Side Select	**@zyi***n*	No	
Duplex Start	**@zyd***n*	No	
Duplex Stop	**@zye**	No	

Xerox command	Format	Support Y/N	Comments
Font Add	**@+A**	No	
Font Load	**@+F**	No	Command removed from print
Font Unload	**@+U**	No	Command removed from print
Font/Form/Graphic Delete	**@+B**	No	
Font/Form/Logo Assignment	**@**+*n*<*name*>	Yes	The XESRTAB font table is searched for the equivalent AFP font. If the XES font name is not defined then conversion will be terminated.
Form ID Assignment	**@+#***n*<*name*>	No	Command removed from print
Form Load	**@+N**<*name*>	No	Command removed from print
Form Merge Start	**@zb***n*	No	Command removed from print
Form Merge Stop	**@zh***c*	No	Command removed from print
Graphic Arc	**@ga***graphics*	No	
Graphic Box	**@gb***graphics*	No	
Graphic Fill	**@gf***graphics*	No	
Graphic Line	**@gl***graphics*	No	
Graphic Pie Chart	**@gp***graphics*	No	
Graphic Window	**@gw***graphics*	No	
Graphic Window Repeat	**@gr***graphics*	No	
Ink Change	**@zi***c*	No	
Job Prioritize	**@+J***n*	No	
Justification Start	**@j**	No	Command removed from print
Justification Stop	**@k**	No	Command removed from print
Justification Unlimited	**@zj**	No	Command removed from print
Language	**@zl***c*	No	Command removed from print
Line Draw X	**@x***X,Y,L,T,S*	Yes	
Line Draw Y	**@y***X,Y,1,T,S*	Yes	
Line Spacing (Absolute)	**@ip***n*	No	
Line Spacing (Font-Based)	**@i***n*	Yes	

Xerox command	Format	Support Y/N	Comments
Margin Bottom	**@zq***B*	Yes	
Margin LEFT	**@zk***L*	Yes	
Margin Right	**@zm***R*	Yes	
Margin Top	**@zn***T*	Yes	
Margins	**@m***H,T,B,L,R*	Yes	
Merge Page Load	**@+M**	Yes	
Merge Page Unload	**@+V**	Yes	
Merge Start	**@ze**	Yes	
Merge Stop	**@zd**	Yes	
Mode Switching	**=MCK=***command*	No	
Multiple Copies (Collated)	**@+C**n	Yes (non-collated)	
Multiple Copies (Non-Collated)	**@+E***n*	No	
Offset	**@o**	No	This can be controlled via the JOG parameter in the FORMDEF.
Operator Text Message	**@+H**	No	Command removed from print
Output Tray	**@zr***n*	No	
Overstrike Start	**@zo***x*	No	Command removed from print
Overstrike Stop	**@zp**	No	Command removed from print
Page Format Select	**@+K***n*	No	
Paper Tray	**@c**,*n*	Yes	Hopper selection requests generate Invoke Media Map structured fields that select copygroups 0-7 from the current FORMDEF. The default FORMDEF VPSXES relates hoppers 0-7 to AFP bins 1-7. This relationship can be changed by generating a customized FORMDEF and specifying its name in the $$XSETUP definition.
Plane Prioritize	**@zz***n*	No	Command removed from print
Print Job (Mixed Orientation)	**@+Q**	No	
Print Job (Single Orientation)	**@+P**	Yes	

Xerox command	Format	Support Y/N	Comments
Reset	**@+X**	Yes	
Shift	**@zys**	No	
Special Paper Enable	**@+R***n*	No	
Subscript Start	**@1**	Yes	
Subscript/Superscript Stop	**@s**	Yes	
Superscript Start	**@h**	Yes	
Tabs Clear Horizontal	**@d**	Yes	
Tabs Clear Vertical	**@e**	Yes	
Tabs Horizontal	**@t***n1,n2,...n8*	Yes	
Tabs Horizontal Set Bisync	**@HT***tabs*	No	
Tabs Vertical	**@v***n1,n2,...n8*	Yes	
Text Highlight	**@zyh***mS*	No	
Text Placement	**@a***X,Y*	Yes	
Text Placement Relative	**@r***Dnc*	Yes	
Time Stamp	**@zyc**	No	
Underline Start	**@u**	Yes	
Underline Stop	**@w**	Yes	End underline
Units – 1/300TH	**@zf**	Yes	
Units – 1/60TH	**@zg**	Yes	
User Defined Key	**=UDK=***c*	Yes	
Vector Draw	**@zu***points*	No	
VFU Stops Clear	**@zw**	No	Command removed from print
VFU Stops Set	**@zv***locations*	No	Command removed from print

Appendix E
VPS® Separators

Six separator routines (both source and load modules) are supplied with VPS. This appendix shows an example of each separator. Refer to "Separator Routine" on page 5.2 for information on how to use the separator routines.

Source Name	Load Name	Description	Width	Page
VPSSSEPR	VPSSSEPR	Block letters	132 characters wide	E.2
VPSSSEP2	VPSSSEP2	Block letters	80 characters wide	E.4
VPSSSEP3	VPSSSEP3	No block letters	132 characters wide	E.6
VPSSSEP4	VPSSSEP4	No block letters	80 characters wide	E.7
VPSSSEP5	VPSSSEP5	JES2 4.1 style	132 characters wide	E.8
VPSSSEP6	VPSSSEP6	Email	132 characters wide	E.10

Start Separator created by VPSSSEPR

```
                LL           RRRRRRRRRRR    SSSSSSSSSS     00000000      00000000    555555555555  RRRRRRRRRRR
               LL           RRRRRRRRRRRR  SSSSSSSSSSS   0000000000    0000000000   555555555555  RRRRRRRRRRRR
              LL           RR         RR  SS         SS  00      0000  00      0000  55            RR         RR
             LL           RR         RR  SS             00     00 00  00     00 00  55            RR         RR
            LL           RR         RR  SSS            00    00  00  00    00  00  55            RR         RR
           LL           RRRRRRRRRRRR   SSSSSSSSS    00   00   00  00   00   00  555555555     RRRRRRRRRRRR
          LL           RRRRRRRRRRR     SSSSSSSSS   00  00    00  00  00    00  5555555555    RRRRRRRRRRR
         LL           RR    RR               SSS  00 00     00  00 00     00           55   RR    RR
        LL           RR     RR               SS  0000      00  0000      00           55  RR     RR
       LL           RR      RR    SS         SS  000       00  000       00           55  RR     RR
      LLLLLLLLLLL  RR       RR   SSSSSSSSSSS   0000000000    0000000000   555555555555  RR       RR
     LLLLLLLLLLLL  RR       RR   SSSSSSSSSS    00000000      00000000    55555555555   RR       RR


  JJJJJJJJJJ    00000000      00000000      00000000     8888888888     00000000     2222222222    6666666666
  JJJJJJJJJJ   0000000000    0000000000    0000000000   888888888888   0000000000   222222222222  666666666666
      JJ      00      0000  00      0000  00      0000  88        88  00      0000  22        22  66        66
      JJ      00     00 00  00     00 00  00     00 00  88        88  00     00 00            22  66
      JJ      00    00  00  00    00  00  00    00  00   88      88   00    00  00            22  66
      JJ      00   00   00  00   00   00  00   00   00    88888888    00   00   00           22   66666666666
      JJ      00  00    00  00  00    00  00  00    00    88888888    00  00    00         22     666666666666
      JJ      00 00     00  00 00     00  00 00     00   88      88   00 00     00       22       66        66
JJ    JJ      0000      00  0000      00  0000      00  88        88  0000      00     22         66        66
JJ    JJ      000       00  000       00  000       00  88        88  000       00   22           66        66
JJJJJJJJ       0000000000    0000000000    0000000000   888888888888   0000000000   222222222222  666666666666
  JJJJJJ         00000000      00000000      00000000     8888888888     00000000    222222222222   6666666666


*A START J0008026 LRS005R  U6020   JOHN DOE   ROOM   12.50.46 PM 07 FEB 2002 VJFC001  LRST ACCTNG LRS,  START A*
*A START J0008026 LRS005R  U6020   JOHN DOE   ROOM   12.50.46 PM 07 FEB 2002 VJFC001  LRST ACCTNG LRS,  START A*
*A START J0008026 LRS005R  U6020   JOHN DOE   ROOM   12.50.46 PM 07 FEB 2002 VJFC001  LRST ACCTNG LRS,  START A*
*A START J0008026 LRS005R  U6020   JOHN DOE   ROOM   12.50.46 PM 07 FEB 2002 VJFC001  LRST ACCTNG LRS,  START A*
*A START J0008026 LRS005R  U6020   JOHN DOE   ROOM   12.50.46 PM 07 FEB 2002 VJFC001  LRST ACCTNG LRS,  START A*
*A START J0008026 LRS005R  U6020   JOHN DOE   ROOM   12.50.46 PM 07 FEB 2002 VJFC001  LRST ACCTNG LRS,  START A*
*A START J0008026 LRS005R  U6020   JOHN DOE   ROOM   12.50.46 PM 07 FEB 2002 VJFC001  LRST ACCTNG LRS,  START A*
*A START J0008026 LRS005R  U6020   JOHN DOE   ROOM   12.50.46 PM 07 FEB 2002 VJFC001  LRST ACCTNG LRS,  START A*
*A START J0008026 LRS005R  U6020   JOHN DOE   ROOM   12.50.46 PM 07 FEB 2002 VJFC001  LRST ACCTNG LRS,  START A*
*A START J0008026 LRS005R  U6020   JOHN DOE   ROOM   12.50.46 PM 07 FEB 2002 VJFC001  LRST ACCTNG LRS,  START A*
```

VPSSSEPR (End Separator)

End Separator created by VPSSSEPR

```
                    LL           RRRRRRRRRRR    SSSSSSSSSS     00000000      00000000    555555555555  RRRRRRRRRRR
                   LL           RRRRRRRRRRRR  SSSSSSSSSSSS   0000000000    0000000000   555555555555  RRRRRRRRRRRR
                  LL           RR        RR  SS        SS  00      0000  00      0000  55            RR        RR
                 LL           RR        RR  SS           00     00 00  00     00 00  55            RR        RR
                LL           RR        RR  SSS          00    00  00  00    00  00  55            RR        RR
               LL           RRRRRRRRRRRR   SSSSSSSSS    00   00   00  00   00   00  555555555     RRRRRRRRRRRR
              LL           RRRRRRRRRRRR     SSSSSSSSS   00  00    00  00  00    00  5555555555    RRRRRRRRRRR
             LL           RR    RR               SSS  00 00     00  00 00     00           55   RR    RR
            LL           RR     RR               SS  0000      00  0000      00           55  RR     RR
           LL           RR      RR    SS        SS  000       00  000       00           55  RR      RR
          LLLLLLLLLLLL  RR       RR   SSSSSSSSSSSS   0000000000    0000000000   555555555555  RR       RR
         LLLLLLLLLLLL  RR        RR   SSSSSSSSSS     00000000      00000000    55555555555   RR        RR

      JJJJJJJJJJ    00000000      00000000      00000000     8888888888     00000000     2222222222    6666666666
      JJJJJJJJJJ   0000000000    0000000000    0000000000   888888888888   0000000000   222222222222  666666666666
          JJ      00      0000  00      0000  00      0000  88        88  00      0000  22        22  66        66
          JJ      00     00 00  00     00 00  00     00 00  88        88  00     00 00            22  66
          JJ      00    00  00  00    00  00  00    00  00   88      88   00    00  00            22  66
          JJ      00   00   00  00   00   00  00   00   00    88888888    00   00   00           22   66666666666
          JJ      00  00    00  00  00    00  00  00    00    88888888    00  00    00         22     666666666666
          JJ      00 00     00  00 00     00  00 00     00   88      88   00 00     00       22       66        66
    JJ    JJ      0000      00  0000      00  0000      00  88        88  0000      00     22         66        66
    JJ    JJ      000       00  000       00  000       00  88        88  000       00   22           66        66
    JJJJJJJJ       0000000000    0000000000    0000000000   888888888888   0000000000   222222222222  666666666666
     JJJJJJ         00000000      00000000      00000000     8888888888     00000000    222222222222   6666666666

 *A END   J0008026 LRS005R  U6020    JOHN DOE      ROOM      12.50.47 PM 07 FEB 2002 VJFC001  LRST ACCTNG LRS,    END   A*
 *A END   J0008026 LRS005R  U6020    JOHN DOE      ROOM      12.50.47 PM 07 FEB 2002 VJFC001  LRST ACCTNG LRS,    END   A*
 *A END   J0008026 LRS005R  U6020    JOHN DOE      ROOM      12.50.47 PM 07 FEB 2002 VJFC001  LRST ACCTNG LRS,    END   A*
 *A END   J0008026 LRS005R  U6020    JOHN DOE      ROOM      12.50.47 PM 07 FEB 2002 VJFC001  LRST ACCTNG LRS,    END   A*

*****************************************************************************************************************************
*      E N D                                   V P S  R8.0  STC: VPSJC80                                      E N D      *
*****************************************************************************************************************************
*                                        |                  |                                                                *
*       JOB / PRINTER IDENTIFICATION     |   OFF-PRINTER    |              VPS JOB RELATED PRINT STATISTICS                  *
*                                        |                  |                                                                *
*JOBNAME: LRS005R  PRINTER NAME:  VJFC001|DATE: 2002 038    |ELAPSED PRINT TIME  00 00 00 76 AVG COMP LINE LGTH (Q)-------0*
*JOBID:   J0008026 VPSLIB MEMBER: VJFC001|      02 07 2002  |NUMBER LINES PRINTED----------1 AVG COMP LINE LGTH (V)---4,224*
*                                        |      THU         |NUMBER PAGES PRINTED----------0 NUMBER VTAM SENDS-----------7*
*                                        |TIME: 12 50 47 44|NUMBER D/S PRINTED------------1 NUMBER STAGING I/O'S---------0*
*                                        |                  |                                                                *
*****************************************************************************************************************************
```

VPSSSEP2 (Start Separator)

Start Separator created by VPSSSEP2

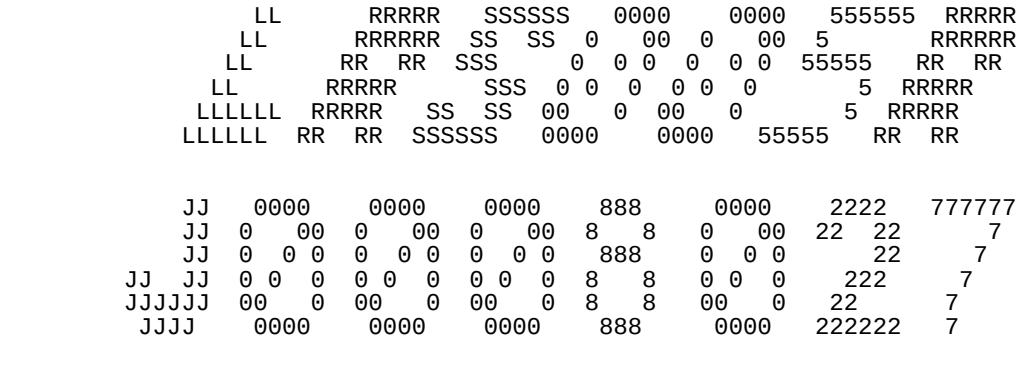
```
                LL      RRRRR   SSSSSS   0000    0000   555555  RRRRR
               LL      RRRRRR  SS  SS  0   00  0   00  5       RRRRRR
              LL      RR  RR  SSS     0  0 0  0  0 0  55555   RR  RR
             LL      RRRRR      SSS  0 0  0  0 0  0       5  RRRRR
            LLLLLL  RRRRR   SS  SS  00   0  00   0       5  RRRRR
           LLLLLL  RR  RR  SSSSSS   0000    0000   55555   RR  RR


           JJ   0000    0000    0000    888     0000    2222   777777
           JJ  0   00  0   00  0   00  8   8   0   00  22  22      7
           JJ  0  0 0  0  0 0  0  0 0   888    0  0 0      22     7
         JJ  JJ  0 0  0  0 0  0  0 0  0  8   8   0 0  0    222     7
         JJJJJJ  00   0  00   0  00   0  8   8   00   0   22      7
          JJJJ    0000    0000    0000    888     0000   222222   7


* START U6020    JOHN DOE           ROOM         12.52.05 PM 07 FEB 2002    *
* START U6020    JOHN DOE           ROOM         12.52.05 PM 07 FEB 2002    *
* START U6020    JOHN DOE           ROOM         12.52.05 PM 07 FEB 2002    *
* START U6020    JOHN DOE           ROOM         12.52.05 PM 07 FEB 2002    *
* START U6020    JOHN DOE           ROOM         12.52.05 PM 07 FEB 2002    *
* START U6020    JOHN DOE           ROOM         12.52.05 PM 07 FEB 2002    *
* START U6020    JOHN DOE           ROOM         12.52.05 PM 07 FEB 2002    *
* START U6020    JOHN DOE           ROOM         12.52.05 PM 07 FEB 2002    *
*A J0008027 LRS005R  VJFC001    LRST ACCTNG LRS,         LRS005R  J0008027 A*
```

VPSSSEP2 (End Separator)

End Separator created by VPSSSEP2




```
* END   U6020    JOHN DOE           ROOM          12.52.05 PM 07 FEB 2002    *
* END   U6020    JOHN DOE           ROOM          12.52.05 PM 07 FEB 2002    *
* END   U6020    JOHN DOE           ROOM          12.52.05 PM 07 FEB 2002    *
* END   U6020    JOHN DOE           ROOM          12.52.05 PM 07 FEB 2002    *
* END   U6020    JOHN DOE           ROOM          12.52.05 PM 07 FEB 2002    *
* END   U6020    JOHN DOE           ROOM          12.52.05 PM 07 FEB 2002    *
* END   U6020    JOHN DOE           ROOM          12.52.05 PM 07 FEB 2002    *
* END   U6020    JOHN DOE           ROOM          12.52.05 PM 07 FEB 2002    *
*A J0008027 LRS005R  VJFC001    LRST ACCTNG LRS,          LRS005R  J0008027 A*

********************************************************************************
*  E N D                    V P S R8.0  STC: VPSJC80                    E N D *
********************************************************************************
*                          |                    |                              *
*     JOB/PRINTER ID       |   OFF-PRINTER      |      VPS PRINT STATISTICS    *
*                          |                    |                              *
* JOBNAME:       LRS005R | DATE: 2002.038     | ELAPSED PRINT TIME: 00.00.00.24 *
* JOBID:         J0008027|       02/07/2002  | NUMBER LINES PRINTED----------1 *
* PRINTER NAME:  VJFC001 |       THU          | AVG COMP LINE LGTH (Q)--------0 *
* VPSLIB MEMBER: VJFC001 | TIME: 12.52.05.96| AVG COMP LINE LGTH (V)----1,677 *
* SEPINFO:               |                    | NUMBER PAGES PRINTED----------0 *
* GROUP NAME:            |                    | NUMBER VTAM SENDS-------------4 *
*                          |                    | NUMBER D/S PRINTED------------1 *
*                          |                    | NUMBER STAGING I/O'S----------0 *
*                          |                    |                              *
********************************************************************************
```

Start Separator from VPSSSEP3

```
*****************************************************************************************************************
*    S T A R T                                V P S  R8.0  STC: VPSJC80                                S T A R T  *
*****************************************************************************************************************
*                                          |                      |                      |                      *
*         JOB / PRINTER IDENTIFICATION     |      ON-PRINTER      |      ON-READER      |  SELECTION CRITERIA  *
*                                          |                      |                      |                      *
*  JOBNAME: LRS005J   PRINTER NAME:  TCPIP |   DATE: 2041 38      |   DATE: 2000 055    |  DEST:      U6020    *
*  JOBID:   JOB01001  VPSLIB MEMBER: TCPIP |         02 24 2000   |         02 24 2000  |  CLASS(ES): ANY      *
*                                          |         THU          |         THU         |  WRITER:    ANY      *
*                                          |   TIME: 11 52 23 09  |   TIME: 11 49 02 64 |  FORM:      ANY      *
*                                          |                      |                      |                      *
*****************************************************************************************************************
```

End Separator from VPSSSEP3

```
*****************************************************************************************************************
*     E N D                                V P S  R8.0  STC: VPSJC80                                  E N D   *
*****************************************************************************************************************
*                                     |                |                                                        *
*      JOB / PRINTER IDENTIFICATION   |   OFF-PRINTER  |           VPS JOB RELATED PRINT STATISTICS             *
*                                     |                |                                                        *
*JOBNAME: LRS005J  PRINTER NAME:  TCPIP|DATE: 2000 055  |ELAPSED PRINT TIME 00 00 00 07 AVG COMP LINE LGTH (Q)--0*
*JOBID:   JOB01001 VPSLIB MEMBER: TCPIP|      02 24 2000|NUMBER LINES PRINTED---------1 AVG COMP LINE LGTH (V)--0*
*                                     |      THU       |NUMBER PAGES PRINTED---------0 NUMBER VTAM SENDS-------0*
*                                     |TIME:11 52 23 16|NUMBER D/S PRINTED-----------1 NUMBER STAGING I/O'S----0*
*                                     |                |                                                        *
*****************************************************************************************************************
```

VPSSSEP4 (Start and End Separators)

Start Separator from VPSSSEP4

```
*******************************************************************************
*  S T A R T              V P S  R8.0  STC: VPSJC80              S T A R T  *
*******************************************************************************
*                         |                  |              |                 *
*     JOB/PRINTER ID      |    ON-PRINTER    | ON-READER    |     SELECTION   *
*                         |                  |              |      CRITERIA   *
*                         |                  |              |                 *
* JOBNAME:       LRS005J  | DATE: 2041.41Y   |  2000.055    | DEST:   U6020   *
* JOBID:         JOB01002 |       02/24/2000 |  02/24/2000  | CLASS:  ANY     *
* PRINTER NAME:  TCPIP    |       THU        |  THU         | WRITER: ANY     *
* VPSLIB MEMBER: TCPIP    | TIME: 11.52.46.22|  11.49.05.89 | FORM:   ANY     *
* SEPINFO:                |                  |              |                 *
* GROUP NAME:             |                  |              |                 *
*                         |                  |              |                 *
*******************************************************************************
```

End Separator from VPSSSEP4

```
*******************************************************************************
*  E N D                  V P S R8.0  STC: VPSJC80                    E N D *
*******************************************************************************
*                         |                  |                                *
*     JOB/PRINTER ID      |   OFF-PRINTER    |      VPS PRINT STATISTICS      *
*                         |                  |                                *
* JOBNAME:       LRS005J  | DATE: 2000.055   | ELAPSED PRINT TIME: 00.00.00.06 *
* JOBID:         JOB01002 |       02/24/2000 | NUMBER LINES PRINTED----------1 *
* PRINTER NAME:  TCPIP    |       THU        | AVG COMP LINE LGTH (Q)--------0 *
* VPSLIB MEMBER: TCPIP    | TIME: 11.52.46.28| AVG COMP LINE LGTH (V)--------0 *
* SEPINFO:                |                  | NUMBER PAGES PRINTED----------0 *
* GROUP NAME:             |                  | NUMBER VTAM SENDS-------------0 *
*                         |                  | NUMBER D/S PRINTED------------1 *
*                         |                  | NUMBER STAGING I/O'S----------0 *
*                         |                  |                                *
*******************************************************************************
```

Start Separator from VPSSSEP5

```
LL           RRRRRRRRRRR    SSSSSSSSSS     00000000      00000000    555555555555    JJJJJJJJJJ
LL           RRRRRRRRRRRR  SSSSSSSSSSSS   0000000000    0000000000   555555555555    JJJJJJJJJJ
LL           RR        RR  SS         SS  00      0000  00      0000  55                  JJ
LL           RR        RR  SS             00     00 00  00     00 00  55                  JJ
LL           RR        RR  SSS            00    00  00  00    00  00  55                  JJ
LL           RRRRRRRRRRRR   SSSSSSSSS     00   00   00  00   00   00  555555555           JJ
LL           RRRRRRRRRRR     SSSSSSSSS   00  00    00  00  00    00  5555555555          JJ
LL           RR    RR                SSS  00 00     00  00 00     00           55         JJ
LL           RR     RR                SS  0000      00  0000      00           55  JJ     JJ
LL           RR      RR   SS           SS  000       00  000       00           55  JJ     JJ
LLLLLLLLLLLL RR       RR  SSSSSSSSSSSS    0000000000    0000000000  555555555555  JJJJJJJ
LLLLLLLLLLLL RR        RR  SSSSSSSSSS      00000000      00000000   55555555555    JJJJJ

  JJJJJJJJJJ    00000000        11         00000000      00000000     3333333333
  JJJJJJJJJJ   0000000000      111         0000000000    0000000000  333333333333
      JJ       00      0000    1111        00      0000  00      0000  33          33
      JJ       00     00 00      11        00     00 00  00     00 00            33
      JJ       00    00  00      11        00    00  00  00    00  00            33
      JJ       00   00   00      11        00   00   00  00   00   00         3333
      JJ       00  00    00      11        00  00    00  00  00    00         3333
      JJ       00 00     00      11        00 00     00  00 00     00           33
JJ    JJ       0000      00      11        0000      00  0000      00           33
JJ    JJ       000       00      11        000       00  000       00  33       33
JJJJJJJJ        0000000000   1111111111    0000000000    0000000000  333333333333
 JJJJJJ          00000000    1111111111     00000000      00000000    3333333333

**START*****START*****START*****START*****START*****START*****START*****START**
*                                                                              *
* JOBID:          JOB01003                                                     *
* JOBNAME:        LRS005J                                                      *
* USERID:         LRS005                                                       *
* CLASS:          A                                                            *
* OUTPUT GROUP:   1       .0001.0001                                           *
* TITLE:                                                                       *
*                                                                              *
* DESTINATION:    U6020                                                        *
* NAME:           JOHN DOE                                                     *
* ROOM:                                                                        *
* BUILDING:                                                                    *
* DEPARTMENT:                                                                  *
* ADDRESS:                                                                     *
*                                                                              *
* PRINT TIME:     11:53:11                                                     *
* PRINT DATE:     24 FEB 2000                                                  *
* PRINT NAME:     TCPIP                                                        *
* SYSTEM:         LRSM                                                         *
*                                                                              *
**START*****START*****START*****START*****START*****START*****START*****START**
```

End Separator from VPSSSEP5

```
LL            RRRRRRRRRR    SSSSSSSSS     00000000      00000000    555555555555    JJJJJJJJJJ
LL            RRRRRRRRRRR  SSSSSSSSSSS   0000000000    00000000000   555555555555    JJJJJJJJJJ
LL            RR        RR  SS        SS  00      0000  00      0000  55                  JJ
LL            RR        RR  SS            00     00 00  00     00 00  55                  JJ
LL            RR        RR  SSS           00    00  00  00    00  00  55                  JJ
LL            RRRRRRRRRRR    SSSSSSSSS    00   00   00  00   00   00  555555555           JJ
LL            RRRRRRRRRR      SSSSSSSSS   00  00    00  00  00    00  5555555555          JJ
LL            RR    RR              SSS  00 00     00  00 00     00           55          JJ
LL            RR     RR              SS  0000      00  0000      00            55  JJ    JJ
LL            RR      RR    SS        SS  000       00  000       00            55  JJ    JJ
LLLLLLLLLLLL  RR       RR   SSSSSSSSSSS   0000000000    0000000000   555555555555  JJJJJJJJ
LLLLLLLLLLLL  RR        RR   SSSSSSSSS     00000000      00000000    55555555555    JJJJJJ

  JJJJJJJJJJ    00000000        11        00000000      00000000     3333333333
  JJJJJJJJJJ   0000000000       111       0000000000    00000000000  333333333333
      JJ      00      0000     1111       00      0000  00      0000  33         33
      JJ      00     00 00       11       00     00 00  00     00 00            33
      JJ      00    00  00       11       00    00  00  00    00  00            33
      JJ      00   00   00       11       00   00   00  00   00   00          3333
      JJ      00  00    00       11       00  00    00  00  00    00          3333
      JJ      00 00     00       11       00 00     00  00 00     00            33
JJ    JJ      0000      00       11       0000      00  0000      00            33
JJ    JJ      000       00       11       000       00  000       00  33        33
JJJJJJJJ       0000000000    1111111111    0000000000    0000000000   333333333333
 JJJJJJ          00000000     1111111111     00000000      00000000     3333333333

***END*******END*******END*******END*******END*******END*******END*******END***
*                                                                              *
* JOBID:          JOB01003                                                     *
* JOBNAME:        LRS005J                                                      *
* USERID:         LRS005                                                       *
* CLASS:          A                                                            *
* OUTPUT GROUP:   1       .0001.0001                                           *
* TITLE:                                                                       *
*                                                                              *
* DESTINATION:    U6020                                                        *
* NAME:           JOHN DOE                                                     *
* ROOM:                                                                        *
* BUILDING:                                                                    *
* DEPARTMENT:                                                                  *
* ADDRESS:                                                                     *
*                                                                              *
* PRINT TIME:     11:53:11                                                     *
* PRINT DATE:     24 FEB 2000                                                  *
* PRINT NAME:     TCPIP                                                        *
* SYSTEM:         LRSM                                                         *
*                                                                              *
***END*******END*******END*******END*******END*******END*******END*******END***
```

VPSSSEP6 (Start and End Separators)

Start Separator from VPSSSEP6

```
************************************************
MESSAGE DELIVERED BY VPS/EMAIL
JOBNAME:  LRS005J
JOBID:    JOB01004
PROC:
STEP:     STEP1
DDNAME:   SYSUT2
CREATOR:  LRS005
OUTGRP:   1
************************************************
```

End Separator from VPSSSEP6

```
************************************************
MESSAGE DELIVERED BY VPS/EMAIL
JOBNAME:  LRS005J
JOBID:    JOB01004
PROC:
STEP:     STEP1
DDNAME:   SYSUT2
CREATOR:  LRS005
OUTGRP:   1
************************************************
```

Appendix F
Documentation

The most recent version of this manual can be downloaded from the LRS Web site (www.lrs.com).

As a licensed user of this product, you may print the PDF file on the *Enterprise Output Management Product Documentation* CD for use within your company as allowed by your license.

If you need extra copies of this manual and do not wish to print the PDF file, you can order the manual from LRS. There will be a charge for any manuals ordered.

Appendix G
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