

Print Services Facility for z/OS  
Version 4.7

*AFP Download Plus*



**Note**

Before using this information and the product it supports, read the information in [“Notices” on page 201.](#)

This edition applies to the IBM® Print Services Facility Version 4 Release 8 Modification 0 for z/OS®, Program Number 5655-M32, and to all subsequent releases and modifications until otherwise indicated in new editions.

This edition replaces S550-0433-07.

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# About this publication

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This publication provides information about AFP Download Plus, a licensed feature of IBM Print Services Facility (PSF) for z/OS. This publication was written with the assumption that you are familiar with Advanced Function Presentation (AFP), PSF for z/OS, and z/OS UNIX System Services concepts.

## Who should read this publication

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The information in this publication is directed to several audiences:

- The job submitter on a z/OS system who submits a job for processing by AFP Download Plus.
- The system programmer responsible for customizing AFP Download Plus on the z/OS system.
- The system console operator responsible for starting, stopping, and monitoring AFP Download Plus.
- The diagnostician responsible for diagnosing problems.

## How this publication is organized

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This publication contains reference and user's guide information. It is organized in parts with information common to the AFP Download Plus sender and receiver components in Part 1, information for using the sender component of AFP Download Plus in Part 2, and information for using the receiver component of AFP Download Plus in Part 3.

Part 1 contains these chapters:

- Chapter 1, “[Introducing AFP Download Plus](#),” on page 3 describes how AFP Download Plus differs from other PSF features; describes the AFP Download Plus sender and receiver communication; explains how AFP Download Plus works; lists highlights, limitations, and software requirements; describes performance considerations; and describes considerations for using MO:DCA interchange set compliant files.
- Chapter 2, “[Planning the size of the working directory](#),” on page 17 describes how to determine the size of the working directory that AFP Download Plus uses.
- Chapter 3, “[Installing AFP Download Plus](#),” on page 23 describes how to install the AFP Download Plus program, including the sender and the receiver components of the program.

Part 2 contains these chapters:

- Chapter 4, “[Configuring the AFP Download Plus sender](#),” on page 29 describes the tasks that you do to configure the sender.
- Chapter 5, “[Operating the AFP Download Plus sender](#),” on page 121 describes how to start, stop, cancel, restart, and monitor the sender.
- Chapter 6, “[Using the AFP Download Plus sender](#),” on page 137 describes how the job submitter uses JCL to direct a data set to the sender. It also describes how to specify the AFPPARMS control statement, direct output to receiver systems, monitor error messages, and recover from errors.
- Chapter 7, “[Diagnosing errors with the AFP Download Plus sender](#),” on page 153 describes how to diagnose problems with the sender, including how to use the PSF for z/OS trace and dump facilities.

Part 3 contains these chapters:

- Chapter 8, “[Configuring the AFP Download Plus receiver on z/OS](#),” on page 161 describes how to configure the receiver on a secondary z/OS system.
- Chapter 9, “[Operating the AFP Download Plus receiver on z/OS](#),” on page 163 describes how to start, stop, and query the status of the receiver, how to locate transmitted files on receiver file systems, and how to use the **apshhsb** exit program, the **apshhmds** exit program, or your own exit program when you start the receiver.

- Chapter 10, “Diagnosing errors with the AFP Download Plus receiver,” on page 179 describes how to diagnose problems with the receiver.

Part 4 contains appendixes, notices, a glossary, and a bibliography. The appendixes include:

- Appendix A, “Syntax for file names,” on page 181
- Appendix B, “SMF type 6 accounting records,” on page 183
- Appendix C, “AFPSTATS report,” on page 185
- Appendix D, “Installation verification program example,” on page 195
- Appendix E, “Connectivity test for AFP Download Plus,” on page 197
- Appendix F, “Accessibility,” on page 199

## Understanding the syntax notation used in this publication

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These rules apply to coding illustrations throughout this publication:

- Bold highlighting identifies commands, keywords, files, directories, and other items whose names are predefined by the system, or items that must be entered as is, such as DUPLEX and BLOCK.
- Variable data is printed in *italics*. Enter specific data to replace the characters in italics; for example, for PRTnnnn you might enter PRT0002. Italics also identify the names of publications.
- Type these symbols exactly as they appear in the command syntax:

Comma ,  
 Equal sign =  
 Parentheses ( )  
 Period .

- Monospacing identifies examples of specific data values, examples of text similar to what you might see displayed, examples of portions of program code similar to what you might write as a programmer, messages from the system, or information that you actually type.
- Do not enter these symbols as part of a parameter or option:

Vertical Bar |  
 Underscore \_\_\_\_  
 Brackets [ ]  
 Braces { }  
 Ellipsis ...

- A vertical bar between two values means that you select only one of the values.
- An underscored value means that if an option is not specified, the underscored value, called the default, is used.
- Brackets around a value mean that you do not have to select the value; the value is optional.
- Braces around a value mean that you must select one of the mutually exclusive values. For example, { THIS | THAT }
- An ellipsis that follows a command or set of commands indicates that the command or set of commands can be repeated.

## Related information

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Publications that are referred to in this document or that contain more information about AFP and related products are listed in the “Bibliography” on page 221. For information about all z/OS product publications, see *z/OS Information Roadmap*.

For more information about z/OS and PSF for z/OS, see these web pages:

- IBM z/OS ([www.ibm.com/products/zos](http://www.ibm.com/products/zos))
- IBM Documentation ([www.ibm.com/docs/en](http://www.ibm.com/docs/en))

To obtain the latest documentation updates for PSF for z/OS, see the appropriate SYS1.SAMPLIB members in [Table 1 on page xiii](#).

<i>Table 1. SYS1.SAMPLIB members for PSF documentation updates</i>	
<b>Member</b>	<b>Publication</b>
<b>APSGADP7</b>	<a href="#"><i>PSF for z/OS: AFP Download Plus</i></a>
<b>APSGCUS7</b>	<a href="#"><i>PSF for z/OS: Customization</i></a>
<b>APSGDGN7</b>	<a href="#"><i>PSF for z/OS: Diagnosis</i></a>
<b>APSGDLG7</b>	<a href="#"><i>PSF for z/OS: Download for z/OS</i></a>
<b>APSGMAC7</b>	<a href="#"><i>PSF for z/OS: Messages and Codes</i></a>
<b>APSGSEC7</b>	<a href="#"><i>PSF for z/OS: Security Guide</i></a>
<b>APSGUSR7</b>	<a href="#"><i>PSF for z/OS: User's Guide</i></a>



## How to send your comments to IBM

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We invite you to submit comments about the z/OS product documentation. Your valuable feedback helps to ensure accurate and high-quality information.

**Important:** If your comment regards a technical question or problem, see instead [“If you have a technical problem”](#) on page xv.

Submit your feedback by using the appropriate method for your type of comment or question:

### Feedback on z/OS function

If your comment or question is about z/OS itself, submit a request through the [IBM RFE Community](http://www.ibm.developerworks/ref) (<http://www.ibm.developerworks/ref>).

### Feedback on IBM Documentation function

If your comment or question is about the IBM Documentation functionality, for example search capabilities or how to arrange the browser view, send a detailed email to IBM Documentation Support at [ibmdoc@us.ibm.com](mailto:ibmdoc@us.ibm.com).

### Feedback on the z/OS product documentation and content

If your comment is about the information that is provided in the z/OS product documentation library, send a detailed email to [mhvrcfs@us.ibm.com](mailto:mhvrcfs@us.ibm.com). We welcome any feedback that you have, including comments on the clarity, accuracy, or completeness of the information.

To help us better process your submission, include the following information:

- Your name, company/university/institution name, and email address
- The following deliverable title and order number: *PSF for z/OS: AFP Download Plus*, S550-0433
- The section title of the specific information to which your comment relates
- The text of your comment.

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## If you have a technical problem

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If you have a technical problem or question, do not use the feedback methods that are provided for sending documentation comments. Instead, take one or more of the following actions:

- Go to the [IBM Support](http://www.ibm.com/mysupport/s) ([www.ibm.com/mysupport/s](http://www.ibm.com/mysupport/s)).
- Contact your IBM service representative.
- Call IBM technical support.





# Summary of Changes

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## PSF for z/OS Version 4 Release 7

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This content includes terminology, maintenance, and editorial changes to information previously presented in *PSF V4R6 for z/OS: AFP Download Plus*, S550-0433-06.

Technical additions or changes to the text and illustrations are indicated by a vertical line to the left of the change.

### Changed information (June 2024)

- This topic is updated for APAR OA66483: [Appendix A, “Syntax for file names,” on page 181.](#)

### New information (January 2024)

- APAR OA64536
  - A new subsection, [“Displaying AFPPARMS parameter values” on page 130](#), is added to [“Using the AFP Download Plus operator interface” on page 124](#) in [Chapter 5, “Operating the AFP Download Plus sender,” on page 121.](#)

### Changed information (January 2024)

- APAR OA64588
  - A sentence explaining the purpose of the **-w** option is added to [“Starting the receiver manually” on page 163.](#)

### Deleted information (July 2023)

- APAR OA64984
  - The **JES-blank-truncation** parameter has been removed from [“Parameters for the AFPPARMS control statement” on page 45.](#)

### Changed information (January 2022)

- APAR OA62033 (Converting FORMLEN parameter):
  - The **match-download-format** parameter is added to [Table 10 on page 46.](#)
  - A note is added to the description of the FORMLEN parameter in [Table 22 on page 137.](#)
  - Information about the **match-download-format** parameter is added to the Exit Program Usage information for the **-oformlength** attribute in [Table 25 on page 172.](#)
- APAR OA62270 (Starting and stopping PSF FSAs):
  - [“DEVICE statement” on page 112](#)
  - [“Starting the sender and FSAs” on page 121](#)
  - [“Stopping an FSA after the current data set is transmitted” on page 122](#)
  - [“Stopping an FSA immediately” on page 123](#)

### Changed information (June 2021)

- APAR OA54593
  - [Chapter 4, “Configuring the AFP Download Plus sender,” on page 29](#)

- Blank truncation (APAR OA60960)
  - [“JCL statements for the startup procedure” on page 39](#)
  - [“Sample Printer Inventory panels” on page 74](#)
  - [“FSS Printer Inventory parameters” on page 76](#)
  - [“Defining a JES2 functional subsystem” on page 108](#)
- APAR OA61005
  - In [“Limitations” on page 12](#), a cross-reference to [“Sending z/OS separator pages” on page 124](#) is added.

## General changes (December 2019)

- References to PSF 4.5.0 and z/OS 2.1 are removed because those releases are no longer in service.

## New information (December 2019)

- Prerequisites
  - [“Software requirements” on page 13](#)
- Inline resource storage above the bar
  - [“Determining MEMLIMIT size” on page 30](#)

## Changed information (December 2019)

- Prerequisites
  - [“Software requirements” on page 13](#)
- Inline resource storage above the bar
  - [“JCL statements for the startup procedure” on page 39](#)
  - [“Parameters for the AFPPARMS control statement” on page 45](#)
  - [“Sample Printer Inventory panels” on page 74](#) (formerly part of [“Specifying Printer Inventory parameters” on page 74](#))
  - [“FSA Printer Inventory parameters” on page 80](#) (formerly part of [“Specifying Printer Inventory parameters” on page 74](#))
  - [“Glossary” on page 205](#)
- AFP statistics report enhancements
  - [“How the AFPPARMS data set is allocated” on page 43](#)
  - [“Parameters for the AFPPARMS control statement” on page 45](#)
  - [“Sample Printer Inventory panels” on page 74](#)
  - [“FSA Printer Inventory parameters” on page 80](#)
  - [“AFPPARMS data set allocation” on page 147](#)
  - [“Sample softcopy report” on page 187](#)
  - [“Generating a hardcopy AFPSTATS report” on page 189](#)
  - [“Sample hardcopy AFPSTATS report” on page 190](#)
  - [“Specifying Printer Inventory parameters” on page 74](#) has been split into multiple topics.

## PSF for z/OS Version 4 Release 6

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This content includes terminology, maintenance, and editorial changes to information previously presented in *PSF V4R5 for z/OS: AFP Download Plus*, S550-0433-05.

## General changes

- References to AFP Download Plus releases earlier than 4.5 are removed because those releases are no longer in service.
- References to z/OS 1.13 are removed because that release is no longer in service.
- References to Ricoh products, including "InfoPrint Manager" and "Ricoh ProcessDirector" are removed.
- "MO:DCA IS/3 compliant files" is changed to "MO:DCA interchange set compliant files" to include IS/3 and AFP/A interchange sets.
- The release for Content Manager OnDemand for Multiplatforms is updated.

## New information

- The MO:DCA AFP/Archive (AFP/A), AFP/A, IS/3, and function set extension to MO:DCA IS/3 are new. See ["Support MO:DCA Presentation Interchange Set data streams"](#) on page 11, ["Considerations for processing specific MO:DCA interchange set compliant files"](#) on page 14, and ["Configuring AFP Download Plus so files remain compliant with the specified MO:DCA interchange set"](#) on page 31.
- A new section , ["Updating MAXPROCSYS and MAXPROCUSER"](#) on page 30, is added.
- These AFPPARMS parameters are added to [Table 10 on page 46](#):
  - message-files-read-access
  - trace-user-data
- These Printer Inventory parameters are added to ["Sample Printer Inventory panels"](#) on page 74 and ["FSA Printer Inventory parameters"](#) on page 80:
  - Message files read access
  - Trace user data
- End-data-set call (EDSC) is added to ["Resource-management exit processing"](#) on page 117.
- A new page that lists print file extension information is added to the AFPSTATS report. See [Figure 22 on page 188](#) and [Figure 25 on page 190](#).

## Changed information

- ["Software requirements"](#) on page 13 are updated with required levels.
- ["Differentiating AFP Download Plus from PSF for z/OS"](#) on page 31 clarifies that AFP Download Plus and PSF cannot share FSS and FSA names.
- The note in ["Creating a startup procedure"](#) on page 34 is updated.
- The FONTOLN font library is changed to SFNTILIB in [Figure 6 on page 36](#).
- Attribute descriptions in the EXEC statement are updated. See ["JCL statements for the startup procedure"](#) on page 39.
- These AFPPARMS parameters are updated in [Table 10 on page 46](#):
  - **auxiliary-files-modca-level**
  - **compression**
  - **dataset-grouping**
  - **direct-download**
  - **save-auxiliary-files**
  - **secure-transmission**
  - **send-messages-on-failure**
  - **send-separator-pages**

- Using the Printer Inventory to activate the AFP Download Plus processing status feature is added to [“Viewing the operator status message when the processing status feature is activated”](#) on page 64, **Display status** in [“FSA Printer Inventory parameters”](#) on page 80, and [“Reporting AFP Download Plus processing status”](#) on page 126.
- These PRINTDEV parameters are updated in [“PRINTDEV parameters”](#) on page 66:
  - DSHDR
  - JOBHDR
  - JOBTRLR
  - MAP2OLN
  - MESSAGE
- The **Auxiliary files MO:DCA level** field is updated with the **BPF match** value in [“Sample Printer Inventory panels”](#) on page 74.
- These Printer Inventory parameters are updated in [“FSA Printer Inventory parameters”](#) on page 80:
  - Auxiliary files MO:DCA level
  - Compression
  - Data set grouping
  - Direct download
  - Map to outline fonts
  - Resolution
  - Save auxiliary files
  - Secure transmission
  - Send messages on failure
  - Send separator pages
- AFP Download Plus now detects JES commands that are entered when data is transmitted to the sender. Therefore, the term "transformation" is removed or changed to "transmission" in [Chapter 5, “Operating the AFP Download Plus sender,”](#) on page 121, [“Canceling a data set”](#) on page 122, and [“Restarting a data set”](#) on page 122.
- [“Sending z/OS separator pages”](#) on page 124 is updated.
- [“Sending messages to the receiver system”](#) on page 151 is updated.
- [“Using the PSF trace facility”](#) on page 153 is updated to include zFS files and Printer Inventory tracing parameters.
- [“Using the PSF dump facility”](#) on page 157 is updated to include Printer Inventory tracing parameters.
- [“Selecting an exit program”](#) on page 161 and [“Using the apshhmds exit program”](#) on page 169 are updated with notes about support for MO:DCA interchange sets.
- New receiver file extensions OPT, TZ, and CONCAT are added to [Figure 20](#) on page 181.
- First extension is added to the list of sections AFP Download Plus creates in the SMF type 6 record. The format of the file-transfer section is also added. See [Appendix B, “SMF type 6 accounting records,”](#) on page 183.
- The description of the information that is collected in the [Appendix C, “AFPSTATS report,”](#) on page 185 is updated. [“Sample softcopy report”](#) on page 187 and [“Sample hardcopy AFPSTATS report”](#) on page 190 are also updated.
- [Appendix E, “Connectivity test for AFP Download Plus,”](#) on page 197 is updated.
- [“Glossary”](#) on page 205 is updated with MO:DCA interchange set definitions.

## Deleted information

- The appendix "Download receiver support" is removed. The information is found in [“Software requirements”](#) on page 13.

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# Part 1. Introduction and installation

This information gives an overview of the AFP Download Plus product and explains how to install it:

**Chapter 1, “Introducing AFP Download Plus,” on page 3**

This information describes how AFP Download Plus differs from other PSF features; describes the AFP Download Plus sender and receiver communication; explains how AFP Download Plus works; lists highlights, limitations, and software requirements; describes performance considerations; and describes considerations for using MO:DCA interchange set compliant files.

**Chapter 2, “Planning the size of the working directory,” on page 17**

This information describes how to determine the size of the working directory that AFP Download Plus uses.

**Chapter 3, “Installing AFP Download Plus,” on page 23**

This information describes how to install the AFP Download Plus program, including the sender and the receiver components of the program.



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# Chapter 1. Introducing AFP Download Plus

AFP Download Plus is a separately ordered feature of IBM Print Services Facility (PSF) for z/OS (referred to as PSF). AFP Download Plus distributes AFP data from a z/OS system to a program such as:

- Content Manager OnDemand
- PSF for z/OS
- AIX®, Linux®, and Windows print servers

AFP Download Plus accepts a data set from the Job Entry Subsystem (JES) spool-line data, XML data, or Mixed Object Document Content Architecture (MO:DCA) data, transforms the data into Mixed Object Document Content Architecture for Presentation (MO:DCA-P), if required, and then distributes the AFP data set and all resources that are required for printing, emailing, faxing, or archiving.

This information describes how AFP Download Plus differs from other PSF features; describes the AFP Download Plus sender and receiver communication; explains how AFP Download Plus works; lists highlights, limitations, and software requirements; describes performance considerations; and describes considerations for using MO:DCA interchange set compliant files.

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## How AFP Download Plus differs from other PSF features

PSF and three of its features, AFP Download Plus, Download for z/OS, and AFP Conversion and Indexing Facility (ACIF), perform various functions on print data. Each feature has its own specific purpose that depends on where the print data is coming from and where the AFP data is sent.

These descriptions summarize PSF and each of the features:

### **PSF**

PSF is the z/OS printer-driver program that manages and controls data that is transmitted to AFP printers. PSF obtains the print data from the JES spool, combines the data with the necessary resources from system and user resource libraries, transforms the data into the Intelligent Printer Data Stream (IPDS), and sends the result to the printer.

### **AFP Download Plus**

AFP Download Plus sends AFP data and all resources to a receiving system for processing. This feature obtains data from the JES spool, obtains resources from system and user resource libraries, transforms the data to MO:DCA-P (if required), and builds a MO:DCA resource group. AFP Download Plus temporarily stores the resource group in a file in a z/OS File System (zFS) working directory before it sends the resource group to the receiving system. AFP Download Plus can temporarily store the MO:DCA-P data in a file in the working directory before it sends the data to the receiving system or optionally, send the MO:DCA-P data directly to the receiving system without storing it in a temporary file in the working directory. The MO:DCA-P data and resource group can optionally be encoded, compressed, or both before they are sent to the receiving system.

### **Download for z/OS**

Download for z/OS sends data, without transforming it, to a receiving system for printing or archiving. This feature obtains the data from the JES spool (but does not obtain any resources) and requires a routing-control data set to specify where the data is sent.

### **ACIF**

ACIF is a batch utility that formats data from a data set to create documents that you can print, view, or archive. ACIF provides indexing capabilities and packages AFP resources in a separate file so you can view, distribute, archive, and retrieve document files across systems.

AFP Download Plus performs similar functions as Download for z/OS and ACIF, but it is not a replacement for Download for z/OS or ACIF. AFP Download Plus has its own unique capabilities, including these advantages:

- The data is obtained from the JES spool, not a data file as with ACIF.

- The data is downloaded automatically and consists entirely of MO:DCA-P data.
- All required resources for printing can be included in the downloaded file, including PSF and JES default resources.
- Installation exit processing, similar to PSF, is reflected in the downloaded file.
- SMF type 6 records are produced, similar to PSF.
- Resource Access Control Facility (RACF®) checking is done for user resource libraries.
- Distributed data can optionally be protected by secure transmission.

Table 2 on page 4 shows how AFP Download Plus differs from PSF, Download for z/OS, and ACIF.

<i>Table 2. Comparison of AFP Download Plus and other PSF features</i>				
<b>Function</b>	<b>AFP Download Plus</b>	<b>PSF</b>	<b>Download for z/OS</b>	<b>ACIF</b>
<b>Obtains input from</b>	JES spool data set	JES spool data set	JES spool data set	User's data set
<b>Transforms data set from</b>	Line data MO:DCA-P XML	Line data MO:DCA-P XML	No transform	Line data MO:DCA-P XML
<b>Transforms data set to</b>	MO:DCA-P	IPDS	No transform	MO:DCA-P
<b>Obtains required resources</b>	Yes	Yes	No	Yes
<b>Puts resources inline</b>	Yes	No	No	No (resources are put inline manually)
<b>Requires receiver resource library synchronization</b>	No	N/A	Yes	N/A
<b>Protects resource libraries with RACF</b>	Yes	Yes	N/A	No
<b>Encodes data and resource group</b>	Yes, optionally	No	No	No
<b>Processes jobs with multiple data sets</b>	Yes	Yes	Yes, with Exit 15	No
<b>Counts pages and sheets</b>	Yes—uses -opagecount, -osheetcount, SMF6IMPS, and SMF6LPGE	Yes—uses SMF6IMPS and SMF6LPGE	No	N/A
<b>Compresses data sets with LZW compression</b>	Yes	No	No	No
<b>Indexes documents</b>	No	No	No	Yes
<b>Connects to</b>	Download receiver	Printer	Download receiver	N/A
<b>Sends data to</b>	z/OS AIX Windows Linux	Printer	z/OS AIX Windows Linux	N/A
<b>Sends messages when errors stop transformation</b>	Yes, optionally	Yes	No	No



Table 2. Comparison of AFP Download Plus and other PSF features (continued)

Function	AFP Download Plus	PSF	Download for z/OS	ACIF
<b>Sends separator pages</b>	Yes, optionally	Yes, optionally	No	No
<b>Uses working directory</b>	Yes—resources; optionally—MO:DCA- P data	No	No	No
<b>Uses routing-control data set</b>	No	No	Yes	No
<b>Creates SMF data (SMF type 6 records can vary)</b>	Yes	Yes	Yes	No
<b>Supports PSF installation exits</b>	1, 2, 3, 4, 5, 6, 7, 8, and 15	1, 2, 3, 4, 5, 6, 7, 8, 14, and 16	15	No

## AFP Download Plus system communication

AFP Download Plus uses a sender-receiver model for communication between the z/OS operating system and an AIX, Windows, Linux, or other z/OS system, as shown in [Figure 1 on page 6](#).

- The *sender* initiates the TCP/IP connection and sends data to another system.
- The *receiver* is on the other system where it receives data from the sender and then distributes the data to a print, archive, email, or fax destination.

AFP Download Plus is a sender on the z/OS system where it is installed with PSF. This can be considered the primary z/OS system. AFP Download Plus can also be installed on a secondary z/OS system, in which case it is a receiver.

**Keep in mind:** When AFP Download Plus is installed on a z/OS system, it can act as both the sender and the receiver. However, in this publication, the sender is always considered to be on the primary z/OS system while the receiver is always considered to be on the secondary z/OS system (also referred to as the remote system), or on an AIX, Windows, or Linux operating system.

Data that is sent to a receiver can be printed by PSF for z/OS (or another z/OS printer-driver program) or an AIX, Linux, or Windows print server, or archived by Content Manager OnDemand. Some AIX, Linux, or Windows receivers can also distribute the data to other output destinations, such as those that email or fax documents.

Each sender with a TCP/IP connection to a receiver is considered a functional subsystem application (FSA). A JES printer definition identifies an FSA with the JES2 PRT statement or the JES3 DEVICE statement. A receiver destination is defined to an FSA with an IP address and a port number.

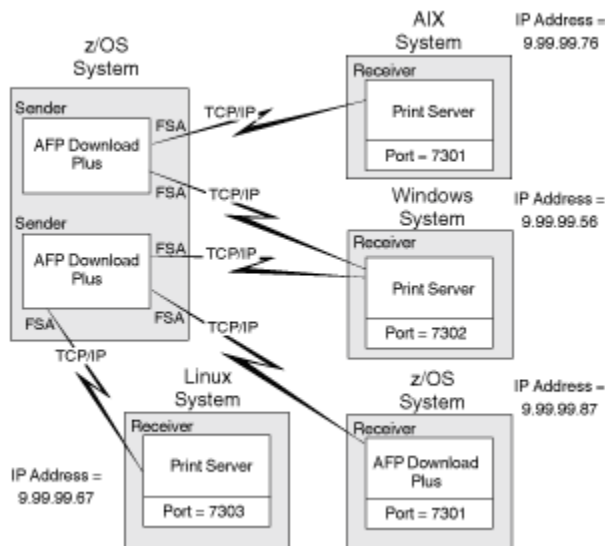


Figure 1. Sender-receiver relationship of AFP Download Plus

As shown in Figure 1 on page 6, a sender can transmit data from multiple FSAs to more than one receiver, although each TCP/IP connection can handle only one file at a time. Multiple receivers can run on the same system, and any one receiver can accept data from more than one sender, again receiving one file at a time.

The IPADDR and PORTNO parameters in the PRINTDEV statement or the **IP address** and **Port number** parameters in the Printer Inventory identify the IP address and port number with which the sender establishes a TCP/IP connection to the receiver system. The IP address parameter must specify the TCP/IP address of the system the receiver is running on. The port number parameter must be the same port number that is defined for the receiver.

The sender initiates a TCP/IP connection to the target receiver when AFP Download Plus has data to transmit, and then disconnects after it receives confirmation from the receiver that the data is completely transmitted.

**Note:** The target receivers must be started before AFP Download Plus attempts to transmit a document; otherwise, the TCP/IP connection cannot be established.

## How AFP Download Plus works

AFP Download Plus uses several methods to send AFP data and all resources to a receiving system for processing. AFP Download Plus uses a temporary file in a working directory to store the resource group and either places the MO:DCA-P data in a temporary file in the working directory (non-direct download method) or sends the data directly to the receiving system (direct download method).

The working directory that AFP Download Plus uses is a z/OS File System (zFS). You must allocate and mount a zFS that is large enough to accommodate the temporary UNIX files that are produced by AFP Download Plus. To determine the size of the zFS, see [Chapter 2, “Planning the size of the working directory,”](#) on page 17.

This information describes the methods AFP Download Plus uses to send data to the receiver and shows how AFP Download Plus distributes a data set to receivers on different operating systems.

## Non-direct download method

The default method that AFP Download Plus uses to send data to the receiver is the non-direct download method. With this method, AFP Download Plus uses temporary files in a working directory to store both the MO:DCA-P data and resources. [Figure 2 on page 7](#) shows these steps in the non-direct download method:

1. AFP Download Plus obtains data from the JES spool and obtains resources from system and user resource libraries.
2. AFP Download Plus transforms the print data set to MO:DCA-P and places the data in a temporary file. Likewise, it identifies every resource that is required by the spool data set and collects them in a second temporary file.
3. AFP Download Plus transmits the two temporary files to the receiving system. Because the resources must be at the front of the document, the resource file is sent first and the MO:DCA-P file is sent second.

After the receiving system confirms that it received all the data, AFP Download Plus deletes the temporary files from the working directory and the print data set from the spool.

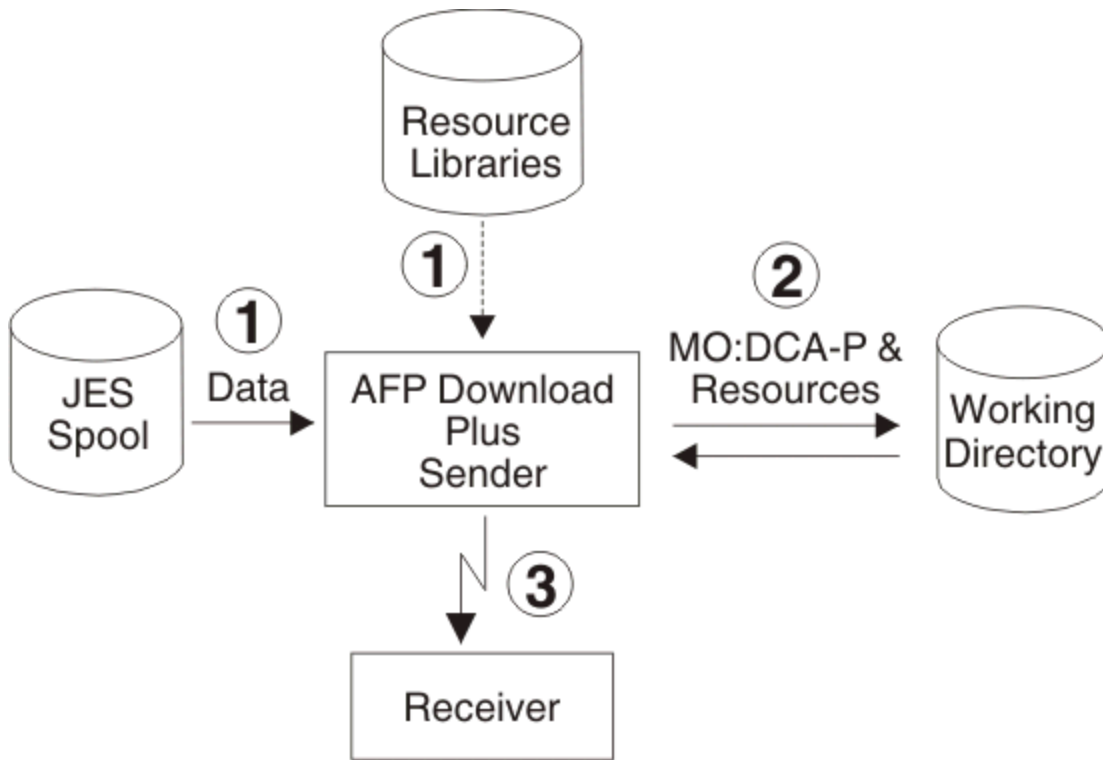


Figure 2. Non-direct download method for sending data to a receiver

## Direct download method

An optional method that AFP Download Plus uses to send data to the receiver is the direct download method. With this method, AFP Download Plus transforms the print data set to MO:DCA-P and then sends the data directly to the receiving system. [Figure 3 on page 8](#) shows these steps in the direct download method:

1. AFP Download Plus obtains data from the JES spool and obtains resources from system and user resource libraries.
2. AFP Download Plus transforms the print data set to MO:DCA-P and then sends the data directly to the receiving system. At the same time, it identifies every resource that is required by the spool data set and collects them in a temporary file.
3. AFP Download Plus transmits the resources in the temporary file to the receiving system.

After the receiving system confirms that it received all the data, AFP Download Plus deletes the temporary files from the working directory and the print data set from the spool.

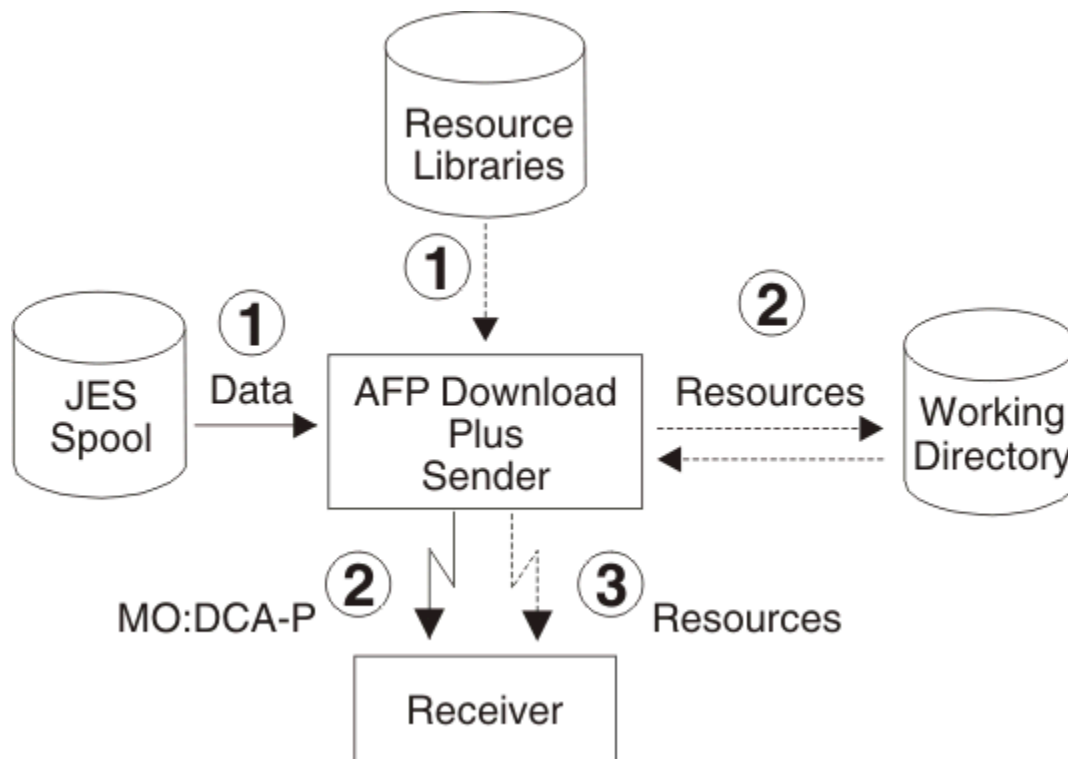


Figure 3. Direct download method for sending data to a receiver

To use the direct download method, you must set a parameter in the AFPPARMS control statement or the Printer Inventory (see **direct-download** in “Parameters for the AFPPARMS control statement” on page 45 or **Direct download** in “FSA Printer Inventory parameters” on page 80). Also, the receiver must support the direct download function.

## Data set distribution to receivers

Figure 4 on page 9 shows how AFP Download Plus distributes a data set from the z/OS JES spool for distribution to receivers on different operating systems: z/OS, AIX, Windows, and Linux.

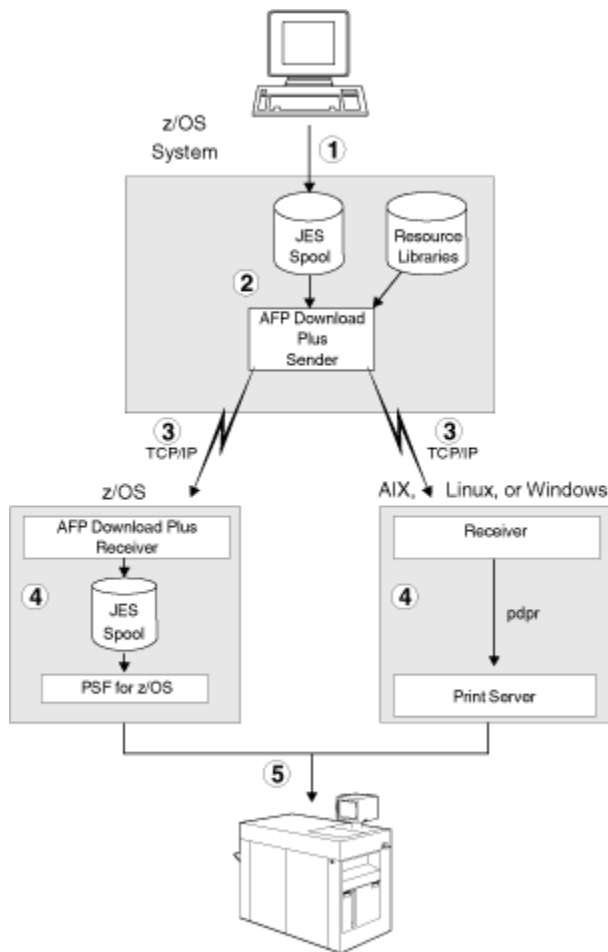


Figure 4. AFP Download Plus data set distribution

This scenario describes the steps that are shown in [Figure 4 on page 9](#):

1. Users submit jobs on a z/OS system, creating system output on the JES spool in either a JES2 or JES3 environment. The job submitters can specify job control language (JCL) parameters that direct the output data sets to AFP Download Plus. The data sets can contain line data, XML data, or MO:DCA-P data streams.
2. The AFP Download Plus sender selects output data sets from the JES spool according to installation-defined JES work-selection criteria that correspond to JCL parameters specified by the job submitters. AFP Download Plus transforms line data and XML data to MO:DCA-P, if required, and collects the resources for the output data set.
3. The AFP Download Plus sender transmits MO:DCA-P data, resources, and information about the job to receiver systems in the Internet Protocol network. The operating systems can be z/OS, AIX, Windows, and Linux.
4. On the receiver system, the AFP Download Plus, AIX, Linux, or Windows receiver saves the transmitted data and resources in a file and then submits it to PSF for z/OS or an AIX, Linux, or Windows print server.
5. PSF for z/OS or another print server sends the data for printing, emailing, or faxing.

## Highlights

Some highlights of AFP Download Plus are:

### Compress files

The temporary files that are stored in the z/OS File System (zFS) and the data that is transmitted to the receiving system can optionally be compressed by AFP Download Plus with the LZW compression

algorithm. Compressing these files minimizes the size requirement on the zFS and reduces TCP/IP transmission time. For more information, see **compression** in “Parameters for the AFPPARMS control statement” on page 45 or **Compression** in “FSA Printer Inventory parameters” on page 80.

#### **Count pages and sheets in data sets**

With AFP Download Plus, users can use the page accounting function to count the number of pages and sheets in a data set and send the number to the receiver. For more information, see **page-accounting-supported** in “Parameters for the AFPPARMS control statement” on page 45 or **Page accounting supported** in “FSA Printer Inventory parameters” on page 80.

#### **Define AFP Download Plus FSAs in the Printer Inventory**

An ISPF panel in the Infoprint Server Printer Inventory is used to define an FSA specifically for AFP Download Plus. The panel includes parameters that you would otherwise need to define on the PRINTDEV statement or the EXEC PARM statement of the startup procedure, in PSF installation Exit 7, or in the AFPPARMS control statement. For more information, see “Printer Inventory” on page 73.

#### **Distribute data sets automatically**

AFP Download Plus distributes data sets the same way PSF does: the IPADDR and PORTNO parameters in the PRINTDEV statement or the **IP address** and **Port number** parameters in the Printer Inventory identify the receiver to which the data set is sent. Distribution of data sets can be transparent to the job submitter, requiring little or no modification to existing application JCL statements. AFP Download Plus supports IP addresses as host names, in dotted decimal notation, and in colon hexadecimal notation.

#### **Encode data for secure transmission**

AFP Download Plus optionally encodes all data before transmission. The data is then decoded by the receiver. For more information, see **secure-transmission** in “Parameters for the AFPPARMS control statement” on page 45 or **Secure transmission** in “FSA Printer Inventory parameters” on page 80.

#### **Guarantee data transmission**

AFP Download Plus guarantees the transmission of data by monitoring the data and retransmitting a document from the last successful recovery point if it detects that bytes are not received. AFP Download Plus also verifies that all data is successfully accepted by the receiver before it deletes a data set from the z/OS system. For information about changing the transmission recovery interval, see **transmit-recovery-pages** in “Parameters for the AFPPARMS control statement” on page 45 or **Recovery pages** in “FSA Printer Inventory parameters” on page 80.

#### **Include resources inline**

AFP Download Plus includes all resources that are required for processing inline with the distributed file, including any PSF and JES default resources. The job submitter can choose which type of resources to include inline with the **Resources included inline** Printer Inventory parameters or with AFPPARMS control statement parameters. You can include one or more of these resources inline: BCOCA, GOCA, IOCA, and PTOCA with OEG objects, color management resources (CMRs), FOCA fonts, form definitions, object containers, overlays, page segments, and TrueType and OpenType fonts. For example, you can choose to include form definitions inline, but not include fonts inline.

#### **Manage system seamlessly**

The system operator manages AFP Download Plus with the same JES or System Display and Search Facility (SDSF) commands that are used to manage PSF for z/OS.

#### **Notify job submitter of transmission**

When requested with the JCL NOTIFY parameter, AFP Download Plus notifies up to four users when it finishes processing a document. Whenever AFP Download Plus creates a message file, even if you do not request notification, AFP Download Plus sends a notification message. If users are not specified or if those users specified cannot be contacted, AFP Download Plus sends a notification to the job submitter. AFP Download Plus always puts a copy of the notification message in the system log.

#### **Perform RACF validation**

AFP Download Plus does RACF validation for user specified resource repositories in a partitioned data set.

## Process installation exits

Many of the installation exits supported by PSF are also supported by AFP Download Plus. Exits 1, 2, 3, 4, 5, 6, 7, 8, and 15 are supported.

## Process jobs with multiple data sets

An output group on z/OS can contain multiple data sets. With AFP Download Plus, users can use the multiple data set function to send data sets to remote systems so all of the data sets in an output group print in sequence, with no intervening files, no NPRO processing between files, and only one header and trailer page for the set. For information about enabling the multiple data set function, see **dataset-grouping** in “Parameters for the AFPPARMS control statement” on page 45 or **Data set grouping** in “FSA Printer Inventory parameters” on page 80.

**Note:** Download for z/OS uses the OUTGRP parameter on Exit 15 to process multiple data set jobs. However, AFP Download Plus ignores the OUTGRP parameter on Exit 15 and uses the **dataset-grouping** AFPPARMS parameter or the **Data set grouping** Printer Inventory parameter instead.

## Process message files

Whenever a data set ends because of an error, AFP Download Plus notifies the receiver about the problem. The receiver might print a message or it might ignore the error.

## Produce AFPSTATS audit trail report

When requested, AFP Download Plus produces the AFPSTATS report as an audit trail.

## Produce SMF type 6 accounting records

AFP Download Plus produces System Management Facility (SMF) type 6 records with statistics about the job, such as the number of bytes transmitted and other processing information.

## Send messages when errors stop transformation

When transformation ends with an error, AFP Download Plus can send the error message data set to the receiver. For more information, see **send-messages-on-failure** in “Parameters for the AFPPARMS control statement” on page 45 or **Send messages on failure** in “FSA Printer Inventory parameters” on page 80. For information about configuring the receiver to receive messages, see Chapter 8, “Configuring the AFP Download Plus receiver on z/OS,” on page 161.

## Send MO:DCA-P data directly to the receiver

To reduce the size of the zFS and make fewer I/O calls to the working directory, AFP Download Plus can send the MO:DCA-P data directly to the receiving system without storing it in a temporary file in the working directory. For more information, see **direct-download** in “Parameters for the AFPPARMS control statement” on page 45 or **Direct download** in “FSA Printer Inventory parameters” on page 80.

## Send separator pages

AFP Download Plus can be configured to send the active PSF for z/OS separator pages to the receiver. For more information, see **send-separator-pages** in “Parameters for the AFPPARMS control statement” on page 45 or **Send separator pages** in “FSA Printer Inventory parameters” on page 80.

## Support MO:DCA Presentation Interchange Set data streams

AFP Download Plus supports MO:DCA Presentation Interchange Set (IS) data streams, including:

### MO:DCA AFP/Archive (AFP/A)

MO:DCA AFP/A is an AFP document architecture interchange set that is used for long-term preservation and retrieval. This subset ensures page independence and eliminates images without clearly specified resolution, device default fonts, and external resources.

### MO:DCA IS/3

MO:DCA IS/3 is the first interchange set to achieve industry consensus through a rigorous open standards process. It improves existing functions and introduces new functions, such as Begin Print File (BPF) and End Print File (EPF) structured fields, and multiple image TIFF object support.

### MO:DCA AFP/A, IS/3

MO:DCA AFP/A, IS/3 is an AFP document architecture interchange set that complies with the rules and restrictions of both the AFP/Archive and IS/3 interchange sets.

### MO:DCA Graphic Arts Function Set (GA)

MO:DCA GA is an extension of MO:DCA IS/3 that adds PDF presentation object support.

For more information, see [“Considerations for processing specific MO:DCA interchange set compliant files”](#) on page 14.

### **Transform data to MO:DCA-P**

AFP Download Plus converts a z/OS spool data set into MO:DCA-P, if it is not already in that format, and then distributes the MO:DCA-P data. The distributed file is always MO:DCA-P and no other products are needed to convert or distribute the data.

### **Use multiple FSAs**

Multiple AFP Download Plus FSAs can transmit data to the same remote system at the same time, including FSAs that are sending multiple data set jobs.

### **View messages in the Infoprint Server common message log**

If you have a license for the Infoprint Server feature of z/OS, you can use Infoprint Central to view FSA and print job messages that AFP Download Plus writes to the Infoprint Server common message log. With the common message log function, you can also use Infoprint Central to:

- Search for print jobs and view the properties for each job.
- Release held print jobs, delete jobs, change the priority of jobs, and move jobs (if AFP Download Plus is not processing the jobs)

For more information, see [“Printer Inventory”](#) on page 73.

## **Limitations**

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AFP Download Plus has these functional limitations:

### **ACIF user exits**

AFP Download Plus does not recognize user exits previously written for and used with ACIF.

### **Direct-printing support**

AFP Download Plus is not supported in direct-printing mode. AFP Download Plus is supported only in deferred-printing mode.

### **Line data indexing**

AFP Download Plus does not index line data.

### **Message files**

When AFP Download Plus sends messages to the receiver, these are the limitations:

- When message APS8239I is sent to the receiver for errors that caused processing to stop (see **send-messages-on-failure** in [“Parameters for the AFPPARMS control statement”](#) on page 45 or **Send messages on failure** in [“FSA Printer Inventory parameters”](#) on page 80), resources that are specified on the startup procedure are not sent inline. Printing the message causes "resource not found" error messages unless the resources are already available to the receiving system or are manually made available.
- Message files are not compliant with a specific MO:DCA interchange set unless you make them compliant. See [“Considerations for processing specific MO:DCA interchange set compliant files”](#) on page 14.

### **Printer-resident only fonts**

The 4028 printer and printers that emulate the 4028 use a set of fonts that are only resident in the printer. Host versions of these fonts exist, but they contain only formatting information for an application, not the actual raster font pattern data. Without the font pattern data, these fonts cannot be put inline and are not supported by AFP Download Plus. If any of these fonts are used, AFP Download Plus issues message APS279I and stops processing the job.

### **Separator page support**

When AFP Download Plus generates and sends separator pages to the receiver, these are the limitations:

- Only one data set header is sent to the receiver when multiple copies of a print job are requested. The receiver then prints only one copy of the data set header even though multiple copies of the job



are printed. This limitation differs from PSF, which prints a data set header with each copy of the print data set.

- The receiver spools the separator pages with the rest of the job (as if they are part of the user's job); this limitation means that they are no longer recognized as separator pages. Therefore, any separator page functions (such as offset stacking, edge marks, and mark forms) are not done by the print server on the receiving system (such as PSF for z/OS).
- Separator pages are not compliant with a specific MO:DCA interchange set unless you make them compliant. See [“Considerations for processing specific MO:DCA interchange set compliant files” on page 14.](#)

For more information, see [“Sending z/OS separator pages” on page 124.](#)

## Software requirements

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You install and configure AFP Download Plus on a z/OS system to send data. In addition, you can install and configure AFP Download Plus on a z/OS system to receive data. In both cases, before you install the AFP Download Plus feature, ensure that you meet these software requirements:

- Communications Server element of z/OS with IP Services
- PSF Version 4 Release 8.0 for z/OS (Program Number 5655–M32).

See [PSF for z/OS: Introduction](#) for the PSF software requirements.

Ensure that the remote system servers that are receiving data from AFP Download Plus are at or above the levels that AFP Download Plus supports. For example, Content Manager OnDemand for Multiplatforms must be at Version 9 Release 0.0 or later (Program Number 5724–J33).

The AFP Download Plus feature of PSF is required to use these AFP Download Plus functions:

- Direct download
- Extended receiver information
- Internet Protocol Version 6 (colon hexadecimal notation)
- LZW compression
- MO:DCA IS/3 files
- Multiple data set
- Page accounting
- Secure transmission
- Separator pages

The AFP Download Plus feature of PSF is required to use these AFP Download Plus functions:

- MO:DCA AFP/A files
- MO:DCA AFP/A, IS/3
- MO:DCA IS/3 with function sets

## Performance considerations

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AFP Download Plus runs as a JES functional subsystem (FSS). AFP Download Plus reads resources from libraries and obtains records from the JES spool. AFP Download Plus then transforms the records to a MO:DCA-P data stream and stores it in temporary files in a z/OS File System (zFS) working directory with the resource group data or optionally, immediately transmits the MO:DCA-P data to the receiving system. When the transform processing is complete, AFP Download Plus transmits the data in the temporary files to the receiving system.

If allowed, AFP Download Plus uses a large amount of the available processor while it reads the resources and transforms the data. It is possible to see AFP Download Plus use 70% or more of the processor during the transform phase of processing, if that much is available. If a spike in processor usage causes

system workload balancing problems, you can refer to the Workload Manager (WLM) documentation for information about limiting AFP Download Plus. You might want to create a resource group, service class, and classification rules in WLM to limit the AFP Download Plus started task (APSHPOSE) processor use by service unit or time.

Place AFP Download Plus in a separate WLM service class from PSF for z/OS because they have dissimilar performance characteristics. Limiting PSF can cause the printers that are driven by PSF to pause because they must wait for data.

Also, follow these guidelines:

- For TCP/IP-attached receivers that use a 1000Base-T Ethernet connection, make sure the speed on both the z/OS host system and the receiver is set to 1000 megabits per second (Mbps)/full duplex operation. If the 1000Base-T Ethernet connection on the receiver does not have a 1000 Mbps/full duplex setting, make sure that it is set to auto-negotiation and the host system is set to 1000 Mbps/full duplex.
- For TCP/IP-attached receivers that use a 100Base-T Ethernet connection, make sure both the z/OS host system and the receiver are set to 100 Mbps/full duplex operation.
- Turn off all tracing for the receiver.
- If you are using a Windows receiver, be aware that your antivirus program might increase processor use, which reduces AFP Download Plus performance.

To reduce the size of the zFS, reduce I/O calls to the working directory, and possibly reduce processor usage, AFP Download Plus can send the MO:DCA-P data directly to the receiving system without storing it in a temporary file in the working directory. The receiver takes over some of the processing rather than AFP Download Plus doing it all. For more information, see **direct-download** in “Parameters for the AFPPARMS control statement” on page 45 or **Direct download** in “FSA Printer Inventory parameters” on page 80.

AFP Download Plus sends recovery points to verify the transmission byte count. If the byte count does not match the current recovery point, AFP Download Plus retransmits a document from the last successful recovery point. AFP Download Plus synchronizes transmitted data with the receiver based on the AFPPARMS parameter (see **transmit-recovery-pages** in “Parameters for the AFPPARMS control statement” on page 45), the Printer Inventory parameter (see **Recovery pages** in “FSA Printer Inventory parameters” on page 80), or at the end of a file. You can use the **transmit-recovery-pages** or **Recovery pages** parameter to change the synchronization frequency, which might improve AFP Download Plus performance. Setting the **transmit-recovery-pages** or **Recovery pages** parameter to 0 gives the best performance because AFP Download Plus only synchronizes the transmitted data with the receiver at the end of a file. The worst performance is obtained when you set the **transmit-recovery-pages** or **Recovery pages** parameter to 1.

Several other AFP Download Plus functions can affect performance:

- Encoding all data before transmission can reduce performance. For more information, see **secure-transmission** in “Parameters for the AFPPARMS control statement” on page 45 or **Secure transmission** in “FSA Printer Inventory parameters” on page 80.
- Compressing data before transmission decreases the amount of data that is sent to the receiver, thus reducing the transmission time. However, because of the time that is required to compress and decompress the data, the overall performance might not be improved.

For more information about establishing performance goals and processing capacity boundaries, see [z/OS MVS Initialization and Tuning Guide](#) and [z/OS MVS Programming: Workload Management Services](#).

## Considerations for processing specific MO:DCA interchange set compliant files

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AFP Download Plus supports MO:DCA Presentation Interchange Set data streams, including:

**MO:DCA AFP/Archive (AFP/A)**

MO:DCA AFP/A is an AFP document architecture interchange set that is used for long-term preservation and retrieval. This subset ensures page independence and eliminates images without clearly specified resolution, device default fonts, and external resources.

**MO:DCA Interchange Set 3 (IS/3)**

MO:DCA IS/3 is the first interchange set to achieve industry consensus through a rigorous open standards process. It improves existing functions and introduces new functions, such as Begin Print File (BPF) and End Print File (EPF) structured fields, and multiple image TIFF object support.

**MO:DCA AFP/A, IS/3**

MO:DCA AFP/A, IS/3 is an AFP document architecture interchange set that complies with the rules and restrictions of both the AFP/Archive and IS/3 interchange sets.

**MO:DCA Graphic Arts Function Set (GA)**

MO:DCA GA is an extension of MO:DCA IS/3 that adds PDF presentation object support.

To correctly process a MO:DCA IS/3 file, you must use applications that claim support for MO:DCA IS/3; otherwise, you have no assurance that the file is processed correctly. For example, when an application concatenates two MO:DCA IS/3 compliant print files, the EPF structured field in the first file and the BPF structured field in the second file must be removed to create a single MO:DCA IS/3 compliant file that is enclosed by a BPF and EPF structured field pair. See *Mixed Object Document Content Architecture Reference* at [AFP Consortium Publications \(afpcinc.org/publications\)](http://afpcinc.org/publications) for more information about IS/3.

MO:DCA IS/3 data streams can use only TrueType and OpenType fonts; FOCA fonts are not allowed. AFP Download Plus might add auxiliary files, such as separator pages and message files, to a job. Typically, these auxiliary files use FOCA fonts and do not contain BPF and EPF structured fields; therefore, they are not MO:DCA IS/3 compliant. If AFP Download Plus processes a MO:DCA IS/3 data stream with non-MO:DCA IS/3 auxiliary files and sends the job to a receiver that concatenates the files into a single file, the resulting file is not MO:DCA IS/3 compliant. To prevent this problem, the auxiliary files must be MO:DCA IS/3 compliant.

The AFP Download Plus receiver on z/OS uses the **afpconcat** exit program to concatenate a multiple data set job to a single data set. This concatenation process preserves the files as MO:DCA IS/3 compliant. If you send MO:DCA IS/3 files as a group to any other receiver that concatenates multiple data sets, make sure that the concatenation process does not remove all BPF and EPF structured fields. Otherwise, the resulting single data set print file is no longer MO:DCA IS/3 compliant.

MO:DCA AFP/A data streams allow FOCA fonts but they require page independence and might use metadata objects. AFP/A print files specify the AFP/A MO:DCA interchange set on the BPF and BDT structured fields. An AFP/A, IS/3 interchange set also exists. This interchange set is an intersection of AFP/A and IS/3. For more information about AFP/A and AFP/A, IS/3, see *Mixed Object Document Content Architecture Reference* at [AFP Consortium Publications \(afpcinc.org/publications\)](http://afpcinc.org/publications).

To ensure that the files AFP Download Plus transmits remain compliant with the interchange set of the print file, you must make sure that these guidelines are followed:

- When AFP Download Plus processes MO:DCA IS/3 data streams, use only TrueType and OpenType fonts, not FOCA fonts.
- If the receiver is concatenating the auxiliary files to the user data set, any auxiliary files that AFP Download Plus might add to a job must match the interchange set and any function sets specified on the user's data set.
- The receiver and applications that process the print file must support the specified MO:DCA interchange set and any specified function sets.
- If you have a multiple data set job with one or more specific MO:DCA interchange set compliant files and you want the data sets and any auxiliary files to remain compliant, you must make sure that the MO:DCA interchange set specification is preserved if the receiver concatenates the data sets.

See [“Configuring AFP Download Plus so files remain compliant with the specified MO:DCA interchange set” on page 31](#) for more information.



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## Chapter 2. Planning the size of the working directory

AFP Download Plus uses a working directory to store two types of files:

### Permanent error message files

These files remain in the file system until you delete them. Error message files are created by AFP Download Plus when a processing error occurs. The files are in the *workdirectory*/userinfo directory, where *workdirectory* is the name of the working directory that is specified by a parameter in the AFPPARMS control statement or the Printer Inventory (see **working-directory** in “Parameters for the AFPPARMS control statement” on page 45 or **Working directory** in “FSA Printer Inventory parameters” on page 80). *workdirectory* is set to a default value of /var/psf/.

See “Monitoring error messages” on page 149 for more information about error message files and how to delete them.

### Temporary files for transformed data and resources

These are files that AFP Download Plus creates and then deletes when it finishes processing a data set. Temporary files are in the *workdirectory*/afpdp/*fsaname* directory, where *workdirectory* is the name of the working directory that is specified by a parameter in the AFPPARMS control statement or the Printer Inventory and *fsaname* specifies the name of the FSA associated with the sender. *workdirectory* is set to a default value of /var/psf/.

Because error message files are small and not many exist, this information only describes how to estimate the size of the working directory for the temporary files that AFP Download Plus creates. However, allocate at least one cylinder of space for the error message files.

AFP Download Plus uses a temporary file in the working directory to store the resources and either places the MO:DCA-P data in a temporary file in the working directory before it sends the resources and data to the receiving system or, if a parameter in the AFPPARMS control statement or the Printer Inventory is set (see **direct-download** in “Parameters for the AFPPARMS control statement” on page 45 or **Direct download** in “FSA Printer Inventory parameters” on page 80), sends the MO:DCA-P data directly to the receiving system.

Because the working directory contains all the resources that are required by the print data set and might contain the entire print data set in its MO:DCA-P form, you must allocate and mount a z/OS File System (zFS) that is large enough to hold the temporary files that AFP Download Plus creates. If the file system you allocate is too small, an AFP Download Plus abend leaves partial temporary files in the zFS. These partial temporary files are deleted by AFP Download Plus the next time that the FSA is successfully started. When you are planning for the working directory, overestimating the size is better than underestimating.

When you are planning the size of the zFS for the AFP Download Plus sender, keep in mind that the AFP Download Plus receiver (z/OS, AIX, Windows, or Linux operating system) needs a file system of a comparable or larger size to receive the data from the AFP Download Plus sender. See “Creating working directories” on page 161.

For information about using zFS, see [z/OS UNIX System Services Planning](#) and [z/OS File System Administration](#).

The factors to consider when you are estimating the size of the working directory are:

- Compression
- Concurrent FSAs
- Direct download of data
- Non-direct download of data

## Compression factor

---

AFP Download Plus can optionally compress the MO:DCA-P data and resources before temporarily storing them in the zFS or sending the data to the receiver. You use a parameter in the AFPPARMS control statement or the Printer Inventory to compress data (see **compression** in “Parameters for the AFPPARMS control statement” on page 45 or **Compression** in “FSA Printer Inventory parameters” on page 80).

Not all data compresses at the same rate, but generally you can expect a compression rate of about 50% and a reduction in the size requirement for the working directory.

Some data does not compress well and some data is larger after compression. These types of data do not compress well:

- Input data with large amounts of data that is already compressed, such as image data
- Small input data sets (5 KB or less)
- TrueType and outline fonts

Also, keep in mind that more processor capacity is required to run the compression and extraction algorithms.

## Concurrent FSAs factor

---

Concurrent FSAs are FSAs that run AFP Download Plus senders and z/OS receivers at the same time.

Running many concurrent FSAs can cause conflict for the file system. Therefore, if performance is slow, consider allocating several zFSs (one for each of the concurrent FSAs) as opposed to a single zFS for all the FSAs.

### **Note:**

Allocate separate zFSs for AFP Download Plus senders and receivers that are running on the same z/OS system.

## Direct download factor for estimating directory size

---

AFP Download Plus can use the optional direct download function to send MO:DCA-P data directly to the receiving system without storing it in a temporary file in the zFS. You set a parameter in the AFPPARMS control statement or the Printer Inventory (see **direct-download** in “Parameters for the AFPPARMS control statement” on page 45 or **Direct download** in “FSA Printer Inventory parameters” on page 80) to use the direct download function.

When AFP Download Plus is using the direct download function, the working directory contains only resources and not MO:DCA-P data. Based on the job that requires the largest number of resource bytes, estimate the size of the working directory. The working directory size must be larger than the resource bytes required.

By using the direct download function, you might see a reduction of up to 90% in the size of the zFS. For example, as the size of the MO:DCA-P data increases compared to the size of the resources, you see more of a reduction in the size of the zFS. Also, with a reduction in I/O calls to the working directory, you might see less processor use than you are typically used to.

## Non-direct download factor for estimating directory size

---

By default, AFP Download Plus uses temporary files in the working directory to store the resources and MO:DCA-P data before it sends them to the receiving system. When AFP Download Plus is using this non-direct download method, consider these factors for estimating and calculating the correct size of a working directory:

- Print data set size
- Expansion factor with required resources

This information also explains how to calculate the size of the zFS when you are using the non-direct download method.

## Print data set size

To estimate the working directory size, you must understand the size of the largest print data set to be processed by AFP Download Plus. You can estimate the largest print data set size from:

- Pages produced
- Lines or records
- Byte count

### Estimation from pages produced

Some print applications produce approximately the same number of pages each time. Therefore, you can use the number of pages that are produced to estimate the size for the print data set that is processed.

To do this estimation, you must determine a page size in bytes for the number of pages produced. Pages can vary greatly in size from a few hundred bytes to thousands of bytes. You must understand your own print application enough to determine the appropriate page size. Keep in mind that the page size can vary greatly from print data set to print data set. For example, the average page size for one data set might be 0.7 KB while another is 27 KB.

Use the formula (*Pages x PageSize*) to estimate the print data set size to use in calculating the size for the zFS. Remember, it is better to overestimate and adjust later than it is to underestimate.

If you do not know the number of pages a print application produces, or the print data set is a MO:DCA-P file and you are a JES2 user, you can use SDSF to determine the number of pages in the print data set. After the print data set is on the JES spool, look at the Tot-Page column on the SDSF output panel.

If you are a JES3 user, you can use the **\*I,J=jobname,E** command to display the pages for a MO:DCA-P format print data set that is on the JES spool.

### Estimation from lines or records

If you know the logical record length (LRECL) of a print job, you can use the metrics, lines or records, to estimate the print data set size. When the record format is fixed, you can use the number of lines (or records) with the record length to compute the size of the print data set in bytes.

Use the formula (*Lines x LRECL*) to estimate the print data set size to use in calculating the size for the zFS.

For line data files in the JES2 spool, you can use SDSF to determine the number of records in the print data set. Look at the Tot-Rec column on the SDSF output panel.

If you are a JES3 user, you can use the **\*I,J=jobname,E** command to determine the number of lines in a print data set on the JES spool.

### Estimation from byte count

You can inspect the individual print data sets in the JES spool to get the most accurate estimate of the print data set size. You use the byte count value as the size for a print data set. Remember to figure the size of the largest print data set that the AFP Download Plus FSA processes.

You can use SDSF to determine the byte count of jobs in the JES2 spool:

1. Enter ? next to your print job on the SDSF output panel. You see the SDSF Job Data Set Display panel.
2. Look at the Byte-Cnt column.

If you are a JES3 user, you can use the **\*I,J=jobname,E** command to display the bytes for a MO:DCA-P format print data set that is on the JES spool.

# Expansion factor

You use the expansion factor for estimating the working directory size. The expansion factor is the amount the transformation and resource collection processes cause the data to grow.

During print data set processing, the spool data set is transformed from its original format to MO:DCA-P. Also, AFP Download Plus collects all the resources that are required to print the data set (such as fonts, page segments, and overlays) and includes them inline in the document sent to the receiver. The number and size of the resources have a bearing on the size of the working directory that is needed to process the print data set.

When you are calculating the size of the zFS, an expansion factor is multiplied by the largest print data set size to allow for transforming the print data set and including the resources inline. The suggested expansion factor is 20% or a value of 1.2; however, because not all print data sets have the same characteristics, you might need to adjust the value of the expansion factor. Also, for small print data sets, print data sets requiring many resources, or print data sets that use large resources, the resources might require more space in the zFS.

# Sample calculations for directory size

This information shows how to calculate the size of the zFS when AFP Download Plus is using the non-direct download method. The formula that you use considers the print data set size, expansion factor, and concurrent FSAs. The formula is:

$$DataSetSize \times ExpFactor \times FSAs = FileSysSize$$

The values are:

**DataSetSize**

Size of the largest print data set.

**ExpFactor**

Expansion factor of 20% or 1.2.

**FSAs**

Number of concurrent FSAs.

**FileSysSize**

Size of the zFS in bytes.

**Keep in mind:** If you are using data compression and the files compress well, you reduce the calculated zFS size by 50% with this calculation:

$$FileSysSize \times 50\%$$

# Calculation examples

The tables here show calculation examples that depend on whether you are estimating the print data set size from pages (Table 3 on page 21), lines or records (Table 4 on page 21), or byte count (Table 5 on page 21). The values in the tables are rounded up because it is better to overestimate.

The calculations in these tables assume that each active FSA is simultaneously processing the largest sized print data set (the most demanding scenario). If not, you might need to adjust the calculations.

# Calculations when estimating from pages

Table 3 on page 21 shows calculation examples when you are estimating from pages with this formula:

$$[(Pages \times PageSize) = DataSetSize] \times ExpFactor \times FSAs = FileSysSize$$

**Note:** The average page size can vary greatly from print data set to print data set.



Table 3. Estimating from pages. M = 10 <sup>6</sup>						
Print job	Largest print data set size			Expansion Factor (ExpFactor)	Number of concurrent FSAs (FSAs)	z/OS File System size (FileSysSize)
	Number of pages (Pages)	Average page size (PageSize)	Largest Size (DataSetSize)			
Test1	65,000	27,000	1,755 M	1.2 (= 2,106 M)	3	6,318 M
Test2	100,000	660	66 M	1.2 (= 79.2 M)	3	238 M

### Calculations when estimating from lines or records

Table 4 on page 21 shows calculation examples when you are estimating from lines or records with this formula:

$$[(\text{Lines} \times \text{LRECL}) = \text{DataSetSize}] \times \text{ExpFactor} \times \text{FSAs} = \text{FileSysSize}$$

**Note:** The print jobs in this table are simple line data jobs.

Table 4. Estimating from lines or records. M = 10 <sup>6</sup> ; G = 10 <sup>9</sup>						
Print job	Largest print data set size			Expansion Factor (ExpFactor)	Number of concurrent FSAs (FSAs)	z/OS File System size (FileSysSize)
	Number of lines (Lines)	Record length (LRECL)	Largest Size (DataSetSize)			
Test3	5,000,000	133	665 M	1.2 (= 798 M)	5	3,990 M
Test4	25,000,000	133	3,325 M	1.2 (= 3,990 M)	5	20 G

### Calculations when estimating from byte count

Table 5 on page 21 shows calculation examples when you are estimating from byte count with this formula:

$$[\text{ByteCount} = \text{DataSetSize}] \times \text{ExpFactor} \times \text{FSAs} = \text{FileSysSize}$$

**Note:** This calculation method is the most accurate.

Table 5. Estimating from byte count. M = 10 <sup>6</sup>				
Print job	Largest print data set size (ByteCount)	Expansion Factor (ExpFactor)	Number of concurrent FSAs (FSAs)	z/OS File System size (FileSysSize)
Test1	1,656 M	1.2 (= 1,988 M)	3	5,954 M
Test2	65 M	1.2 (= 78 M)	3	234 M
Test3	619 M	1.2 (= 743 M)	5	3,715 M

Table 5. Estimating from byte count. M = 10 <sup>6</sup> (continued)				
Print job	Largest print data set size ( <i>ByteCount</i> )	Expansion Factor ( <i>ExpFactor</i> )	Number of concurrent FSAs ( <i>FSAs</i> )	z/OS File System size ( <i>FileSysSize</i> )
Test4	2,148 M	1.2 (= 2,578 M)	5	12,890 M

## Calculation scenario

An application that is called RACER is processed by AFP Download Plus. AFP Download Plus reads the print data set from the JES spool and sends it to another system for printing. These factors are known:

- The print data set produced by RACER is the largest print data set that this AFP Download Plus FSA must process.
- The average byte size of the RACER application's print data set on the JES spool is 110 M, where M = 10<sup>6</sup>.
- Only one FSA is running AFP Download Plus.

These are the steps for calculating the size of the zFS in bytes:

1. Because you know the byte count, use the formula for estimating from byte count:

$$\text{ByteCount} \times \text{ExpFactor} \times \text{FSAs} = \text{FileSysSize}$$

See [Table 5 on page 21](#) for examples.

2. Calculate the file system size with *ByteCount* = 110 M and *FSAs* = 1:

$$110 \text{ M} \times 1.2 \times 1 = 132 \text{ M}$$

3. Convert 132 M to megabytes (MB), where 1 MB = 1,048,576:

$$132,000,000 / 1,048,576 = 125 \text{ MB}$$

**Note:** For allocation purposes, it is better to have a value in gigabytes (GB) or megabytes (MB), where 1 GB = 1,073,741,824.

In this scenario, the zFS must be allocated with a size of 125 MB or larger in order for AFP Download Plus to process RACER. If you are using data compression and the files compress well (see [“Compression factor” on page 18](#)), you can reduce the 125 MB or larger size by 50%.

---

## Chapter 3. Installing AFP Download Plus

The AFP Download Plus feature includes software for both the sender and receiver. You can configure your system to use just the sender or the receiver, or you can use both components on the same system. If you are using AFP Download Plus to send jobs from one z/OS operating system to another, you must install AFP Download Plus on both z/OS systems.

**Note:** Each AFP Download Plus installation requires a separate IBM license.

This information describes how to install the AFP Download Plus feature. If you are migrating from Download for z/OS to AFP Download Plus, you might want to do a connectivity test to an existing receiver before you do a complete, customized installation. If so, see [Appendix E, “Connectivity test for AFP Download Plus,” on page 197](#).

To install AFP Download Plus, do these steps:

1. Make sure that you are at the correct program levels. See [“Software requirements” on page 13](#).
2. Install AFP Download Plus on the z/OS operating system. See the Program Directory for AFP Download Plus for instructions.
3. Establish security with group and user profiles. See [“Establishing security” on page 23](#).
4. Change directory ownership. See [“Changing directory ownership” on page 24](#).
5. Create a working directory. See [“Creating a working directory” on page 24](#).
6. Set the PATH environment variable. See [“Setting the PATH environment variable” on page 25](#).
7. Configure the SYS1.PARMLIB member for AFP Download Plus. See [“Enabling AFP Download Plus in the SYS1.PARMLIB member” on page 26](#).
8. Configure the AFP Download Plus sender on the z/OS operating system. See [Chapter 4, “Configuring the AFP Download Plus sender,” on page 29](#).
9. Configure a receiver. Do one of these:
  - Configure the AFP Download Plus receiver on the secondary z/OS operating system. See [Chapter 8, “Configuring the AFP Download Plus receiver on z/OS,” on page 161](#).
  - Configure a download receiver on an AIX, Windows, or Linux operating system to receive data from the AFP Download Plus sender.

### Establishing security

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To establish security for AFP Download Plus, you must create a group profile, such as APSADMIN, which defines the users who are authorized to control and use various functions of AFP Download Plus. You must also create a user profile, such as APS, which gives the sender authority to access the group profile.

To create the group profile and user profile, you can use the Resource Access Control Facility (RACF) or another program that follows System Authorization Facility (SAF) protocol to establish security. Do this:

1. Create a group profile with an OMVS group identifier (GID). For example, this RACF command defines group APSADMIN:

```
ADDGROUP APSADMIN OMVS(GID(number))
```

where *number* is a unique GID number with values 1–2147483647.

2. Define a user profile with an OMVS user identifier (UID). For example, these RACF commands create the user APS and grant access to the APSADMIN group:

```
ADDUSER APS DFLTGRP(APSADMIN) OMVS(UID(number)) NOPASSWORD
```

where *number* is a unique UID number with values 1 - 2147483647.

**Note:** NOPASSWORD defines the user ID as a protected user ID.

3. Define the startup procedure that you are using to the RACF STARTED class. If you want to use the RACF Started Procedures Table (ICHRIN03) instead, see [z/OS Security Server RACF Security Administrator's Guide](#). For example, these RACF commands define the startup procedure, AFPPLUS and relate the user ID, APS, and group ID, APSADMIN:

```
SETOPTS GENERIC(STARTED)
REDEFINE STARTED AFPPLUS.* STDATA(USER(APS) GROUP(APSADMIN))
SETOPTS CLASSACT(STARTED) RACLIST(STARTED)
SETOPTS RACLIST(STARTED) REFRESH
```

4. Grant READ access to this privilege profile to be able to change the ownership of any file that is used by AFP Download Plus. For example, these RACF commands grant READ access to user APS:

```
SETOPTS CLASSACT(UNIXPRIV)
SETOPTS RACLIST(UNIXPRIV)
RDEFINE UNIXPRIV SUPERUSER.FILESYS.CHOWN UACC(NONE)
PERMIT SUPERUSER.FILESYS.CHOWN CLASS(UNIXPRIV) ID(APS) ACCESS(READ)
SETOPTS RACLIST(UNIXPRIV) REFRESH
```

5. Set up a RACF data set profile definition for each resource library data set listed in the startup procedure (such as FONTLIB, PDEFLIB, and FDEFLIB). Also, use the RACF PERMIT command to give the user ID from the RDEFINE command access to the data set. For example:

```
ADDSD 'dsn.*' OWNER(xx) UACC(NONE) GENERIC
PERMIT 'dsn.*' GENERIC ID(APS) ACC(READ)
```

6. Create user IDs with OMVS segments for each user you want included in the group. Each OMVS segment must have a unique UID number with values 1 - 2147483647.
7. Connect the user IDs to the group. For example, this RACF command connects a user ID to the APSADMIN group:

```
CONNECT (userid) GROUP(APSADMIN)
```

## Changing directory ownership

After you create the APSADMIN group, you must change ownership of the AFP Download Plus installation directories and files (/usr/lpp/psf) to APSADMIN group ownership. Do this:

1. Mount in read/write mode the file system that contains /usr/lpp/psf.
2. Run this command from an **rlogin** shell or from an OMVS session:  
**chgrp -R APSADMIN /usr/lpp/psf**

## Creating a working directory

To use AFP Download Plus, you need a z/OS File System (zFS) that is set up as a working directory. To create the working directory, you must:

1. Allocate the zFS.
2. Set up the working directory.
3. Mount the zFS.

This information summarizes the steps for creating the working directory. It also describes how to monitor the zFS. See [z/OS File System Administration](#) for complete instructions about creating a working directory and estimating, allocating, and mounting a zFS.

## Allocating the z/OS File System

To allocate a z/OS File System (zFS) that AFP Download Plus can use as the working directory:

1. Calculate the size of the zFS. See [Chapter 2, "Planning the size of the working directory," on page 17](#).

2. Allocate a zFS based on the size you calculated. The data set you allocate must be large enough to contain, on one or more volumes, data that equals the megabytes (MB) or gigabytes (GB) you calculated.

## Setting up the working directory

AFP Download Plus uses a working directory to save data before it sends print data sets to the receiving system. You specify the working directory name with a parameter in the AFPPARMS control statement or the Printer Inventory (see **working-directory** in [“Parameters for the AFPPARMS control statement” on page 45](#) or **Working directory** in [“FSA Printer Inventory parameters” on page 80](#)), or you can use the default value of `/var/psf/`.

To set up the working directory:

1. Create the working directory in your file system or as a separate file system in its own zFS data set (it is recommended that you use a separate file system).

**Sysplex users:** The working directory file system must be system-specific. If the working directory is defined in the BPXPRMxx SYS1.PARMLIB member, it must be designated NOAUTOMOVE.

2. Change the group owner of the working directory with this command, where *workdirectory* is the working directory name:

**chgrp APSADMIN workdirectory**

3. Change the permissions of the working directory with this command:

**chmod 775 workdirectory**

## Mounting the z/OS File System

To mount the z/OS File System (zFS):

1. Use TSO or z/OS UNIX System Services to mount the new zFS to the working directory (see [“Setting up the working directory” on page 25](#)).
2. If you are using multiple mounts within the file system, mount each file at the mount points with settings such as these:

- `/workdirectory/afpdp`
- `/workdirectory/afpdp/fsaname`

*workdirectory* is the working directory name and *fsaname* is the FSA name that is specified with the PRT(*nnnn*) parameter in the JES2 PRT statement (see [“PRT statement” on page 109](#)) or the JNAME parameter in the JES3 DEVICE statement (see [“DEVICE statement” on page 112](#)).

**Tip:** To make the mount point permanent, specify it in the BPXPRMxx SYS1.PARMLIB member.

For more information, see [z/OS MVS Initialization and Tuning Reference](#).

## Monitoring the z/OS File System

You can monitor the z/OS File System (zFS) usage and adjust the size when appropriate. For information about monitoring zFS, see [z/OS UNIX System Services Planning](#) and [z/OS File System Administration](#).

**Tip:** Use the zFS threshold monitoring function **aggrfull** to report space usage that is based on total aggregate disk size.

## Setting the PATH environment variable

You must change the PATH environment variable in the `/etc/profile` file to include the directories for the AFP Download Plus executable files. Do this:

1. Edit `/etc/profile`.

**Notes:**

- a. You must have authority to edit the `/etc/profile` file.
  - b. The environment variables are case-sensitive; therefore, enter the values exactly as shown.
2. Add this to the PATH environment variable:

```
/usr/lpp/psf/local:/usr/lpp/psf/bin
```

3. Log out and then log in again for the new PATH to become available.

## Enabling AFP Download Plus in the SYS1.PARMLIB member

---

After you install AFP Download Plus, ensure that SYS1.PARMLIB contains member IFAPRDxx and that AFP Download Plus is enabled in the member. [Figure 5 on page 26](#) shows the PRODUCT entry that IFAPRDxx must contain for AFP Download Plus.

**Note:** The STATE value is set to ENABLED.

```
PRODUCT OWNER('IBM CORP')
        NAME('PSF for z/OS')
        ID(5655-M32)
        VERSION(*)
        RELEASE(*)
        MOD(*)
        FEATURENAME('Download Plus')
        STATE(ENABLED)
```

*Figure 5. PRODUCT entry for AFP Download Plus in your IFAPRDxx member of SYS1.PARMLIB*

---

## Part 2. Using AFP Download Plus to transform and send data

This information contains tasks for working with the sender component of AFP Download Plus:

**Chapter 4, “Configuring the AFP Download Plus sender,” on page 29**

This information describes the tasks that you do to configure the sender.

**Chapter 5, “Operating the AFP Download Plus sender,” on page 121**

This information describes how to start, stop, cancel, restart, and monitor the sender.

**Chapter 6, “Using the AFP Download Plus sender,” on page 137**

This information describes how the job submitter uses JCL to direct a data set to the sender. It also describes how to specify the AFPPARMS control statement, direct output to receiver systems, monitor error messages, and recover from errors.

**Chapter 7, “Diagnosing errors with the AFP Download Plus sender,” on page 153**

This information describes how to diagnose problems with the sender, including how to use the PSF for z/OS trace and dump facilities.





# Chapter 4. Configuring the AFP Download Plus sender

This information describes the tasks that you must do to configure the sender after you install AFP Download Plus on your z/OS operating system. See [Chapter 3, “Installing AFP Download Plus,”](#) on page 23 for information about installing the feature.

The tasks for configuring the AFP Download Plus sender on the z/OS operating system are:

1. Plan for AFP Download Plus.
2. Configure TCP/IP.
3. Create the AFP Download Plus startup procedure.
4. Define JES initialization statements.
5. Write installation exits.
6. Review the program properties table (PPT) entry.
7. Update MAXPROCSYS and MAXPROCUSER, if necessary.

## Planning considerations

AFP Download Plus operates as a JES functional subsystem (FSS). An FSS is an extension of JES, which runs in its own address space. Within the FSS, the AFP Download Plus program runs as a functional subsystem application (FSA) by using the support facilities of the FSS to communicate with JES. Several AFP Download Plus FSAs can run in the same FSS.

This information describes the planning decisions to consider before you write a startup procedure and code the JES2 or JES3 initialization statements:

- How many FSSs and FSAs to define
- What region size to define for each FSS
- What JES work-selection criteria to specify for each FSA
- How to differentiate AFP Download Plus from PSF for z/OS
- What to do so the output from AFP Download Plus remains compliant with specified MO:DCA interchange sets

## Deciding how many FSSs and FSAs to define

For improved throughput and more efficient use of system resources, you can define more than one FSA within an FSS. You also can define more than one FSS. [Table 6 on page 29](#) lists the maximum number of FSSs and FSAs you can define.

Table 6. Number of FSSs and FSAs supported	
Number of FSSs	Number of FSAs per FSS
32767 maximum for JES2 2000 maximum for JES3	128 maximum (see Note)
<b>Note:</b> The actual number of FSAs per FSS might be limited by the amount of storage each AFP Download Plus FSA requires below the 16 MB line. See <a href="#">“Determining FSS region size”</a> on page 30 to determine how much virtual storage size each FSA requires.	

## Determining FSS region size

The region-size requirements for each AFP Download Plus FSS depend on:

- Whether the trace option is active
- The number of FSAs supported by the FSS

An installation option that can affect storage requirements is the size of the trace table. The default is 128 KB per FSA. See [PSF for z/OS: Diagnosis](#) for more information about tracing.

You specify the amount of storage that is required by each AFP Download Plus FSS on the EXEC JCL statement of the startup procedure (see [“JCL statements for the startup procedure”](#) on page 39). Table 7 on page 30 shows the minimum storage that is required for AFP Download Plus. The storage includes all subpools that are associated with each of the AFP Download Plus-related task control blocks.

Table 7. Minimum storage required for FSS and FSAs		
FSA	Below 16 Megabytes	Above 16 Megabytes
The first FSA in an FSS	0.6 MB below 16 MB	8.2 MB above 16 MB
Each additional FSA in the FSS	0.2 MB below 16 MB	1.4 MB above 16 MB

## Determining MEMLIMIT size

The MEMLIMIT parameter specifies the total amount of usable virtual storage that is above the bar in a single address space. Specify MEMLIMIT on the EXEC JCL statement of the startup procedure (see [“JCL statements for the startup procedure”](#) on page 39).

AFP Download Plus uses storage that is above the bar only when the **above-the-bar-storage** parameter is set to **inline-resources** on the AFPPARMS control statement or in the Printer Inventory. Storage above the bar is used only for inline resources. The amount of storage required depends on the number and size of inline resources in the job.

For more information about MEMLIMIT, see [z/OS MVS JCL Reference](#).

## Updating MAXPROCSYS and MAXPROCUSER

The operator command D OMVS,O displays the current values for the MAXPROCSYS and MAXPROCUSER BPXPRMxx parameters in the SYS1.PARMLIB member. The operator command D OMVS,L displays the CURRENT USAGE, HIGHWATER USAGE, and SYSTEM LIMIT for the MAXPROCSYS parameter.

To update the MAXPROCSYS and MAXPROCUSER parameters, increase the value by 2 for each FSS and by 1 for each FSA.

See [z/OS MVS Initialization and Tuning Reference](#) for information about setting the MAXPROCUSER and MAXPROCSYS parameters.

## Defining work-selection criteria

You define work-selection criteria for each AFP Download Plus FSA during JES initialization. These criteria determine which output data sets the AFP Download Plus FSA selects from the JES2 or JES3 spool.

You can use JES2 and JES3 to specify numerous work-selection criteria, which correspond to JCL parameters. See [z/OS JES2 Initialization and Tuning Guide](#) or [z/OS JES2 Initialization and Tuning Reference](#) for information about the possible criteria. Some work-selection criteria that you might consider for data sets to be processed by AFP Download Plus are:

- Output class of the data set
- Form name
- Destination name

You specify the work-selection criteria for each AFP Download Plus FSA on a parameter of a JES initialization statement:

- WS parameter of the JES2 PRT(*nnnn*) statement
- WS parameter of the JES3 DEVICE statement

## Differentiating AFP Download Plus from PSF for z/OS

The FSS for AFP Download Plus is similar to the FSS that might be defined for PSF for z/OS. Thus, you can use similar JES initialization statements to define the AFP Download Plus FSS and FSAs, and your AFP Download Plus startup procedure can be similar to the existing PSF startup procedure.

You must give the AFP Download Plus FSS a name that is different than the PSF FSS name because they cannot share the FSS. Also, the AFP Download Plus FSA names cannot be the same as the PSF FSA names. Make modifications in these areas:

### JES work-selection criteria

You must specify different JES work-selection criteria for the AFP Download Plus FSA than for the PSF for z/OS FSA. For example, if class A is specified for the PSF for z/OS FSA, you must specify a different class or a different work-selection criteria, such as destination, for the AFP Download Plus FSA.

### Printing defaults

When you define an FSA, you can specify defaults for several printing options. However, to transmit a data set to an AIX, Windows, or Linux operating system for printing, you might not want to specify defaults on the z/OS system. See [“Specifying defaults in JES2” on page 111](#) and [“Specifying defaults in JES3” on page 116](#).

### Startup procedure

The startup procedure must specify a different program entry point for AFP Download Plus. Some of the parameters on the PRINTDEV statement do not apply to AFP Download Plus. See [“PRINTDEV parameters” on page 66](#) for the PRINTDEV parameters that do apply to AFP Download Plus.

## Configuring AFP Download Plus so files remain compliant with the specified MO:DCA interchange set

AFP Download Plus accepts input files with these interchange sets:

- MO:DCA AFP Archive (AFP/A)
- MO:DCA AFP/A, IS/3
- MO:DCA IS/3
- MO:DCA IS/3 with function sets (MO:DCA GA)

AFP Download Plus preserves the MO:DCA interchange set and function set specifications when it transmits the files. For the files to remain compliant, AFP Download Plus must transmit them to receivers that support the same MO:DCA interchange set and function sets. All applications that process the print file must also support the MO:DCA interchange set and function sets to preserve the MO:DCA specification on the transmitted files

For example, even though a receiver supports MO:DCA IS/3 and a certain function set level, you must still make sure that it preserves that level on output. For example, the AFP Download Plus receiver on z/OS uses the **afpconcat** exit program to concatenate a multiple data set job to a single data set. This concatenation process preserves the files as MO:DCA IS/3 compliant. However, another receiver might use an exit program that concatenates multiple data sets and removes all Begin Print File (BPF) and End Print File (EPF) structured fields, resulting in a single data set print file that is no longer MO:DCA IS/3 compliant.

To ensure that all transmitted input files remain compliant with the specified interchange set, follow the guidelines for the type of interchange set.

## Input files with MO:DCA IS/3; IS/3 with function sets; and AFP/A, IS/3

- To make sure the auxiliary files that AFP Download Plus sends to the receiver, such as separator pages and message files, are MO:DCA IS/3 compliant, do these:
  1. Create or update a PRINTDEV statement in the startup procedure that specifies a message OUTPUT statement with these entries:
    - A page definition that uses only TrueType and OpenType fonts, not FOCA fonts. For example, the OUTPUT statement can specify the P1TT6462 sample page definition that is included with PSF. P1TT6462 is equivalent to the P1A06462 default message page definition, except that it uses TrueType and OpenType fonts.
    - A form definition that either is compiled with the COMPIS3 PPFA parameter or is one of the sample IS/3 form definitions that is included with PSF: F1I30110 for simplex or F1I30111 for duplex. To use the COMPIS3 parameter in PPFA, you must have PTF UK79320 installed.

See PRT004 in [Figure 9 on page 39](#) for more information.
  2. When you are sending separator pages, create or update a PRINTDEV statement in the startup procedure that specifies separator OUTPUT statements with these entries:
    - A page definition that uses only TrueType and OpenType fonts, not FOCA fonts. For example, the OUTPUT statements can specify the P1TT6483 sample page definition that is included with PSF. P1TT6483 is equivalent to the P1V06483 default separator page definition, except that it uses TrueType and OpenType fonts.
    - A form definition that either is compiled with the COMPIS3 PPFA parameter or is one of the sample IS/3 form definitions that is included with PSF: F1I30110 for simplex or F1I30111 for duplex. To use the COMPIS3 parameter in PPFA, you must have PTF UK79320 installed.

See PRT004 in [Figure 9 on page 39](#) for more information.
  3. If the files to be transmitted all specify a MO:DCA interchange set level of IS/3, set a parameter in the AFPPARMS control statement to `is3` or the Printer Inventory parameter to `IS/3`. If the files to be transmitted are a mix of MO:DCA IS/3, IS/3 with function sets, and AFP/A, IS/3, set the AFPPARMS parameter to `bpf-match` or the Printer Inventory parameter to `BPF match`. See **auxiliary-files-modca-level** in “Parameters for the AFPPARMS control statement” on [page 45](#) or **Auxiliary files MO:DCA level** in “FSA Printer Inventory parameters” on [page 80](#).
  4. Test that the auxiliary files are MO:DCA IS/3 compliant by doing these:
    - a. Set a parameter in the AFPPARMS control statement or the Printer Inventory to Yes (see **save-auxiliary-files** in “Parameters for the AFPPARMS control statement” on [page 45](#) or **Save auxiliary files** in “FSA Printer Inventory parameters” on [page 80](#)) and then run AFP Download Plus. During processing, AFP Download Plus ignores the parameters for compression, direct download, and send messages on failure; saves the auxiliary files in the job submitter's default message directory, `/var/psf/userinfo/userid`; and does not send any files to the receiver.
    - b. Run the MO:DCA validation tool of your choice on the saved auxiliary files to determine whether your files are compliant. The AFP Consortium ([www.afpcinc.org](http://www.afpcinc.org)), provides an IS/3 validation tool that you can use. The validation tool indicates whether MO:DCA errors are present in the file. See *Mixed Object Document Content Architecture Reference* at [AFP Consortium Publications \(afpcinc.org/publications\)](http://AFP Consortium Publications (afpcinc.org/publications)) for more information about resolving IS/3-related errors.
    - c. Fix the files if they contain errors, run AFP Download Plus, and then run the MO:DCA validation tool. Do this until the files are compliant. The saved auxiliary files are replaced each time that you run AFP Download Plus.
    - d. When testing is complete, set the parameter for saving auxiliary files to No.
- If you have a multiple data set job with one or more data sets that specify a MO:DCA interchange set level and you want the data sets and any auxiliary files to remain compliant, do one of these:
  - Send the job to a receiver that does not concatenate data sets.

- Send the job to a receiver that preserves the MO:DCA interchange level during the concatenation process.
- Set an AFPPARMS parameter or Printer Inventory parameter to No (see **dataset-grouping** in “Parameters for the AFPPARMS control statement” on page 45 or **Data set grouping** in “FSA Printer Inventory parameters” on page 80), and send the job to a receiver that does not preserve MO:DCA IS/3 files during the concatenation process.

## Input files without IS/3 interchange sets

For input files with interchange sets that are not IS/3, such as MO:DCA AFP/A, add as few auxiliary data sets as possible to the output to ensure that all print files in the job are compliant with the specified interchange set. TrueType and OpenType fonts are compliant with all MO:DCA interchange sets, so auxiliary files must be set up to use them. Follow these guidelines:

- To make sure the message files that AFP Download Plus sends to the receiver use TrueType or OpenType fonts, create or update a PRINTDEV statement in the startup procedure that specifies a message OUTPUT statement with these entries:
  - A page definition that uses only TrueType and OpenType fonts, not FOCA fonts. For example, the OUTPUT statement can specify the P1TT6462 sample page definition that is included with PSF. P1TT6462 is equivalent to the P1A06462 default message page definition, except that it uses TrueType and OpenType fonts.
  - A form definition that either is compiled with the COMPIS3 PPFA parameter or is one of the sample IS/3 form definitions that is included with PSF works for MO:DCA AFP/A data streams and might work for others. You need to verify the output for other interchange sets. The sample IS/3 form definitions are: F1I30110 for simplex or F1I30111 for duplex. To use the COMPIS3 parameter in PPFA, you must have PTF UK79320 installed.

See PRT004 in [Figure 9 on page 39](#) for more information.

- Send separator pages to the receiver only if necessary. If you need to, create or update a PRINTDEV statement in the startup procedure that specifies separator OUTPUT statements with these entries:
  - A page definition that uses only TrueType and OpenType fonts, not FOCA fonts. For example, the OUTPUT statements can specify the P1TT6483 sample page definition that is included with PSF. P1TT6483 is equivalent to the P1V06483 default separator page definition, except that it uses TrueType and OpenType fonts.
  - A form definition that either is compiled with the COMPIS3 PPFA parameter or is one of the sample IS/3 form definitions that is included with PSF works for MO:DCA AFP/A data streams and might work for others. You need to verify the output for other interchange sets. The sample IS/3 form definitions are: F1I30110 for simplex or F1I30111 for duplex. To use the COMPIS3 parameter in PPFA, you must have PTF UK79320 installed.

See PRT004 in [Figure 9 on page 39](#) for more information.

- Set the AFPPARMS parameter to `bpf-match` or the Printer Inventory parameter to `BPF match` to generate the matching interchange set specification on the BPF and BDT structured fields of the auxiliary files as are specified on the user's print file. See **auxiliary-files-modca-level** in “Parameters for the AFPPARMS control statement” on page 45 or **Auxiliary files MO:DCA level** in “FSA Printer Inventory parameters” on page 80.
- Test that the auxiliary files are compliant with the interchange set of your input print files by doing these:
  1. Set a parameter in the AFPPARMS control statement or the Printer Inventory to Yes (see **save-auxiliary-files** in “Parameters for the AFPPARMS control statement” on page 45 or **Save auxiliary files** in “FSA Printer Inventory parameters” on page 80) and then run AFP Download Plus. During processing, AFP Download Plus ignores the parameters for compression, direct download, and send messages on failure; saves the auxiliary files in the job submitter's default message directory, `/var/psf/userinfo/userid`; and does not send any files to the receiver.

2. Manually verify or run the MO:DCA validation tool of your choice on the saved auxiliary files to determine whether your files are compliant. See *Mixed Object Document Content Architecture Reference* at AFP Consortium Publications ([afpcinc.org/publications](http://afpcinc.org/publications)) for more information about resolving IS/3-related errors.
  3. Fix the files if they contain errors, run AFP Download Plus, and verify the output files. Do this until the files are compliant. The saved auxiliary files are replaced each time that you run AFP Download Plus.
  4. When testing is complete, set the parameter for saving auxiliary files to No.
- If you have a multiple data set job with one or more data sets that specify a MO:DCA interchange set level and you want the data sets and any auxiliary files to remain compliant, do one of these:
    - Send the job to a receiver that does not concatenate data sets.
    - Send the job to a receiver that preserves the MO:DCA interchange level during the concatenation process.
    - Set an AFPPARMS parameter or Printer Inventory parameter to No (see **dataset-grouping** in “Parameters for the AFPPARMS control statement” on page 45 or **Data set grouping** in “FSA Printer Inventory parameters” on page 80), and send the job to a receiver that does preserve MO:DCA files during the concatenation process.

## Configuring TCP/IP

---

AFP Download Plus uses TCP/IP to send data to a receiver, and supports IPv4 and IPv6. TCP/IP configuration parameters, in addition to other network considerations, can affect how fast data is sent. For information about configuring TCP/IP, see *z/OS Communications Server: IP System Administrator's Commands*. For AFP Download Plus, also check the recommendations that are listed in *PSF for z/OS: Customization*.

For TCPRCVBUFSIZE and TCPSENBFRSIZE, use a buffer size of 256 KB. You can specify these parameters in the TCPCONFIG statement in the hlq.PROFILE.TCPIP data set. See *z/OS Communications Server: IP Configuration Reference* for information about the TCPCONFIG statement and the PROFILE.TCPIP search order.

## Creating a startup procedure

---

Before you start the AFP Download Plus sender, create a cataloged startup procedure to define FSAs for the sender and indicate how the job is to be processed. The startup procedure identifies:

- Program name and region size.
- AFP Download Plus resources.
- Defaults for processing with different FSA destinations. You can define different defaults for each FSA.

Include the startup procedure in a library that is known to either JES2 or JES3. See *z/OS JES2 Initialization and Tuning Reference* for your installation for more information about startup procedure libraries.

### Notes:

1. See “Configuring AFP Download Plus so files remain compliant with the specified MO:DCA interchange set” on page 31 for the changes you need to make in the startup procedure when you are generating compliant auxiliary files, such as separator pages and message files.
2. You can define initialization parameters in the Infoprint Server Printer Inventory instead of the startup procedure. Using the Printer Inventory is more efficient than using the startup procedure because when you change parameters in the Printer Inventory, you do not need to restart all the FSAs in the startup procedure; you need to restart only the FSA for which you changed parameters. See “Printer Inventory” on page 73 for information about how to use parameters in the Printer Inventory instead of the startup procedure. For more information about the Printer Inventory, see *PSF for z/OS: Customization*.

This information describes sample startup procedures, JCL statements for the startup procedure, the AFPPARMS control statement, PRINTDEV parameters, and Printer Inventory parameters.

## Sample startup procedure

Table 8 on page 35 lists the sample startup procedures that are provided with AFP Download Plus in SYS1.PROCLIB.

Table 8. Sample startup procedure members in SYS1.PROCLIB	
Member name	Description
<b>APSWAFPP</b>	Startup procedure for AFP Download Plus, which includes the use of Quick Response (QR) Code bar codes with SOSI data, extended code pages that are stored in UNIX files, RAT-installed resources, such as TrueType and OpenType fonts and data object resources, and an IS/3-defined FSA.
<b>APSWAFP2</b>	Startup procedure for AFP Download Plus.

Figure 6 on page 36–Figure 9 on page 39 show an example of an AFP Download Plus sender startup procedure with four FSAs that send data to different receivers that are running on the same system. The startup procedure name is AFPPLUS and the FSA names are PRT001, PRT002, PRT003, and PRT004.

The JES2 initialization statements for this sender are shown in Figure 14 on page 109; the JES3 initialization statements are shown in Figure 15 on page 112.

```

//AFPPLUS PROC
//*****
//* This sample startup procedure defines the DD, OUTPUT, and
//* PRINTDEV JCL for four AFP Download Plus destinations.
//*
//*****
//STEP01 EXEC PGM=APSHPOSE,REGION=4M,PARM=(,,,TCPIP,)
//*****
//AFPSTATS DD DSN=INST.AFPPLUS.AFPSTATS,DISP=SHR
//AFPPARMS DD DSN=FSS.PDS.AFPPARMS,DISP=SHR
//*
//MSGDSR OUTPUT PAGEDDEF=A06462,
// FORMDEF=A10110,
// PIMSG=NO,
// CLASS=M
//JOBHDR OUTPUT PAGEDDEF=V06483, /* JOB HEADER PAGE */
// FORMDEF=A10120,CHARS=60D8 /* FORMDEF: ALTERNATIVE BIN */
//JOBHIS3 OUTPUT PAGEDDEF=TT6483 /* JOB HEADER SEPARATOR USING TRUETYPE */
// FORMDEF=I30110 /* FONTS SPECIFIED IN THE PAGEDDEF */
//JOBTLR OUTPUT PAGEDDEF=V06483, /* JOB TRAILER PAGE */
// FORMDEF=A10110,CHARS=60D8 /* FORMDEF: MAIN BIN */
//JOBTIS3 OUTPUT PAGEDDEF=TT6483 /* JOB TRAILER SEPARATOR USING TRUETYPE */
// FORMDEF=I30110 /* FONTS SPECIFIED IN THE PAGEDDEF */
//DSHDR OUTPUT PAGEDDEF=V06483, /* DATA SET SEPARATOR */
// FORMDEF=A10110,CHARS=60D8 /* FORMDEF: MAIN BIN */
//DSHIS3 OUTPUT PAGEDDEF=TT6483 /* JOB DATA SET SEPARATOR USING TRUETYPE*/
// FORMDEF=I30110 /* FONTS SPECIFIED IN THE PAGEDDEF */
//MSGDS OUTPUT PAGEDDEF=A08682, /* MESSAGE DATA SET FOR ERRORS */
// FORMDEF=A10110,CHARS=60D8
//MSGIS3 OUTPUT PAGEDDEF=TT6462, /* MESSAGE DATA SET USING TRUETYPE */
// FORMDEF=I30110 /* FONTS SPECIFIED IN THE PAGEDDEF */
//*****
//* AFP Download Plus RESOURCES:
//*****
//* 240-pel raster font and outline font library
//FONT01 DD DSN=INST.FONT240,DISP=SHR
// DD DSN=SYS1.FONTLIBB,DISP=SHR
// DD DSN=SYS1.SFNTILIB,DISP=SHR /*SYSTEM OUTLINE FONTS
*/
//* 300-pel raster font and outline font library
//FONT02 DD DSN=INST.FONT300,DISP=SHR
// DD DSN=SYS1.FONT300,DISP=SHR
// DD DSN=SYS1.SFNTILIB,DISP=SHR /*SYSTEM OUTLINE FONTS */
//*
//TTFONT01 DD PATH='/usr/lpp/fonts/worldtype'
// DD PATH='/usr/lpp/PSF/fonts/ttf/'
//*
//OBJ01 DD PATH='/u/objc/dataobjresource/'
// DD PATH='/u/objc/coloimgmtresource/'
//*

```

Figure 6. Example of an AFP Download Plus startup procedure (Part 1 of 4)



```

//PSEG01 DD DSN=INST.R240.PSEGLIB,DISP=SHR
// DD DSN=SYS1.PSEGLIB,DISP=SHR
//PSEG02 DD DSN=INST.R300.PSEGLIB,DISP=SHR
//*
//OLAY01 DD DSN=INST.R240.OVERLIB,DISP=SHR
// DD DSN=SYS1.OVLYLIB,DISP=SHR
//OLAY02 DD DSN=INST.R300.OVERLIB,DISP=SHR
//*
//PDEF01 DD DSN=INST.PDEFLIB,DISP=SHR
// DD DSN=SYS1.PDEFLIB,DISP=SHR
//*
//FDEF01 DD DSN=INST.FDEFLIB,DISP=SHR
// DD DSN=SYS1.FDEFLIB,DISP=SHR
//*
//OC01 DD DSN=INST.OCLIB,DISP=SHR
// DD DSN=SYS1.OCLIB,DISP=SHR
//*****
//* This FSA defines a destination that:
//* - Writes transform messages to a zFS file. When errors stop
//* transformation, sends messages to the receiver system using the
//* resources specified on the MESSAGE OUTPUT statement.
//* - Passes the default of block data check reporting to the destination.
//* - Attempts connection forever.
//* - Connects to PORT 6100.
//* - Defaults to using the 240-pel raster font library.
//*****
//PRT001 CNTL
//PRT001 PRINTDEV FONTDD=*.FONT01,
// FONT240=*.FONT01,
// FONT300=*.FONT02,
// FONTPATH=*.TTFONT01,
// OVLYDD=*.OLAY01,
// OVLY240=*.OLAY01,
// OVLY300=*.OLAY02,
// PSEGDD=*.PSEG01,
// PSEG240=*.PSEG01,
// PSEG300=*.PSEG02,
// PDEFDD=*.PDEF01,
// FDEFDD=*.FDEF01,
// MESSAGE=*.MSGDS,
// OBJCOND=*.OC01,
// PAGEDEF=A06462,
// FORMDEF=A10110,
// JOBHDR=*.JOBHDR, /* JOB HDR OUTPUT */
// JOBTRLR=*.JOBTLR, /* JOB TLR OUTPUT */
// DSHDR=*.DSHDR, /* DS SEPARATOR */
// CHARS=60DB,
// TRACE=YES,
// DATAK=BLOCK,
// PIMSG=YES,
// CONNINTV=0,
// IPADDR=9.99.999.9,
// PORTNO=6100
//PRT001 ENDCTL

```

Figure 7. Example of an AFP Download Plus startup procedure (Part 2 of 4)

```

//*****
//* This FSA defines a destination that:
//* - Redirects transform messages to spool. When errors stop transformation,
//*   sends messages to the receiver system using the resources specified on
//*   the MESSAGE OUTPUT statement.
//* - Passes the default of block data check reporting to the destination.
//* - Attempts connection forever.
//* - Connects to PORT 8500.
//* - Defaults to using the 300-pel raster font library.
//*****
//PRT002 CNTL
//PRT002 PRINTDEV FONTDD=*.FONT02,
//      FONT240=*.FONT01,
//      FONT300=*.FONT02,
//      FONTPATH=*.TTFONT01,
//      OVLYDD=*.OLAY02,
//      OVLY240=*.OLAY01,
//      OVLY300=*.OLAY02,
//      PSEGDD=*.PSEG02,
//      PSEG240=*.PSEG01,
//      PSEG300=*.PSEG02,
//      PDEFDD=*.PDEF01,
//      FDEFDD=*.FDEF01,
//      MESSAGE=*.MSGDSR,
//      PAGEDEF=A06462,
//      FORMDEF=A10110,
//      JOBHDR=*.JOBHDR,          /* JOB HDR OUTPUT    */
//      JOBTRLR=*.JOBTLR,        /* JOB TLR OUTPUT    */
//      DSHDR=*.DSHDR,          /* DS SEPARATOR      */
//      CHARS=60DB,
//      TRACE=YES,
//      DATAK=BLOCK,
//      PIMSG=YES,
//      CONNINTV=0,
//      IPADDR=9.99.999.9,
//      PORTNO=8500
//PRT002 ENDCNTL
//*****
//* This FSA defines a destination that:
//* - Writes transform messages to a zFS file. When errors stop
//*   transformation, sends messages to the receiver system using the
//*   resources specified on the MESSAGE OUTPUT statement.
//* - Maps raster font references to outline font references.
//* - Uses object container libraries that contain data object resources
//*   and color management resources.
//* - Passes the default of allow data check reporting to the destination.
//* - Attempts connection for 10 minutes.
//* - Connects to PORT 7200.
//*****
//PRT003 CNTL
//PRT003 PRINTDEV FONTDD=*.FONT02,
//      FONT240=*.FONT01,
//      FONT300=*.FONT02,
//      FONTPATH=*.TTFONT01,
//      OBJCPATH=*.OBJ01,
//      OVLYDD=*.OLAY02,
//      OVLY240=*.OLAY01,
//      OVLY300=*.OLAY02,
//      PSEGDD=*.PSEG02,
//      PSEG240=*.PSEG01,
//      PSEG300=*.PSEG02,
//      PDEFDD=*.PDEF01,

```

Figure 8. Example of an AFP Download Plus startup procedure (Part 3 of 4)

```

//      FDEFDD=*.FDEF01,
//      MESSAGE=*.MSGDS,
//      OBJCONDD=*.OC01,
//      PAGEDEF=A06462,
//      FORMDEF=A10110,
//      JOBHDR=*.JOBHDR,          /* JOB HDR OUTPUT   */
//      JOBTRLR=*.JOBTLR,        /* JOB TLR OUTPUT   */
//      DSHDR=*.DSHDR,          /* DS SEPARATOR     */
//      CHARS=60DB,
//      TRACE=YES,
//      MAP20LN=YES,
//      DATAK=UNBLOCK,
//      PIMSG=YES,
//      CONNINTV=600,
//      IPADDR=9.99.999.9,
//      PORTNO=7200
//PRT003  ENDCNTL
//*****
/* This FSA defines a destination that:
/* - Generates separator pages and message data sets that use only TrueType
/* and OpenType fonts so the files are M0:DCA IS/3 compliant. The AFPPARMS
/* data set or the Printer Inventory specifies an entry for PRT004 with
/* Yes for send separator pages and IS/3 for auxiliary files M0:DCA level.
/* - Writes transform messages to a zFS file. When errors stop
/* transformation, sends messages to the receiver system using the
/* resources specified on the MESSAGE OUTPUT statement, which only
/* uses TrueType and OpenType fonts for print files that are M0:DCA
/* IS/3 compliant.
/* - Passes the default of block data check reporting to the destination.
/* - Attempts connection forever.
/* - Connects to PORT 8500.
/* - Defaults to using the 300-pel raster font library for data sets that
/* are not M0:DCA IS/3 compliant.
/* - Does not use the CHARS parameter; for print files that are not M0:DCA
/* IS/3 compliant, you can specify CHARS to include raster fonts.
//*****
//PRT004  CNTL
//PRT004  PRINTDEV FONTDD=*.FONT02,
//      FONT240=*.FONT01,
//      FONT300=*.FONT02,
//      FONTPATH=*.TTFONT01,
//      OVLYDD=*.OLAY02,
//      OVLY240=*.OLAY01,
//      OVLY300=*.OLAY02,
//      PSEGDD=*.PSEG02,
//      PSEG240=*.PSEG01,
//      PSEG300=*.PSEG02,
//      PDEFDD=*.PDEF01,
//      FDEFDD=*.FDEF01,
//      MESSAGE=*.MSGIS3,
//      FORMDEF=I30110,
//      JOBHDR=*.JOBHIS3,          /* JOB HDR OUTPUT   */
//      JOBTRLR=*.JOBTIS3,        /* JOB TLR OUTPUT   */
//      DSHDR=*.DSHIS3,          /* DS SEPARATOR     */
//      TRACE=YES,
//      DATAK=BLOCK,
//      PIMSG=YES,
//      CONNINTV=0,
//      IPADDR=9.99.999.9,
//      PORTNO=8500
//PRT004  ENDCNTL
//*/

```

Figure 9. Example of an AFP Download Plus startup procedure (Part 4 of 4)

**Note:** This sample JCL assumes that the AFP Download Plus programs are in a data set that is part of the standard system search order; if not, include a STEPLIB statement to identify the data set.

## JCL statements for the startup procedure

This information describes the statements and parameters that are shown in [Figure 6 on page 36](#)—[Figure 9 on page 39](#).

### **proc\_name PROC**

Specifies the name of the startup procedure. *proc\_name* must be specified in the JES2 FSS or the JES3 FSSDEF initialization statement.

**EXEC PGM=APSHPOSE[,REGION=nnnn{K | M} [,MEMLIMIT=nnnnn{M | G | T | P} | NOLIMIT]  
[,TIME=NOLIMIT] [,PARM=({'INV=piname' |  
NSTddname,trace\_type,prompt,trace\_size,tcip\_name,UNICODE,blank\_truncation,restore\_blanks\_classes})]**

Specifies the name of the AFP Download Plus program and identifies any special processing parameters. This statement is required.

**PGM=APSHPOSE**

Specifies the name of the AFP Download Plus executable program.

**REGION=nnnn{K | M}**

Specifies the amount of storage that the sender requires.

**nnnn**

0–9999 K or 0–2047 M

**K**

Kilobytes

**M**

Megabytes

See [Table 7](#) on [page 30](#) for the minimum storage that is required for AFP Download Plus.

**MEMLIMIT=nnnnn{M | G | T | P} | NOLIMIT}**

Specifies the amount of usable virtual storage that is above the bar in a single address space.

When a value other than 0 is specified, you can specify the **above-the-bar-storage** parameter on the AFPPARMS control statement or in the Printer Inventory to request that inline resources be stored above the 2 GB bar to relieve region storage area constraints.

**nnnnn**

0–99999

**M**

Megabytes

**G**

Gigabytes

**T**

Terabytes

**P**

Petabytes

**NOLIMIT**

All available storage

**TIME=NOLIMIT**

Specifies NOLIMIT to prevent TIMEOUT abends.

**PARM=({'INV=piname' |**

**NSTddname,trace\_type,prompt,trace\_size,tcip\_name,UNICODE,blank\_truncation,restore\_blanks\_classes})**

Specifies parameters for using the InfoPrint Server Printer Inventory or PSF tracing values and JES2 blank truncation values. See [“Using the PSF trace facility” on page 153](#) for more information about tracing.

**Note:** If you need more than the limit of 100 characters or prefer, you can replace PARM= with PARMDD= to specify these parameters. See the [z/OS MVS JCL Reference](#) for more information on the syntax for using PARMDD on the EXEC statement.

**INV=piname**

Specifies the 4-character name of the Printer Inventory that is specified in the Infoprint Server configuration file. This parameter indicates that AFP Download Plus uses the Printer Inventory and obtains parameters from the specified Printer Inventory for each FSA in the startup procedure.

For more information about using the Printer Inventory, see [“Printer Inventory” on page 73](#).

***NSTddname***

Specifies the name of a DD statement that defines the output data set in which to record the NST trace output. This name must conform to the standard JCL naming conventions.

This parameter specifies that the NST trace is to start during AFP Download Plus initialization if you specify TRACE=YES on the PRINTDEV statement and define the NST trace data set in a DD statement. If you want the NST trace to be started dynamically, do not specify *NSTddname*.

The equivalent parameter in the PRINTER Inventory is the NST **trace dsname** parameter.

***trace\_type***

Specifies which FSA trace to start:

**FULL**

Specifies an FSA full external trace.

**INTR**

Specifies an FSA internal trace. INTR is the default value.

**IPDS**

Specifies an FSA Intelligent Printer Data Stream (IPDS) external trace.

**LIMIT**

Specifies a shortened FSA external trace.

**SYNC**

Specifies an FSA SYNC external trace.

***prompt***

Specifies whether an operator response is required to initialize the AFP Download Plus operator interface:

**PROMPT**

Specifies that each time the sender is initialized, the operator receives message APS620A. The message prompts the operator to enter a response, which notifies AFP Download Plus to initialize the AFP Download Plus operator interface. The response can be any AFP Download Plus operator interface command; it is directed to all FSAs or to the notify subtask.

Thereafter, the operator can type commands, such as those to start the functional subsystem interface (FSI) or FSA component traces, before AFP Download Plus starts processing data sets. Prompting occurs even if the startup procedure does not include tracing specifications.

**NOPROMPT**

Specifies that the AFP Download Plus operator interface is initialized automatically. No operator response is required. NOPROMPT is the default value.

The equivalent parameter in the Printer Inventory is the **Trace prompt** parameter.

***trace\_size***

Specifies the number of 4 KB pages of storage to allocate for each internal FSA trace table. Valid values are 1–999. The default is 32 (128 KB) per FSA.

**Note:**

When the number of pages that are specified is more than 32 and the result of adding the REGION increase to the current REGION specification on the EXEC statement is greater than 32 MB, increase the REGION size on your EXEC statement to this new total value. If the new value of REGION causes storage problems, use REGIONX instead of REGION to specify how storage is distributed above and below the 16 MB line.

To determine how large an increase is needed due to tracing, use the following equation, where *number of FSAs active* is the maximum number of FSAs active while the FSS is running:

$$\text{REGION increase} = (\text{number of FSAs active}) \times 4 \text{ KB} \times (\text{pgcount} - 32)$$

The equivalent parameter in the Printer Inventory is the **Trace table size** parameter.

#### ***tcpip\_name***

Specifies the name of the TCP/IP address space. If this parameter is not specified, AFP Download Plus uses the default name of TCPIP.

The equivalent parameter in the Printer Inventory is the **TCP/IP job name** parameter.

#### **UNICODE**

Specifies that AFP Download Plus is enabled to use the system conversion services that z/OS provides. The parameter is ignored because PSF is always Unicode-enabled.

The equivalent parameter in the Printer Inventory is the **Unicode enabled** parameter.

#### ***blank\_truncation***

Specifies whether trailing blanks are truncated for non-page-mode records received from JES2:

##### **NOBLNKTRNC**

Trailing blanks are **not** truncated for all non-page-mode data sets.

##### **BLNKTRNC**

Trailing blanks are truncated for all non-page-mode data sets. **BLNKTRNC** is the default.

Non-page-mode data sets include line-mode data, text data, mixed-mode data, and XML data. If you specify this parameter for composed-text page data sets (for example, output created by the Document Composition Facility), it has no effect. Note that the PRMODE= parameter, on both the JCL and JES2 output device initialization statements, does not affect blank truncation. To turn off blank truncation for some SYSOUT classes, see the *restore\_blanks\_classes* parameter.

The equivalent parameter in the Printer Inventory is the **Blank truncation** parameter.

Specify NOBLNKTRNC when all data sets processed by this FSS require right-hand blank padding to print properly.

#### ***restore\_blanks\_classes***

This parameter is only used when *blank\_truncation* = BLNKTRNC. It specifies the SYSOUT classes for which you do **not** want trailing blanks truncated for non-page-mode data sets. Non-page-mode data sets include line-mode data, text data, mixed-mode data, and XML data.

Specify the same classes for which you specified BLNKTRNC=NO on the JES2 OUTCLASS(v) statement before z/OS 2.4. Or, specify this parameter for SYSOUT classes that have:

- Non-page-mode data sets that require trailing blanks to be preserved
- Data sets containing double-byte font characters

Valid values are A–Z, 0–9.

Specifies up to thirty-six SYSOUT class values. Each class is one alphanumeric character. Do not separate the class values by commas or blanks. The value of the SYSOUT class of the data set received from JES is compared to the *restore\_blanks\_classes*. If the SYSOUT class matches one of these classes trailing blanks will not be truncated.

For example, if your JES2 OUTCLASS statement specified BLNKTRNC=NO for:

- OUTCLASS(K,L,Y), specify *restore\_blanks\_classes* = KLY
- OUTCLASS(S-Z), specify *restore\_blanks\_classes* = STUVWXYZ

The equivalent parameter in the Printer Inventory is the **Restore blanks classes** parameter.

#### **OUTPUT**

Specifies the page definitions, form definitions, and fonts that are used to format the different pages in a job or data set, including job header pages, data set header pages, job trailer pages, and pages that are used for formatting messages.

To redirect messages for viewing or processing by another FSA, you use these parameters on OUTPUT statements for message pages: CHARS, CLASS, COLORMAP, COMSETUP, DEST, FORMDEF, PAGEDEF, PIMSG, RESFMT, and TRC. All other parameters are ignored.

For information about how to specify OUTPUT so that the messages are redirected for viewing or processing by another FSA, see [“Redirecting messages” on page 150](#).

## **DD**

Identifies the system libraries that contain:

- Resources that are used for processing (fonts, page segments, overlays, page definitions, form definitions, and object containers)
- Traces and reports (AFP Download Plus external trace data set and AFP Download Plus AFPSTATS report)

## **CNTL**

Indicates the beginning of program control statements for each FSA.

The FSA name on the CNTL statement must match the label on the subsequent PRINTDEV and ENDCNTL statements. For JES3, the FSA name must match the name that is specified on the JNAME parameter on the JES3 DEVICE initialization statement. For JES2, the FSA name must match the name on the PRT $nnn$  initialization statement.

## **PRINTDEV**

Specifies default FSA-initialization parameters. A PRINTDEV statement is entered for each FSA defined in an AFP Download Plus startup procedure.

The FSA name on the PRINTDEV statement must match the label on the CNTL and ENDCNTL statements, and the JES2 PRT $nnn$  initialization statement or the JNAME parameter on the JES3 DEVICE initialization statement.

See [Table 12 on page 66](#) for a description of the PRINTDEV parameters. Many of the PRINTDEV parameters can be defined in the Printer Inventory. For more information about using Printer Inventory parameters instead of PRINTDEV parameters, see [“Printer Inventory” on page 73](#).

## **ENDCNTL**

Specifies the end of the program control statements for the FSA. This statement is specified only when you specify PRINTDEV parameters.

The FSA name on the ENDCNTL statement must match the label on the preceding CNTL and PRINTDEV statements, and the JES2 PRT $nnn$  initialization statement or the JNAME parameter on the JES3 DEVICE initialization statement.

# **AFPPARMS control statement in the startup procedure**

Additional parameters that AFP Download Plus uses to transform and distribute JES spool data sets are contained in an AFPPARMS control statement. You can specify this control statement with the AFPPARMS DD name in the startup procedure and on a job-by-job basis with the AFPPARMS parameter on the OUTPUT JCL statement (see [“Specifying the AFPPARMS control statement on the OUTPUT statement” on page 147](#)).

This is an example of the AFPPARMS DD statement in the startup procedure:

```
//AFPPARMS DD DSN=FSS.PDS.AFPPARMS,DISP=SHR
```

The AFPPARMS control statement that is specified with the AFPPARMS DD name is a partitioned data set; the data set name ends with a qualifier of AFPPARMS. Also, DISP=SHR is used so that AFP Download Plus processes the spool data sets for multiple FSAs.

## **How the AFPPARMS data set is allocated**

[Table 9 on page 44](#) shows how to allocate the AFPPARMS data set that is specified with the AFPPARMS DD name in the startup procedure.

Table 9. Allocation of AFPPARMS data set attributes			
Attribute	Value	Type	Description
<b>DCB=DSORG=</b>	PO	Required	Data set organization
<b>DSNTYPE=</b>	LIBRARY	Required	Data set defined as PDSE
<b>DCB=RECFM=</b>	xx	Required	Any value except U
<b>DCB=LRECL=</b>	nnnn	Required	Maximum bytes in the record (see Note “1” on page 44)
<b>DISP=</b>	SHR	Required	Data set can be shared
<b>SPACE=</b>	(CYL,(nn,1,10))	Required	Direct access storage device (DASD) cylinders that are required to process data (see Note “2” on page 44)

#### Notes:

1. Any record size is valid; however, use a small record size, such as DCB=LRECL=120, to conserve DASD space.
2. Space requirements depend on the type of DASD that is used and on the number of FSAs that are specified in the startup procedure.

## How members in the data set are specified

The parameters in the AFPPARMS control statement are used by AFP Download Plus as defaults to process the spool data sets for each FSA. The AFPPARMS control statement can contain a defaults member, named either DEFAULTS or AFDPDEF, and members with the same names as the FSA names specified in the startup procedure. These members are optional, but you can use them to associate AFPPARMS parameters to specific FSAs.

**Note:** The AFPPARMS control statement can contain only one defaults member, DEFAULTS or AFDPDEF, not both.

You can use an FSA member name to specify parameters that apply to that FSA. For example, if you want to associate AFPPARMS parameters to an FSA named PRT619, which is specified in the startup procedure, you specify the parameters in a member that is named PRT619 in the AFPPARMS control statement. AFP Download Plus finds the member in the data set and uses the AFPPARMS parameters to process the spool data sets for the PRT619 FSA.

You can also use the defaults member to specify default parameters that apply to all FSAs in the FSS. However, if a member for a specific FSA is specified, it is also used and overrides the same parameters that are specified in the defaults member. For example:

- The DEFAULTS member specifies these parameters:

```
overlays = inline
foca-fonts = inline
```

- The PRT619 member specifies these parameters:

```
foca-fonts = not-inline
object-containers = inline
```



- Therefore, the parameter values AFP Download Plus uses are:

```
overlays = inline
foca-fonts = not-inline
object-containers = inline
```

Notice that the **foca-fonts** value is overridden by the value in the PRT619 member, but the overlays value remains the same.

## Selection hierarchy for AFPPARMS parameters

This hierarchy shows the order that AFP Download Plus uses to select AFPPARMS parameters:

1. AFPPARMS control statement on the OUTPUT JCL statement
2. Printer Inventory
3. FSA member name in the AFPPARMS control statement that is specified in AFP Download Plus startup procedure
4. Defaults member name, either DEFAULTS or AFDPDEF, in the AFPPARMS control statement that is specified in AFP Download Plus startup procedure

## Syntax of the AFPPARMS control statement

The syntax guidelines for the AFPPARMS control statement are:

- A parameter is a *keyword=value* pair.
- Spaces are allowed after the keyword and before the value (on either side of the =).
- Only one parameter is allowed on a line.
- A parameter can span multiple lines. For example, the keyword can be on the first line, = can be on the next line, and the value can be on the third line.
- Parameter keywords and values can be specified in uppercase, lowercase, or mixed case.
- Comments are delimited with #. AFP Download Plus ignores everything on a line after the # character.

Figure 10 on page 45 shows an example of the AFPPARMS control statement syntax.

```
#-----#
# This is an example AFPPARMS control statement that demonstrates      #
# the syntax rules for specifying the control statements                  #
#-----#
goca-box=yes                    # A simple control parameter
GOCA-frac-Line=Yes              # Different cases
pass-oid = allow                # Blanks before and after =
    formdefs                    # A keyword preceded by spaces
                                # A blank line
                                # = on its own line
                                # A blank line
                                # The value for the "formdefs" keyword
    inline                      #
mcf2-format=CF overlays=inline  # Not allowed--two parameters on one line
```

Figure 10. Sample AFP Download Plus control statement

## Parameters for the AFPPARMS control statement

Table 10 on page 46 shows the parameters that are valid in the AFPPARMS control statement. An X in a column indicates that the parameter can be specified by the:

- AFPPARMS DD name in the startup procedure
- AFPPARMS parameter on the OUTPUT JCL statement

### Notes:

1. If you specify parameters in the AFPPARMS control statement in an FSA, AFDPDEF, or DEFAULTS member when you are using the Printer Inventory, the parameters in the AFPPARMS control statement are ignored.

2. When you change parameters for the defaults member in the AFPPARMS control statement, you must restart all the FSAs in the startup procedure.

Table 10. AFPPARMS control statement parameters			
Parameter	Description	Startup Proc	OUTPUT JCL
<b>above-the-bar-storage={inline-resources   none}</b>	<p>Specifies whether PSF uses storage that is above the bar for processing inline resources.</p> <p>The values are:</p> <p><b>none</b> PSF stores inline resources above the 16 MB line but below the 2 GB bar (the region area) during job processing.</p> <p><b>inline-resources</b> PSF stores inline resources above the 2 GB bar during job processing.</p> <p>See <b>Above the bar storage</b> in “FSA Printer Inventory parameters” on <a href="#">page 80</a> for the parameter you specify when you are using the Printer Inventory.</p>	X	X

Table 10. AFPPARMS control statement parameters (continued)

Parameter	Description	Startup Proc	OUTPUT JCL
<b>auxiliary-files-modca-level={bpf-match   is3   none}</b>	<p>Specifies the MO:DCA interchange set level that auxiliary files, such as separator pages and message files, support.</p> <p>The values are:</p> <p><b>bpf-match</b> Auxiliary files contain the same BPF MO:DCA Interchange Set triplet and Function Set triplets that are specified on the BPF structured field in the user's data set.</p> <p><b>is3</b> Auxiliary files are MO:DCA IS/3 compliant.</p> <p><b>none</b> Auxiliary files do not support a MO:DCA IS level. This is the default.</p> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1. Make sure that changes are made to the PRINTDEV statement for this FSA so that auxiliary files are generated correctly. See <a href="#">“Configuring AFP Download Plus so files remain compliant with the specified MO:DCA interchange set”</a> on page 31</li> <li>2. Do not use JESNEWS when you are specifying bpf-match for this parameter because if the JESNEWS data set is active, AFP Download Plus matches the JESNEWS data set, and the Job Header auxiliary file that is created does not match the MO:DCA interchange set level for the user's data set.</li> </ol> <p>See <b>Auxiliary files MO:DCA level</b> in <a href="#">“FSA Printer Inventory parameters”</a> on page 80 for the parameter you specify when you are using the Printer Inventory.</p>	X	
<b>bcoca={inline   not-inline}</b>	<p>Specifies whether all BCOCA objects required to print or view the output file are included inline. The default is inline.</p> <p>See <b>Resources Included Inline: Barcode objects (BCOCA)</b> in <a href="#">“FSA Printer Inventory parameters”</a> on page 80 for the parameter you specify when you are using the Printer Inventory.</p>	X	X

Table 10. AFPPARMS control statement parameters (continued)

Parameter	Description	Startup Proc	OUTPUT JCL
<b>cmr-objects={inline-all   inline-generic   not-inline}</b>	<p>Specifies whether color management resource (CMR) objects required to print or view the output file are included inline.</p> <p>The values are:</p> <p><b>inline-all</b> These objects are included inline:</p> <ul style="list-style-type: none"> <li>• All CMR objects that are referenced in the data stream.</li> <li>• All CMR objects for all device types and models that are referenced by data object or CMR resource access tables (RATs) and mapped to a generic instruction CMR.</li> </ul> <p><b>Note:</b> Link CMR objects are not included inline.</p> <p><b>inline-generic</b> These objects are included inline:</p> <ul style="list-style-type: none"> <li>• All CMR objects that are referenced in the data stream.</li> <li>• All non-device specific CMR objects that are referenced by data object or CMR RATs.</li> </ul> <p>This is the default.</p> <p><b>Note:</b> Link CMR objects are not included inline.</p> <p><b>not-inline</b> No CMR objects are included inline.</p> <p>See <b>Resources Included Inline: Color management resources</b> in “FSA Printer Inventory parameters” on page 80 for the parameter you specify when you are using the Printer Inventory.</p>	X	X

Table 10. AFPPARMS control statement parameters (continued)

Parameter	Description	Startup Proc	OUTPUT JCL
<b>compression={none   lzw}</b>	<p>Specifies whether the compression function is used to compress the transformed data before it is sent to the remote system. When lzw is specified, the data is compressed with the LZW compression algorithm. The default is none, which indicates that the data is not compressed.</p> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1. AFP Download Plus ignores this parameter when yes is specified for the <b>save-auxiliary-files</b> parameter.</li> <li>2. See <b>Compression</b> in “FSA Printer Inventory parameters” on page 80 for the parameter you specify when you are using the Printer Inventory.</li> </ol>	X	X
<b>dataset-grouping={yes   no}</b>	<p>Specifies whether the multiple data set function is used when the job is sent to the remote system. This parameter is only valid in the data set specified by the AFPPARMS DD name in the startup procedure. The default is no.</p> <p><b>Note:</b> When this parameter is set to yes:</p> <ol style="list-style-type: none"> <li>1. Ensure that the download receiver is at the correct level. Also, if you use the AFP Download Plus receiver, ensure that you specify the <b>apshhmds</b> exit program (see “Using the apshhmds exit program” on page 169).</li> <li>2. When the job contains print files that specify a MO:DCA interchange set level, ensure that your receiver supports and preserves that MO:DCA interchange set.</li> </ol> <p>See <b>Data set grouping</b> in “FSA Printer Inventory parameters” on page 80 for the parameter you specify when you are using the Printer Inventory.</p>	X	

Table 10. AFPPARMS control statement parameters (continued)

Parameter	Description	Startup Proc	OUTPUT JCL
<b>direct-download={<u>none</u>   modca}</b>	<p>Indicates whether AFP Download Plus stores data in a temporary directory or sends it directly to the receiver.</p> <p>The values are:</p> <p><b>none</b> AFP Download Plus stores the MO:DCA-P and resource data that is created from the JES spool print data in temporary UNIX files until transmission to the receiver. This is the default.</p> <p><b>modca</b> AFP Download Plus sends the MO:DCA-P data that is created from the JES spool print data directly to the receiver. The resource data is stored in a temporary UNIX file until transmission to the receiver.</p> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1. AFP Download Plus ignores this parameter when yes is specified for the <b>save-auxiliary-files</b> parameter.</li> <li>2. See <b>Direct download</b> in “FSA Printer Inventory parameters” on page 80 for the parameter you specify when you are using the Printer Inventory.</li> </ol>	X	

Table 10. AFPPARMS control statement parameters (continued)

Parameter	Description	Startup Proc	OUTPUT JCL
<b>display-afpdp-status={yes   no}</b>	<p>Indicates whether AFP Download Plus activates the processing status feature.</p> <p>The values are:</p> <p><b>yes</b></p> <p>AFP Download Plus processing status is activated and stays activated for the life of the FSA or until the DISPLAY,STATUS=AFDPDP operator interface MODIFY command is issued. Processing status is reported at the end of the spool data set in message APS8559I for both the spool data set transformation to MO:DCA-P and the transformed document transmission. See <a href="#">“Viewing the operator status message when the processing status feature is activated”</a> on page 64.</p> <p><b>no</b></p> <p>AFP Download Plus processing status is not activated. This is the default.</p> <p>See <b>Display status</b> in <a href="#">“FSA Printer Inventory parameters”</a> on page 80 for the parameter you specify when you are using the Printer Inventory. Also, see <a href="#">“Reporting AFP Download Plus processing status”</a> on page 126 for information about activating the status feature with the operator interface.</p>	X	
<b>foca-fonts={inline   not-inline}</b>	<p>Specifies whether all font character sets and code pages that are required to print or view the output file are included inline. If mcf2ref=cf is specified, AFP Download Plus also includes coded fonts inline; otherwise, coded fonts are not included inline. The default is inline.</p> <p>See <b>Resources Included Inline: Font objects (FOCA)</b> in <a href="#">“FSA Printer Inventory parameters”</a> on page 80 for the parameter you specify when you are using the Printer Inventory.</p>	X	X

Table 10. AFPPARMS control statement parameters (continued)

Parameter	Description	Startup Proc	OUTPUT JCL
<b>formdefs={<u>inline</u>   not-inline}</b>	<p>Specifies whether the form definition that is used in processing the file is included inline. The default is <code>inline</code>.</p> <p><b>Note:</b> The job that is sent to the receiver might fail to print or be archived, without any error messages, in these situations:</p> <ul style="list-style-type: none"> <li>You set these parameters for a job that is sent with separator pages:  <pre>formdefs=not-inline dataset-grouping=yes send-separator-pages=yes</pre> </li> <li>You set these parameters for a job that is sent with multiple data sets:  <pre>formdefs=not-inline dataset-grouping=yes</pre> </li> </ul> <p>See <b>Resources Included Inline: Form definitions</b> in “FSA Printer Inventory parameters” on page 80 for the parameter you specify when you are using the Printer Inventory.</p>	X	X
<b>goa={<u>inline</u>   not-inline}</b>	<p>Specifies whether all GOCA objects required to print or view the output file are included inline. The default is <code>inline</code>.</p> <p>See <b>Resources Included Inline: Graphics objects (GOCA)</b> in “FSA Printer Inventory parameters” on page 80 for the parameter you specify when you are using the Printer Inventory.</p>	X	X
<b>goa-box={yes   <u>no</u>}</b>	<p>Specifies whether GOCA box drawing orders are supported by the printer on the receiver system. The default is <code>no</code>.</p> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>The value that you select affects how line data is transformed to MO:DCA-P before it is sent to the receiver.</li> <li>When you are using the PPFA DRAWGRAPHIC command in a page definition, specify <code>yes</code> for this parameter.</li> </ol> <p>See <b>GOCA Box orders</b> in “FSA Printer Inventory parameters” on page 80 for the parameter you specify when you are using the Printer Inventory.</p>	X	X



Table 10. AFPPARMS control statement parameters (continued)

Parameter	Description	Startup Proc	OUTPUT JCL
<b>goca-frac-line={yes   no}</b>	<p>Specifies whether GOCA fractional line width drawing orders are supported by the printer on the receiver system. The default is no.</p> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1. The value that you select affects how line data is transformed to MO:DCA-P before it is sent to the receiver.</li> <li>2. When you are using the PPFA DRAWGRAPHIC command in a page definition, specify yes for this parameter.</li> </ol> <p>See <b>GOCA Set Fractional Line Width orders</b> in “FSA Printer Inventory parameters” on page 80 for the parameter you specify when you are using the Printer Inventory.</p>	X	X
<b>goca-process-color={yes   no}</b>	<p>Specifies whether GOCA process color drawing orders are supported by the printer on the receiver system. The default is no.</p> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1. The value that you select affects how line data is transformed to MO:DCA-P before it is sent to the receiver.</li> <li>2. When you are using the PPFA DRAWGRAPHIC command in a page definition, specify yes for this parameter.</li> </ol> <p>See <b>GOCA Set Process Color orders</b> in “FSA Printer Inventory parameters” on page 80 for the parameter you specify when you are using the Printer Inventory.</p>	X	X

Table 10. AFPPARMS control statement parameters (continued)

Parameter	Description	Startup Proc	OUTPUT JCL
<b>image-output-format={asis   ioca}</b>	<p>Specifies the image data format AFP Download Plus produces in the output document. IM1 images can be saved in the same format as in the input file or converted to uncompressed Image Object Content Architecture (IOCA) images.</p> <p>Most printers support both IM1 and IOCA image formats, but IM1 images cannot be rotated or rescaled correctly at different printer resolutions. Print servers, such as PSF, convert IM1 images to uncompressed IOCA when the IM1 image resolution differs from the actual printer resolution. Because AFP Download Plus does not know what printer the output might be printed on, by default it converts IM1 images to uncompressed IOCA.</p> <p>Because uncompressed IOCA images are often greater in size than the original IM1 images, printer performance can be slower. If you have problems with printer performance, specify <b>image-output-format=asis</b> so the IM1 images are not converted to IOCA.</p> <p>The values are:</p> <p><b>asis</b> All image data is produced in the same format as in the input file.</p> <p><b>ioca</b> All image data is produced in uncompressed IOCA format. This is the default.</p> <p>See <b>Image output format</b> in “FSA Printer Inventory parameters” on page 80 for the parameter you specify when you are using the Printer Inventory.</p>	X	X
<b>ioca={inline   not-inline}</b>	<p>Specifies whether all IOCA objects required to print or view the output file are included inline. The default is <b>inline</b>.</p> <p>See <b>Resources Included Inline: Image objects (IOCA)</b> in “FSA Printer Inventory parameters” on page 80 for the parameter you specify when you are using the Printer Inventory.</p>	X	X

Table 10. AFPPARMS control statement parameters (continued)

Parameter	Description	Startup Proc	OUTPUT JCL
<b>ioca-replicate-trim-func={yes   no}</b>	<p>Specifies whether the IOCA Replicate and Trim function is used when you are converting IM1 celled images. This parameter might reduce the number of bytes needed for a raster image, allowing it to display or print faster. When set to yes, this parameter is only accepted if the <b>image-output-format</b> parameter is set to ioca. The default is no.</p> <p><b>Note:</b> The value that you select affects how line data is transformed to MO:DCA-P before it is sent to the receiver.</p> <p>See <b>IOCA replicate and trim function</b> in “FSA Printer Inventory parameters” on page 80 for the parameter you specify when you are using the Printer Inventory.</p>	X	X
<b>match-download-format={formlen   none}</b>	<p>Specifies whether AFP Download Plus should convert the OUTPUT statement FORMLEN parameter to millimeters with no units to match how Download for z/OS sends it. The default is to send the FORMLEN value exactly as specified on the OUTPUT statement.</p> <p>The requirements of the receiver you are using will determine how this parameter should be set.</p> <p><b>Note:</b> Do not specify match-download-format=formlen if you are transmitting files to the AFP Download Plus receiver. This receiver expects the <b>-oformlength</b> parameter to match the syntax of the FORMLEN parameter on the OUTPUT statement. You will get a JCL error when printing this job on PSF for z/OS.</p>	X	

Table 10. AFPPARMS control statement parameters (continued)

Parameter	Description	Startup Proc	OUTPUT JCL
<b>mcf2-format={cpcs   cf}</b>	<p>Specifies the way AFP Download Plus builds the Map Coded Font Format 2 (MCF-2) structured field.</p> <p>The values are:</p> <p><b>cpcs</b> AFP Download Plus uses the names of the code page and character set to build the MCF-2 structured field. AFP Download Plus opens and reads the contents of all coded fonts that are specified in MCFs in the input file or input resources. This is the default.</p> <p><b>cf</b> AFP Download Plus uses the name of the coded font to build the MCF-2 structured field. This is recommended when double-byte character set (DBCS) fonts are processed.</p> <p>See <b>Map Coded Font (MCF) Format 2 name</b> in “FSA Printer Inventory parameters” on page 80 for the parameter you specify when you are using the Printer Inventory.</p>	X	X
<b>message-files-read-access={yes   no}</b>	<p>Specifies whether users with an <b>other</b> permission level can view the message files that AFP Download Plus creates. When AFP Download Plus is installed, only the owner and users in the APSADMIN group have permission to list files in the default message directory, /var/psf/userinfo/userid, where <i>userid</i> is the name of the user who submitted the job.</p> <p>The values are:</p> <p><b>yes</b> AFP Download Plus sets permissions for the .MSG files to 664 so that <b>other</b> users can view message files.</p> <p><b>no</b> AFP Download Plus sets permissions for the .MSG files to 660 so that only the owner and users in the APSADMIN group can view message files (default).</p> <p><b>Note:</b> When you specify this attribute, it does not change the permissions that are set for existing message files.</p> <p>See <b>Message files read access</b> in “FSA Printer Inventory parameters” on page 80 for the parameter you specify when you are using the Printer Inventory.</p>	X	

Table 10. AFPPARMS control statement parameters (continued)

Parameter	Description	Startup Proc	OUTPUT JCL
<b>object-containers={<u>inline</u>   not-inline}</b>	Specifies whether all object container files that are requested by the input data stream are included inline. The default is <code>inline</code> .  See <b>Resources Included Inline: Object containers</b> in “FSA Printer Inventory parameters” on page 80 for the parameter you specify when you are using the Printer Inventory.	X	X
<b>overlays={<u>inline</u>   not-inline}</b>	Specifies whether all overlays required to print or view the output document file are included inline. The default is <code>inline</code> .  See <b>Resources Included Inline: Overlays</b> in “FSA Printer Inventory parameters” on page 80 for the parameter you specify when you are using the Printer Inventory.	X	X
<b>page-accounting-supported={yes   no}</b>	Specifies whether AFP Download Plus supports the page accounting function. When set to yes, AFP Download Plus counts the number of pages and sheets in the data set. The number of pages and sheets is sent to the receiver in the <b>-o</b> attributes, <b>-opagecount</b> and <b>-osheetcount</b> . This parameter is only valid in the data set specified by the AFPPARMS DD name in the startup procedure. The default is <code>no</code> .  See <b>Page accounting supported</b> in “FSA Printer Inventory parameters” on page 80 for the parameter you specify when you are using the Printer Inventory.	X	
<b>page-segments={<u>inline</u>   not-inline}</b>	Specifies whether all page segments required to print or view the output document file are included inline. The default is <code>inline</code> .  See <b>Resources Included Inline: Page segments</b> in “FSA Printer Inventory parameters” on page 80 for the parameter you specify when you are using the Printer Inventory.	X	X

Table 10. AFPPARMS control statement parameters (continued)

Parameter	Description	Startup Proc	OUTPUT JCL
<b>paper-length=nnnn[.mmm]unit</b>	<p>Specifies the actual paper length to be used for Line-Mode Migration or Line-Mode Conversion. The default is 14IN.</p> <p>The values are:</p> <p><b>nnnn</b> Specifies the 1– 4 digit decimal number that indicates the paper length.</p> <p><b>mmm</b> Specifies the 1–3 digit decimal number that indicates the paper length.</p> <p><b>unit</b> Specifies one of these measurement units:</p> <p><b>IN</b> Inches</p> <p><b>CM</b> Centimeters</p> <p><b>MM</b> Millimeters</p> <p><b>PELS</b> Picture elements (1/240 inch)</p> <p><b>POINTS</b> Points (1/72 inch)</p> <p><b>Note:</b> If you specify the unit as PELS or POINTS, you must specify the value as a whole number with no decimal point.</p> <p>See <b>Paper length</b> in “FSA Printer Inventory parameters” on page 80 for the parameter you specify when you are using the Printer Inventory.</p> <p>See information about Line-Mode Migration and 3800 Line-Mode Conversion considerations for AFP Download Plus in <a href="#">PSF for z/OS: Customization</a>.</p>	X	X

Table 10. AFPPARMS control statement parameters (continued)

Parameter	Description	Startup Proc	OUTPUT JCL
<b>paper-width=nnnn[.mmm]unit</b>	<p>Specifies the actual paper width to be used for Line-Mode Migration or Line-Mode Conversion. This value does not include the carrier strips. The default is 13.2IN.</p> <p>The values are:</p> <p><b>nnnn</b> Specifies the 1–4 digit decimal number that indicates the paper width.</p> <p><b>mmm</b> Specifies the 1–3 digit decimal number that indicates the paper width.</p> <p><b>unit</b> Specifies one of these measurement units:</p> <p><b>IN</b> Inches</p> <p><b>CM</b> Centimeters</p> <p><b>MM</b> Millimeters</p> <p><b>PELS</b> Picture elements (1/240 inch)</p> <p><b>POINTS</b> Points (1/72 inch)</p> <p><b>Note:</b> If you specify the unit as PELS or POINTS, you must specify the value as a whole number with no decimal point.</p> <p>See <b>Paper width</b> in “FSA Printer Inventory parameters” on page 80 for the parameter you specify when you are using the Printer Inventory.</p> <p>See information about Line-Mode Migration and 3800 Line-Mode Conversion considerations for AFP Download Plus in <a href="#">PSF for z/OS: Customization</a>.</p>	X	X

Table 10. AFPPARMS control statement parameters (continued)

Parameter	Description	Startup Proc	OUTPUT JCL
<b>pass-oid={allow   <u>disallow</u>}</b>	<p>Specifies whether AFP Download Plus passes OID information from the resource access table (RAT) to the Begin Object Container (BOC) structured field when it places TrueType and OpenType fonts inline.</p> <p>The values are:</p> <p><b>allow</b> Allows OID information to be passed when it includes TrueType and OpenType fonts.</p> <p><b>disallow</b> Does not allow OID information to be included with TrueType and OpenType fonts inline. This is the default.</p> <p><b>Note:</b> The value that you select affects how line data is transformed to MO:DCA-P before it is sent to the receiver.</p> <p>See <b>Object identifier (OID) format</b> in “FSA Printer Inventory parameters” on page 80 for the parameter you specify when you are using the Printer Inventory.</p>	X	X
<b>ptoca={<u>inline</u>   not-inline}</b>	<p>Specifies whether all PTOCA objects required to print or view the output file are included inline. The default is inline.</p> <p>See <b>Resources Included Inline: Presentation text objects (PTOCA)</b> in “FSA Printer Inventory parameters” on page 80 for the parameter you specify when you are using the Printer Inventory.</p>	X	X



Table 10. AFPPARMS control statement parameters (continued)

Parameter	Description	Startup Proc	OUTPUT JCL
<b>save-auxiliary-files={yes   no}</b>	<p>Specifies whether all auxiliary files, such as separator pages and message files, are saved in the job submitter's default message directory, /var/psf/userinfo/<i>userid</i>. AFP Download Plus never transmits these files to the receiver. Before they are used in production, the system programmer can validate that these files are compliant with the MO:DCA interchange set level for auxiliary files that are specified in the AFPPARMS control statement or the Printer Inventory (see <b>auxiliary-files-modca-level</b> or <b>Auxiliary files MO:DCA level</b> in “FSA Printer Inventory parameters” on page 80). When this parameter is specified, AFP Download Plus ignores the <b>compression</b>, <b>direct-download</b>, and <b>send-messages-on-failure</b> parameters if they are specified. The default is no.</p> <p>See <b>Save auxiliary files</b> in “FSA Printer Inventory parameters” on page 80 for the parameter you specify when you are using the Printer Inventory.</p>	X	
<b>secure-transmission={yes   no}</b>	<p>Specifies whether data is encoded before transmission. This parameter is only valid in the data set specified by the AFPPARMS DD name in the startup procedure. The default is yes.</p> <p><b>Note:</b> If standardized Internet security protocols are required to use secure communications for print files, IBM suggests that you use the IPSec protocol. See <i>z/OS Communications Server: IP Configuration Guide</i> for information about IPSec.</p> <p>See <b>Secure transmission</b> in “FSA Printer Inventory parameters” on page 80 for the parameter you specify when you are using the Printer Inventory.</p>	X	

Table 10. AFPPARMS control statement parameters (continued)

Parameter	Description	Startup Proc	OUTPUT JCL
<b>send-messages-on-failure={all   generic-only}</b>	<p>Specifies which messages are sent to the receiver system when the print job has errors that stop transformation.</p> <p>The values are:</p> <p><b>all</b>  AFP Download Plus transforms the messages for the data set that has errors and sends them to the receiver system as a MO:DCA-P file. This is the default.</p> <p><b>Note:</b> Use this value when you want to send a MO:DCA interchange set compliant message file to the receiver. See <a href="#">“Configuring AFP Download Plus so files remain compliant with the specified MO:DCA interchange set” on page 31</a> for the other changes you need to make.</p> <p><b>generic-only</b>  AFP Download Plus generates message APS8239I and sends it to the receiver system as line data.</p> <p><b>Note:</b> This value must not be specified when you are using <b>dataset-grouping=yes</b> to send multiple data set jobs to the z/OS receiver system because the receiving system cannot receive jobs with both line data and MO:DCA-P data sets.</p> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1. AFP Download Plus ignores this parameter when yes is specified for the <b>save-auxiliary-files</b> parameter.</li> <li>2. See <b>Send messages on failure</b> in <a href="#">“FSA Printer Inventory parameters” on page 80</a> for the parameter you specify when you are using the Printer Inventory.</li> </ol>	X	

Table 10. AFPPARMS control statement parameters (continued)

Parameter	Description	Startup Proc	OUTPUT JCL
<b>send-separator-pages={yes   no}</b>	<p>Specifies whether AFP Download Plus sends the separator pages for a job. The default is no.</p> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1. Specify this parameter when you want to send MO:DCA interchange set compliant separator pages to the receiver. See <a href="#">“Configuring AFP Download Plus so files remain compliant with the specified MO:DCA interchange set”</a> on page 31 for the other changes you need to make.</li> <li>2. See <b>Send separator pages</b> in <a href="#">“FSA Printer Inventory parameters”</a> on page 80 for the parameter you specify when you are using the Printer Inventory.</li> <li>3. For more information, see <a href="#">“Sending z/OS separator pages”</a> on page 124.</li> </ol>	X	
<b>transmit-recovery-pages=nnnnn</b>	<p>Specifies a number that indicates how often AFP Download Plus synchronizes with the receiving system to determine whether the transmitted data is received and if not, retransmits the data from the last successful recovery point.</p> <p><b>Values:</b> 0–65535; the default is 1000. When 0 is specified, AFP Download Plus does not synchronize the transmitted data with the receiver until the end of a file.</p> <p>See <b>Recovery pages</b> in <a href="#">“FSA Printer Inventory parameters”</a> on page 80 for the parameter you specify when you are using the Printer Inventory.</p>	X	
<b>trace-user-data={yes   no}</b>	<p>Specifies whether user data is traced when a trace function is requested with AFP Download Plus. User data is traced when yes is specified and user data is available. For more information about using traces, see <a href="#">PSF for z/OS: Diagnosis</a>.</p> <p>The default is yes.</p> <p>See <b>Trace user data</b> in <a href="#">“FSA Printer Inventory parameters”</a> on page 80 for the parameter you specify when you are using the Printer Inventory.</p>	X	

Table 10. AFPPARMS control statement parameters (continued)			
Parameter	Description	Startup Proc	OUTPUT JCL
<b>truetype-fonts={<u>inline</u>   not-inline}</b>	Specifies whether all TrueType and OpenType base fonts, linked fonts, and font collections that are required to print or view the output file are included inline. The default is <u>inline</u> .  <b>Note:</b> When each TrueType or OpenType font is processed, if the value in a Data-Object Font Descriptor triplet (X'8B') is set to ON to indicate that a font is inline, it overrides <b>truetype-fonts=not-inline</b> and includes that font, and all linked fonts, inline.  See <b>Resources Included Inline: TrueType fonts</b> in “FSA Printer Inventory parameters” on page 80 for the parameter you specify when you are using the Printer Inventory.	X	X
<b>working-directory=pathname</b>	Specifies the name of the working directory that AFP Download Plus uses to store error messages files and temporary files for transformed data and inline resources. The <i>pathname</i> can be 1–256 characters in length; the default is /var/psf/. AFP Download Plus adds the beginning and ending slashes if they are missing and uses the name as an absolute path.  See <b>Working directory</b> in “FSA Printer Inventory parameters” on page 80 for the parameter you specify when you are using the Printer Inventory.	X	

## APSHPRM1 sample member for AFPPARMS

The APSHPRM1 sample member, which contains the AFPPARMS parameters, is in SYS1.SAMPLIB. You can either view the sample online or print it. You can also copy the sample to your AFPPARMS data set to use as the defaults member or as the member for one of your FSAs.

After you modify it to contain only control statement parameters that are valid for OUTPUT JCL, you can also use the sample member as the member for the AFPPARMS data set or as the sequential data set specified on the OUTPUT statement for the job.

## Viewing the operator status message when the processing status feature is activated

The **display-afpdp-status** parameter in the AFPPARMS control statement or the **Display Status** parameter in the Printer Inventory activates the AFP Download Plus processing status feature. You can also activate the status feature with the operator interface. For more information, see “Reporting AFP Download Plus processing status” on page 126.

When the status feature is activated, AFP Download Plus issues status report message, APS8559I, to the operator's console and the JES log. The message is issued at the end of the spool data set for both the spool data set transformation to MO:DCA-P and transformed document transmission. This report message is only displayed when the FSA is active. The format of the message is:

APS8559I *jobname, jobid, stepname, ddname, jobpart, eventdata*.

The values are:

***jobname***

Specifies the name of the job that is being processed.

***jobid***

Specifies the job identifier of the spool data set that is being processed.

***stepname***

Specifies the step name of the job that is being processed.

***ddname***

Specifies the DD name for the step name that is being processed.

***jobpart***

Specifies the part of the job that is being processed.

***eventdata***

Specifies a combination of these:

**Transformed bytes=*nnnnnnnn***

The number of bytes that result from AFP Download Plus transforming data to MO:DCA-P format.  
This value is always displayed.

**Transmitted=*pppppp***

The percentage of the total number of transformed bytes that AFP Download Plus transmitted to the receiving system.

**Transmitted bytes=*gggggggg***

The number of bytes that AFP Download Plus transmitted to the receiving system.

**Compressed bytes=*ccccccc***

When compression is activated for the FSA or data set, the number of bytes that result from AFP Download Plus compressing the data.

Table 11 on page 65 shows how the AFP Download Plus mode determines what other event data the message displays.

Table 11. Event data displayed in APS8559I message when AFPPARMS activates the status feature	
AFP Download Plus Mode	Message Displays
Compression off Direct download off	Transformed bytes= <i>nnnnnnnn</i> , Transmitted= <i>pppppp</i> For example:  APS8559I WTRPOSE1 WTRPOSE1 *** PRT660 (TCPIP) SIMP1K, JOB00722, STEP1, SYSUT2, USER, Transformed bytes= 647MB, Transmitted= 58%.
Compression on Direct download off	Transformed bytes= <i>nnnnnnnn</i> , Compressed bytes= <i>ccccccc</i> , Transmitted= <i>pppppp</i> For example:  APS8559I WTRPOSE1 WTRPOSE1 *** PRT660 (TCPIP) SIMP1K, JOB00728, STEP1, SYSUT2, USER, Transformed bytes= 1312KB, Compressed bytes= 203363, Transmitted= 100%.
Compression off Direct download on	Transformed bytes= <i>nnnnnnnn</i> , Transmitted bytes= <i>gggggggg</i> For example:  APS8559I WTRPOSE1 WTRPOSE1 *** PRT660 (TCPIP) SIMP1K, JOB00724, STEP1, SYSUT2, USER, Transformed bytes= 1312KB, Transmitted bytes= 1312KB.

Table 11. Event data displayed in APS8559I message when AFPPARMS activates the status feature (continued)

AFP Download Plus Mode	Message Displays
Compression on Direct download on	Transformed bytes=nnnnnnn, Compressed bytes=ccccccc, Transmitted bytes=gggggggg For example:  APS8559I WTRPOSE1 WTRPOSE1 *** PRT660 (TCPIP) SIMP1K, JOB00726, STEP1, SYSUT2, USER, Transformed bytes= 1312KB, Compressed bytes= 203348, Transmitted bytes= 203348.

If AFP Download Plus is still transforming the data, you can see 0% for the transmitted percentage. For example:

```
APS8559I WTRPOSE1 WTRPOSE1 *** PRT660 (TCPIP) SIMP1K, JOB00728, STEP1, SYSUT2, USER,
Transformed bytes= 405KB, Transmitted= 0%.
```

## PRINTDEV parameters

You can use PRINTDEV parameters to define default FSA-initialization options for all data sets transmitted by the AFP Download Plus sender. Table 12 on page 66 describes the parameters that can be included in a PRINTDEV statement. All parameters are optional unless specified otherwise.

### Notes:

- Many of the parameters in this table can be defined in the Infoprint Server Printer Inventory. When that is the case, the parameter is marked with an X and you are referred to Table 13 on page 77 or Table 14 on page 81.
- If you specify parameters that are marked with an X in the PRINTDEV statement when you are using the Printer Inventory, the parameters in the PRINTDEV statement are ignored.
- If you specify parameters in the PRINTDEV statement and do not use the Printer Inventory, you must restart all the FSAs in the startup procedure when you change a parameter in the PRINTDEV for an existing FSA.

Table 12. Initialization parameters for the PRINTDEV statement. An X in the **Ignored** column indicates that if you are using the Printer Inventory, this parameter is ignored in the PRINTDEV and must be specified in the Printer Inventory.

Parameter	Ignored	Description
<b>CHARS</b>	X	Specifies the last 4 characters of up to four default coded font names. AFP Download Plus adds the coded font names to the page definition and the inline resource group. See <b>Character sets</b> in Table 14 on page 81 for the Printer Inventory parameter.  <b>Syntax:</b> CHARS=(fontname1[, fontname2][,fontname3 ][,fontname4])  <b>Note:</b> When it processes a MO:DCA IS/3 print file, AFP Download Plus does not add the specified coded fonts to the inline resource group because raster fonts cannot be used in a MO:DCA IS/3 file.
<b>COLORMAP</b>	X	Specifies the member name of the printer default color mapping table on the receiver system. AFP Download Plus puts the table in the inline resource group and exports this parameter for use by the printer on the receiver system. See <b>Color map</b> in Table 14 on page 81 for the Printer Inventory parameter.  <b>Syntax:</b> COLORMAP=(membername)

Table 12. Initialization parameters for the PRINTDEV statement. An X in the **Ignored** column indicates that if you are using the Printer Inventory, this parameter is ignored in the PRINTDEV and must be specified in the Printer Inventory. (continued)

Parameter	Ignored	Description
<b>COMPRESS</b>	X	Specifies whether AFP Download Plus compresses data (blanks) in line data before it transforms the data to MO:DCA-P. See <b>Blank compression</b> in Table 14 on page 81 for the Printer Inventory parameter. <b>Syntax:</b> COMPRESS=YES NO
<b>COMSETUP</b> (required for microfilm device only)	X	Specifies the member name of the printer default microfilm setup resource object container on the receiver system that is generated with the utility provided with your microfilm device. AFP Download Plus puts the object container in the inline resource group and exports this parameter for use by the microfilm device on the receiver system. See <b>Com setup member</b> in Table 14 on page 81 for the Printer Inventory parameter. <b>Syntax:</b> COMSETUP=membername
<b>CONNINTV</b>	X	Specifies the connect interval, in seconds, during which AFP Download Plus attempts to start a connection with the receiver system. When the connect interval expires and the connection is not complete, AFP Download Plus issues a message and stops the FSA. See <b>Connect interval</b> in Table 14 on page 81 for the Printer Inventory parameter. <b>Syntax:</b> CONNINTV=nnnnn, where nnnnn is a value 0 - 86400.
<b>DATAACK</b>	X	Specifies the character and position errors the printer reports. AFP Download Plus exports this parameter for use by the printer on the receiver system. See <b>Print error reporting</b> in Table 14 on page 81 for the Printer Inventory parameter. <b>Syntax:</b> DATAACK=BLOCK UNBLOCK BLKCHAR BLKPOS <b>DATAACK=BLOCK</b> Specifies that the printer is not to report character or position errors. BLOCK is the default. <b>DATAACK=UNBLOCK</b> Specifies that the printer is to report all character and position errors. <b>DATAACK=BLKCHAR</b> Specifies that the printer is not to report character errors. (The destination reports only position errors.) <b>DATAACK=BLKPOS</b> Specifies that the printer is not to report position errors. (The destination reports only character errors.)
<b>DSHDR</b>		Identifies the OUTPUT statement that specifies the form definition and page definition that are used to format and print data set header pages. <b>Syntax:</b> DSHDR=*.label <b>Note:</b> Use this parameter when you want to send MO:DCA interchange set compliant separator pages to the receiver. See “Configuring AFP Download Plus so files remain compliant with the specified MO:DCA interchange set” on page 31 for the other changes you need to make.

Table 12. Initialization parameters for the PRINTDEV statement. An X in the **Ignored** column indicates that if you are using the Printer Inventory, this parameter is ignored in the PRINTDEV and must be specified in the Printer Inventory. (continued)

Parameter	Ignored	Description
<b>DUMP</b>	X	Specifies that a conditional memory dump of the sender address space is produced when a specific reason code, restartable abend, or message occurs. See <b>Dump:Code</b> , <b>Dump:Count</b> , and <b>Dump:Message ID</b> in <a href="#">Table 14</a> on page 81 for the Printer Inventory parameters. <b>Syntax:</b> DUMP= ([reasoncode ABD0nnn] [,msgid,count]) <b>Note:</b> For a description of the syntax of this parameter and an explanation of restartable abends, see <i>PSF for z/OS: Diagnosis</i> .
<b>FDEFDD (required)</b>		Identifies the DD statement that specifies the form definition libraries. <b>Syntax:</b> FDEFDD=*.label
<b>FONTDD (required)</b>		Identifies the DD statement that specifies the default font libraries for Font Object Content Architecture (FOCA) fonts (the default library is used when the data does not indicate a resolution). <b>Syntax:</b> FONTDD=*.label
<b>FONTPATH</b>		Identifies the DD statement that specifies the paths for font libraries, which contain extended code pages or TrueType and OpenType fonts. <b>Syntax:</b> FONTPATH=*.label <b>Note:</b> For more information about extended code pages, see <i>PSF for z/OS: User's Guide</i> .
<b>FONT240</b>		Identifies the DD statement that specifies the 240-pel font libraries. <b>Syntax:</b> FONT240=*.label
<b>FONT300</b>		Identifies the DD statement that specifies the 300-pel font libraries. <b>Syntax:</b> FONT300=*.label
<b>FORMDEF (required)</b>	X	Specifies a default form definition. See <b>Form definition</b> in <a href="#">Table 14</a> on page 81 for the Printer Inventory parameter. <b>Syntax:</b> FORMDEF=fdefname
<b>IPADDR (required)</b>	X	Identifies the Internet Protocol (IP) address or host name of the TCP/IP-attached receiver system. See <b>IP address</b> in <a href="#">Table 14</a> on page 81 for the Printer Inventory parameter. <b>Syntax:</b> IPADDR='ip-address' or 'host-name'
<b>JOBHDR</b>		Identifies the OUTPUT statement that specifies the form definition and page definition that are used to format and print job-header separator pages. <b>Syntax:</b> JOBHDR=*.label <b>Note:</b> Use this parameter when you want to send MO:DCA interchange set compliant separator pages to the receiver. See “Configuring AFP Download Plus so files remain compliant with the specified MO:DCA interchange set” on page 31 for the other changes you need to make.



Table 12. Initialization parameters for the PRINTDEV statement. An X in the **Ignored** column indicates that if you are using the Printer Inventory, this parameter is ignored in the PRINTDEV and must be specified in the Printer Inventory. (continued)

Parameter	Ignored	Description
<b>JOBTRLR</b>		<p>Identifies the OUTPUT statement that specifies the form definition and page definition that are used to format and print job-trailer separator pages.</p> <p><b>Syntax:</b> JOBTRLR=*.label</p> <p><b>Note:</b> Use this parameter when you want to send MO:DCA interchange set compliant separator pages to the receiver. See <a href="#">“Configuring AFP Download Plus so files remain compliant with the specified MO:DCA interchange set”</a> on page 31 for the other changes you need to make.</p>
<b>MAP2OLN</b>	X	<p>Indicates whether AFP Download Plus maps fonts to outline fonts and places outline fonts in the inline resource group. Use this parameter if the printer on the receiver system supports outline fonts, you have existing applications that use raster fonts, and you want to use outline fonts without changing the applications. Also, see <b>Map to outline fonts</b> and <b>Recover from font not found</b> in Table 14 on page 81 for Printer Inventory parameters. For more information about mapping to outline fonts, including limitations, see <a href="#">PSF for z/OS: Customization</a>.</p> <p><b>Syntax:</b> MAP2OLN=YES (YES, CONT) (YES, QUIT) NO</p> <p><b>MAP2OLN=YES</b> AFP Download Plus maps raster fonts to outline fonts and stops processing the job if a requested raster font cannot be mapped to an outline font.</p> <p><b>MAP2OLN=(YES,CONT)</b> AFP Download Plus maps raster fonts to outline fonts and continues processing a job if a requested raster font cannot be mapped to an outline font. AFP Download Plus sends the original raster font to the receiver destination.</p> <p><b>MAP2OLN=(YES, QUIT)</b> AFP Download Plus maps raster fonts to outline fonts and stops processing the job if a requested raster font cannot be mapped to an outline font.</p> <p><b>MAP2OLN=NO</b> AFP Download Plus does not map raster fonts to outline fonts (default).</p>
<b>MESSAGE</b>		<p>Identifies the OUTPUT statement that specifies the options that are used to format and print messages that are redirected to a spool data set or another FSA for processing, sent to the receiver system, or both. For more information about redirecting messages, see <a href="#">“Redirecting messages”</a> on page 150.</p> <p><b>Syntax:</b> MESSAGE=*.label</p> <p><b>Note:</b> Use this parameter when you want to send a MO:DCA interchange set compliant message file to the receiver. See <a href="#">“Configuring AFP Download Plus so files remain compliant with the specified MO:DCA interchange set”</a> on page 31 for the other changes you need to make.</p>

Table 12. Initialization parameters for the PRINTDEV statement. An X in the **Ignored** column indicates that if you are using the Printer Inventory, this parameter is ignored in the PRINTDEV and must be specified in the Printer Inventory. (continued)

Parameter	Ignored	Description
<b>NORESP</b>	X	<p>Specifies the action that AFP Download Plus takes when the time that is specified by the RESPTIME parameter expires before a response is received from the download receiver. See <b>No response action</b> and <b>No response action: Notify</b> in Table 14 on page 81 for Printer Inventory parameters.</p> <p><b>Syntax:</b> NORESP=NOTIFY NOTIFY(<i>node.userid</i>) NOTIFY(OPERATOR) TERMINATE</p> <p><b>NORESP=NOTIFY</b> AFP Download Plus notifies JES that an expected response was not received from the download receiver. This condition is also displayed by SDSF. NOTIFY is the default.</p> <p><b>NORESP=NOTIFY(<i>node.userid</i>)</b> AFP Download Plus sends a message to the specified user ID and JES indicating that an expected response was not received from the download receiver. The node and period can be omitted if the user ID is on the node on which AFP Download Plus is running.</p> <p><b>NORESP=NOTIFY(OPERATOR)</b> AFP Download Plus sends a message to the system operator and JES indicating that an expected response was not received from the download receiver.</p> <p><b>NORESP=TERMINATE</b> AFP Download Plus stops the FSA. The system operator must issue a command to restart the FSA. The data set that is active when the FSA is stopped is restarted from the last checkpoint.</p>
<b>OBJCONDD</b> (required with <b>COLORMAP</b> and <b>COMSETUP</b> )		<p>Identifies the DD statement that specifies the object container library.</p> <p><b>Syntax:</b> OBJCONDD=*.label</p>
<b>OBJCPATH</b>		<p>Identifies the 1 - 8 character name of the DD statement that specifies the paths for object container libraries, which contain data object resources, including color management resources (CMRs).</p> <p><b>Syntax:</b> OBJCPATH=*.label</p>
<b>OVLYDD</b>		<p>Identifies the DD statement that specifies the default overlay libraries. Required if OVLY240 or OVLY300 is specified (the default library is used when data does not indicate a resolution); otherwise, optional if no attempt is made to process an overlay from the system overlay library.</p> <p><b>Syntax:</b> OVLYDD=*.label</p>
<b>OVLY240</b>		<p>Identifies the DD statement that specifies the 240-pel overlay libraries.</p> <p><b>Syntax:</b> OVLY240=*.label</p>
<b>OVLY300</b>		<p>Identifies the DD statement that specifies the 300-pel overlay libraries.</p> <p><b>Syntax:</b> OVLYDD=*.label</p>

Table 12. Initialization parameters for the PRINTDEV statement. An X in the **Ignored** column indicates that if you are using the Printer Inventory, this parameter is ignored in the PRINTDEV and must be specified in the Printer Inventory. (continued)

Parameter	Ignored	Description
<b>PAGEDEF (required)</b>	X	Specifies the default page definition. See <b>Page definition</b> in Table 14 on page 81 for the Printer Inventory parameter. <b>Syntax:</b> PAGEDEF= <i>pdefname</i>
<b>PDEFDD (required)</b>		Identifies the DD statement that specifies the page definition libraries. <b>Syntax:</b> PDEFDD=*. <i>label</i>
<b>PIMSG</b>	X	Indicates whether all message groups that are generated in the processing of a data set are reported. Also indicates the maximum number of message groups that are written. See <b>Print error messages</b> and <b>Print error messages: Maximum messages</b> in Table 14 on page 81 for the Printer Inventory parameters. <b>Syntax:</b> PIMSG=(YES [, <i>nnn</i> ]  NO [, <i>nnn</i> ]) <i>nnn</i> indicates the maximum number of messages and specifies that after AFP Download Plus has generated <i>nnn</i> message groups, it is to end processing of the data set and purge the data set from the spool. The final count of written messages might be more than <i>nnn</i> message groups if the message groups are generated for errors that are reported during processing for data that is transmitted before the message count is reached. With a value of 0, data set processing continues, regardless of the number of message groups that are generated, unless an error that stops processing occurs. The default is YES,16.
<b>PORTNO</b>	X	Specifies the port number with which AFP Download Plus is to establish a connection and transmit data. See <b>Port number</b> in Table 14 on page 81 for the Printer Inventory parameter. <b>Syntax:</b> PORTNO= <i>nnnnn</i> , where <i>nnnnn</i> is a value 5001–65535. The default value is 5001.

Table 12. Initialization parameters for the PRINTDEV statement. An X in the **Ignored** column indicates that if you are using the Printer Inventory, this parameter is ignored in the PRINTDEV and must be specified in the Printer Inventory. (continued)

Parameter	Ignored	Description
<b>PRMODE</b>	X	<p>Indicates the default processing mode AFP Download Plus uses to process data sets that contain both single-byte and double-byte fonts. See <b>Default process mode</b> in <a href="#">Table 14 on page 81</a> for the Printer Inventory parameter.</p> <p><b>Syntax:</b> PRMODE=SOSI1 SOSI2 SOSI3 SOSI4</p> <p>PRMODE=SOSI1 specifies that each shift-out, shift-in code is converted to a blank and a Set Coded Font Local text control.</p> <p>PRMODE=SOSI2 specifies that each shift-out, shift-in code is converted to a Set Coded Font Local text control.</p> <p>PRMODE=SOSI3 specifies that the shift-in code is converted to a Set Coded Font Local text control and two blanks. A shift-out code is converted to a Set Coded Font Local text control.</p> <p>PRMODE=SOSI4 specifies that each shift-out, shift-in code is to be skipped and not counted when offsets are calculated for the data set. SOSI4 is used when double-byte character set (DBCS) text is converted from ASCII to EBCDIC. When SOSI4 is specified, the page definition offsets are correct after conversion; therefore, the user does not need to account for SOSI characters when FIELD offsets are computed. The data conversion that AFP Download Plus makes for SOSI4 is the same as for SOSI2.</p> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1. AFP Download Plus uses this parameter only if you are not using the Printer Inventory or Exit 7 and the PRMODE keyword is not specified on the OUTPUT JCL statement.</li> <li>2. If this parameter is not specified in the PRINTDEV statement, the Printer Inventory, or Exit 7, and the PRMODE keyword is not specified on the OUTPUT JCL statement, AFP Download Plus defaults to either line data or MO:DCA-P, depending on the type of data stream.</li> </ol>
<b>PRERROR</b>	X	<p>Controls whether the PRERROR parameter is accepted on the OUTPUT JCL statement. See <b>Error disposition supported</b> in <a href="#">Table 14 on page 81</a> for the Printer Inventory parameter.</p> <p><b>Syntax:</b> PRERROR=HONOR NOTHONOR</p> <p>PRERROR=HONOR specifies that AFP Download Plus accepts PRERROR if specified on the OUTPUT JCL statement for data sets processed at this destination.</p> <p>PRERROR=NOTHONOR specifies that AFP Download Plus ignores PRERROR if specified on the OUTPUT JCL statement for data sets processed at this destination. This is the default.</p>

Table 12. Initialization parameters for the PRINTDEV statement. An X in the **Ignored** column indicates that if you are using the Printer Inventory, this parameter is ignored in the PRINTDEV and must be specified in the Printer Inventory. (continued)

Parameter	Ignored	Description
<b>PSEGDD</b>		Identifies the DD statement that specifies the default page segment libraries. In addition to page segments, the page segment library might contain Bar Code Object Content Architecture (BCOCA), Graphics Object Content Architecture (GOCA), and Image Object Content Architecture (IOCA) resources. Required if PSEG240 or PSEG300 is specified (the default library is used when data does not indicate a resolution); otherwise, optional if no attempt is made to process a page segment from the system page segment library. <b>Syntax:</b> PSEGDD=*.label
<b>PSEG240</b>		Identifies the DD statement that specifies the 240-pel page segment libraries. <b>Syntax:</b> PSEG240=*.label
<b>PSEG300</b>		Identifies the DD statement that specifies the 300-pel page segment libraries. <b>Syntax:</b> PSEG300=*.label
<b>RESPTIME</b>	X	Specifies the maximum number of seconds AFP Download Plus waits for a response from the download receiver. See <b>Response timeout</b> in Table 14 on page 81 for the Printer Inventory parameter. <b>Syntax:</b> RESPTIME=nnnnn, where nnnnn is a value 0–86400. The default value is 0, which means AFP Download Plus waits indefinitely for a response. <b>Note:</b> When the RESPTIME parameter is specified, the NORESP parameter must also be specified to tell AFP Download Plus what action to take when no response is received within the time specified.
<b>TRACE</b>	X	Specifies AFP Download Plus tracing. For more information about using traces, see <i>PSF for z/OS: Diagnosis</i> . See <b>NST trace dsname, Trace prompt</b> , and <b>Trace table size</b> in Table 13 on page 77 and <b>FSA trace dsname, Trace mode, Trace table size</b> in Table 14 on page 81 for more information. <b>Syntax:</b> TRACE=YES NO

## Printer Inventory

With AFP Download Plus you can use default FSA-initialization, tracing, and execution option parameters that are defined in the Printer Inventory instead of those defined in:

- PRINTDEV statement (see “PRINTDEV parameters” on page 66) or the EXEC statement (see “JCL statements for the startup procedure” on page 39) of the AFP Download Plus startup procedure
- AFPPARMS control statement (see “Parameters for the AFPPARMS control statement” on page 45)
- Exit 7 initialization (INIT) call (see Table 18 on page 117)

With the Printer Inventory, you can define an FSA in the AFP Download Plus startup procedure and JES initialization statements before the FSA is used. When the new FSA is added, you can assign variable parameters for it in the Printer Inventory. This saves you time because you do not need to restart all the FSAs in a startup procedure when you add an FSA or change parameters for an existing FSA. The Printer Inventory also makes it much easier to define parameters than through the AFP Download Plus

startup procedure, the AFPPARMS control statement, or Exit 7. See *PSF for z/OS: Customization* for more information about the Printer Inventory.

You can use the Printer Inventory component of Infoprint Server to define an FSS and AFP Download Plus FSAs without licensing the Infoprint Server feature of z/OS. For more information, see *z/OS Infoprint Server Printer Inventory for PSF*. If you want to use Infoprint Central, you must have a license for the Infoprint Server feature.

## Infoprint Central and common message log

When you define an FSS and AFP Download Plus FSAs in the Printer Inventory, you can use Infoprint Central to start, stop, and view properties of each AFP Download Plus FSA. If AFP Download Plus is writing messages to the Infoprint Server common message log, you can also:

- View FSA and print job messages that AFP Download Plus has written to the common message log.
- Search for print jobs and view the properties for each job.
- Release held print jobs, delete jobs, change the priority of jobs, and move jobs (if AFP Download Plus is not processing the jobs).

To enable AFP Download Plus to write messages to the common message log, you must customize AFP Download Plus and select the **Log messages** parameter in the Printer Inventory. See *PSF for z/OS: Customization* for information about customizing AFP Download Plus to use the common message log with the Printer Inventory.

## Specifying Printer Inventory parameters

To use the Printer Inventory, you must:

1. Specify the Printer Inventory name on the INV parameter in the PARM field of the EXEC statement for the startup procedure:

```
// EXEC PGM=APSHPOSE,PARM=('INV=piname')

```

where *piname* is the 4-character name of the Printer Inventory that is specified in the Infoprint Server configuration file. For example, // EXEC PGM=APSHPOSE,PARM=('INV=A0P1') specifies the default name of the Printer Inventory.

2. Specify the parameters that you want to use in the Printer Inventory:

- Use the **aopmig** Printer Inventory migration program to copy parameters from the PRINTDEV statement, the EXEC PARM statement, and the AFPPARMS control statement into the Printer Inventory (see *PSF for z/OS: Customization*). You must manually migrate parameters from Exit 7.
- Use the Printer Inventory Definition Utility (PIDU) or Infoprint Server ISPF panels to define parameters in the Printer Inventory.

**Note:** When you use the Printer Inventory, do not specify the parameters in the PRINTDEV statement or the AFPPARMS control statement because AFP Download Plus ignores them. You must specify the parameters in the Printer Inventory if you want to use them.

3. Select the **Log messages** parameter in the Printer Inventory to use the Infoprint Server common message log.

## Sample Printer Inventory panels

Figure 11 on page 75 shows a sample ISPF panel for defining an FSS for AFP Download Plus.

```

Add                                     PSF FSS
Command ==> -----

FSS Name. . . AFPFSS
Description . AFP Download Plus (extend)

TCP/IP job name. . . -----
NST trace dsname . . . -----
PINST trace dsname . . . -----
Trace table size . . 32
- Trace prompt
- Unicode enabled
/ Log messages
/ Blank truncation
Restore blanks classes . . . -----

```

Figure 11. Sample ISPF Printer Inventory panel for defining an FSS for AFP Download Plus

Figure 12 on page 75 and Figure 13 on page 76 show sample pages of ISPF panels that are used to define the parameters for an AFP Download Plus FSA.

```

Add                                     PSF FSA, AFP Download Plus
Command ==> -----

FSA Name. . . AFPDP2
Description . AFP Download Plus (extend)
Location. . . Building 001 (extend)
More: +

Operator security profile
. . . AFP2PROF
Processing Information:
- Blank compression
- Consolidate IM1 images
- Release data set when repositioning
- Page accounting supported
- Report Line-Mode Conversion paper-length errors
- Use Line-Mode Migration LINECT
- Save auxiliary files
Default process mode. . . -----
Paper width . . . . . 13.2IN
Paper length. . . . . 14IN
Resolution. . . . . (240, 300)
Image output format. . . . . 1 1. IOCA 2. Unchanged
Auxiliary files MO:DCA level . . . . 1 1. None 2. IS/3 3. BPF match
Map Coded Font (MCF) Format 2 name . . 1 1. Code page and character set
2. Coded font
Above the bar storage. . . . . 1 1. None 2. Inline resources
Working directory . . /var/PSF/ (extend)

Printer Supported Functions:
- GOCA Box orders
- GOCA Set Fractional Line Width orders
- GOCA Set Process Color orders
- IOCA replicate and trim function
- Object identifier (OID) format

Resources:
Form definition. . A10110
Page definition. . A08682
Character sets . . 60D8
Color map. . . . .
Com setup member . . . . .
- Map to outline fonts
- Recover from font not found

```

Figure 12. Sample ISPF Printer Inventory panel for defining an AFP Download Plus FSA (Page 1 of 2)

```

Add                                     PSF FSA, AFP Download Plus
Command ==> -----

FSA Name. . . AFPDP2
Description . AFP Download Plus (extend)
Location. . . Building 001 (extend)
More: -

Resources Included Inline:
/ Bar code objects (BCOCA)
/ Font objects (FOCA)
/ Form definitions
/ Graphics objects (GOCA)
/ Image objects (IOCA)
/ Object containers
/ Overlays
/ Page segments
/ Presentation text objects (PTOCA)
/ TrueType fonts
Color management resources. . 3 1. None 2. All 3. Generic

Error Reporting Values:
- Error disposition supported
- Message files read access
- Send msgs to SYSOUT
Print error messages . . . 2 1. No 2. Yes
Maximum messages. . . 16 (0-999)
Print error reporting. . . 1 1. None 2. All 3. Character 4. Position
Send messages on failure . 1 1. All 2. Generic only

Connection:
Connect Interval. . . 600 (0-86400 seconds)
No response action. . 1 1. Notify JES 2. Notify user
3. Notify operator 4. Terminate
Notify . . . . .
Response timeout. . . (0-86400)
IP address . . . . . 9.99.99.87 (extend)
Port number . . . . . 5001

Transmission:
- Data set grouping
/ Secure transmission
- Send separator pages
- Display status
Compression. . . 1 1. None 2. LZW
Direct download. 1 1. None 2. MO:DCA-P
Recovery pages . 1000 (0-65535)

Debugging:
Dump:
Code . . . . . Message ID . . . . . Count . . 1 (1-99)
Trace:
/ Trace user data
Trace mode . . . 2 1. None 2. Internal 3. Sync
4. Full 5. Limit 6. IPDS
Trace table size . 32 (1-999)
FSA trace dsname .

3800 Compatibility:
- Override default font
Set media origin to 3800 origin for:
- Data set

```

Figure 13. Sample ISPF Printer Inventory panel (Page 2 of 2)

### FSS Printer Inventory parameters

Table 13 on page 77 describes the Functional Subsystem (FSS) parameters that you can define in the Printer Inventory and compares them to the parameters you can define on the PRINTDEV statement or the EXEC PARM statement of the startup procedure, in PSF installation Exit 7, or in the AFPPARMS control statement. All parameters are optional unless specified otherwise.

When you are defining parameters on the ISPF panels, see the online help for information about each parameter. For more information about the Printer Inventory and Exit 7 parameters, see [PSF for z/OS: Customization](#).



Table 13. FSS Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters. If you change the value for an FSS parameter, you must restart the FSS to pick up the new value.

Printer Inventory: ISPF Panel	Printer Inventory: PIDU	Equivalent Parameter	Description
Blank truncation <b>Values:</b> / = Yes Blank = No	blank-truncation <b>Values:</b> BLNKTRNC NOBLNKTRNC <b>BLNKTRNC</b> is the default.	PARM=(,,,,,blank_truncation)	Specifies whether trailing blanks in non-page-mode data sets received from JES2 are truncated. Non-page-mode data sets include line-mode data, text data, mixed-mode data, and XML data. If you specify this parameter for composed-text data sets (for example, output created by the Document Composition Facility), it has no effect.  Note that the PRMODE= parameter, on both the JCL and JES2 output device initialization statements, does not affect blank truncation. To turn off blank truncation for some SYSOUT classes, see the <b>restore_blanks_classes</b> parameter.
Log messages <b>Values:</b> / = Yes Blank = No	log-messages <b>Values:</b> yes no		Indicates whether AFP Download Plus writes messages to the Infoprint Server common message log. The default is <b>No</b> .
NST trace dsname	nst-trace-dsname	PARM=(NSTddname)	Specifies the name of the data set that AFP Download Plus directs a notify subtask (NST) trace to. This name must be different from both the data set name AFP Download Plus directs an FSA external trace to and the PINST trace data set name. The trace data set must exist and be cataloged before the first sender FSA is started.  <b>Note:</b> An NST trace is recorded only if an FSA internal or external trace of the page printing writer (PPWTR) component is also active for that FSA.  For more information about using traces, see <a href="#">PSF for z/OS: Diagnosis</a> .

Table 13. FSS Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters. If you change the value for an FSS parameter, you must restart the FSS to pick up the new value. (continued)

Printer Inventory: ISPF Panel	Printer Inventory: PIDU	Equivalent Parameter	Description
PINST trace dsname	pinst-trace-dsname		<p>Specifies the name of the data set that AFP Download Plus directs a Printer Inventory notify subtask (PINST) trace to. This name must be different from both the data set name AFP Download Plus directs an FSA external trace to and the NST trace data set name. The trace data set must exist and be cataloged before the first sender FSA is started.</p> <p><b>Note:</b> A PINST trace is recorded only if an FSA internal or external trace of the page printing writer (PPWTR) component is also active for that FSA.</p> <p>For more information about using traces, see <a href="#"><i>PSF for z/OS: Diagnosis</i></a>.</p>

Table 13. FSS Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters. If you change the value for an FSS parameter, you must restart the FSS to pick up the new value. (continued)

Printer Inventory: ISPF Panel	Printer Inventory: PIDU	Equivalent Parameter	Description
Restore blanks classes	restore-blanks-classes	PARM= (,,,,,,,,restore_blanks_classes )	<p>This parameter is used only when blank-truncation=BLNKTRNC. It specifies the SYSOUT classes for which you do <b>not</b> want trailing blanks truncated for non-page-mode-data sets. Non-page-mode data sets include line-mode data, text data, mixed-mode data, and XML data.</p> <p>Specify the same classes for which you specified BLNKTRC=NO on the JES2 OUTCLASS(v) statement before z/OS 2.4. Or, specify this attribute for SYSOUT classes that have:</p> <ul style="list-style-type: none"> <li>• Non-page-mode data sets that require trailing blanks to be preserved</li> <li>• Data sets containing double-byte font characters</li> </ul> <p><b>Values: A-Z, 0-9</b></p> <p>Specifies up to 36 SYSOUT class values. Each class is one alphanumeric character. Do not separate the class values by commas or blanks. The value of the SYSOUT class of the data set received from JES is compared to the <b>restore-blanks-classes</b>. If the SYSOUT class matches one of these classes, trailing blanks will <b>not</b> be truncated.</p> <p>For example, if your JES2 OUTCLASS statement specified BLNKTRNC=NO for:</p> <ul style="list-style-type: none"> <li>• OUTCLASS(K,L,Y), specify restore_blanks_classes = KLY</li> <li>• OUTLCLASS(S-Z), specify restore_blanks_classes = STUVWXYZ</li> </ul>

Table 13. FSS Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters. If you change the value for an FSS parameter, you must restart the FSS to pick up the new value. (continued)

Printer Inventory: ISPF Panel	Printer Inventory: PIDU	Equivalent Parameter	Description
TCP/IP job name	tcpip-job-name	PARM= (,,,tcpip_name)	Specifies the name of the TCP/IP startup procedure. If you changed the name of the TCP/IP startup procedure, specify the new name for this parameter. If you do not use this parameter, the FSA uses the default TCP/IP startup procedure name of TCPIP.
Trace prompt <b>Values:</b> / = Yes Blank = No	trace-prompt <b>Values:</b> yes no	PARM= (,,prompt) <b>Values:</b> PROMPT NOPROMPT	Indicates whether an operator response is required each time the FSS starts to initialize the AFP Download Plus operator interface. The default is <b>NOPROMPT (No)</b> .  For more information about using traces, see <a href="#">PSF for z/OS: Diagnosis</a> .
Trace table size	trace-table-size	PARM= (,,trace_size)	Specifies a number that indicates how many 4 KB pages of storage are allocated for the FSA trace table. This allocation occurs only if <b>Trace mode</b> is <b>Full</b> , <b>Internal</b> , <b>Limit</b> , or <b>Sync</b> . <b>Values:</b> 1–999 The default is 32.  For more information about using traces, see <a href="#">PSF for z/OS: Diagnosis</a> .
Unicode enabled <b>Values:</b> / = Yes Blank = Yes	unicode-enabled <b>Values:</b> yes no	PARM= (,,,,UNICODE)	Specifies that AFP Download Plus is enabled to use the system conversion services that z/OS provides. This parameter is ignored because AFP Download Plus with PSF is always Unicode-enabled.

### FSA Printer Inventory parameters

Table 14 on page 81 describes the Functional Subsystem Application (FSA) parameters that you can define in the Printer Inventory and compares them to the parameters you can define on the PRINTDEV statement or the EXEC PARM statement of the startup procedure, in PSF installation Exit 7, or in the AFPPARMS control statement. All parameters are optional unless specified otherwise.

When you are defining parameters on the ISPF panels, see the online help for information about each parameter. For more information about the Printer Inventory and Exit 7 parameters, see [PSF for z/OS: Customization](#).

Table 14. FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters

Printer Inventory: ISPF Panel	Printer Inventory: PIDU	Equivalent Parameter	Description
<p>Above the bar storage</p> <p><b>Values:</b></p> <ul style="list-style-type: none"> <li>1 = None</li> <li>2 = Inline resources</li> </ul>	<p>above-the-bar-storage</p> <p><b>Values:</b></p> <ul style="list-style-type: none"> <li>none</li> <li>inline-resources</li> </ul>	<p>above-the-bar-storage</p>	<p>Specifies whether AFP Download plus uses storage that is above the bar for inline resources.</p> <p><b>Values:</b></p> <ul style="list-style-type: none"> <li>None: AFP Download Plus stores inline resources above the 16 MB line but below the 2 GB bar (the region area) during job processing.</li> <li>Inline resources: AFP Download Plus stores inline resources above the 2 GB bar during job processing.</li> </ul>
<p>Auxiliary files MO:DCA level</p> <p><b>Values:</b></p> <ul style="list-style-type: none"> <li>1 = None</li> <li>2 = IS/3</li> <li>3 = BPF match</li> </ul>	<p>auxiliary-files-modca-level</p> <p><b>Values:</b></p> <ul style="list-style-type: none"> <li>none</li> <li>is3</li> <li>bpf-match</li> </ul>	<p>auxiliary-files-modca-level</p>	<p>Specifies the MO:DCA interchange set level that auxiliary files, such as separator pages and message files, support.</p> <p><b>Values:</b></p> <ul style="list-style-type: none"> <li>None: Auxiliary files do not support a MO:DCA IS level (default).</li> <li>IS/3: Auxiliary files are MO:DCA IS/3 compliant.</li> <li>BPF match: Auxiliary files contain the same BPF MO:DCA Interchange Set triplet and Function Set triplets that are specified on the BPF structured field in the user's data set.</li> </ul> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1. Make sure that changes are made to the PRINTDEV statement for this FSA so that auxiliary files are generated correctly. See <a href="#">“Configuring AFP Download Plus so files remain compliant with the specified MO:DCA interchange set”</a> on page 31.</li> <li>2. Do not use JESNEWS when you are specifying BPF match for this parameter because if the JESNEWS data set is active, AFP Download Plus matches the JESNEWS data set, and the Job Header auxiliary file that is created does not match the MO:DCA interchange set level for the user's data set.</li> </ol>

Table 14. FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters (continued)

Printer Inventory: ISPF Panel	Printer Inventory: PIDU	Equivalent Parameter	Description
Blank compression <b>Values:</b> / = Yes Blank = No	blank-compression <b>Values:</b> yes no	COMPRESS	Specifies whether AFP Download Plus compresses data (blanks) in line data before it transforms the data to MO:DCA-P. <b>Values:</b> Yes: Causes AFP Download Plus to compress contiguous blanks. No: AFP Download Plus does not compress blanks (default). <b>Notes:</b> 1. Blank compression is a data-compression function in AFP Download Plus. It reduces the amount of data that must be sent through the TCP/IP attachment and might improve the throughput. 2. AFP Download Plus compresses any string of more than five contiguous blanks within line data.
Character sets	chars	CHARS	Specifies the last 4 characters of the coded font name. A font name must contain 1–4 alphanumeric or national characters; up to four default font names can be specified. AFP Download Plus adds the coded font names to the page definition and the inline resource group. <b>Note:</b> When AFP Download Plus processes a MO:DCA IS/3 print file, it does not add the specified coded fonts to the inline resource group because raster fonts cannot be used in a MO:DCA IS/3 file.
Color map	color-map	COLORMAP	Specifies the member name (1–8 alphanumeric or national characters) of the printer default color mapping table. The color mapping table is an object container resource that is used to tell the printer what colors to use for various identifiable parts of the data stream. AFP Download Plus puts the table in the inline resource group and exports this parameter for use by the printer. Use a prefix of M1 for color mapping table resources. The full member name must be specified, such as M1SYSTEM. <b>Note:</b> For printers not supporting color mapping table object container resources, this parameter is ignored.

Table 14. FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters (continued)

Printer Inventory: ISPF Panel	Printer Inventory: PIDU	Equivalent Parameter	Description
<p>Compression</p> <p><b>Values:</b></p> <p>1 = None</p> <p>2 = LZW</p>	<p>compression</p> <p><b>Values:</b></p> <p>none</p> <p>lzw</p>	<p>compression</p>	<p>Indicates whether the LZW compression algorithm is used to compress the transformed data before it is sent to the remote system. The default is None.</p> <p><b>Note:</b> AFP Download Plus ignores this parameter when Yes is specified for the <b>Save auxiliary files</b> parameter.</p>
<p>Com setup member</p>	<p>com-setup-member</p>	<p>COMSETUP</p>	<p>Specifies the member name (1–8 alphanumeric or national characters) of the printer default microfilm setup resource object container that is generated with the utility provided with your microfilm device. AFP Download Plus puts the object container in the inline resource group and exports this parameter for use by the microfilm device. This parameter is used only when output is sent to a microfilm device.</p> <p>Use a prefix of H1 for microfilm setup resources. The full member name must be specified, such as H1SETUPS.</p> <p><b>Note:</b> Required for microfilm devices only; for non-microfilm devices, this parameter is ignored.</p>
<p>Connect interval</p>	<p>printer-connect-interval</p>	<p>CONNINTV</p>	<p>Specifies the number of seconds during which AFP Download Plus attempts to connect to the receiver system. When the connect interval expires and the connection is not complete, AFP Download Plus issues a message and stops the FSA. If <b>Connect interval=0</b>, AFP Download Plus attempts to connect for an unlimited time.</p> <p>The connect interval is set when AFP Download Plus attempts to connect to the receiver system (connect).</p> <p><b>Values:</b> 0 - 86400</p> <p>The default value is 600, which indicates that AFP Download Plus attempts the connection for 10 minutes.</p>

Table 14. FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters (continued)

Printer Inventory: ISPF Panel	Printer Inventory: PIDU	Equivalent Parameter	Description
Consolidate IM1 images <b>Values:</b> / = Yes Blank = No	consolidate-im1-images <b>Values:</b> yes no	XTP7C2SI	<p>Indicates whether AFP Download Plus consolidates a multiple-celled IM1 image into a single IOCA image. The default is No, which indicates that AFP Download Plus converts a multiple-celled IM1 image to multiple IOCA images.</p> <p>This change improves performance only if the image is a 240-pel IM1 celled image that requests replication. For any other case, this change might degrade performance.</p>
Data set grouping <b>Values:</b> / = Yes Blank = No	afpdp-dataset-grouping <b>Values:</b> yes no	dataset-grouping	<p>Indicates whether the multiple data set function is used when the job is sent to the remote system. The default is No.</p> <p><b>Note:</b> When this parameter is set to Yes:</p> <ol style="list-style-type: none"> <li>1. Ensure that the download receiver is at the correct level. Also, if you use the AFP Download Plus receiver, ensure that you specify the <b>apshhmds</b> exit program (see <a href="#">“Using the apshhmds exit program” on page 169</a>).</li> <li>2. When the job contains print files that specify a MO:DCA interchange set, ensure that your receiver supports and preserves that level.</li> </ol>



Table 14. FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters (continued)

Printer Inventory: ISPF Panel	Printer Inventory: PIDU	Equivalent Parameter	Description
Default process mode	default-process-mode	PRMODE XTP7PRMD	<p>Indicates the default processing mode AFP Download Plus uses to transform data sets containing both single-byte and double-byte fonts.</p> <p><b>Values:</b> AFP Download Plus ignores all values but these:</p> <p><b>SOSI1</b> Each shift-out, shift-in code is converted to a blank and a Set Coded Font Local text control.</p> <p><b>SOSI2</b> Each shift-out, shift-in code is converted to a Set Coded Font Local text control.</p> <p><b>SOSI3</b> The shift-in code is converted to a Set Coded Font Local text control and two blanks. A shift-out code is converted to a Set Coded Font Local text control.</p> <p><b>SOSI4</b> Each shift-out, shift-in code is to be skipped and not counted when offsets are calculated for the data set. SOSI4 is used when double-byte character set (DBCS) text is converted from ASCII to EBCDIC. When SOSI4 is specified, the page definition offsets are correct after conversion; therefore, the user does not need to account for SOSI characters when FIELD offsets are computed. The data conversion that AFP Download Plus makes for SOSI4 is the same as for SOSI2.</p> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1. AFP Download Plus uses this parameter only if the PRMODE keyword is not specified on the OUTPUT JCL statement.</li> <li>2. If this parameter is not specified in the Printer Inventory, Exit 7, or the PRINTDEV statement, and the PRMODE parameter is not specified on the OUTPUT JCL statement, AFP Download Plus defaults to MO:DCA-P.</li> </ol>

Table 14. FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters (continued)

Printer Inventory: ISPF Panel	Printer Inventory: PIDU	Equivalent Parameter	Description
Direct download <b>Values:</b> 1 = None 2 = MO:DCA-P	direct-download <b>Values:</b> none modca-p	direct-download	<p>Indicates whether AFP Download Plus stores data in a temporary directory or sends it directly to the receiver.</p> <p>The values are:</p> <p><b>Values:</b></p> <p>None: AFP Download Plus stores the MO:DCA-P and resource data that is created from the JES spool print data in temporary UNIX files until transmission to the receiver. This is the default.</p> <p>MO:DCA-P: AFP Download Plus sends the MO:DCA-P data that is created from the JES spool print data directly to the receiver. The resource data is stored in a temporary UNIX file until transmission to the receiver.</p> <p><b>Note:</b> AFP Download Plus ignores this parameter when Yes is specified for the <b>Save auxiliary files</b> parameter.</p>
Display status <b>Values:</b> / = Yes Blank = No	display-afpdp-status <b>Values:</b> yes no	display-afpdp-status	<p>Indicates whether AFP Download Plus activates the processing status feature.</p> <p><b>Values:</b></p> <p>Yes: AFP Download Plus processing status is activated and stays activated for the life of the FSA or until the DISPLAY,STATUS=AFPDOP operator interface MODIFY command is issued. Processing status is reported at the end of the spool data set in message APS8559I for both the spool data set transformation to MO:DCA-P and the transformed document transmission. See <a href="#">“Viewing the operator status message when the processing status feature is activated”</a> on page 64.</p> <p>No: AFP Download Plus processing status is not activated (default).</p> <p>See <a href="#">“Reporting AFP Download Plus processing status”</a> on page 126 for information about activating the status feature with the operator interface.</p>

Table 14. FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters (continued)

Printer Inventory: ISPF Panel	Printer Inventory: PIDU	Equivalent Parameter	Description
Dump: Code	dump-code	DUMP	<p>Identifies a reason code that causes a conditional memory dump of the sender address space when the reason code occurs. The reason code can be:</p> <ul style="list-style-type: none"> <li>A 7-character hexadecimal abend reason code for an abend for which AFP Download Plus does not typically produce a memory dump, such as a restartable abend; the first 3 characters of an abend reason code are always ABD. For example: <div>ABD011C</div> <p>See <i>PSF for z/OS: Messages and Codes</i> for a list of abend reason codes.</p> </li> <li>An 8-character hexadecimal PSF reason code; you can enter the hexadecimal characters only or the hexadecimal characters with a prefix of 0x. For example: <div>09600c00 0x09600c00</div> <p>See <i>PSF for z/OS: Diagnosis</i> for a list of PSF reason codes.</p> </li> <li>An integer 0–2147483647. For example: <div>157289480</div> </li> </ul> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>If both a reason code and a message ID are specified, a dump occurs at the first occurrence of either one.</li> <li>For an explanation of restartable abends, see <i>PSF for z/OS: Diagnosis</i>.</li> </ol>
Dump: Count	message-count-before-dump	DUMP	<p>Specifies the number of times the message that is specified by the Dump: Message ID parameter is issued before AFP Download Plus produces a conditional memory dump.</p> <p><b>Values:</b> 1–99</p> <p>The default is 1.</p>

Table 14. FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters (continued)

Printer Inventory: ISPF Panel	Printer Inventory: PIDU	Equivalent Parameter	Description
Dump: Message ID	dump-message-id	DUMP	<p>Identifies an AFP Download Plus message that causes a conditional memory dump of the sender address space when the message occurs. The dump occurs after the message is issued for the number of times specified by the <b>Dump: Count</b> parameter.</p> <p><b>Syntax:</b> APSnnnnt</p> <p><b>nnnn</b> 3–4 digit message number.</p> <p><b>t</b> One of these type codes:</p> <p><b>A</b> Message requiring operator action.</p> <p><b>I</b> Information message.</p> <p><b>Examples:</b> APS896I, APS2001A</p> <p><b>Note:</b> If both a reason code and a message ID are specified, a dump occurs at the first occurrence of either one.</p>
<p>Error disposition supported</p> <p><b>Values:</b> / = Yes Blank = No</p>	<p>error-disposition-supported</p> <p><b>Values:</b> yes no</p>	PRTERORR	<p>Indicates whether AFP Download Plus accepts the error disposition that is specified on the OUTPUT JCL statement when AFP Download Plus stops processing a data set because an error occurs during processing. The default is No.</p> <p><b>Note:</b> The Printer Inventory values are equivalent to these PRTERORR values in the PRINTDEV statement:</p> <p><b>Yes = HONOR</b> <b>No = NOTHONOR</b></p>

Table 14. FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters (continued)

Printer Inventory: ISPF Panel	Printer Inventory: PIDU	Equivalent Parameter	Description
Form definition (required)	form-definition	FORMDEF	Specifies a required 1–8 character default form definition. Form definition names in AFP Download Plus must begin with an F1 prefix or AFP Download Plus adds the prefix. If the name is 3 or more characters and the first 2 characters are the F1 prefix, AFP Download Plus uses the name as is. Otherwise, if the name does not begin with the F1 prefix and is a maximum of 6 characters, AFP Download Plus adds the F1 prefix to the name. However, if the form definition name begins with F1, which is part of the name and not the prefix, and is a maximum of 6 characters, you must include the prefix in the form definition name. For example, if the form definition name is F1A20, you must code F1F1A20 as the form definition.
FSA trace dsname	fsa-trace-dsname	ddname	Specifies the data set that AFP Download Plus directs an FSA trace to when the trace mode is <b>Full</b> , <b>Limit</b> , or <b>Sync</b> . The trace data set must exist and be cataloged before the sender FSA is started.  For more information about using traces, see <i>PSF for z/OS: Diagnosis</i> .
GOCA Box orders <b>Values:</b> / = Yes Blank = No	goca-box-supported <b>Values:</b> yes no	goca-box	Indicates whether GOCA box drawing orders are supported by the printer on the receiver system. The default is No.  <b>Notes:</b> 1. The value that you select affects how line data is transformed to MO:DCA-P before it is sent to the receiver. 2. When you are using the PPFA DRAWGRAPHIC command in a page definition, specify Yes for this parameter.
GOCA Set Fractional Line Width orders <b>Values:</b> / = Yes Blank = No	goca-fractional-line-supported <b>Values:</b> yes no	goca-frac-line	Indicates whether GOCA fractional line width drawing orders are supported by the printer on the receiver system. The default is No.  <b>Notes:</b> 1. The value that you select affects how line data is transformed to MO:DCA-P before it is sent to the receiver. 2. When you are using the PPFA DRAWGRAPHIC command in a page definition, specify Yes for this parameter.

Table 14. FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters (continued)

Printer Inventory: ISPF Panel	Printer Inventory: PIDU	Equivalent Parameter	Description
GOCA Set Process Color orders  <b>Values:</b> / = Yes Blank = No	goca-process-color- supported  <b>Values:</b> yes no	goca-process-color	Indicates whether GOCA process color drawing orders are supported by the printer on the receiver system. The default is No.  <b>Notes:</b> 1. The value that you select affects how line data is transformed to MO:DCA-P before it is sent to the receiver. 2. When you are using the PPFA DRAWGRAPHIC command in a page definition, specify Yes for this parameter.
Image output format  <b>Values:</b> 1 = IOCA 2 = Unchanged	image-output-format  <b>Values:</b> ioca unchanged	image-output-format	Indicates the image data format AFP Download Plus produces in the output document. IM1 images can be saved in the same format as in the input file or converted to uncompressed Image Object Content Architecture (IOCA) images.  Most printers support both IM1 and IOCA image formats, but IM1 images cannot be rotated or rescaled correctly at different printer resolutions. Print servers, such as PSF, convert IM1 images to uncompressed IOCA when the IM1 image resolution differs from the actual printer resolution. Because AFP Download Plus does not know what printer the output might be printed on, by default it converts IM1 images to uncompressed IOCA.  Because uncompressed IOCA images are often greater in size than the original IM1 images, printer performance can be slower. If you have problems with printer performance, specify Image output format=Unchanged so the IM1 images are not converted to IOCA.  <b>Values:</b> IOCA: All image data is produced in uncompressed IOCA format. This is the default.  Unchanged: All image data is produced in the same format as in the input file.

Table 14. FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters (continued)

Printer Inventory: ISPF Panel	Printer Inventory: PIDU	Equivalent Parameter	Description
IOCA replicate and trim function  <b>Values:</b> / = Yes Blank = No	ioca-replicate-trim-supported  <b>Values:</b> yes no	ioca-replicate-trim-func	Indicates whether the IOCA Replicate and Trim function is used when IM1 celled images are converted. This parameter might reduce the number of bytes needed for a raster image, allowing it to display or print faster. When set to <b>Yes</b> , this parameter is only accepted if <b>Image output format=IOCA</b> . The default is No.  <b>Note:</b> The value that you select affects how line data is transformed to MO:DCA-P before it is sent to the receiver.
IP address	printer-ip-address	IPADDR	Identifies the 1 - 250 character Internet Protocol (IP) address or host name of the TCP/IP-attached receiver system. Specify one of these: <ul style="list-style-type: none"> <li>• Host name; for example, <code>denver.mysystem</code></li> <li>• Dotted decimal address in the format <code>nnn.nnn.nnn.nnn</code>; for example, <code>20.97.8.201</code></li> <li>• Colon hexadecimal address in the format: <code>nnnn:nnnn:nnnn:nnnn:nnnn:nnnn:nnnn:nnnn</code> For example, <code>2001:0db8:85a3:0000:0000:8a2e:0c22:384e</code>. These restrictions apply: <ul style="list-style-type: none"> <li>– Leading zeros in each hexadecimal value can be omitted. For example: <code>2001:db8:85a3:0:0:8a2e:c22:384e</code></li> <li>– One sequence of repeat zero values can be omitted. For example: <code>2001:db8:85a3::8a2e:c22:384e</code></li> <li>– The last 2 hexadecimal digits can be in dotted decimal notation. For example: <code>2001:db8:85a3::8a2e:12.34.56.78</code></li> </ul> </li> </ul>
Map Coded Font (MCF) Format 2 name  <b>Values:</b> 1 = Code page and character set 2 = Coded font	mcf2-format  <b>Values:</b> codepage-character-set  coded-font	mcf2-format	Indicates whether AFP Download Plus uses the names of the code page and character set to build the MCF-2 structured field or the name of the coded font.  <b>Values:</b> Code page and character set: AFP Download Plus opens and reads the contents of all coded fonts that are specified in MCFs in the input file or input resources. This is the default.  Coded font: Recommended when DBCS fonts are processed.

Table 14. FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters (continued)

Printer Inventory: ISPF Panel	Printer Inventory: PIDU	Equivalent Parameter	Description
Map to outline fonts <b>Values:</b> / = Yes Blank = No	map-to-outline-fonts <b>Values:</b> yes no	MAP2OLN XTP7MTOF	<p>Indicates whether AFP Download Plus maps fonts to outline fonts. Use this parameter if your printer supports outline fonts, you have existing applications that use raster fonts, and you want to use outline fonts without changing the applications. The default is No.</p> <p>For more information about mapping to outline fonts, including limitations, see <i>PSF for z/OS: Customization</i>.</p>
Message files read access <b>Values:</b> / = Yes Blank = No	message-files-read-access <b>Values:</b> yes no	message-files-read-access	<p>Specifies whether users with an <b>other</b> permission level can view the message files that AFP Download Plus creates. When AFP Download Plus is installed, only the owner and users in the APSADMIN group have permission to list files in the default message directory, /var/psf/userinfo/<i>userid</i>, where <i>userid</i> is the name of the user who submitted the job.</p> <p><b>Values:</b></p> <p>Yes: AFP Download Plus sets permissions for the .MSG files to 664 so that <b>other</b> users can view message files.</p> <p>No: AFP Download Plus sets permissions for the .MSG files to 660 so that only the owner and users in the APSADMIN group can view message files (default).</p> <p><b>Note:</b> When you specify this attribute, it does not change the permissions that are set for existing message files.</p>



Table 14. FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters (continued)

Printer Inventory: ISPF Panel	Printer Inventory: PIDU	Equivalent Parameter	Description
No response action <b>Values:</b> 1 = Notify JES 2 = Notify user 3 = Notify operator 4 = Terminate	no-response-action <b>Values:</b> notify-jes notify-user notify-operator terminate	NORESP	<p>Specifies what action AFP Download Plus takes when the time that is specified by the <b>Response timeout</b> parameter expires and a response is not received from the download receiver.</p> <p><b>Values:</b></p> <p>  Notify JES: AFP Download Plus notifies JES that an expected response was not received from the download receiver. This condition is also displayed by SDSF (default).</p> <p>  Notify user: AFP Download Plus sends a message to the user ID specified by the <b>No response action: Notify</b> parameter and to JES indicating that an expected response was not received from the download receiver.</p> <p>  Notify operator: AFP Download Plus sends a message to the system operator and to JES indicating that an expected response was not received from the download receiver.</p> <p>  Terminate: AFP Download Plus stops the FSA. The system operator must issue a command to restart the FSA. The data set that is active when the FSA is stopped is restarted from the last checkpoint.</p> <p><b>Note:</b> When the <b>No response action</b> parameter is specified, the <b>Response timeout</b> parameter must also be specified.</p>
No response action: Notify	no-response-notify	NORESP	<p>Specifies the user ID that AFP Download Plus sends a message to when an expected response is not received from the download receiver before time expires. This parameter is used when <b>Notify user</b> is specified by the <b>No response action</b> parameter.</p>
Object identifier (OID) format <b>Values:</b> / = Yes Blank = No	oid-format-supported <b>Values:</b> yes no	pass-oid	<p>Indicates whether AFP Download Plus passes OID information when TrueType and OpenType fonts are placed inline. The default is No.</p> <p><b>Note:</b> The value that you select affects how line data is transformed to MO:DCA-P before it is sent to the receiver.</p>

Table 14. FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters (continued)

Printer Inventory: ISPF Panel	Printer Inventory: PIDU	Equivalent Parameter	Description
Page accounting supported  <b>Values:</b> / = Yes Blank = No	page-accounting-supported  <b>Values:</b> yes no	page-accounting-supported	Indicates whether AFP Download Plus supports the page accounting function. When set to <b>Yes</b> , AFP Download Plus counts the number of pages and sheets in the data set. The number of pages and sheets is sent to the receiver in the <b>-o</b> attributes, <b>-opagecount</b> and <b>-osheetcount</b> . The default is No.
Page definition (required)	page-definition	PAGEDEF	Specifies a required 1 - 8 character default page definition. Page definition names in AFP Download Plus must begin with a P1 prefix or AFP Download Plus adds the prefix. If the name is 3 or more characters and the first 2 characters are the P1 prefix, AFP Download Plus uses the name as is. Otherwise, if the name does not begin with the P1 prefix and is a maximum of 6 characters, AFP Download Plus adds the P1 prefix to the name. However, if the page definition name begins with P1, which is part of the name and not the prefix, and is a maximum of 6 characters, you must include the prefix in the page definition name. For example, if the page definition name is P1011, you must specify P1P1011 as the page definition.

Table 14. FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters (continued)

Printer Inventory: ISPF Panel	Printer Inventory: PIDU	Equivalent Parameter	Description
Paper length	paper-length	paper-length	<p>Specifies the actual paper length to be used for Line-Mode Migration or Line-Mode Conversion. The default is 14IN.</p> <p><b>Syntax:</b> <i>nnnn[mmm]unit</i></p> <p><b>nnnn</b> 1–4 digit decimal number that indicates the paper length.</p> <p><b>mmm</b> 1–3 digit decimal number that indicates the paper length.</p> <p><b>unit</b> One of these measurement units:</p> <p><b>CM</b> Centimeters</p> <p><b>IN</b> Inches</p> <p><b>MM</b> Millimeters</p> <p><b>PELS</b> Picture elements (1/240 inch)</p> <p><b>POINTS</b> Points (1/72 inch)</p> <p>If you specify the unit as PELS or POINTS, you must specify the value as a whole number with no decimal point.</p> <p>See information about Line-Mode Migration and 3800 Line-Mode Conversion considerations for AFP Download Plus in <a href="#">PSF for z/OS: Customization</a>.</p>

Table 14. FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters (continued)

Printer Inventory: ISPF Panel	Printer Inventory: PIDU	Equivalent Parameter	Description
Paper width	paper-width	paper-width	<p>Specifies the actual paper width to be used for Line-Mode Migration or Line-Mode Conversion. This value does not include the carrier strips. The default is 13.2IN.</p> <p><b>Syntax:</b> <i>nnnn[.mmm]unit</i></p> <p><b>nnnn</b> 1–4 digit decimal number that indicates the paper width.</p> <p><b>mmm</b> 1–3 digit decimal number that indicates the paper width.</p> <p><b>unit</b> One of these measurement units:</p> <p><b>CM</b> Centimeters</p> <p><b>IN</b> Inches</p> <p><b>MM</b> Millimeters</p> <p><b>PELS</b> Picture elements (1/240 inch)</p> <p><b>POINTS</b> Points (1/72 inch)</p> <p>If you specify the unit as PELS or POINTS, you must specify the value as a whole number with no decimal point.</p> <p>See information about Line-Mode Migration and 3800 Line-Mode Conversion considerations for AFP Download Plus in <a href="#">PSF for z/OS: Customization</a>.</p>
Port number	port-number	PORTNO	<p>Specifies the port number with which AFP Download Plus is to establish a connection. The port number identifies the appropriate internal process in the receiver system. The port number must match the TCP/IP port number for the receiver.</p> <p><b>Values:</b> 5001–65535</p> <p>The default port is 5001.</p>

Table 14. FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters (continued)

Printer Inventory: ISPF Panel	Printer Inventory: PIDU	Equivalent Parameter	Description
Print error messages <b>Values:</b> 1 = No 2 = Yes	print-error-messages <b>Values:</b> no yes	PIMSG	<p>Indicates whether all message groups that are generated in the processing of a data set are written to a file.</p> <p><b>Values</b></p> <p>No: Specifies that no message groups are to be written unless an error occurs that forces a premature end to the processing of the data set. If that happens, the message group that describes the error that stopped processing is written.</p> <p>Yes: Specifies that all message groups that are generated in the processing of a data set are to be written to a file (default). If a data set is not completed because of an error, message groups that are generated up to this error are written, including the message group that describes the error that stopped processing.</p> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1. Reaching the message count value that is specified by the <b>Print error messages: Maximum message</b> parameter is one error that forces a premature end to processing.</li> <li>2. The PIMSG parameter that is specified on the OUTPUT statement in the startup procedure for the message data set, referenced by the MESSAGE keyword, also affects the rerouting of messages.</li> </ol>

Table 14. FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters (continued)

Printer Inventory: ISPF Panel	Printer Inventory: PIDU	Equivalent Parameter	Description
Print error messages: Maximum messages	print-error- messages-maximum	PIMSG	<p>Indicates the maximum number of message groups that are written to a file when a value is specified for the <b>Print error messages</b> parameter. When the maximum number is reached, processing of the data set stops and the data set is purged from the spool. The final count of written messages might be more than the value for maximum messages if the message groups are generated for errors that are reported during processing for data that is transmitted before the message count is reached.</p> <p><b>Values:</b> 0–999</p> <p>A value of 0 means that the data set is processed until complete and all message groups are written unless an error occurs that stops processing. The default is 16.</p> <p><b>Note:</b> Messages are written depending on whether <b>Yes</b> or <b>No</b> is specified for the <b>Print error messages</b> parameter.</p>
Print error reporting <b>Values:</b> 1 = None 2 = All 3 = Character 4 = Position	print-error-reporting <b>Values:</b> none all character position	DATAACK	<p>Specifies whether the printer reports character and position errors. AFP Download Plus exports this parameter for use by the printer. Character errors are caused by trying to use a code point that is not assigned to a character in a font. Position errors are caused by trying to print outside the valid printable area or off the logical page. Some printers use exception highlighting to mark position errors on the printed page.</p> <p><b>Values:</b></p> <p>None: Do not report any character or position errors (default). This is equivalent to BLOCK in the PRINTDEV DATAACK parameter.</p> <p>All: Report all character and position errors. This is equivalent to UNBLOCK in the PRINTDEV DATAACK parameter.</p> <p>Character: Report only character errors. This is equivalent to BLKPOS in the PRINTDEV DATAACK parameter.</p> <p>Position: Report only position errors. This is equivalent to BLKCHAR in the PRINTDEV DATAACK parameter.</p> <p><b>Note:</b> This parameter also produces error messages, unless <b>Print error messages=No</b>.</p>

Table 14. FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters (continued)

Printer Inventory: ISPF Panel	Printer Inventory: PIDU	Equivalent Parameter	Description
Recover from font not found  <b>Values:</b> / = Yes Blank = No	recover-from-font-not-found  <b>Values:</b> yes no	MAP2OLN XTP7RFNF	Indicates whether AFP Download Plus makes sure that the outline font that is derived from the mapped font exists before proceeding. Use this parameter if your printer supports outline fonts, you requested that AFP Download Plus map to outline fonts, and you do not want pages in your job ended because the outline font identified through the mapped font did not exist on the host. The default is No.
Recovery pages	transmit-recovery-pages	transmit-recovery-pages	Specifies a number that indicates how often AFP Download Plus synchronizes with the receiving system to determine whether the transmitted data is received and if not, retransmits the data from the last successful recovery point.  <b>Values:</b> 0–65535  The default is 1000. When 0 is specified, AFP Download Plus does not synchronize the transmitted data with the receiver until the end of a file.
Release data set when repositioning  <b>Values:</b> / = Yes Blank = No	release-ds-when-repositioning  <b>Values:</b> yes no	XTP7RDSR	Indicates whether AFP Download Plus releases spool data sets it obtained from JES when it is repositioning to handle an exception that is reported during transformation. Releasing data sets might reorder the data sets when transformation resumes. The default is No.
Report Line-Mode Conversion paper-length errors  <b>Values:</b> / = Yes Blank = No	report-line-mode-conversion-paper-length-errors  <b>Values:</b> yes no	XTP7LMCM	Indicates whether AFP Download Plus reports message APS973I for Line-Mode Conversion paper-length errors.  <b>Values:</b>  <b>Yes</b> The message is reported.  <b>No</b> The message is suppressed. This is the default.  For more information about 3800 Line-Mode Conversion considerations for AFP Download Plus, see <a href="#">PSF for z/OS: Customization</a> .

Table 14. FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters (continued)

Printer Inventory: ISPF Panel	Printer Inventory: PIDU	Equivalent Parameter	Description
Resolution	resolution	XTP7FMT	<p>Indicates the resolution at which the output is formatted. AFP Download Plus uses this value to choose the associated resolution system library that is previously defined by the system programmer. If this parameter is blank, AFP Download Plus uses the default system library.</p> <p><b>Values:</b></p> <p><b>240</b> The data was formatted with resources at 240 pels per inch.</p> <p><b>300</b> The data was formatted with resources at 300 pels per inch.</p> <p><b>Note:</b> The resolution value that is specified is used for all jobs unless you override it with the Exit 7 BDSC or EDSC.</p>
<p>Resources Included Inline: Bar code objects (BCOCA)</p> <p><b>Values:</b> / = Inline Blank = Not inline</p>	<p>inline-bcoca-objects</p> <p><b>Values:</b> yes no</p>	bcoca	<p>Indicates whether all BCOCA objects required to print or view the output file are included inline. The default is Inline.</p>



Table 14. FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters (continued)

Printer Inventory: ISPF Panel	Printer Inventory: PIDU	Equivalent Parameter	Description
Resources Included Inline: Color management resources  <b>Values:</b> 1 = None 2 = All 3 = Generic	inline-color-management-resources  <b>Values:</b> none all generic	cmr-objects	Specifies whether color management resource (CMR) objects required to print or view the output file are included inline.  <b>Values:</b> <b>None</b> No CMR objects are included inline. <b>All</b> These objects are included inline: <ul style="list-style-type: none"> <li>• All CMR objects that are referenced in the data stream.</li> <li>• All CMR objects for all device types and models that are referenced by data object or CMR resource access tables (RATs) and mapped to a generic instruction CMR.</li> </ul> <b>Generic</b> These objects are included inline: <ul style="list-style-type: none"> <li>• All CMR objects that are referenced in the data stream.</li> <li>• All non-device specific CMR objects that are referenced by data object or CMR RATs.</li> </ul> This is the default. <b>Note:</b> Link CMR objects are not included inline.
Resources Included Inline: Font objects (FOCA)  <b>Values:</b> / = Inline Blank = Not inline	inline-foca-objects  <b>Values:</b> yes no	foca-fonts	Indicates whether all font character sets and code pages that are required to print or view the output file are included inline. If <b>Map Coded Font (MCF) Format 2 name=2</b> is specified, AFP Download Plus also includes coded fonts inline; otherwise, coded fonts are not included inline. The default is Inline.

Table 14. FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters (continued)

Printer Inventory: ISPF Panel	Printer Inventory: PIDU	Equivalent Parameter	Description
Resources Included Inline: Form definitions  <b>Values:</b> / = Inline Blank = Not inline	inline-form-definitions  <b>Values:</b> yes no	formdefs	Indicates whether the form definition that is used in processing the file is included inline. The default is Inline.  <b>Note:</b> The job that is sent to the receiver might fail to print or be archived, without any error messages, in these situations: <ul style="list-style-type: none"><li>You set these parameters for a job that is sent with separator pages: <div>Resources Included Inline: Form     definitions=Not inline Data set grouping=Yes Send separator pages=Yes</div></li><li>You set these parameters for a job that is sent with multiple data sets: <div>Resources Included Inline: Form     definitions=Not inline Data set grouping=Yes</div></li></ul>
Resources Included Inline: Graphics objects (GOCA)  <b>Values:</b> / = Inline Blank = Not inline	inline-goca-objects  <b>Values:</b> yes no	goca	Indicates whether all GOCA objects required to print or view the output file are included inline. The default is Inline.
Resources Included Inline: Image objects (IOCA)  <b>Values:</b> / = Inline Blank = Not inline	inline-ioca-objects  <b>Values:</b> yes no	ioca	Indicates whether all IOCA objects required to print or view the output file are included inline. The default is Inline.
Resources Included Inline: Object containers  <b>Values:</b> / = Inline Blank = Not inline	inline-object-containers  <b>Values:</b> yes no	object-containers	Indicates whether all object container files that are requested by the input data stream are included inline. The default is Inline.
Resources Included Inline: Overlays  <b>Values:</b> / = Inline Blank = Not inline	inline-overlays  <b>Values:</b> yes no	overlays	Indicates whether all overlays required to print or view the output document file are included inline. The default is Inline.

Table 14. FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters (continued)

Printer Inventory: ISPF Panel	Printer Inventory: PIDU	Equivalent Parameter	Description
Resources Included Inline: Page segments <b>Values:</b> / = Inline Blank = Not inline	inline-page-segments <b>Values:</b> yes no	page-segments	Indicates whether all page segments required to print or view the output document file are included inline. The default is Inline.
Resources Included Inline: Presentation text objects (PTOCA) <b>Values:</b> / = Inline Blank = Not inline	inline-ptoca-objects <b>Values:</b> yes no	ptoca	Indicates whether all PTOCA objects required to print or view the output file are included inline. The default is Inline.
Resources Included Inline: TrueType fonts <b>Values:</b> / = Inline Blank = Not inline	inline-truetype-fonts <b>Values:</b> yes no	truetype-fonts	Indicates whether all TrueType and OpenType base fonts, linked fonts, and font collections that are required to print or view the output file are included inline. The default is Inline. <b>Note:</b> When each TrueType or OpenType font is processed, if the value in a Data-Object Font Descriptor triplet (X'8B') is set to ON to indicate that a font is inline, it overrides <b>Not inline</b> and includes that font, and all linked fonts, inline.
Response timeout	response-timeout	RESPTIME	Specifies the maximum number of seconds AFP Download Plus waits for a response from the download receiver. <b>Values:</b> 0–86400 The default is 0, which means AFP Download Plus waits indefinitely for a response. <b>Note:</b> When the <b>Response timeout</b> parameter is specified, the <b>No response action</b> parameter must also be specified to tell AFP Download Plus what action to take when no response is received within the time specified.

Table 14. FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters (continued)

Printer Inventory: ISPF Panel	Printer Inventory: PIDU	Equivalent Parameter	Description
Save auxiliary files <b>Values:</b> / = Yes Blank = No	save-auxiliary-files <b>Values:</b> yes no	save-auxiliary-files	Specifies whether all auxiliary files, such as separator pages and message files, are saved in the job submitter's default message directory, /var/psf/userinfo/userid. AFP Download Plus never transmits these files to the receiver. Before they are used in production, the system programmer can validate that these files are compliant with the MO:DCA interchange set level for auxiliary files that are specified in the AFPPARMS control statement or the Printer Inventory (see <b>auxiliary-files-modca-level</b> in "Parameters for the AFPPARMS control statement" on page 45 or <b>Auxiliary files MO:DCA level</b> ). When this parameter is specified, AFP Download Plus ignores the <b>Compression</b> , <b>Direct download</b> , and <b>Send messages on failure</b> parameters if they are specified. The default is No.
Secure transmission <b>Values:</b> / = Yes Blank = No	secure-transmission <b>Values:</b> yes no	secure-transmission	Indicates whether data is encoded before transmission. The default is Yes.  <b>Note:</b> If standardized Internet security protocols are required to use secure communications for print files, IBM suggests that you use the IPSec protocol. See <a href="#">z/OS Communications Server: IP Configuration Guide</a> for information about IPSec.

Table 14. FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters (continued)

Printer Inventory: ISPF Panel	Printer Inventory: PIDU	Equivalent Parameter	Description
<p>Send messages on failure</p> <p><b>Values:</b></p> <p>1 = All</p> <p>2 = Generic only</p>	<p>send-messages-on-failure</p> <p><b>Values:</b></p> <p>all</p> <p>generic-only</p>	<p>send-messages-on-failure</p>	<p>Specifies which messages AFP Download Plus sends to the receiver when an error stops transformation of the print job or the operator cancels processing.</p> <p><b>Values:</b></p> <p><b>All</b></p> <p>AFP Download Plus sends all messages for the data set to the receiver in a MO:DCA-P file (default).</p> <p><b>Note:</b> Use this value when you want to send a MO:DCA interchange set compliant message file to the receiver. See <a href="#">“Configuring AFP Download Plus so files remain compliant with the specified MO:DCA interchange set”</a> on page 31 for the other changes you need to make.</p> <p><b>Generic only</b></p> <p>AFP Download Plus sends message APS8239I to the receiver as line data to indicate that the data set cannot be sent.</p> <p><b>Note:</b> This value must not be specified when you are using <b>Data set grouping</b> to send multiple data set jobs to the z/OS receiver system because the receiver system cannot receive jobs with both line data and MO:DCA-P data sets.</p> <p><b>Note:</b> AFP Download Plus ignores this parameter when Yes is specified for the <b>Save auxiliary files</b> parameter.</p>
<p>Send msgs to SYSOUT</p> <p><b>Values:</b></p> <p>/ = Yes</p> <p>Blank = No</p>	<p>send-messages-to-sysout</p> <p><b>Values:</b></p> <p>yes</p> <p>no</p>	<p>XTP7MDSD</p>	<p>Indicates whether AFP Download Plus redirects a message data set as a SYSOUT data set to another CLASS or DEST for viewing or printing.</p>

Table 14. FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters (continued)

Printer Inventory: ISPF Panel	Printer Inventory: PIDU	Equivalent Parameter	Description
<p>Send separator pages</p> <p><b>Values:</b> / = Yes Blank = No</p>	<p>send-separator-pages</p> <p><b>Values:</b> yes no</p>	<p>send-separator-pages</p>	<p>Indicates whether AFP Download Plus sends the separator pages for a job to the receiver. The default is No.</p> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>1. Use this parameter when you want to send MO:DCA interchange set compliant separator pages to the receiver. See <a href="#">“Configuring AFP Download Plus so files remain compliant with the specified MO:DCA interchange set” on page 31</a> for the other changes you need to make.</li> <li>2. For more information, see <a href="#">“Sending z/OS separator pages” on page 124</a>.</li> </ol>
<p>Set media origin to 3800 origin for: Data set</p> <p><b>Values:</b> / = Yes Blank = No</p>	<p>set-3800-dataset-origin</p> <p><b>Values:</b> yes no</p>	<p>XTP738MO</p>	<p>Indicates whether AFP Download Plus sets the user’s data set media origin on continuous-forms printers to the 3800 media origin (upper left corner). The default is No.</p>

Table 14. FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters (continued)

Printer Inventory: ISPF Panel	Printer Inventory: PIDU	Equivalent Parameter	Description
<p>Trace mode</p> <p><b>Values:</b></p> <ul style="list-style-type: none"> <li>1 = None</li> <li>2 = Internal</li> <li>3 = Sync</li> <li>4 = Full</li> <li>5 = Limit</li> <li>6 = IPDS</li> </ul>	<p>trace-mode</p> <p><b>Values:</b></p> <ul style="list-style-type: none"> <li>none</li> <li>internal</li> <li>sync</li> <li>full</li> <li>limit</li> <li>ipds</li> </ul>	<p>PARM= (,trace_type)</p> <p><b>Note:</b> Applies to all FSAs in the FSS.</p>	<p>Specifies the type of AFP Download Plus tracing that is started during FSA initialization. For more information about using traces, see <a href="#">PSF for z/OS: Diagnosis</a>.</p> <p><b>Values:</b></p> <p><b>None</b> No AFP Download Plus tracing is started during AFP Download Plus initialization.</p> <p><b>Internal</b> An internal trace is started (default). It reflects only the most recent history of AFP Download Plus processing.</p> <p><b>Sync</b> An FSA SYNC external trace is started. An internal trace is also started.</p> <p><b>Full</b> An FSA full external trace is started. An internal trace is also started.</p> <p><b>Limit</b> A shortened FSA external trace is started along with an internal trace.</p> <p><b>IPDS</b> An FSA IPDS trace is started along with an internal trace. This value is not used in AFP Download Plus.</p> <p><b>Note:</b> The FSA trace dsname parameter is required when the trace mode is <b>Full</b>, <b>Limit</b>, or <b>Sync</b>.</p>
<p>Trace table size</p>	<p>trace-table-size</p>	<p>PARM= (,,trace_size)</p> <p><b>Note:</b> Applies to all FSAs in the FSS.</p>	<p>Specifies a number that indicates how many 4 KB pages of storage are allocated for the FSA trace table. This allocation occurs only if the trace mode is <b>Full</b>, <b>Internal</b>, <b>Limit</b>, or <b>Sync</b>.</p> <p><b>Values:</b> 1–999</p> <p>The default is 32.</p> <p>For more information about using traces, see <a href="#">PSF for z/OS: Diagnosis</a>.</p>

Table 14. FSA Printer Inventory parameters compared to AFPPARMS, EXEC PARM, Exit 7 (XTP7), or PRINTDEV parameters (continued)

Printer Inventory: ISPF Panel	Printer Inventory: PIDU	Equivalent Parameter	Description
Trace user data <b>Values:</b> / = Yes Blank = No	trace-user-data <b>Values:</b> yes no	trace-user-data	Specifies whether user data is traced when a trace function is requested with AFP Download Plus. <b>Values:</b> <b>Yes</b> User data is traced when user data is available. This is the default. <b>No</b> User data is not included during trace processing. For more information about using traces, see <a href="#">PSF for z/OS: Diagnosis</a> .
Use Line-Mode Migration LINECT <b>Values:</b> / = Yes Blank = No	use-line-mode-migration-linect <b>Values:</b> yes no	XTP7LCNT	Indicates whether AFP Download Plus uses line count (LINECT) in Line-Mode Migration for calculating the number of lines on a page. <b>Values:</b> <b>Yes</b> LINECT is used. <b>No</b> LINECT is not used. This is the default.
Working directory	working-directory	working-directory	Specifies the 1–256 character name of the working directory that AFP Download Plus uses to store error messages files and temporary files for transformed data and resources. The default is /var/psf/. AFP Download Plus adds the beginning and ending slashes if they are missing and uses the name as an absolute path.
3800 compatibility: Override default font <b>Values:</b> / = Yes Blank = No	override-3800-default-font <b>Values:</b> yes no	XTP7HDF	Indicates whether AFP Download Plus tells the 3800 to replace the hardware default font with the first font in the current font list. The default is No.

## Defining a JES2 functional subsystem

To define an AFP Download Plus sender in a JES2 environment, code these JES2 initialization statements as part of JES2 initialization:

- One FSS statement to define each sender
- One PRT statement (also called a printer definition) for each sender FSA

In addition to the FSS and PRT statements, these JES2 initialization statements have considerations for AFP Download Plus:

- On the JES2 SPOOLDEF statement, specify TRKCELL=5 for improved performance. Also, specify TRKCELL=YES on the PRT statement.



## Sample JES2 initialization statements

Figure 14 on page 109 shows sample JES2 statements for one AFP Download Plus sender and its associated FSA named PRT001.

```
FSS(AFPPLUS) PROC=AFPPLUS,HASPFSSM=HASPFSSM,AUTOSTOP=YES  
PRT(001) CKPTSEC=30,CLASS=A,START=NO,  
         FSS=AFPPLUS,MODE=FSS,PRESELECT=YES,  
         PRMODE=(LINE,PAGE,SOSI1,SOSI2),  
         TRKCELL=YES,UCS=0,WS=(Q)
```

Figure 14. Sample JES2 initialization statements

“FSS statement” on page 109 describes the JES2 initialization statements that are shown in Figure 14 on page 109, including some additional parameters that you might want to specify for an AFP Download Plus sender and FSA.

**Note:** For detailed descriptions of each of the parameters, see [z/OS JES2 Initialization and Tuning Reference](#).

## FSS statement

The FSS initialization statement defines the sender to JES2. The FSS statement is associated with one or more PRT statements that define each FSA. The FSS initialization statement is optional but recommended. If you omit it, JES2 generates a default FSS when an FSA is started.

The FSS statement contains these parameters for AFP Download Plus:

### **FSS(fssname)**

Specifies the 1–8 character name of the sender. The FSS name must match the FSS name in the PRT(nnnn) statement for each associated FSA.

### **PROC=procedurename**

Specifies the name of the procedure for starting this sender. This parameter is required. The procedure must be defined before the sender is started (see “Creating a startup procedure” on page 34). A sample AFP Download Plus startup procedure is named AFPPLUS in Figure 6 on page 36.

### **HASPFSSM= HASPFSSM**

Specifies the 1–8 character JES load module to be loaded into the sender address space.

This parameter is optional. For AFP Download Plus, either omit the parameter or specify the default value of HASPFSSM.

### **AUTOSTOP={YES | NO}**

Specifies whether the sender address space (FSS) is to be stopped automatically if all FSAs under control of the sender are stopped.

This parameter is optional; if you omit it, the default is NO.

## PRT statement

A PRT statement (also called a printer definition) is required to define each FSA.

The PRT(nnnn) statement contains these parameters:

### **PRT(nnnn)**

Specifies the name of an FSA that is associated to the sender, where nnnn is 1–5 digits. In addition to the PRT(nnnn) format, AFP Download Plus accepts the PRINTnnn and PRINTERn formats, if the name is no more than 8 characters. In this publication, PRT(nnnn) is used to represent the FSA definition statement.

### **CKPTMODE={PAGE | SEC}**

Specifies whether checkpointing of a data set that is transformed is based on the number of pages or on time. If you specify both CKPTPAGE and CKPTSEC, the CKPTMODE parameter determines which value is used. This parameter is optional.

**Note:** AFP Download Plus checkpoints data sets; however, when an error occurs, AFP Download Plus restarts from the beginning of a job, not from a checkpoint.

**CKPTPAGE=nnn**

Specifies the number of pages between checkpoints of a data set that is transformed.

**Note:** AFP Download Plus checkpoints data sets; however, when an error occurs, AFP Download Plus restarts from the beginning of a job, not from a checkpoint.

**CKPTSEC={nnnnn | 0}**

Specifies the seconds between checkpoints of a data set that is transformed. The value must be 0–32767.

The default is 0, which means AFP Download Plus only checkpoints a data set if a checkpoint value is specified on the OUTPUT JCL statement for the data set.

**Note:** AFP Download Plus checkpoints data sets; however, when an error occurs, AFP Download Plus restarts from the beginning of a job, not from a checkpoint.

**CLASS=n**

Specifies the output class that is processed by this FSA. List all classes to be selected by this FSA; do not separate each class with a comma.

This parameter is optional. If you omit it, this FSA selects data sets with any output class.

**FCB=pdefname**

Specifies the 1–4 character name of a default page definition. Do not code the P1 prefix of the page definition. This name is converted to uppercase.

This parameter is optional. If you omit it, JES2 determines the default page definition from the NIFCB parameter of the JES2 PRINTDEF statement. If no default is specified on the PRINTDEF statement, the default is that specified on the PRINTDEV statement in the FSS startup procedure.

**FORMS=(formnames)**

Specifies the 1 - 8 character form names processed by this FSA. List 1 - 8 different form names that can be selected by this FSA; separate each form name with a comma.

If you designate F as a work-selection criterion on the WS parameter, the FSA selects data sets whose form name matches one of the values specified here.

This parameter is optional. If you omit it and do not specify F as a work-selection criterion, this FSA selects data sets with any form name.

**FSS=fssname**

Specifies the name of the sender FSS associated with this FSA. This parameter is required.

**MODE=FSS**

Specifies that the FSA is managed by an AFP Download Plus sender. This parameter is optional. The default is FSS if you do not code the FSS parameter.

**PRESELECT={YES | NO}**

Specifies whether output data sets are preselected for this FSA. This parameter is optional. If you omit it, the default is YES.

**PRMODE=(processingmodes)**

Specifies the data set processing modes that are supported by this FSA. Separate the modes with commas. List all PRMODE values to be accepted by this FSA, because the FSA processes only data sets with a mode that matches one of the values specified in this parameter:

**LINE**

Specifies that data sets containing line data are selected.

**PAGE**

Specifies that data sets containing MO:DCA-P data are selected.

**SOSIn**

Specifies that data sets with the shift-out, shift-in processing mode of SOSI1, SOSI2, SOSI3, or SOSI4 for double-byte fonts are selected.

**installation-defined**

Specifies any mode that your installation defined.

Specify both LINE and PAGE for FSAs that are to transmit both types of data sets.

This parameter is optional. If you omit it, the default is LINE.

**SEP={YES | NO}**

Specifies whether this FSA produces job-header and job-trailer separator pages. The default is YES.

**SEPDS={YES | NO}**

Specifies whether this FSA produces formatted data set header separator pages. The default is NO.

**START={YES | NO}**

Specifies whether JES2 is to automatically start this FSA whenever JES2 starts. If you specify NO, the operator must start the FSA.

This parameter is optional. If you omit it, YES is the default.

**TRKCELL={YES | NO}**

Specifies whether track-cell despooling is to be used with this FSA. You specify the size of the track cell, in terms of buffers, in the TRKCELL parameter of the JES2 SPOOLDEF statement. For improved performance, specify TRKCELL=YES on this statement and TRKCELL=5 on the JES2 SPOOLDEF statement.

This parameter is optional. If you omit it, the default is NO.

**UCS={fontname | 0}**

Specifies the 1 - 4 character default font name. 0 specifies that no default font is passed to AFP Download Plus.

This parameter is optional. If you omit it, JES2 determines the default font from the NIUCS parameter of the PRINTDEF statement or, if NIUCS is not specified, from the PRINTDEV statement of the startup procedure.

**WS=(criteria)**

Specifies the work-selection criteria for this FSA; separate each value with a comma. See the [z/OS JES2 Initialization and Tuning Reference](#) for the valid values and defaults.

This parameter is optional but recommended. If you omit it, the FSA selects output data sets for processing according to default work-selection criteria.

## Specifying defaults in JES2

You can specify defaults for processing options on JES2 initialization statements PRINTDEF and PRT(*nnnn*) and on the PRINTDEV statement of the AFP Download Plus startup procedure.

To specify no defaults in a JES2 environment, code the JES2 and PRINTDEV statements as shown in [Table 15 on page 111](#).

Table 15. Specifying no defaults in JES2.			
Option	PRT( <i>nnnn</i> ) Statement	PRINTDEF Statement	PRINTDEV Statement
Data Check Blocking	Not applicable	Not applicable	Omit DATAACK parameter
Fonts	UCS=0	Omit NIUCS parameter	Omit CHARS parameter
Form Definition	Not applicable	Not applicable	Omit FORMDEF parameter
Page Definition	Omit FCB parameter	Omit NIFCB parameter	Omit PAGEDEF parameter

## Defining a JES3 functional subsystem

To define a sender for AFP Download Plus in a JES3 environment, code these JES3 initialization statements as part of the JES3 initialization processing for the z/OS system:

- One FSSDEF statement to define each sender
- One DEVICE statement (also called a printer definition) to define each sender FSA

### Sample JES3 initialization statements

Figure 15 on page 112 shows sample JES3 statements for an AFP Download Plus sender and its associated FSA named PRT001.

```
FSSDEF,FSSNAME=AFPLUS,PNAME=AFPLUS,TYPE=WTR  
  
DEVICE,CARRIAGE=(YES,6),CHARS=(YES,60D8),  
      CKPNTSEC=30,DTYPE=PRTAFP1,  
      FSSNAME=AFPLUS,  
      JNAME=PRT001,JUNIT=(,SYS1,UR,ON),  
      MODE=FSS,PM=(LINE,PAGE,SOSI1,SOSI2),  
      WC=(R),WS=(CL)
```

Figure 15. Sample JES3 initialization statements

“FSSDEF statement” on page 112 describes the JES3 initialization statements that are shown in Figure 15 on page 112, including some additional parameters that you might want to specify to define a sender.

**Note:** For detailed descriptions of each of the parameters, see *z/OS JES3 Initialization and Tuning Guide*.

### FSSDEF statement

The FSSDEF initialization statement is optional but recommended. If you omit it, JES3 generates a default sender when an FSA is started. The FSSDEF statement contains these parameters:

**FSSNAME=***fssname*

Specifies the name of this sender. Each sender must have a unique 1–8 character name. This sender name must match the sender name in the DEVICE statement for each associated FSA.

This parameter is required.

**PNAME=***procedurename*

Specifies the name of the procedure for starting this sender. The procedure must be defined before the sender is started (see “Creating a startup procedure” on page 34). A sample AFP Download Plus startup procedure is named AFPLUS in Figure 6 on page 36.

**SYSTEM=***systemname*

Specifies the JES3 processor on which the sender runs. This parameter is optional. JES determines the default from the DEVICE statement.

**TERM={YES | NO}**

Specifies whether the sender stops if the JES3 global address space is stopped by a \*RETURN or \*DUMP operator command. This parameter is optional; if you omit it, the default is NO.

**TYPE=WTR**

Specifies that the sender is an output writer. This parameter is required.

### DEVICE statement

A DEVICE statement (also called a printer definition) is required to define each FSA. The DEVICE statement contains these parameters:

**CARRIAGE=({YES | NO},*pdefname*)**

Specifies the JES default page definition.

**YES**

Specifies that the page definition can be changed during the startup procedure.

**NO**

Specifies that the page definition cannot be changed during the startup procedure.

***pdefname***

Specifies the 1–4 character name of the page definition be used as a default. Do not code the P1 prefix of the page definition.

This parameter is optional. If you omit it, JES3 determines the default page definition from the CARRIAGE parameter of the JES3 OUTSERV initialization statement. If you omit the CARRIAGE parameter in the OUTSERV statement, the default is 6; that is, page definition P16. If you do not want JES3 to supply a default page definition to AFP Download Plus, specify PDEFAULT=FCB.

**CHARS={YES | NO},fontname)**

Specifies a 1 - 4 character default font name. NO specifies that no default font is passed to AFP Download Plus.

This parameter is optional. If you omit it, JES3 determines the default font from the CHARS parameter of the JES3 OUTSERV initialization statement. If you omit the CHARS parameter of the OUTSERV statement, the default is GS10. If you do not want JES3 to supply a default font value to AFP Download Plus, specify PDEFAULT=CHARS.

**CKPNTPG=nnn**

Specifies the number of pages between checkpoints of a data set that is transformed.

**Note:** AFP Download Plus checkpoints data sets; however, when an error occurs, AFP Download Plus restarts from the beginning of a job, not from a checkpoint.

**CKPNTSEC=nnnnn**

Specifies the seconds between checkpoints of a data set that is transformed. The value must be 0–32767.

This parameter is optional. If not specified, AFP Download Plus only checkpoints a data set if a checkpoint value is specified on the OUTPUT JCL statement for the data set.

**Note:** AFP Download Plus checkpoints data sets; however, when an error occurs, AFP Download Plus restarts from the beginning of a job, not from a checkpoint.

**DTYPE=PRtnnnn**

Specify the device type for an FSA. This parameter is required.

**DYNAMIC={YES | NO}**

Specifies whether JES3 is to start and stop this FSA dynamically.

**YES**

Specifies that JES3 is to start this FSA whenever work is available for it. JES3 stops this FSA, and deactivates the address space when no work is available.

**NO**

Specifies that the operator is to start and stop this FSA. Specify NO to keep the address space active between transmission of data sets.

This parameter is optional. If you omit it, the default is NO.

A value of DYNAMIC=NO is recommended for Download for z/OS writers for these reasons:

- Running Download for z/OS as a dynamic writer could slow output processing because an address space must be brought up or down each time the writer is started or stopped.
- If the FSAs are managed by an automated process, it will have conflicts with a JES3-managed dynamic writer.

For more information, see the *z/OS JES3 Initialization and Tuning Guide*.

**FORMS={YES | NO},formname)**

Specifies the form name that is processed by this FSA.

**YES**

Specifies that the form name can be changed during the startup procedure.

**NO**

Specifies that the form name cannot be changed during the startup procedure.

***formname***

Specifies the 1–8 character name of the form to be processed by this FSA. If you designate FORMS as a work-selection criterion on the WS parameter, the FSA selects data sets whose form name matches the value specified here.

This parameter is optional. If you omit it and do not specify forms as a work-selection criteria, this FSA selects data sets with any form name.

**FSSNAME=*fssname***

Specifies a unique sender FSS associated with this FSA. This value must match the value that is coded for the FSSNAME parameter in the corresponding FSSDEF statement.

This parameter is optional. If you omit it, the default is the name of this FSA, as specified with the JNAME parameter.

**HEADER={YES | NO}**

Specifies whether this FSA produces job-header and data set header separator pages. The default is YES.

**JNAME=*fsaname***

Specifies the unique 1–8 character name of this FSA. This parameter is required.

**JUNIT=(*main,msgdest*[,ON | OFF])**

Specifies information for the FSA:

***main***

The name of the processor to which the FSA is attached.

***msgdest***

Destination information for messages about the FSA.

**ON | OFF**

Indicator of whether the FSA is initially online or offline.

This parameter is required.

**MODE=FSS**

Specifies that this FSA is managed by an AFP Download Plus sender. This parameter is required.

**PDEFAULT={NONE | CHARS | FCB | CHARS,FCB}**

Specifies whether JES3 is to use certain JES3 default values during sender processing or ignore them. If JES3 ignores the default values, AFP Download Plus uses default values for CHARS, PAGEDEF, or both, that are defined in the PRINTDEV statement. See [Table 12 on page 66](#) for information about the PRINTDEV statement.

**NONE**

Specifies that JES3 is to use JES3 default values for font name (UCS or train) and page definition name (FCB or CARRIAGE); AFP Download Plus does not use the CHARS and PAGEDEF values specified in the PRINTDEV statement.

**CHARS**

Specifies that JES3 is to ignore the JES3 default value for font name (UCS or train); AFP Download Plus uses the CHARS value that is specified in the PRINTDEV statement when the WS=U parameter is specified on the DEVICE statement.

**FCB**

Specifies that JES3 is to ignore the JES3 default value for page definition name (FCB or CARRIAGE); AFP Download Plus uses the PAGEDEF value that is specified in the PRINTDEV statement when the WS=C parameter is specified on the DEVICE statement.

**CHARS,FCB**

Specifies that JES3 ignores the JES3 defaults for both font name (UCS or train) and page definition name (FCB or CARRIAGE); AFP Download Plus uses the PRINTDEV value for CHARS when the WS=U parameter is specified on the DEVICE statement and the PRINTDEV value for PAGEDEF when the WS=C parameter is specified on the DEVICE statement.

This parameter is optional. The default is NONE.

**PM=(processingmodes)**

Specifies the data set processing modes that are supported by this FSA. Separate the modes with commas. List all processing mode values to be accepted by this FSA because the FSA processes only data sets with a mode that matches one of the values specified in this parameter:

**LINE**

Specifies that line-format data sets are selected.

**PAGE**

Specifies that composed-page data sets are selected.

**SOSIn**

Specifies that data sets with the shift-out, shift-in processing mode of SOSI1, SOSI2, SOSI3, SOSI4 for double-byte fonts are selected.

**installation-defined**

Specifies any mode that your installation defined.

This parameter is optional. If you omit it, the default is LINE,PAGE.

**WC=(classes)**

Specifies the output classes that are processed by this FSA. List all classes to be selected by this FSA; separate each class with a comma. If you designate CLASS as a work-selection criterion on the WS parameter, this FSA selects data sets that match the values specified here.

This parameter is optional. If you omit it, this FSA selects data sets with any output class.

**WS=(criteria)**

Specifies the work-selection criteria for this FSA; separate each value with a comma. See the *z/OS JES3 Initialization and Tuning Reference* for the valid values and the default.

For an AFP Download Plus FSA, consider these values:

**C**

Causes JES3 to pass the FCB name that is specified on the OUTPUT JCL statement to the FSA.

**CL**

Specifies that the FSA selects only those data sets with the same class as specified in the WC parameter of this statement.

**D**

Specifies that the FSA selects only those data sets with the same destination name as in the DGROUP parameter of this statement.

**F**

Causes JES3 to pass the form name that is specified as a JCL parameter to the FSA.

**U**

Causes JES3 to pass the font name that is specified as a JCL parameter to the FSA.

**Notes:**

1. This parameter is optional but recommended. If you omit it, the FSA selects output data sets for processing according to default work-selection criteria.
2. If you want AFP Download Plus to use the FCB specified in the FCB JCL parameter to format output, specify WS=C as one of the work-selection criteria. Otherwise, JES3 does not pass the FCB name that is specified in JCL to the FSA.
3. If you want AFP Download Plus to use the form name that is specified in the FORMS JCL parameter to select printer definitions in the Printer Inventory, specify WS=F as one of the work-selection criteria. Otherwise, JES3 does not pass the form name that is specified in JCL to the FSA.
4. If you want AFP Download Plus to use the page definition that is specified in the PAGEDEF (or FCB) JCL parameter, specify WS=C as one of the work-selection criteria. Otherwise, JES3 does not pass the page definition name that is specified in JCL to the FSA.

5. If you want AFP Download Plus to use the font that is specified in the CHARS (or UCS) JCL parameter, specify WS=U as one of the work-selection criteria. Otherwise, JES3 does not pass the font name that is specified in JCL to the FSA.

## Specifying defaults in JES3

You can specify defaults on JES3 initialization statements (OUTSERV and DEVICE) and on the PRINTDEV statement of the AFP Download Plus startup procedure.

To specify no defaults in a JES3 environment, code the JES3 and PRINTDEV statements as shown in [Table 16 on page 116](#).

Table 16. Specifying no defaults in JES3.			
Option	DEVICE Statement	OUTSERV Statement	PRINTDEV Statement
Data Check Blocking	Not applicable	Not applicable	Omit DATAACK parameter
Fonts	Specify PDEFAULT CHARS and omit CHARS parameter	Omit CHARS parameter	Omit CHARS parameter
Form Definition	Not applicable	Not applicable	Omit FORMDEF parameter
Page Definition	Specify PDEFAULT FCB and omit CARRIAGE parameter	Omit CARRIAGE parameter	Omit PAGEDEF parameter

## Writing installation exits

AFP Download Plus supports PSF for z/OS installation exits that you can use to code and install modifications to AFP Download Plus functions. [Table 17 on page 116](#) describes the PSF installation exits that AFP Download Plus supports.

Table 17. PSF installation exits for AFP Download Plus		
Exit	Name	CSECT
1	Job header	APSUX01/APSUC01
2	Job trailer	APSUX02/APSUC02
3	Data set header	APSUX03/APSUC03
4	Logical-record processing	APSUX04/APSUC04
5	SMF type 6 record	APSUX05/APSUC05
6	Message	APSUX06/APSUC06 <b>Note:</b> AFP Download Plus produces some messages that are not produced by PSF.
7	Resource-management	APSUX07/APSUC07 <b>Note:</b> Some Exit 7 options are not supported in AFP Download Plus. See <a href="#">Table 18 on page 117</a> for the options that are supported.
8	Line-mode migration	APSUX08/APSUC08



Table 17. PSF installation exits for AFP Download Plus (continued)

Exit	Name	CSECT
15	Print parameter	APSUX15/APSUC15  <b>Note:</b> AFP Download Plus uses Exit 15 the same way Download for z/OS does, except AFP Download Plus ignores the OUTGRP parameter because it is not supported by the receiver. Instead, to process jobs with multiple data sets, use the multiple data set function available in AFP Download Plus (see <b>dataset-grouping</b> in “Parameters for the AFPPARMS control statement” on page 45 or <b>Data set grouping</b> in Table 14 on page 81).

For information about PSF installation exits, see [PSF for z/OS: Customization](#).

## Resource-management exit processing

AFP Download Plus supports all Exit 7 subroutine calls, including:

- Initialization call (INIT)
- Begin-data-set call (BDSC)
- Resource access call (RAC)
- Resource load call (RLC)
- Resource deletion call (RDC)

**Note:** No resources are deleted for AFP Download Plus.

- End-data-set call (EDSC)
- Termination call (TERM)

Table 18 on page 117 shows the APSUX07 or APSUC07 options that AFP Download Plus supports. For more information about the Exit 7 Resource Management options, see [PSF for z/OS: Customization](#).

Table 18. Exit 7 options supported by AFP Download Plus

Exit 7 option	Description
<b>XTP7ASAP</b>	Gather AFP statistics about the output file: 0 = No, do not gather AFP statistics for this output file (default). 1 = Yes, gather AFP statistics for this output file.
<b>XTP7C2SI</b>	Convert a multiple-celled IM1 image to a single IOCA image: 0 = No, do not convert to single IOCA image (default). 1 = Yes, convert to single IOCA image.
<b>XTP7FMT</b>	Specify resolution at which the data set is formatted: 0 = No format resolution is specified (default). 240 = Data is formatted at 240 pels per inch resolution. 300 = Data is formatted at 300 pels per inch resolution.
<b>XTP7HDF</b>	Override the 3800 default font: 0 = No, use the 3800 default font (default). 1 = Yes, replace the 3800 default font with the first font in the current font list.
<b>XTP7HQUE</b>	Send data set to JES and mark it as unprintable: 0 = No, delete the data set (default). 1 = Yes, mark the data set as unprintable.

Table 18. Exit 7 options supported by AFP Download Plus (continued)

Exit 7 option	Description
<b>XTP7LCNT</b>	Use line count (LINECT) in Line-Mode Migration to calculate the number of lines on a page: 0 = No, do not use LINECT (default). 1 = Yes, use LINECT.
<b>XTP7LMCM</b>	Report message APS973I for Line-Mode Conversion paper-length errors in AFP Download Plus: 0 = No, suppress the message (default). 1 = Yes, report the message.
<b>XTP7MDSD</b>	Send messages to the SYSOUT data set: 0 = No, the message data set is not sent to SYSOUT (default). 1 = Yes, the message data set is sent to SYSOUT.
<b>XTP7MTOF</b>	Map fonts to outline fonts: 0 = No, do not map to outline fonts (default). 1 = Yes, map to outline fonts.
<b>XTP7PRMD</b>	Specify the default processing mode PSF uses to process data sets containing both single-byte and double-byte fonts: S0SI1, S0SI2, S0SI3, S0SI4.
<b>XTP7RDSR</b>	Release data set when repositioning: 0 = No, do not release data sets when repositioning (default). 1 = Yes, release data sets when repositioning.
<b>XTP7RFNF</b>	Recover from font not found: 0 = No, do not query the host font libraries to ensure that the mapped font exists (default). 1 = Yes, query the host font libraries for the mapped font.
<b>XTP7RSTR</b>	Control whether AFP Download Plus is automatically restarted after an abend: 0 = No, do not restart after an abend. 1 = Yes, restart after an abend (default).
<b>XTP7TDS</b>	Stop processing the current data set: 0 = No, do not stop processing the data set (default). 1 = Yes, stop processing the data set.
<b>XTP738MO</b>	Set the user's data set media origin to the 3800 media origin: 0 = No, the data set media origin is not set to the 3800 media origin (default). 1 = Yes, the data set media origin is set to the 3800 media origin.

## Reviewing default program properties table entries

z/OS supplies an internal default program properties table (PPT) entry for AFP Download Plus. The internal default values are:

```
PPT      PGMNAME (APSHPOSE)
          KEY(1)
          NOSWAP
          NOPRIV
          CANCEL
          SYST
          NODSI
          PASS
          AFF(NONE)
          NOPREF
```

These are the recommended values and no changes are required. However, you can change them by specifying a PPT entry in the SCHEDxx member in the system PARMLIB with overriding values for

APSHPOSE. For more details, see *z/OS MVS Initialization and Tuning Reference*. Modification of any values other than NODSI might cause a JES abend, or other unexpected results to occur.

By specifying NODSI (nonexclusive use of data sets) in the PPT, other programs, such as OGL and PPFA, can change the resources while AFP Download Plus is running. When NODSI is specified, Data Management functions, such as compression and library migration, can occur. However, these functions can cause problems for AFP Download Plus if they run while AFP Download Plus is active. Therefore, you must manually exclude AFP Download Plus resource libraries from the Data Management functions. If you do not want to manually exclude the resource libraries, you must use DSI in the PPT entry.

Specifying DSI and running AFP Download Plus with DISP=SHR causes other programs to wait until AFP Download Plus no longer has the resource libraries open. Therefore, DSI prevents programs from updating or changing the resource libraries while AFP Download Plus is active. Typically, AFP Download Plus has the resource libraries open as long as any FSA is running.



---

## Chapter 5. Operating the AFP Download Plus sender

This information describes how to operate the AFP Download Plus sender, including how to:

- Start a sender and its FSAs.
- Cancel the current transmission on an FSA.
- Restart the current transmission on an FSA.
- Stop a sender and its FSAs.
- Set up AFP Download Plus to send z/OS separator pages.
- Use operator interface commands for AFP Download Plus.

You operate an AFP Download Plus sender just as you operate a PSF FSS and FSA, or any other JES output writer. For more information about the JES2 and JES3 commands that are described here and additional JES commands that you can use to manage an output writer, see [z/OS JES2 Commands](#). For more information about the MVS commands that are described here, see [z/OS MVS System Commands](#).

Although this information shows only MVS and JES commands, you can also use System Display and Search Facility (SDSF) commands or the commands of a comparable product to start and stop FSAs and to display and cancel data sets. See [z/OS SDSF Operation and Customization](#) for more information about SDSF commands.

---

### Starting the sender and FSAs

Before you start an AFP Download Plus sender, you must:

- Create a cataloged startup procedure for the FSS.
- Define one or more FSAs.
- Start the AFP Download Plus receiver or equivalent receiver on the receiver system (see [“Starting the receiver manually”](#) on page 163). You must start the receiver before the FSA attempts to transmit any data to it; otherwise, a TCP/IP error occurs.

The first two tasks are described in [Chapter 4, “Configuring the AFP Download Plus sender,”](#) on page 29.

After the required tasks are accomplished, you can enter commands at the operator console to start each FSA. You do not need to enter a special command to start the sender because JES starts the sender automatically when you start the first FSA.

In JES2, if the FSA was defined with the START=YES parameter on the JES2 PRT(*nnnn*) statement, JES2 automatically starts the FSA when you start the z/OS operating system. JES3 does not support the automatic start option.

Starting an FSA requires some coordination with TCP/IP and the receiver on the z/OS, AIX, Windows, or Linux operating system. To start an FSA:

1. Verify that TCP/IP is started on the z/OS operating system. You can start TCP/IP by entering this MVS command:

```
S tcpip_name
```

Replace *tcpip\_name* with the job name of the TCP/IP address space. The job name of the address space is TCPIP, unless changed by your installation.

2. Verify that the receiver on the receiver system is started. See [“Starting the receiver manually”](#) on page 163.
3. Start the FSA by entering this JES2 or JES3 start command:
  - JES2:

```
$S fsa_name [,fsa_name ... ]
```

where *fsa\_name* is the name of the PRT(*nnnn*) statement, for example, PRT0001.

- JES3:

```
*VARY,fsa_name,ONLINE  
*START fsa_name
```

where *fsa\_name* is the JNAME parameter of the DEVICE statement.

## Canceling a data set

---

Use the JES **cancel** command to stop processing an active data set. The data set is removed from the JES spool.

Enter this JES2 or JES3 command to cancel a data set:

- JES2:

```
$C fsa_name [,fsa_name ... ]
```

where *fsa\_name* is the name of the PRT(*nnnn*) statement, for example, PRT0001.

- JES3:

```
*CANCEL fsa_name
```

where *fsa\_name* is the JNAME parameter of the DEVICE statement.

## Restarting a data set

---

Use the JES **restart** command to stop processing an active data set and requeue it for processing from the beginning.

Enter this JES2 or JES3 command to restart a data set:

- JES2:

```
$E fsa_name [,fsa_name ... ]
```

where *fsa\_name* is the name of the PRT(*nnnn*) statement, for example, PRT0001.

- JES3:

```
*RESTART fsa_name
```

where *fsa\_name* is the JNAME parameter of the DEVICE statement.

## Stopping the sender and FSAs

---

Before you stop the AFP Download Plus sender, stop each FSA. You can stop an FSA after it finishes transmitting the current data set to the receiver system, or you can stop it immediately.

### Stopping an FSA after the current data set is transmitted

Use this JES2 or JES3 command to stop an FSA after transmission of the current data set is complete:

- JES2:

```
$P fsa_name [,fsa_name ... ]
```

where *fsa\_name* is the name of the PRT(*nnnn*) statement, for example, PRT0001.

- JES3:

- If DYNAMIC=YES for the FSA, issue the following command:

```
*VARY,fsa_name,OFFLINE
```

- If DYNAMIC=NO for the FSA, issue the following command:

```
*S,fsa_name,T
```

where *fsa\_name* is the JNAME parameter of the DEVICE statement.

## Stopping an FSA immediately

Use these JES2 or JES3 commands to stop an FSA immediately:

- JES2:

```
$P fsa_name [,fsa_name ... ]  
$C fsa_name [,fsa_name ... ]
```

or

```
$P fsa_name [,fsa_name ... ]  
$E fsa_name [,fsa_name ... ]
```

where *fsa\_name* is the name of the PRT(*nnnn*) statement, for example, PRT0001.

The \$P command followed by the \$C command cancels processing of the current data set, purges it from the spool, and stops the FSA.

The \$P command followed by the \$E command interrupts processing of the current data set, returns it to the spool to be restarted from the beginning, and stops the FSA.

If the current data set cannot be canceled, the FSA does not stop. You can use the following MVS Modify Force command to stop the FSA in this case:

```
f fsa_name,force,fsa_name
```

or you can use the following MVS Cancel command to stop the FSA in this case:

```
c fsa_name
```

**Note:** The MVS Cancel command (c *fsa\_name*) will stop all FSAs as well as the FSS.

- JES3:

```
*VARY,fsa_name,OFFLINE  
*CANCEL,fsa_name,T
```

where *fsa\_name* is the JNAME parameter of the DEVICE statement.

The \*VARY command makes the FSA unavailable for transmitting data sets. The \*CANCEL command cancels the current data set; the T option stops the FSA after the current data set is canceled.

If the current data set cannot be canceled, the FSA does not stop. You can use the following MVS Modify Force command to stop the FSA in this case:

```
f fsa_name,force,fsa_name
```

or you can use the following MVS Cancel command to stop the FSA in this case:

```
c fsa_name
```

**Note:** The MVS Cancel command (c *fsa\_name*) will stop all FSAs as well as the FSS.

## Stopping the sender

**Remember:** Before you stop the sender, you must stop all sender FSAs.

In a JES2 environment, if the sender was configured with the AUTOSTOP=YES option on the JES2 FSS(*fss\_name*) statement, JES2 stops the sender automatically after you stop all FSAs.

If AUTOSTOP=YES was not specified, you must stop the sender with the following MVS Cancel command:

```
c fss_name
```

In a JES3 environment, JES automatically stops the sender after you stop all FSAs under its control; therefore, you do not need to stop the sender by using an MVS operator command.

If JES does not automatically stop the sender, use this MVS operator command after you stop all sender FSAs:

```
c fss_name
```

where *fss\_name* is the name on the FSS(*fss\_name*) statement in JES2 or the name in the FSSNAME parameter of the FSSDEF statement in JES3.

## Sending z/OS separator pages

AFP Download Plus can be configured to send z/OS separator pages for a job to the receiver.

To set up AFP Download Plus to send separator pages:

1. Specify YES for the **Send separator pages** parameter in the Printer Inventory or the **send-separator-pages** parameter in the AFPPARMS control statement.
2. Specify YES for the **Data set grouping** parameter in the Printer Inventory or the **dataset-grouping** parameter in the AFPPARMS control statement because when a separator page is sent to the receiver with a job, the job becomes a multiple data set job.
3. For the appropriate separator page, ensure that an installation exit is in a data set pointed to in a STEPLIB DD statement in the AFP Download Plus startup procedure or in a LINKLIB in the standard MVS search order:

**Job header separator page**

APSUX01 or APSUC01

**Job trailer separator page**

APSUX02 or APSUC02

**Data set header separator page**

APSUX03 or APSUC03

4. Specify the appropriate JOBHDR, JOBTRLR, and DSHDR PRINTDEV parameters that identify the OUTPUT statement to be used for the separator pages.
5. When you want to send MO:DCA interchange set compliant separator pages to the receiver, see [“Configuring AFP Download Plus so files remain compliant with the specified MO:DCA interchange set” on page 31](#) for the changes you need to make.
6. Specify YES for the appropriate JES initialization statements:

**JES2**

SEP and SEPDS

**JES3**

HEADER

## Using the AFP Download Plus operator interface

The AFP Download Plus operator interface can be used to:

- Initialize the operator interface.



- Start traces dynamically.
- Stop traces.
- Stop FSAs.
- Report AFP Download Plus processing status.
- Display AFPPARMS parameter values.
- Display TCP/IP status.

This information describes the operator interface commands that can be used with AFP Download Plus. The MVS MODIFY command can be used as an AFP Download Plus operator interface.

Operator interface commands can be entered at any time while AFP Download Plus is running. However, if a command is directed to a specific FSA, that FSA must be up and running at the time when the command is issued or the command is rejected.

## Initializing the operator interface

The AFP Download Plus operator interface must be initialized before any AFP Download Plus operator interface commands are processed.

**Be aware:** Before the AFP Download Plus operator interface is initialized, enter only parameters on the MODIFY command that do not require an *fsa\_name*, such as TRACEON or TRACEOFF; otherwise, the command fails. After the AFP Download Plus operator interface is initialized, you can enter any MODIFY parameter.

You can use the Printer Inventory or the AFP Download Plus startup procedure to indicate whether the operator interface is initialized automatically or whether you are prompted to issue a command to initialize the operator interface:

- To initialize the operator interface automatically without prompting from AFP Download Plus, do one of these:
  - In the Printer Inventory, set the **Trace prompt** parameter to No (see **Trace prompt** in “FSS Printer Inventory parameters” on page 76 for more information).
  - In the AFP Download Plus startup procedure, use the PARM parameter in the EXEC statement. For example:

```
// EXEC PGM=APSHPOSE,PARM=(, ,NOPROMPT)
```

See “JCL statements for the startup procedure” on page 39 for more information about the PARM parameters.

- To initialize the operator interface after you are prompted from AFP Download Plus to issue a command:

1. Do one of these to prompt for operator interface initialization:

- In the Printer Inventory, set the **Trace prompt** parameter to Yes (see **Trace prompt** in “FSS Printer Inventory parameters” on page 76 for more information).
- In the AFP Download Plus startup procedure, use the PARM parameter in the EXEC statement. For example:

```
// EXEC PGM=APSHPOSE,PARM=(, ,PROMPT)
```

See “JCL statements for the startup procedure” on page 39 for more information about the PARM parameters.

2. At the prompt, type the MODIFY (or F) command with the U parameter to initialize the AFP Download Plus operator interface. The syntax of the command is:

```
{MODIFY | F} fsa_name,U
```

The parameters are:

***fss\_name***

Specifies the name of the AFP Download Plus sender that is initialized. This parameter is required.

**U**

Specifies that the AFP Download Plus operator interface is to be initialized.

## Starting and stopping traces

An AFP Download Plus operator interface command can affect one of these trace environments:

- An NST trace
- An FSA external trace for an active FSA
- FSA external traces for all FSAs that are not yet active
- An FSI trace
- An internal trace

To start a trace dynamically, type the MODIFY (or F) command with the TRACEON parameter. The syntax of the command is:

```
{MODIFY | F} fss_name,TRACEON[,fss_name]
```

To stop a trace, type the MODIFY (or F) command with the TRACEOFF parameter. The syntax of the command is:

```
{MODIFY | F} fss_name,TRACEOFF[,fss_name]
```

For more detailed information about using the operator interface command to affect a trace environment, see [PSF for z/OS: Diagnosis](#).

## Stopping FSAs

If you cannot stop or cancel an FSA by using a JES command, use one of these methods to stop the FSA:

- Type the AFP Download Plus operator interface (MODIFY (or F) command with the FORCE parameter. The syntax of the command is:

```
{MODIFY | F} fss_name,FORCE,fss_name
```

For more information about stopping FSAs with the operator interface, see [PSF for z/OS: Diagnosis](#).

- On the sp.r SDSF panel, enter K in the NP column next to the FSA that you want to stop or cancel. This AFP Download Plus operator interface command is issued:

```
MODIFY fss_name,FORCE,fss_name
```

*fss\_name* is the name of the FSS for the FSA and *fss\_name* is the name of the FSA that you want to stop.

## Reporting AFP Download Plus processing status

You can use the AFP Download Plus operator interface, AFPPARMS control statement, or Printer Inventory to activate and control the AFP Download Plus status feature, which produces a message that reports the processing status for the current spool data set.

**Note:** This status feature can cause longer processing time for jobs and affect performance. The performance can be affected by the size of your job and the status interval you choose. For example, if a job is several gigabytes (GBs) in size and the status interval is set to kilobytes (KBs), the job takes longer to process because the status is issued in frequent intervals.

This information describes how to use the operator interface to activate the AFP Download Plus status feature. To use the AFPPARMS control statement, see **display-afpdp-status** in [“Parameters for the](#)

AFPPARMS control statement” on page 45. To use the Printer Inventory, see **Display status** in “FSA Printer Inventory parameters” on page 80.

## Activating the AFP Download Plus status feature with the operator interface

To activate the status feature with the operator interface, type the MODIFY (or F) command with the DISPLAY and STATUS parameters. The syntax of the command is:

```
{MODIFY | F} fss_name,DISPLAY,fsa_name,STATUS=AFPDP  
[,SCOPE={OFF | ONCE | SF | FSA }]  
[,EVENT={XFORM | XMIT | BOTH }]  
[,INTV={SFEND | nnn{KB | MB | GB | S | M } | 500KB}]
```

The required parameters that are used with the MODIFY command to control the AFP Download Plus status feature are:

### **fss\_name**

Specifies the name of the FSS for which the AFP Download Plus status is displayed. This parameter must match the FSSNAME parameter of the JES FSSDEF statement for the FSS.

### **DISPLAY**

Specifies that information is displayed on a display console and the system log.

### **fsa\_name**

Specifies the name of the FSA for which the AFP Download Plus status is displayed.

### **STATUS=AFPDP**

Specifies that status for AFP Download Plus is displayed on a display console and the system log.

The optional parameters are:

### **SCOPE={OFF | ONCE | SF | FSA}**

The SCOPE parameter specifies the scope of the AFP Download Plus status feature request, including how long the request is active. The values are:

#### **OFF**

Indicates that the status feature is inactive.

#### **ONCE**

Indicates that the status feature is active for one occurrence when the command is entered (default).

#### **SF**

Indicates that the status feature is active until the current spool data set completes processing, at which time the status feature is turned off. This value can be used when the INTV parameter is used.

If a STATUS=AFPDP,SCOPE=OFF parameter is issued before the spool data set completes processing, the status feature is turned off early.

#### **FSA**

Indicates that the status feature is active until this FSA session is stopped. This value can be used when the INTV parameter is used.

If a STATUS=AFPDP,SCOPE=OFF parameter is issued before the FSA is stopped, the status feature is turned off early.

### **EVENT={XFORM | XMIT | BOTH }**

The EVENT parameter specifies which events are to be included in the AFP Download Plus status feature request. The values are:

#### **XFORM**

Generates status feature message APS8559I for the spool data set transformation to MO:DCA-P.

#### **XMIT**

Generate status feature message APS8559I for the transformed document destination transmission.

## **BOTH**

Generate status message APS8559I for both the spool data set transformation to MO:DCA-P and the transformed document transmission (default).

## **INTV={SFEND | *nnn*{KB | MB | GB | S | M } | 500KB}**

The INTV parameter specifies how often AFP Download Plus reports processing status in message APS8559I. This parameter can be used when SCOPE values SF and FSA are used.

### **SFEND**

Report processing status only at the end of the spool data set.

### ***nnn*{KB | MB | GB | S | M }**

Report processing status in an interval of 1 to 999 kilobytes, megabytes, gigabytes, seconds, or minutes, where:

#### **KB**

Kilobytes (32 KB is the minimum interval)

#### **MB**

Megabytes

#### **GB**

Gigabytes

#### **S**

Seconds

#### **M**

Minutes

### **500KB**

Report processing status every 500,000 bytes that are processed (default).

This example shows the MODIFY command that is used to display AFP Download Plus status for the current spool data set, reporting only transmission activity, at an interval of 500 KB, when the FSS name is WTRES600 and the FSA name is PRT619:

```
MODIFY WTRES600,DISPLAY,PRT619,STATUS=AFDPD,SCOPE=SF,EVENT=XMIT
```

## **Viewing the operator status message when the operator interface activates the status feature**

When the status feature is activated, AFP Download Plus issues status report message, APS8559I, to the operator's console and the JES log. The message is issued at the end of each page or resource that is processed in a job. This report message is only displayed when the FSA is active. The format of the message is:

APS8559I *jobname, jobid, stepname, ddname, jobpart, eventdata.*

The values are:

### ***jobname***

Specifies the name of the job that is being processed.

### ***jobid***

Specifies the job identifier of the spool data set that is being processed.

### ***stepname***

Specifies the step name of the job that is being processed.

### ***ddname***

Specifies the DD name for the step name that is being processed.

### ***jobpart***

Specifies the part of the job that is being processed.

### ***eventdata***

Depending on the EVENT value that is specified with the DISPLAY,STATUS=AFDPD parameters and the AFP Download Plus mode, specifies one or more of these:

**Transformed bytes=nnnnnnnn**

The number of bytes that result from AFP Download Plus transforming data to MO:DCA-P format.  
This value is always displayed.

**Transmitted=ppppp**

The percentage of the total number of transformed bytes that AFP Download Plus transmitted to the receiving system.

**Transmitted bytes=gggggggg**

The number of bytes that AFP Download Plus transmitted to the receiving system.

**Compressed bytes=ccccccc**

When compression is activated for the FSA or data set, the number of bytes that result from AFP Download Plus compressing the data.

Table 19 on page 129 shows how the EVENT parameter value and the AFP Download Plus mode determine what other event data the message displays.

Table 19. Event data displayed in APS8559I message when the operator interface activates the status feature		
EVENT=	AFP Download Plus Mode	Message Displays
<b>XFORM</b>	No effect	Transformed bytes=nnnnnnnn
<b>BOTH XMIT</b>	Compression off Direct download off	Transformed bytes=nnnnnnnn, Transmitted=ppppp For example: <pre>APS8559I WTRPOSE1 WTRPOSE1 *** PRT660 (TCPIP) SIMP1K, JOB00722, STEP1, SYSUT2, USER, Transformed bytes= 647MB, Transmitted= 58%.</pre> <b>Note:</b> With XMIT, the message is not displayed until transmission starts.
<b>BOTH XMIT</b>	Compression on Direct download off	Transformed bytes=nnnnnnnn, Compressed bytes=ccccccc, Transmitted=ppppp For example: <pre>APS8559I WTRPOSE1 WTRPOSE1 *** PRT660 (TCPIP) SIMP1K, JOB00728, STEP1, SYSUT2, USER, Transformed bytes= 1312KB, Compressed bytes= 203363, Transmitted= 100%.</pre> <b>Note:</b> With XMIT, the message is not displayed until transmission starts.
<b>BOTH XMIT</b>	Compression off Direct download on	Transformed bytes=nnnnnnnn, Transmitted bytes=gggggggg For example: <pre>APS8559I WTRPOSE1 WTRPOSE1 *** PRT660 (TCPIP) SIMP1K, JOB00724, STEP1, SYSUT2, USER, Transformed bytes= 1312KB, Transmitted bytes= 1312KB.</pre> <b>Note:</b> With XMIT, the message is not displayed until transmission starts.

Table 19. Event data displayed in APS8559I message when the operator interface activates the status feature (continued)

EVENT=	AFP Download Plus Mode	Message Displays
<b>BOTH XMIT</b>	Compression on Direct download on	<p>Transformed bytes=nnnnnnn, Compressed bytes=ccccccc, Transmitted bytes=ggggggg For example:</p> <pre>APS8559I WTRPOSE1 WTRPOSE1 *** PRT660 (TCPIP) SIMP1K, JOB00726, STEP1, SYSUT2, USER, Transformed bytes= 1312KB, Compressed bytes= 203348, Transmitted bytes= 203348.</pre> <p><b>Note:</b> With XMIT, the message is not displayed until transmission starts.</p>

If AFP Download Plus is transforming the data, you can see 0% for the transmitted percentage. For example:

```
APS8559I WTRPOSE1 WTRPOSE1 *** PRT660 (TCPIP) SIMP1K, JOB00728, STEP1, SYSUT2, USER,
Transformed bytes= 405KB, Transmitted= 0%.
```

## Displaying AFPPARMS parameter values

You can use the AFP Download Plus interface to dynamically display the current AFPPARMS parameter values in the system log.

The display has two columns of output for each AFPPARMS parameter:

- The FSA column is a combination of the FSS defaults and any overriding FSA member values.
- The OUTPUT JCL column has values specified in a JCL OUTPUT statement AFPPARMS data set. The values shown in the JCL OUTPUT column reflect the current or the last data set processed, if no data set is transmitting.

The MVS MODIFY command is used to display the AFPPARMS in the system log; however, AFP Download Plus must be connected to the receiver. AFP Download Plus is connected to the receiver when APS8223I is issued.

Figure 16 on page 130 shows the format of the MODIFY command used for displaying AFPPARMS.

```
{MODIFY | F} fss_name,DISPLAY,fss_name,DATA=AFPPARMS
```

Figure 16. MODIFY command format for displaying AFPPARMS

The parameters used with the MODIFY command for displaying AFPPARMS are:

### **fss\_name**

Specifies the name of the FSS for which AFPPARMS is displayed. This parameter is required and must match the FSS parameter for the JES2 FSS statement or the FSSNAME parameter for the JES3 FSSDEF statement.

### **DISPLAY**

Specifies that information is displayed in the system log. This parameter is required.

### **fss\_name**

Specifies the name of the FSA for which AFPPARMS is displayed. This parameter is required.

### **DATA=AFPPARMS**

Specifies that the AFPPARMS parameter values in effect for the FSA and JCL OUTPUT statement level be displayed in the system log.

**Note:** The FSA column contains the values from the default member and the FSA member, if present; otherwise, the AFP Download Plus defaults.

Figure 17 on page 131 shows the MODIFY command used to display the AFPPARMS parameter values when the FSS name is APSWAFP2 and the FSA name is PRT660.

```
MODIFY APSWAFP2,DISPLAY,PRT660,DATA=AFPPARMS

APS6520I APSWAFP2 APSWAFP2 *** PRT660 (TCP/IP) AFPPARMS
      DISPLAY DATA
AFP DOWNLOAD PLUS          IMPBAR02 JOB00101 STEP1      SYSUT2

AFPPARMS PARAMETERS          FSAPRT660          OUTPUT JCL
=====
above-the-bar-storage        none                inline-resources
auxiliary-files-modca-level  none
bcoca                        inline
cmr-objects                  inline-all      not-inline
compression                  none
dataset-grouping             yes
direct-download              none
display-afpdp-status         no
foca-fonts                   inline
formdefs                     inline
goca                         inline
goca-box                     yes
goca-frac-line               yes
goca-process-color           yes
image-output-format          ioca
ioca                         inline
ioca-replicate-trim-func     yes
match-download-format        none
mcf2-format                  cpcs
message-files-read-access    no
object-containers            inline
overlays                     inline
page-accounting-supported    no
page-segments                inline
paper-length                 14in
paper-width                  13.2in
pass-oid                     allowed
ptoca                       inline
save-auxiliary-files         no
secure-transmission           no
send-messages-on-failure     all
send-separator-pages         no
transmit-recovery-pages      1000
trace-user-data              yes
truetype-fonts               not-inline
working-directory             /var/psf
```

Figure 17. Displaying the AFPPARMS parameter values (example)

## Displaying TCP/IP Status

You can use the AFP Download Plus operator interface to dynamically display the status of a TCP/IP connection on the console and system log.

To display TCP/IP status, type the MODIFY (or F) command with the DISPLAY and STATUS=TCP/IP parameters. The syntax of the command is:

```
{MODIFY | F} fss_name,DISPLAY,[fss_name],STATUS=TCP/IP
```

The display TCP/IP status command is the same as the display TCP/IP status command for PSF. For more information about the command parameters, see *PSF for z/OS: Diagnosis*.

Figure 18 on page 132 shows a sample of the TCP/IP status output displayed on the system log with the APS699I message when the MVS MODIFY command is entered with the DISPLAY and STATUS=TCP/IP parameters.

```

F WTRES600,DISPLAY,PRT619,STATUS=TCPIP
APS639I WTRES600 WTRES600 *** COMMAND (DISPLAY) ACCEPTED.
APS699I TCP/IP DISPLAY STATUS 645

FSANAME..... TCP/IP STATUS..... PENDING
PRT619 READY TCP/IP IS ACTIVE COMMANDS.....
DESTINATION CONNECTED

```

Figure 18. Status output displayed on the system log (sample)

The TCP/IP status output displayed on the console and system log consists of a primary TCP/IP status and might consist of one or two sub-statuses and a pending command. The primary TCP/IP statuses, sub-statuses, and pending commands that might be displayed on the console and system log for AFP Download Plus are described in Table 20 on page 132.

Table 20. TCP/IP status, sub-status, and pending command descriptions		
Status Type	Status Name	Description
Primary Status	INITIALIZING TCP/IP	AFP Download Plus is in the process of initializing the TCP/IP interface. Issue the MODIFY command again and if the same TCP/IP status is displayed, there is most likely a problem with the interface. Additional messages have already been or will be issued describing the problem in more detail. (See Note.)
	TCP/IP IS ACTIVE	AFP Download Plus has initialized the TCP/IP interface and is ready to start transmitting a job or is actively transmitting a job. This is the normal status for the TCP/IP interface.
	TCP/IP IS INACTIVE	The TCP/IP interface between AFP Download Plus and TCP/IP is inactive because either: <ul style="list-style-type: none"> <li>The interface has not started yet (INITAPI). This can occur when there is no work for AFP Download Plus or when AFP Download Plus is in the process of transforming the data and has not started transmitting data; therefore, AFP Download Plus is not connected to the receiver destination.</li> <li>The interface has stopped (TERMAPI) and has not restarted yet (INITAPI). This can occur when there is no more work for AFP Download Plus after transmitting the previous data set; therefore, AFP Download Plus is not connected to the receiver destination.</li> </ul>
	TERMINATING TCP/IP	AFP Download Plus is in the process of stopping the TCP/IP interface. Issue the MODIFY command again and if the same TCP/IP status is displayed, there is most likely a problem with the interface. Additional messages have already been or will be issued describing the problem in more detail. (See Note.)
Sub-Status	TCP/IP INTERFACE CONNECTED	When AFP Download Plus is initializing the TCP/IP interface, this sub-status indicates that INITAPI has successfully completed. When AFP Download Plus is stopping the TCP/IP interface, this sub-status indicates that CLOSE has successfully completed but TERMAPI has not. Issue the MODIFY command again and if the same TCP/IP status is displayed, there is most likely a problem with the interface. (See Note.)
	DESTINATION CONNECTED	When TCP/IP is active, this sub-status indicates that CONNECT has successfully completed. This is the normal sub-status for the TCP/IP interface.
	READY	This sub-status indicates that AFP Download Plus is connected to the receiver destination.



Table 20. TCP/IP status, sub-status, and pending command descriptions (continued)

Status Type	Status Name	Description
Pending Command	CLOSE	Issue the MODIFY command again and if the CLOSE command is still pending, there is most likely a problem with the interface. (See Note.)
	CONNECT	Whenever this command is pending, AFP Download Plus is unable to connect with the receiver destination. An APS6513I message either has already been issued or will be issued with more details, including the TCP/IP error number (errno) received. (See Note.)
	FREEADDRINFO	Issue the MODIFY command again and if the FREEADDRINFO command is still pending, there is most likely a problem with the interface.
	GETADDRINFO	Issue the MODIFY command again and if the GETADDRINFO command is still pending, there is most likely a problem with the interface.
	INITAPI	Issue the MODIFY command again and if the INITAPI command is still pending, there is most likely a problem with the interface. (See Note.)
	IOCTL	Issue the MODIFY command again and if the IOCTL command is still pending, there is most likely a problem with the interface. (See Note.)
	PTON	Issue the MODIFY command again and if the PTON command is still pending, there is most likely a problem with the interface.
	RECV	Issue the MODIFY command again and if the RECV command is still pending, there is most likely a problem with the interface. (See Note.)
	SELECT BOTH	Select was issued looking for either a Read or Write operation with Read taking priority. Whenever this command is pending, PSF is waiting for a response from the printer and the printer is not responding.
	SELECT READ	Select was issued for a Read operation only. Whenever this command is pending, AFP Download Plus is waiting for a response from the receiver destination, which is not responding.
	SELECT WRITE	Select was issued for a Write operation. Issue the MODIFY command again and if the SELECT-WRITE command is still pending, there is most likely a problem with the interface. (See Note.)
	SEND	Issue the MODIFY command again and if the SEND command is still pending, there is most likely a problem with the interface. (See Note.)
	SETSOCKOPT	Issue the MODIFY command again and if the SETSOCKOPT command is still pending, there is most likely a problem with the interface. (See Note.)
	SHUTDOWN	Issue the MODIFY command again and if the SHUTDOWN command is still pending, there is most likely a problem with the interface. (See Note.)
	SOCKET	Issue the MODIFY command again and if the SOCKET command is still pending, there is most likely a problem with the interface. (See Note.)
	TERMAPI	Issue the MODIFY command again and if the TERMAPI command is still pending, there is most likely a problem with the interface. (See Note.)
<b>Note:</b> If the problem is only occurring on one TCP/IP-attached destination, it is most likely a receiver problem. If the problem is occurring on all or multiple TCP/IP-attached destinations, it is most likely a problem with TCP/IP and you need to contact your TCP/IP administrator.		

*Table 20. TCP/IP status, sub-status, and pending command descriptions*

<b>Status Type</b>	<b>Status Name</b>	<b>Description</b>
Primary Status	INITIALIZING TCP/IP	Download for z/OS is in the process of initializing the TCP/IP interface. Issue the MODIFY command again and if the same TCP/IP status is displayed, there is most likely a problem with the interface. Additional messages have already been or will be issued describing the problem in more detail. (See Note.)
	TCP/IP IS ACTIVE	Download for z/OS has created a TCP/IP session with the remote server. This is the normal status when a job is being sent to the remote server.
	TCP/IP IS INACTIVE	No TCP/IP session exists between Download for z/OS and the remote server. This is the normal state when Download for z/OS is not sending a job to the remote server because a new session is created for each job.
	TERMINATING TCP/IP	Download for z/OS is in the process of stopping the TCP/IP interface. Issue the MODIFY command again and if the same TCP/IP status is displayed, there is most likely a problem with the interface. Additional messages have already been or will be issued describing the problem in more detail. (See Note.)
Sub-Status	TCP/IP INTERFACE CONNECTED	When Download for z/OS is initializing the TCP/IP interface, this sub-status indicates that SOCKET has successfully completed. Issue the MODIFY command again and if the same TCP/IP status is displayed, there is most likely a problem with the interface. (See Note.)
	DESTINATION CONNECTED	When TCP/IP is active, this sub-status indicates that CONNECT has successfully completed. This is the normal sub-status for the TCP/IP interface when a job is being sent to the remote server.
	READY	This sub-status indicates that Download for z/OS is connected to the remote server.

Table 20. TCP/IP status, sub-status, and pending command descriptions (continued)

Status Type	Status Name	Description
Pending Command	CLOSE	Issue the MODIFY command again and if the CLOSE command is still pending, there is most likely a problem with the interface. (See Note.)
	CONNECT	Whenever this command is pending, Download for z/OS is unable to connect with the remote server. Wait 10 minutes for a possible TCP/IP timeout. An APS989I message either has already been issued or will be issued with more details, including the TCP/IP error number (errno) received. (See Note.)
	FREEADDRINFO	Issue the MODIFY command again and if the FREEADDRINFO command is still pending, there is most likely a problem with the interface.
	GETADDRINFO	Issue the MODIFY command again and if the GETADDRINFO command is still pending, there is most likely a problem with the interface.
	INITAPI	Issue the MODIFY command again and if the INITAPI command is still pending, there is most likely a problem with the interface. (See Note.)
	IOCTL	Issue the MODIFY command again and if the IOCTL command is still pending, there is most likely a problem with the interface. (See Note.)
	PTON	Issue the MODIFY command again and if the PTON command is still pending, there is most likely a problem with the interface.
	RECV	Issue the MODIFY command again and if the RECV command is still pending, there is most likely a problem with the interface. (See Note.)
	SELECT-READ	Select was issued for a Read operation. Whenever this command is pending, Download for z/OS is waiting for a response from the remote server. Some remote servers do not acknowledge the job until the job has been transformed. This might be a normal state indicating that the remote server is processing the job. However, this might indicate that an error has occurred at the remote system. Refer to error messages in the remote system logs, and then determine if the remote server needs more file system space or needs to be restarted.
	SELECT-WRITE	Select was issued for a Write operation. Whenever this command is pending, Download for z/OS is waiting to send data to the remote server. Issue the MODIFY command again and if the SELECT-WRITE command is still pending, there is most likely a problem with the interface; for example, the TCP/IP buffers might be full. (See Note.)
	SEND	Issue the MODIFY command again and if the SEND command is still pending, there is most likely a problem with the interface; for example, the TCP/IP buffers might be full. (See Note.)
	SHUTDOWN	Issue the MODIFY command again and if the SHUTDOWN command is still pending, there is most likely a problem with the interface. (See Note.)
	SOCKET	Issue the MODIFY command again and if the SOCKET command is still pending, there is most likely a problem with the interface. (See Note.)
	TERMAPI	Issue the MODIFY command again and if the TERMAPI command is still pending, there is most likely a problem with the interface. (See Note.)
<b>Note:</b> If the problem is only occurring on one TCP/IP-attached destination, it is most likely a remote server problem. If the problem is occurring on all or multiple TCP/IP-attached destinations, it is most likely a problem with TCP/IP and you need to contact your TCP/IP administrator.		

When the TCP/IP status is displayed on the console and system log, it might be displayed in combination with a sub-status or a pending command. Each sub-status might have another sub-status, pending command, or both that is displayed with it. Table 21 on page 136 shows the possible combinations of TCP/IP statuses, sub-statuses, and pending commands that can be displayed on the console and system log.

<i>Table 21. TCP/IP status combinations displayed on the console</i>		
<b>TCP/IP Status</b>	<b>Sub-Status</b>	<b>Pending Command</b>
TCP/IP IS INACTIVE	None	None
INITIALIZING TCP/IP One sub-status or pending command might be displayed with this status.		INITAPI
	TCP/IP INTERFACE CONNECTED	One of these might be displayed with the sub-status: <ul style="list-style-type: none"> <li>• CONNECT</li> <li>• FREEADDRINFO</li> <li>• GETADDRINFO</li> <li>• IOCTL</li> <li>• PTON</li> <li>• SOCKET</li> </ul>
TCP/IP IS ACTIVE The sub-status is always displayed with this status.	DESTINATION CONNECTED READY is displayed.	One of these might be displayed with the sub-status: <ul style="list-style-type: none"> <li>• RECV</li> <li>• SELECT READ</li> <li>• SEND</li> </ul>
TERMINATING TCP/IP One sub-status is always displayed with this status.	DESTINATION CONNECTED	One of these might be displayed with the sub-status: <ul style="list-style-type: none"> <li>• CLOSE</li> <li>• SHUTDOWN</li> </ul>
	TCP/IP INTERFACE CONNECTED	One of these might be displayed with the sub-status: <ul style="list-style-type: none"> <li>• FREEADDRINFO</li> <li>• TERMAPI</li> </ul>

## Chapter 6. Using the AFP Download Plus sender

This information describes how a job submitter uses job control language (JCL) to direct a data set to AFP Download Plus, which then transmits the data set to a receiver system. At the receiver system, the data set can be printed, emailed, or faxed. If you are using PSF for z/OS, you need to be familiar with concepts of AFP, such as form definitions, page definitions, and fonts. See [PSF for z/OS: User's Guide](#) for an introduction to AFP and the JCL used to print with PSF for z/OS.

This information also describes how to specify the AFPPARMS control statement, direct output to receiver systems, monitor error messages, and recover from errors.

### Using JCL Parameters

Table 22 on page 137 lists all of the JCL parameters that you might specify in the DD or OUTPUT JCL statements when you submit a data set for processing with AFP Download Plus. In the table, an X in a column indicates that the parameter can be:

- Specified in the DD statement
- Specified in the OUTPUT statement
- Sent to the receiver system

The parameters that are required for submitting the data set to the receiver system are contained in **-o** attributes. The **-o** attributes are derived from parameters that are specified in z/OS, including the DD and OUTPUT JCL statements.

**Note:** In JES3, many JCL parameters, such as CHARS, FCB, and FORMS, do not override the JES defaults unless the parameter is included as a writer-selection criteria for the device (see **WS=criteria** in “[DEVICE statement](#)” on page 112).

AFP Download Plus sends **-o** attributes to the receiver system during processing. See [Table 23 on page 144](#) for the JCL parameters that are sent as **-o** attributes.

Table 22. JCL parameters for AFP Download Plus				
JCL parameter	DD	OUTPUT	Recvr	Description
<b>ADDRESS=</b> ( 'address1' [, 'address2' ] [, 'address3' ] [, 'address4' ] )		X	X	Indicates 1 - 4 address lines to be put on output separator pages. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.
<b>AFPPARMS=</b> 'dsname[ (membername)]'		X		Indicates the name of the AFPPARMS control statement that contains additional AFP Download Plus parameters. See “ <a href="#">Specifying the AFPPARMS control statement on the OUTPUT statement</a> ” on page 147.
<b>AFPSTATS=</b> {YES   <u>NO</u> }		X		Indicates whether an AFPSTATS report is generated. See <a href="#">Appendix C, “AFPSTATS report,”</a> on page 185
<b>BUILDING=</b> building		X	X	Indicates the building identifier to be put on output separator pages. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.

Table 22. JCL parameters for AFP Download Plus (continued)

JCL parameter	DD	OUTPUT	Recvr	Description
<b>BURST={YES   NO}</b>	X	X	X	Indicates whether continuous-forms paper is separated into single sheets at the receiver destination. This parameter is not always accepted by print servers at receiver destinations. If you specify the parameter in both a DD statement and an OUTPUT statement, the parameter value on the DD statement is used. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.
<b>CHARS=(fontname1[,fontname2][,fontname3][,fontname4])</b>	X	X		Indicates 1–4 coded fonts that AFP Download Plus integrates into the MO:DCA-P data set. AFP Download Plus puts this parameter in the inline resource group. If you specify the parameter in both a DD statement and an OUTPUT statement, the parameter value on the DD statement is used.  <b>Note:</b> When AFP Download Plus is processing a MO:DCA IS/3 print file, it does not add the specified coded fonts to the inline resource group because raster fonts cannot be used in a MO:DCA IS/3 file.
<b>CKPTPAGE=pages</b>		X		Indicates the number of pages between data set checkpoints, which is the interval at which AFP Download Plus checkpoints the spool data set with JES.
<b>CKPTSEC=seconds</b>		X		Indicates the number of seconds between data set checkpoints, which is the interval at which AFP Download Plus checkpoints the spool data set with JES.
<b>CLASS=class</b>		X	X	Indicates the output class that is assigned to the output data set at the receiver destination. If the class is specified on the SYSOUT parameter in the DD statement, it overrides the CLASS parameter in the OUTPUT statement. AFP Download Plus forwards this parameter for use on the receiver system.
<b>COLORMAP=membername</b>		X	X	Specifies the object container member name of the color mapping table resource at the receiver destination. AFP Download Plus puts the table in the inline resource group and forwards this parameter for use by the printer on the receiver system.
<b>COMSETUP=membername</b>		X	X	Specifies the object container member name of the microfilm setup resource at the receiver destination. AFP Download Plus puts the object container in the inline resource group and forwards this parameter for use by the microfilm device on the receiver system.

Table 22. JCL parameters for AFP Download Plus (continued)

JCL parameter	DD	OUTPUT	Recvr	Description
<b>CONTROL</b> = <b>{PROGRAM   SINGLE   DOUBLE   TRIPLE}</b>		X		Indicates the line spacing AFP Download Plus uses when it transforms line data to MO:DCA-P.
<b>COPIES</b> = ( <i>nnn</i> , ( <i>groupvalue1</i> , . . . <i>groupvalue8</i> ))	X	X	X	Indicates the number of copies that are printed at the receiver destination (when the receiver destination supports this parameter). If you specify the parameter in both a DD statement and an OUTPUT statement, the parameter value on the DD statement is used. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.
<b>DATAACK</b> = <b>{BLOCK   UNBLOCK   BLKCHAR   BLKPOS}</b>		X	X	Specifies the character and position errors the printer reports at the receiver destination. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.
<b>DCB=OPTCD=J</b>	X			Indicates that the data set contains table reference characters (TRCs). You can also specify table reference characters in the TRC parameter on the OUTPUT statement; however, if DCB=OPTCD=J is specified, it overrides the TRC parameter on the OUTPUT statement.
<b>DCB=RECFM</b> = <b>{recordformat}</b> [A   M]	X			Indicates whether ANSI or machine carriage-control characters exist in a data set with line data. See <a href="#">z/OS MVS JCL Reference</a> for <i>recordformat</i> values you can use, such as FB, V, or VB. A for ANSI control characters or M for machine-code control characters can be specified with any record format, such as: RECFM=FBA.
<b>DEPT</b> = <i>department</i>		X	X	Indicates the department identifier to be put on output separator pages. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.

Table 22. JCL parameters for AFP Download Plus (continued)

JCL parameter	DD	OUTPUT	Recvr	Description
<b>DEST=</b> [ <i>node.</i> ] <i>name</i>   '[ <i>node.</i> ] IP: <i>ipaddress</i> '	X	X	X	<p>Specifies an IP address for the output data set. This IP address does not affect the transmission of the data set to a receiver system. AFP Download Plus always uses the IP address that is specified on the PRINTDEV statement for the FSA to transmit a data set to a receiving system. This parameter provides an extra value, which a shell script, destination control file, or exit routine on the receiving system can optionally use to route a file to a particular device attached to the receiving system. The administrator must modify the IBM-supplied shell script, destination control file, or exit routine to use this parameter. If you specify the parameter in both a DD statement and an OUTPUT statement, the parameter value on the DD statement is used.</p> <p><b>Note:</b> If you specify the DEST=IP parameter, you cannot also specify a destination name in the DEST JCL parameter. Therefore, if your system programmer configured the AFP Download Plus startup procedure to select jobs that are based on destination name (that is, WS=R is specified as JES work-selection criteria), you must specify a destination name and you cannot specify the DEST=IP parameter. Or, you can remove the destination name from the JES work-selection criteria for the FSA you are using.</p>
<b>DUPLEX={NO   NORMAL   TUMBLE}</b>		X	X	Indicates whether printing is done on both sides of each sheet at the receiver destination. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.
<b>FCB=pdefname</b>	X	X		Indicates the name of the page definition AFP Download Plus uses to format line data to MO:DCA-P. If you specify the parameter in both a DD statement and an OUTPUT statement, the parameter value on the DD statement is used.
<b>FLASH=(flashname, [count])</b>	X	X	X	Indicates the name of the forms flash that is printed at the receiver destination and the number of copies. If you specify the parameter in both a DD statement and an OUTPUT statement, the parameter value on the DD statement is used. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.



Table 22. JCL parameters for AFP Download Plus (continued)				
JCL parameter	DD	OUTPUT	Recvr	Description
<b>FORMDEF=fdefname</b>		X	X	Indicates the name of the form definition that is used for processing the data set. AFP Download Plus puts this parameter in the inline resource group.
<b>FORMLEN=xx.yyyIN   xx.yyyCM</b>		X	X	Indicates the paper length in inches or centimeters that is used to print the data set at the receiver destination. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.  <b>Note:</b> This parameter is sent exactly as specified by default. If the receiver requires this parameter to be in millimeters with no units specified (as Download for z/OS sends it), then specify the AFPPARMS <b>match-download-format=formlen</b> parameter. Do not specify <b>match-download-format</b> if you are using the AFP Download Plus z/OS receiver.
<b>FORMS=formname</b>		X	X	Indicates the name of the form that the print operator is notified to load at the receiver destination. If you specify the form name on the SYSOUT parameter in the DD statement, it overrides the FORMS parameter in the OUTPUT statement. AFP Download Plus forwards this parameter for use on the receiver system.
<b>INTRAY=nnn</b>		X	X	Indicates the tray number from which paper is selected at the receiver destination. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.
<b>LINECT=nnn</b>		X		Indicates the maximum number of lines that are processed on each output page.
<b>NAME=name</b>		X	X	Indicates a name identifier to be put on output separator pages. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.
<b>NOTIFY=(node.userid1[, node.userid2] [, node.userid3] [, node.userid4])</b>		X		Indicates up to four users who are notified when AFP Download Plus finishes processing the data set. If users are not specified or if those users specified cannot be contacted, AFP Download Plus sends a notification to the job submitter. Whenever AFP Download Plus creates a message file, even if you do not request notification, AFP Download Plus sends a notification message. AFP Download Plus always puts a copy of the notification message in the system log. See <a href="#">“Specifying message notification”</a> on page 150.

Table 22. JCL parameters for AFP Download Plus (continued)

JCL parameter	DD	OUTPUT	Recvr	Description
<b>OFFSETXB=nnnn[.mmm]unit</b>		X	X	Indicates the offset in the x direction of the logical page origin from the media origin for the backside of each sheet. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.
<b>OFFSETXF=nnnn[.mmm]unit</b>		X	X	Indicates the offset in the x direction of the logical page origin from the media origin for the front side of each sheet. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.
<b>OFFSETYB=nnnn[.mmm]unit</b>		X	X	Indicates the offset in the y direction of the logical page origin from the media origin for the backside of each sheet. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.
<b>OFFSETYF=nnnn[.mmm]unit</b>		X	X	Indicates the offset in the y direction of the logical page origin from the media origin for the front side of each sheet. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.
<b>OUTBIN=nnnnn</b>		X	X	Indicates the number of the output bin into which the print job is placed at the receiver destination. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.
<b>OVERLAYB=overlayname</b>		X	X	Indicates the member name of a medium overlay that is placed on the backside of each sheet. AFP Download Plus puts this parameter in the inline resource group.
<b>OVERLAYF=overlayname</b>		X	X	Indicates the member name of a medium overlay that is placed on the front side of each sheet. AFP Download Plus puts this parameter in the inline resource group.
<b>PAGEDEF=pdefname</b>		X		Indicates the member name of the page definition AFP Download Plus uses to format line data to MO:DCA-P.
<b>PIMSG={YES   NO   (YES,nnn)   (,nnn)}</b>		X		Indicates whether all message groups generated in the processing of a data set are written to a file.
<b>PRMODE={SOSI1   SOSI2   SOSI3   SOSI4   aaaaaaaa}</b>		X		Indicates the default processing mode AFP Download Plus uses to process data sets containing both single-byte and double-byte fonts.
<b>PRERROR=HOLD   QUIT   <u>DEFAULT</u></b>		X		Indicates whether AFP Download Plus accepts the error disposition that is specified when AFP Download Plus stops processing a data set because an error occurs during processing.

Table 22. JCL parameters for AFP Download Plus (continued)				
JCL parameter	DD	OUTPUT	Recvr	Description
<b>PRTQUEUE=</b> <i>'printqueue'</i>		X	X	Indicates the name of the target print queue at the receiver destination. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.
<b>RESFMT=</b> {P240   P300}		X		Indicates the resolution at which the output is formatted.
<b>ROOM=</b> <i>room</i>		X	X	Indicates the room identifier to be put on output separator pages. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.
<b>SEGMENT=</b> <i>pagecount</i>	X		X	Indicates that part of the output for a job is spooled to print while the job is still running, or indicates that different segments of a job are printed simultaneously on different printers at the receiver destination. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.
<b>SYSOUT=</b> ( <i>class,,formname</i> )	X		X	Indicates the output class and the form name that is assigned to the output data set at the receiver destination. You can also specify the output class and form name in the CLASS and FORMS parameters of the OUTPUT statement. However, if you specify the SYSOUT, it overrides the CLASS and FORMS parameters in the OUTPUT statement. AFP Download Plus forwards this parameter for use on the receiver system.
<b>TITLE=</b> <i>title</i>		X	X	Indicates the description to be put on the output separator pages. AFP Download Plus does not use this parameter but forwards it for use on the receiver system.
<b>TRC=</b> {YES   <u>NO</u> }		X		Indicates that the data set contains table reference characters. If you also specify table reference characters with the DCB=OPTCD=J parameter in the DD statement, it overrides the TRC parameter.
<b>UCS=</b> <i>fontname</i>	X	X		Indicates the name of the coded font that AFP Download Plus integrates into the MO:DCA-P data set. If you specify the parameter in both a DD statement and an OUTPUT statement, the parameter value on the DD statement is used.
<b>USERLIB=</b> ( <i>'libname1'</i> , <i>'libname2'</i> . . . , <i>'libname8'</i> )		X		Indicates the name of the user libraries that contain AFP resources for processing the data set.
<b>USERPATH=</b> ( <i>'libpath1'</i> , <i>'libpath2'</i> . . . , <i>'libpath8'</i> )		X		Indicates the name of the UNIX file resource path libraries that contain TrueType and OpenType fonts.

## Syntax for JCL parameters

The syntax for the JCL parameters in [Table 22 on page 137](#) is described in detail in *PSF for z/OS: User's Guide*.

For more details about how to code the parameter values, see the *JCL Reference* for your operating system [z/OS MVS JCL Reference](#).

## JCL parameters sent as -o attributes

Just before AFP Download Plus transmits the MO:DCA-P file to the receiver system, it forwards JCL parameters, which are required to submit the file for printing on the receiver system. The JCL parameters that are forwarded are called **-o** attributes and contain the original z/OS JCL parameters for the print file, the PSF defaults, and the JES defaults. AFP Download Plus uses the **-o** attributes to schedule the MO:DCA-P file for printing on the receiver system.

[Table 23 on page 144](#) lists the **-o** attributes that might be sent to the receiver system. All **-o** attributes that are required or are specified on the JCL OUTPUT statement are sent to the receiver system for each data set type (data set header, job header, job trailer, message, and user), unless otherwise noted. If the attribute is derived from more than one statement, the order of the statements indicates their priority. For example, if the BURST parameter is specified in both the DD statement and the OUTPUT statement, AFP Download Plus forwards the attribute from the DD statement because it has a priority of 1.

### Notes:

1. AFP Download Plus replaces nulls (X'00') and blanks (X'40') in the values of text parameters with X'1C' to make it possible for AIX and Linux to parse the text string.
2. The OUTPUT statement that is listed in the Location column always refers to the user's JCL OUTPUT statement, unless otherwise noted.

[Table 25 on page 172](#) describes the syntax for the **-o** attributes.

Table 23. -o attributes AFP Download Plus sends to the receiver system				
-o attribute	Description	Required	Derived from	
			Location	Parameter
-oaddress1 -oaddress2 -oaddress3 -oaddress4	Address		OUTPUT	ADDRESS
-obu	Building		OUTPUT	BUILDING
-oburst	Burst		1. DD 2. OUTPUT	BURST
-occ={yes   no} <sup>1</sup>	Carriage control	✓	Sender	
-occtype=m <sup>2</sup>	Carriage control type	✓	Sender	
-ochars <sup>3</sup>	Character sets		1. OUTPUT (for data set type) 2. PRINTDEV (user data set only)	CHARS
-ocolormap	Color mapping table		1. OUTPUT (for data set type) 2. PRINTDEV (user data set only)	COLORMAP

Table 23. -o attributes AFP Download Plus sends to the receiver system (continued)

-o attribute	Description	Required	Derived from	
			Location	Parameter
<b>-ocomsetup</b>	Microfilm setup		1. OUTPUT (for data set type) 2. PRINTDEV (user data set only)	COMSETUP
<b>-ocop</b> <sup>2</sup>	Transmissions		1. DD 2. OUTPUT (for data set type)	COPIES= <i>nnn</i>
<b>-odatac</b> <sup>4</sup>	Data check handling	✓	1. OUTPUT 2. PRINTDEV	DATAACK
<b>-odatat=af   line</b>	Data type	✓	Sender	
<b>-ode</b>	Department		OUTPUT	DEPT
<b>-odu</b> <sup>2</sup>	Duplexing		OUTPUT	DUPLEX
<b>-ofiletype={dshdr   jobhdr   jobtrl   message}</b> <sup>5</sup>	File type	✓	Sender	
<b>-of</b>	Form definition	✓	1. OUTPUT (for data set type) 2. PRINTDEV	FORMDEF
<b>-ofileformat={record   stream}</b>	File format	✓	Sender	
<b>-oflash</b>	Forms flash		1. DD 2. OUTPUT 3. JES	1. FLASH 2. FLASH 3. DEVFLASH
<b>-oformlength</b> <sup>2</sup>	Form length		OUTPUT	FORMLEN
<b>-oin</b> <sup>6</sup>	Input tray		OUTPUT	INTRAY
<b>-oipdest</b>	Destination IP address		1. DD 2. OUTPUT	DEST=IP
<b>-ojobn</b>	Job name	✓	JOB	
<b>-ona</b>	Name		OUTPUT	NAME
<b>-ono</b>	Node ID	✓	z/OS system	
<b>-ooffxb</b> <sup>6</sup>	X offset, back overlay		OUTPUT	OFFSETXB
<b>-ooffxf</b> <sup>6</sup>	X offset, front overlay		OUTPUT	OFFSETXF
<b>-ooffyb</b> <sup>6</sup>	Y offset, back overlay		OUTPUT	OFFSETYB
<b>-ooffyf</b> <sup>6</sup>	Y offset, front overlay		OUTPUT	OFFSETYF
<b>-outbin</b> <sup>6</sup>	Output bin		OUTPUT	OUTBIN

Table 23. -o attributes AFP Download Plus sends to the receiver system (continued)

-o attribute	Description	Required	Derived from	
			Location	Parameter
<b>-oovlyb</b> <sup>6</sup>	Backside overlay		OUTPUT	OVERLAYB
<b>-oovlyf</b> <sup>6</sup>	Front side overlay		OUTPUT	OVERLAYF
<b>-opa class</b>	Output class	✓	1. DD 2. OUTPUT 3. JES	1. SYSOUT 2. CLASS 3. CLASS= <i>default</i>
<b>-opa destination</b>	Output destination	✓	1. DD 2. OUTPUT	DEST
<b>-opa forms</b>	Output forms name		1. DD 2. OUTPUT 3. JES	1. SYSOUT 2. FORMS 3. FORMS
<b>-opa jobid</b>	Output job ID	✓	JES	
<b>-opa segmentid</b>	Output segment ID		DD	SEGMENT
<b>-opagecount</b>	Page count			
<b>-opagedef</b> <sup>7</sup>	Page definition		1. OUTPUT (Message) 2. PRINTDEV	PAGEDEF
<b>-oprqueue</b>	Print queue		OUTPUT	PRTQUEUE
<b>-opr</b>	Programmer name		JOB	
<b>-ore</b>	Resolution		OUTPUT (for the data set type)	RESFMT
<b>-oro</b>	Room		1. OUTPUT 2. JOBPARM	ROOM
<b>-osheetcount</b>	Sheet count			
<b>-otrc</b> <sup>7</sup>	Table reference characters		1. DD 2. OUTPUT	TRC
<b>-oti</b>	Title		OUTPUT	TITLE
<b>-ous</b>	User ID	✓	z/OS system	

**Table footnotes:**

1. No is only used when AFP Download Plus sends the APS8239I message.
2. This attribute is not sent when AFP Download Plus sends the APS8239I message.
3. This attribute is only sent to the receiver system when **generic only** is specified on the **send-messages-on-failure** parameter in the AFPPARMS control statement or the **Send messages on failure** parameter in the Printer Inventory and AFP Download Plus sends the APS8239I message.
4. For separators and messages, this attribute is always set to block.
5. AFP Download Plus does not send this attribute for the user data set.

6. AFP Download Plus sends only this attribute for the user data set.
7. AFP Download Plus sends only this attribute for message APS8239I.

## Specifying the AFPPARMS control statement on the OUTPUT statement

Additional parameters that AFP Download Plus uses to transform and distribute JES spool data sets are contained in an AFPPARMS control statement. You specify this control statement with the AFPPARMS parameter on the OUTPUT JCL statement at job submission. The parameters in the AFPPARMS control statement are associated with a current JES spool data set and used by AFP Download Plus to process the spool data set. For example:

```
//OUT1 OUTPUT PAGEDEF=MYDEF,
//          AFPPARMS='MY.PDS.PARMS(MEMBER)',
//          USERLIB='MY.RESOURCE.DATASET'
```

The AFPPARMS parameter has this syntax:

**AFPPARMS='dsname[(membername)]'**

The values are:

### **dsname**

Specifies the 1–44 character data set name that contains AFP Download Plus parameters. Data set names can contain alphanumeric (0–9, A–Z) and national (@, #, \$) characters.

### **membername**

Specifies a 1–8 character member name within the data set that contains AFP Download Plus parameters. The member name is required when using a Partition Organized data set. The data set and member name can be 4–54 characters. Member names can contain alphanumeric (0–9, A–Z) and national (@, #, \$) characters.

## AFPPARMS data set allocation

Table 24 on page 147 shows how to allocate the AFPPARMS data set that is specified with the AFPPARMS parameter on the OUTPUT JCL statement.

Table 24. Allocation of AFPPARMS data set attributes			
Attribute	Value	Type	Description
<b>DCB=DSORG=</b>	PO	Required	Data set organization
<b>DSNTYPE=</b>	LIBRARY	Required	Data set defined as PDSE
<b>DCB=RECFM=</b>	xx	Required	Any value except U
<b>DCB=LRECL=</b>	nnnn	Required	Maximum bytes in the record (see Note “1” on page 147)
<b>DISP=</b>	SHR	Required	Data set can be shared
<b>SPACE=</b>	(CYL,(nn,1,10))	Required	Direct access storage device (DASD) cylinders that are required to process data (see Note “2” on page 148)

### Notes:

1. Any record size is valid; however, use a small record size, such as DCB=LRECL=120, to conserve DASD space.

2. Space requirements depend on the type of DASD that is used and on the number of FSAs that are specified in the startup procedure.

## AFPPARMS parameter selection hierarchy

This hierarchy shows the order that AFP Download Plus uses to select AFPPARMS parameters:

1. AFPPARMS control statement on the OUTPUT JCL statement
2. Printer Inventory
3. FSA member name in the AFPPARMS control statement that is specified in the AFP Download Plus startup procedure
4. Defaults member name, either DEFAULTS or AFPDPDEF, in the AFPPARMS control statement that is specified in the AFP Download Plus startup procedure

## AFPPARMS control statement syntax and parameters

See [“Syntax of the AFPPARMS control statement” on page 45](#) for the syntax guidelines to use with the AFPPARMS control statement.

See [“Parameters for the AFPPARMS control statement” on page 45](#) for the parameters that are valid in the AFPPARMS control statement that is specified by the AFPPARMS parameter on the OUTPUT JCL statement.

## Directing output to a receiver system

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To transmit your output to a receiver system, you must direct the output to the AFP Download Plus sender. To do this, you specify the JES work-selection criteria that is defined by your installation for the AFP Download Plus sender on either the DD or OUTPUT JCL statements for the data set. For example, you might need to specify a particular output class to direct output to the AFP Download Plus sender in your installation. Consult your system programmer for the appropriate values to specify.

To direct an output data set to a particular receiver system and to a particular destination on that system, you specify the appropriate routing criteria on either the DD or OUTPUT JCL statements for the data set. The routing criteria can include one or more of these JCL parameters:

- Output class
- Destination name
- Form name

Each combination of class, destination, and form name you specify can direct the data set to a different receiver system and to a different destination on that system.

The examples here show how to specify the class, destination, and form name in JCL statements to direct an output data set to a particular receiver system, such as PSF for z/OS.

Consult with your z/OS system programmer to determine the appropriate values to specify for the class, destination, and form name in your installation. You might not need to specify all three parameters. For example, by specifying only a particular class, you can direct the output data set to the AFP Download Plus sender and also to a particular system and destination.

### Examples:

1. This example shows how to direct an output data set to a receiver system and destination by specifying output class R, which is a JES work-selection criterion for the AFP Download Plus sender.

```
//AFPUSERA JOB ...  
//STEP1    EXEC PGM=USERA  
//DD1      DD SYSOUT=R
```



2. This example shows how to direct an output data set to a receiver system and destination by specifying output class R, destination ZOSPHX, and form name PSF6. This example shows how to specify these values on a DD statement.

```
//AFPUSERA JOB ...  
//STEP1 EXEC PGM=USERA  
//DD1 DD SYSOUT=(R,,PSF6),DEST=ZOSPHX
```

**Note:** If the form name is more than 4 characters, you must specify the name on an OUTPUT statement. Example “3” on page 149 shows an OUTPUT statement.

3. This example shows how to direct an output data set to the same system and destination as in the second example. However, this example shows how to specify these values on an OUTPUT statement. Note that the DD statement must refer to the OUTPUT statement. Also, the DD statement must include a null class value when you specify the class on the OUTPUT statement.

```
//AFPUSERA JOB ...  
//STEP1 EXEC PGM=USERA  
//OUTDS OUTPUT CLASS=R,FORMS=PSF6,DEST=ZOSPHX  
//DD1 DD SYSOUT=(,),OUTPUT=(*.OUTDS)
```

## Directing output to multiple receiver systems

To transmit an output data set to more than one system or to more than one destination on the same system, you can create multiple output data sets. You do this by using multiple OUTPUT JCL statements. On each OUTPUT statement, specify the class, form, or destination name that corresponds to the receiver system and the destination to which you want that data set transmitted.

This example shows how to specify multiple OUTPUT statements to transmit an output data set to different systems or to different destinations on one system at the same time.

**Note:** Contact your system programmer to determine the appropriate values to specify for the class, destination, and form name in your installation.

This example shows how to request that AFP Download Plus transmit an output data set three times:

1. The first transmission is to the AIX system identified with destination AIXDEN.
2. The second transmission is to the Windows system identified with destination WINSEAT1.
3. The third transmission is to the z/OS system identified with destination ZOSPHX.

The OUTPUT parameter on the DD statement references three OUTPUT JCL statements; therefore, AFP Download Plus transmits the data set three times. Because class R is the class for all three transmissions, this example specifies the class in the DD statement. However, because the destination name is different for each transmission, this example specifies the destination on the three OUTPUT statements.

```
//AFPUSERA JOB ...  
//STEP1 EXEC PGM=USERA  
//OUTDS1 OUTPUT DEST=AIXDEN  
//OUTDS2 OUTPUT DEST=WINSEAT1  
//OUTDS3 OUTPUT DEST=ZOSPHX  
//DD1 DD SYSOUT=(R),OUTPUT=(*.OUTDS1,*.OUTDS2,*.OUTDS3)
```

## Monitoring error messages

During processing, AFP Download Plus collects and writes messages to a zFS file when errors occur, and then notifies the job submitter and the operator about the location of the messages. The messages are written to a file in the `/var/psf/userinfo/userid` directory, where `userid` is the job submitter's system user ID. The job submitter owns the `userid` directory and can delete any of the message files in the directory.

The message file name has an extension of MSG. See [Figure 20 on page 181](#) for the format of the rest of the file name.

Because AFP Download Plus does not delete the message files that it creates, periodically delete the message files to conserve disk space. AFP Download Plus provides a sample script, **apshhc1n.sh**, that you can use to delete the message files. The sample script is in the `/usr/lpp/psf/samples` directory and the prolog indicates how to use the script.

You can decide to redirect the messages to a new spool data set on AFP Download Plus or to an FSA for printing. Keep in mind though, redirecting messages can make it more difficult to locate and associate the messages with the print application.

You can also decide to notify users other than the job submitter that errors occurred and where the error messages are located.

By default, when errors cause transformation to stop, AFP Download Plus transforms the message data set to a MO:DCA-P file. Then, rather than sending the data set with errors, AFP Download Plus sends the message data set MO:DCA-P file with associated resources to the receiver system. If the messages are only informational, the data set is sent to the receiver but the message data set is not.

## Redirecting messages

Instead of AFP Download Plus writing the transform error messages to a zFS file, you can redirect the processing of error messages to a new spool data set on AFP Download Plus or to an FSA for printing. Do one of these:

- To redirect to a new spool data set, specify `CLASS=n` and `PIMSG=NO` on the `OUTPUT JCL` statement that is specified on the `MESSAGE` parameter in the `PRINTDEV` statement. For example,

```
//MSGDSR OUTPUT CLASS=n,PIMSG=NO
.
.
.
//PRT001 PRINTDEV MESSAGE=*.MSGDSR
```

- To redirect to an FSA for printing, specify `DEST=fsaname` (where *fsaname* is the name of the FSA) on the `OUTPUT JCL` statement that is specified on the `MESSAGE` parameter in the `PRINTDEV` statement. For example,

```
//MSGDSR OUTPUT DEST=fsaname
.
.
.
//PRT001 PRINTDEV MESSAGE=*.MSGDSR
```

## Specifying message notification

You can specify that AFP Download Plus notify up to four users when it finishes processing a data set. A notification message advises a user that the job is completed, successfully or unsuccessfully, indicates which output is finished, incomplete, or unprintable, and indicates the location of the message file. Whenever AFP Download Plus creates a message file, even if you do not request notification, AFP Download Plus sends a notification message. If users are not specified or if those users specified cannot be contacted, AFP Download Plus sends a notification to the job submitter. AFP Download Plus always puts a copy of the notification message in the system log.

To use message notification in AFP Download Plus, specify the `NOTIFY` parameter in an `OUTPUT` statement. For example:

```
//OUTPUT1 OUTPUT NOTIFY=(DEST01.USERID1)
//DD1 DD SYSOUT=N,OUTPUT=(*.OUTPUT1)
```

The `NOTIFY` parameter has this syntax:

**NOTIFY=(*node.userid1* [, *node.userid2*] [, *node.userid3*] [, *node.userid4*])**

The values are:

**node**

Specifies a 1–8 alphanumeric character node for a system where the notification is to be sent. The node is optional if it is the same as the system that processes the job.

**userid**

Specifies a 1–8 alphanumeric character user ID of the person who is to receive the notification.

For more information about the NOTIFY parameter and examples of using the parameter, see [PSF for z/OS: User's Guide](#).

**Keep in mind:** Notification messages are placed in the TSO BROADCAST data set structure. If AFP Download Plus sends numerous notification messages, the data set might fill up. If you see a console message, such as IKJ579I CANNOT EXECUTE SEND, you must increase the size of the BROADCAST data set. See [z/OS TSO/E Customization](#).

## Sending messages to the receiver system

When errors cause transformation to stop, AFP Download Plus, by default, transforms the message data set into a MO:DCA-P file and sends it to the receiver system. To specify which resources to use to transform the message data set, you must specify these:

- A corresponding message data set OUTPUT statement
- A MESSAGE PRINTDEV parameter for each FSA defined in your startup procedure

For example:

```
//MSGDS    OUTPUT  PAGEDDEF=A08682,FORMDEF=A10110,CHARS=6008
.
.
.
//PRT001 PRINTDEV MESSAGE=*.MSGDS
```

If a MESSAGE PRINTDEV parameter is not specified or a required resource is not specified on the message data set OUTPUT statement, a default resource that is specified in the PRINTDEV statement is used.

Message files that are sent to the receiver system are designated with **-ofiletype=message**. The AFP Download Plus receiver on z/OS submits the message file to the spool just as it does for other files it receives.

By default, when a message file or message APS8239I is received, some receivers either discard the print job or hold the print job without printing it. To change the default so that the receiver prints the job, see the receiver documentation.

If you do not want the message data set transformed and sent to the receiver system, you can specify **generic only** on the **send-messages-on-failure** parameter in the AFPPARMS control statement or the **Send messages on failure** parameter in the Printer Inventory. Specifying **generic only** causes AFP Download Plus to send message APS8239I to the receiver system as line data without sending inline resources.

**Notes:**

1. You must not specify **generic only** when you are using the **dataset-grouping** or **Data set grouping** parameter to send multiple data set jobs to the z/OS receiver system because the receiver system cannot receive jobs with both line data and MO:DCA-P.
2. When you want to send a MO:DCA interchange set compliant message file to the receiver, see [“Configuring AFP Download Plus so files remain compliant with the specified MO:DCA interchange set” on page 31](#) for the changes you need to make.

## Recovering from errors

During data set transmission to the receiver, AFP Download Plus creates recovery points that are based on the setting of the AFPPARMS parameter (see **transmit-recovery-pages** in [“Parameters for the](#)

AFPPARMS control statement” on page 45) or the parameter in the Printer Inventory (see **Recovery pages** in [“FSA Printer Inventory parameters”](#) on page 80). If a transmission error occurs, AFP Download Plus retransmits the data set from the last successful recovery point. AFP Download Plus also retransmits a document from the last successful recovery point if it detects that all the data is not received. AFP Download Plus verifies that all data is successfully received by the system before it deletes a data set from the z/OS system.

---

## Chapter 7. Diagnosing errors with the AFP Download Plus sender

This information contains information to help the diagnostician identify a problem with the sender component of AFP Download Plus and report it to IBM. The information describes:

- How to use the PSF for z/OS trace facility with the sender
- How to use the PSF for z/OS dump facility with the sender

Before you use the PSF trace and dump facilities, determine whether the problem you encountered is one that other users reported and that is fixed. See the [\*PSF for z/OS: Diagnosis\*](#) for information about how to construct a keyword string to search in IBMLink. If you determine that your problem is not already reported, see the [\*PSF for z/OS: Diagnosis\*](#) for information about how to report a problem.

The messages and abend codes that are issued by the sender are described in [\*PSF for z/OS: Messages and Codes\*](#). The modules that produce each AFP Download Plus message are listed in [\*PSF for z/OS: Diagnosis\*](#).

---

### Using the PSF trace facility

You can use the same trace facilities that you use with PSF for z/OS. These facilities are described in detail in [\*PSF for z/OS: Diagnosis\*](#). This information provides an overview of the trace facilities available for the sender.

You specify trace parameters in one of these places:

- The Infoprint Server Printer Inventory:
  - Printer Inventory Definition Utility (PIDU)
  - ISPF panels
- The AFP Download Plus startup procedure:
  - TRACE parameter on the PRINTDEV statement
  - PARM parameters on the EXEC statement
  - DD statements for trace data sets
- The MVS MODIFY command, which serves as a PSF operator interface

If you suspect the problem is in the sender component of AFP Download Plus, request an FSA full external trace, tracing all components. An FSA full external trace includes an internal wrap trace and a recording of all events that occur on the FSI. The sender does not have a separate component identifier.

The parameters that activate tracing in the Printer Inventory or the AFP Download Plus startup procedure take effect when AFP Download Plus is initialized. By using the PSF operator interface, you can control traces dynamically while AFP Download Plus is running.

When you use the Printer Inventory to specify trace parameters, the trace data set must exist and be cataloged before AFP Download Plus is started. For an FSA trace, the trace data set must exist and be cataloged before the AFP Download Plus FSA is started. For an NST trace and a Printer Inventory notify subtask (PINST) trace, the trace data set must exist and be cataloged before the first AFP Download Plus FSA in the FSS is started.

### Examples of traces

This information shows examples of traces you can do.

## Starting a trace while the sender is running

To obtain a full external trace and direct the trace data to a Generalized Trace Facility (GTF) data set, follow this procedure:

1. Start GTF, requesting USR records of type FD0 and FD4.
2. Do one of these:
  - In the Printer Inventory, specify `Trace mode=Internal`. See **Trace mode** in “FSA Printer Inventory parameters” on page 80 for more information.
  - In the AFP Download Plus startup procedure, specify `PARM=( , INTR)` on the EXEC statement and `TRACE=YES` on the PRINTDEV statement for the FSA you want to trace so that you obtain an internal trace that starts when the sender is initialized. These are the default values, so you can omit the PARM parameter and the TRACE parameter. For information about tracing parameters in the startup procedure, see “JCL statements for the startup procedure” on page 39.
3. Start the sender FSA.
4. Enter this PSF operator interface command to start a full external trace:

```
MODIFY fss_name,TRACEON,fsa_name,FORMAT=GTF,MODE=FULL
```

where *fss\_name* is the name of the sender, and *fsa\_name* is the name of the FSA you want to trace.

5. Run the failing job.
6. Enter this AFP Download Plus operator interface command to end the trace:

```
MODIFY fss_name,TRACEOFF,fsa_name
```

7. Stop GTF.

## Starting a trace at initialization of the sender

To obtain a full external trace that begins during initialization of the sender and then direct the trace output to a PSF trace data set or zFS file, follow this procedure:

1. Do one of these:
  - In the Printer Inventory:
    - a. Specify `Trace mode=Full` and a PSF data set name or zFS file in the **FSA trace dsname** parameter. See “FSA Printer Inventory parameters” on page 80 for information about the FSA tracing parameters.
    - b. Allocate the PSF trace data set or zFS file. See “Allocating a PSF trace data set or zFS file” on page 155 for more information.
  - In the AFP Download Plus startup procedure:
    - a. Specify `PARM=( , FULL)` on the EXEC statement and `TRACE=YES` on the PRINTDEV statement for the FSA you want to trace. `TRACE=YES` is the default, so you can omit the TRACE parameter. For information about tracing parameters in the startup procedure, see “JCL statements for the startup procedure” on page 39.
    - b. Specify a DD statement to allocate a PSF trace data set or zFS file. The name of the DD statement must match the name of the FSA to be traced. See “Allocating a PSF trace data set or zFS file” on page 155 for more information.
2. For some problems, IBM support might ask you to also specify an FSS trace data set or zFS file (also called a notify subtask (NST) trace data set or zFS file). Do one of these:
  - In the Printer Inventory:
    - a. Specify an FSS data set name or zFS file in the **NST trace dsname** parameter for the FSS. See “FSS Printer Inventory parameters” on page 76 for information about FSS tracing parameters.

b. Allocate the FSS trace data set or zFS file. See [“Allocating an FSS trace data set or zFS file”](#) on page 156 for more information.

- In the AFP Download Plus startup procedure, specify a DD statement in the PARM parameter to allocate an FSS trace data set or zFS file. For example:

```
//stepname EXEC PGM=APSHPOSE,PARM=(NSTddname,FULL)
```

where *NSTddname* is the name of the DD statement for the FSS trace in the startup procedure. See [“Allocating an FSS trace data set or zFS file”](#) on page 156 for more information.

3. Run the failing job.
4. Enter this PSF operator interface command to end the trace:

```
MODIFY fss_name,TRACEOFF,fsa_name
```

where *fss\_name* is the name of the sender, and *fsa\_name* is the name of the FSA.

## Allocating a PSF trace data set or zFS file

You can direct trace output to a GTF data set, a PSF trace data set, or a PSF trace zOS File System (zFS) file. However, if you start tracing during initialization of the sender, you must direct trace output to either a PSF trace data set or a PSF trace zFS file. To direct the trace to a PSF trace data set or a PSF trace zFS file, do one of these:

- Specify the **FSA trace dsname** parameter in the Printer Inventory.
- Specify a DD statement for the PSF trace in the AFP Download Plus startup procedure. The name of this DD statement must be the name of the FSA that you want to trace, which means that the name must match the name on the PRINTDEV statement. Include a DD statement for each FSA that you want to trace.

When you allocate a PSF trace data set, specify these DCB parameters:

- Record length of 80
- Block size that is a multiple of 80; for better performance, 27920 is recommended
- Record format of either F, U, or FB
- Sequential organization (PS)

The size of the trace data set depends on the size of the data sets that are transmitted because the transmitted data is part of the trace. You must allocate larger trace data sets for larger data sets.

This example allocates a trace data set with a record format of FB, a record length of 80, a block size of 27920, a primary space allocation of 5 cylinders, and a secondary space allocation of 10 cylinders:

```
//ddname DD DSNAME=DOWNLOAD.TRACE,UNIT=3390,VOL=SER=SYS000,  
// DISP=(NEW,KEEP,CATLG),SPACE=(CYL,(5,10),RLSE)  
// DCB=BLKSIZE=27920
```

where *ddname* is the name of the FSA you want to trace.

When you allocate a PSF trace zFS file, specify the following parameters:

- PATHOPTS=(OCREAT,OWRONLY,OTRUNC)
- PATHMODE=(SIRWXU,SIRWXG,SIRWXO)

In this example of allocating a zFS file, *ddname* is the name of the FSA you want to trace:

```
//ddname DD PATH='var/psf/trace.afpdp',  
// PATHOPTS=(OCREAT,OWRONLY,OTRUNC),  
// PATHMODE=(SIRWXU,SIRWXG,SIRWXO)
```

## Allocating an FSS trace data set or zFS file

AFP Download Plus makes more trace entries during the initialization of the sender than PSF does, and AFP Download Plus directs these trace entries to an FSS trace data set or zFS file (also called an NST trace data set or zFS file). This means that to trace some problems, you might need to allocate an FSS trace data set or zFS file, and a PSF trace data set or zFS file.

To direct the trace to an FSS trace data set or zFS file, do one of these:

- Specify the **NST trace dsname** parameter in the Printer Inventory.
- Specify the name of the DD statement for the FSS trace data set or zFS file in the EXEC statement of the AFP Download Plus startup procedure. For example:

```
//stepname EXEC PGM=APSHPOSE,PARM=(fss_ddname,FULL)
```

where *fss\_ddname* is the name of the DD statement that allocates the FSS trace data set or zFS file.

When you allocate an FSS trace data set, specify these DCB parameters:

- Record length of 80
- Block size that is a multiple of 80; for better performance, 27920 is recommended
- Record format of either F, U, or FB
- Sequential organization (PS)

When you allocate an FSS trace zFS file, specify these parameters:

- PATHOPTS=(OCREAT,OWRONLY,OTRUNC)
- PATHMODE=(SIRWXU,SIRWXG,SIRWXO)

## Formatting trace data in a PSF trace data set or zFS file

The trace output contains unformatted data. You can format the PSF trace data set or zFS file by using the PSF trace post formatter program, APSTRFMT, which is included in SYS1.SAMPLIB. You must stop the sender before formatting the trace data. [Figure 19 on page 156](#) shows a sample JCL for starting the PSF trace post formatter.

```
//APSWTRCF JOB 'ACCOUNT #', 'NAME', MSGLEVEL=(1,1)
//*****
/* PSF TRACE FORMATTER INVOCATION JCL
//*****
//STEP01 EXEC PGM=APSTRFMT,REGION=100K
//*                               /* REGION = (3 * BLKSIZE) + 20K
//*                               /* BLKSIZE = TRACEIN BLOCKSIZE
//SYSUDUMP DD SYSOUT=*
//*TRACEIN DD PATH='tracein' /* SET TO PSF GENERATED z/FS FILE NAME
//TRACEIN DD UNIT=unit, /* UNIT CAN BE TAPE OR DASD
//          DSN=tracein, /* SET TO PSF TRACE DATA SET NAME
//          DISP=SHR,
//          VOL=SER=volser /* SERIAL NUMBER OF VOLUME
//TRACEOUT DD UNIT=unit, /* UNIT MIGHT BE TAPE OR DASD
//          DSN=traceout, /* SET TO DATA SET NAME WHERE
//*                          FORMATTED RECORDS ARE PLACED
//*                          DISP=disp, /* DISPOSITION OF TRACE OUT
//*                          VOL=SER=volser /* SERIAL NUMBER OF VOLUME
//SYSPRINT DD SYSOUT=*
//SYSIN DD *
//          TYPE=SHORT
//*
//
```

Figure 19. Sample JCL for starting the PSF trace formatter

The TRACEIN DD statement identifies the trace data set that contains the trace data; therefore, specify the attributes of that data set in the DD statement.



The TRACEOUT DD statement identifies the data set into which the formatted trace output is stored. The parameters that are specified on the DD statement are device-dependent. Specify these DCB parameters:

- Record length of 117, which is the default.
- Block size that is a multiple of 117. If it is not specified, or is not a multiple of 117, it defaults to 1287.
- Record format of FBA, U, or FB. The default is FBA.
- Sequential organization (PS).

You can specify three TYPE options on the SYSIN DD statement:

#### **SHORT**

Excludes some PSF data, specifically PPCC trace entries. For some entries, only the first 32 bytes of data are traced. In a truncated entry, a '<' is placed in the space between the address and the start of the data in the trace output data set. This is the default.

#### **TITLES**

Only headers are printed for the trace entry that is formatted.

#### **LONG**

All data is included in the trace data set.

## **Formatting and printing GTF trace data**

You can print GTF trace data sets by using the Interactive Problem Control System (IPCS). You can also use IPCS with the COMMANDS parameter GTF USR(FD1) to view the data at a display terminal. For more information about using IPCS, see [z/OS MVS IPCS User's Guide](#).

## **Using the PSF dump facility**

---

You can use the same dump facilities that you use with PSF for z/OS. These facilities are described in detail in [PSF for z/OS: Diagnosis](#).

As with PSF for z/OS, you can request a conditional dump of PSF control blocks by specifying a dump parameter on one of these:

- Infoprint Server Printer Inventory. See **Dump** parameters in [“FSA Printer Inventory parameters”](#) on page 80.
- PRINTDEV statement in the AFP Download Plus startup procedure. See the DUMP parameter in [Table 12](#) on page 66.

You can request that a conditional dump occur when:

- A PSF reason code or restartable abend reason code occurs.
- A specific AFP Download Plus message is issued.

A conditional dump causes an AFP Download Plus abend to occur. The dump goes directly to SYS1.DUMPxx; you can print or view it by using IPCS.

In these examples, a dump occurs the second time message APS8000I is issued:

#### **Printer Inventory**

```
Dump: Message ID=APS8000I
Dump: Count=2
```

#### **PRINTDEV statement**

```
DUMP=( ,APS8000I,2)
```



---

## Part 3. Using AFP Download Plus to receive and process data

This information contains tasks for working with the receiver component of AFP Download Plus on z/OS:

**Chapter 8, “Configuring the AFP Download Plus receiver on z/OS,” on page 161**

This task describes how to configure the receiver on a z/OS system.

**Chapter 9, “Operating the AFP Download Plus receiver on z/OS,” on page 163**

This task describes how to start, stop, and query the status of the receiver and how to locate transmitted files on receiver file systems. It also describes how to use the **apshhsub** exit program, the **apshhmds** exit program, or your own exit program when you start the receiver.

**Chapter 10, “Diagnosing errors with the AFP Download Plus receiver,” on page 179**

This task describes how to diagnose problems with the receiver.

The AFP Download Plus receiver runs on z/OS under z/OS UNIX System Services. All of the commands in this environment are case-sensitive.



---

## Chapter 8. Configuring the AFP Download Plus receiver on z/OS

This information describes the tasks that you must do to configure the AFP Download Plus receiver after you install AFP Download Plus on a z/OS system. See [Chapter 3, “Installing AFP Download Plus,”](#) on page 23 for information about installing the feature.

The tasks for configuring the AFP Download Plus receiver on the z/OS system are:

1. Create working directories.
2. Select an exit program.
3. Set up the receiver to handle APS8239I messages, if necessary.

### Creating working directories

---

The AFP Download Plus receiver uses a working directory to store a temporary copy of the job data it receives from the sender. You must create the working directory and have write access to it before you start the receiver. The size of the z/OS File System (zFS) on the receiver depends on these:

- When AFP Download Plus is using the non-direct download method (storing MO:DCA-P data in a temporary file on the sender), the size of the file system on the receiver must be comparable to the file system on the sender.
- When AFP Download Plus is using the direct download method (sending MO:DCA-P data directly to the receiver system), the size of the file system on the receiver must be larger than the file system on the sender. This is because when the receiver receives the data file and the resource file, it creates one file by copying the data file to the end of the resource file. Therefore, the zFS must be large enough to contain the resource file, the data file, and a copy of the data file.

**Keep in mind:** The receiver must support the direct download function to receive files when AFP Download Plus is using the direct download method.

- When AFP Download Plus is using compression, the size of the file system on the receiver must be larger than the file system on the sender to contain both compressed and uncompressed data.

See [Chapter 2, “Planning the size of the working directory,”](#) on page 17 for information about determining the size of the zFS on the sender.

When you create the working directory, use this directory scheme and characteristics so that all users in the APSADMIN group have access to the receiver:

- Directory: `/var/psf/download/portnumber`
- Group owner: APSADMIN
- Permissions: 770

### Selecting an exit program

---

The receiver calls an exit program to process jobs after it receives the transformed file from the sender. The exit program can be **apshhsub** or **apshhmds**, which are provided with AFP Download Plus, or it can be an exit program that you create.

You use the **apshhsub** exit program to submit individual jobs to the spool on the receiving system with the same characteristics as from the spool on the sending system. With **apshhsub**, you can automatically reassign job attributes that are based on criteria you specify in an attribute mapping file.

The **apshhmds** exit program processes multiple data sets into a single data set and then uses the **apshhsub** exit program to put the individual job on the JES spool.

**Notes:**

1. In this release of AFP Download Plus, the **apshhmds** exit program concatenates multiple data sets that all specify the same supported MO:DCA interchange set (IS/3, IS/3 with function sets, AFP/A, or AFP/A, IS/3), which results in a file that is compliant with that interchange set.
2. AFP Download Plus supports MO:DCA IS/3 with function sets. Before you transmit files with this designation on the BPF structured field of the print file, be sure that the receiver supports the same level of MO:DCA IS/3 with function sets.

For information about using **apshhsub**, **apshhmds**, or creating your own exit program, see [Chapter 9, “Operating the AFP Download Plus receiver on z/OS,”](#) on page 163.

## Setting up the receiver to handle APS8239I messages

---

When the AFPPARMS **send-messages-on-failure=generic-only** parameter or the Printer Inventory **Send messages on failure=Generic only** parameter is specified, AFP Download Plus sends an APS8239I message file to the receiver for errors that caused processing to stop. Any resources that are specified on the message data set OUTPUT statement in the AFP Download Plus startup procedure are sent to the receiver in **-o** attributes (see [Table 23 on page 144](#)). However, the resources themselves are not sent inline.

To avoid receiving "resource not found" error messages when you print the message file, you must:

- Manually make the resources available to the receiving system, if they are not already available.
- Place the resources in the appropriate libraries.

---

## Chapter 9. Operating the AFP Download Plus receiver on z/OS

The AFP Download Plus receiver uses a working directory to store a temporary copy of the job data that it receives from the sender. When all the data is received, the receiver calls an exit program and passes the file name to the exit program for processing of the data.

Before the sender can transmit transformed data to the receiver system, you must start the receiver. When you start the receiver, you tell it the name of the working directory that you want it to use. You must create the directory before you start the receiver, and you must have write access to the directory when you start the receiver (see [“Creating working directories”](#) on page 161).

This information describes how to operate the AFP Download Plus receiver on z/OS, including how to:

- Start the receiver manually, including using the **apshhsub** exit program, using the **apshhmnds** exit program, creating and using your own exit program, and using the attributes from the sender.
- Start the receiver automatically.
- Stop and query the status of the receiver.
- Locate transmitted files on receiver file systems.

**Keep in mind:** The sender and the receiver must be operating in the same system locale. If they are not, unpredictable results can occur.

---

### Starting the receiver manually

To start the AFP Download Plus receiver manually, use this command from an **rlogin** shell or an OMVS session:

**apshhrd -p PortNum -d Directory -x ExitProg [-X ExitParms] [-n 1] [-k] [-q Queue] [-t] [-m 1] [-w]**

This command causes the receiver to monitor the specified port number, receive a transformed file and write it to the specified directory, and call the specified exit program as jobs are received.

The command options are:

**-p PortNum**

Specifies the port number that the receiver monitors. This is a required option and must match the port number that is specified in the sender configuration.

**-d Directory**

Specifies the name of the working directory where the receiver saves the file that it receives. This is a required option.

**Note:** The user who starts **apshhrd** must have permission to write to the specified directory (the user must be in the APSADMIN group and the directory must be writable by the APSADMIN group).

**-x ExitProg**

Specifies the exit program that the receiver calls to process jobs after it receives the file. This is a required option. The exit programs that are provided with AFP Download Plus are **apshhsub**, which spools the job (see [“Using the apshhsub exit program”](#) on page 165), and **apshhmnds**, which groups multiple data sets into a single data set (see [“Using the apshhmnds exit program”](#) on page 169).

**Note:** The **apshhmnds** exit program supports only MO:DCA-P data. If you are processing multiple data set jobs that contain line data, you must use **apshhsub**.

**-X ExitParms**

Specifies additional parameters for the exit program that the receiver calls. The exit program that is provided with AFP Download Plus provides a number of functions by using these additional

parameters (see [“Using the apshhsub exit program” on page 165](#)). If you create your own exit program, you can specify additional parameters for other functions (see [“Creating your own exit program” on page 171](#)).

**-n 1**

Specifies that the receiver receives and processes one job at a time. If you do not specify this option, the receiver starts the exit program in the background, causing jobs to be received and processed concurrently. This option is required when the **apshhmds** exit program is specified.

**-k**

Specifies that the receiver saves a copy of the options string from the sender in a file. The file name has the same syntax as the syntax for Parameter 1 in [“Creating your own exit program” on page 171](#). See [Appendix A, “Syntax for file names,” on page 181](#).

**-q Queue**

Specifies the queue name to be passed to the exit program.

**-t**

Specifies that the trace mechanism for **apshhrcd** is turned on. See [“Diagnosing problems with apshhrcd” on page 179](#).

**-m 1**

Specifies that the receiver receives and processes multiple data sets. This option is required when the **apshhmds** exit program is specified.

**-w**

Specifies that a return code is issued to indicate whether a single data set created from multiple data sets was successfully spooled. The return code values are:

**0**

The data set was successfully spooled.

**Non-zero**

The data set was not spooled.

This option is only used when the **apshhmds** exit program is specified. This option is recommended in order to detect errors generated by the receiver after a successful transmission, but before a job gets spooled.

The command in this example shows how to start the receiver so it uses the **apshhsub** exit program to process jobs:

```
apshhrcd -p 6001 -d /var/psf/download/6001 -x apshhsub -X afpstats=yes -n 1 &
```

The command options indicate:

**-p**

The receiver monitors port 6001.

**-d**

The receiver uses `/var/psf/download/6001` for its working directory.

**-x**

The receiver calls the **apshhsub** exit program.

**-X**

The exit program requests an AFPSTATS report.

**-n 1**

The receiver receives and processes one job at a time.

**&**

The shell environment runs the receiver as a background process so you can enter other commands on the command line while the receiver is running.

**Note:** Access permissions for files that are created by the receiver are controlled by the file mode creation mask. The **umask** command displays or sets the file mode creation mask. In most cases, set the file mode creation mask to a value of 0007. With this value, files that are created by the receiver are accessible



by the owning user and group. See the **chmod** and **umask** commands in *z/OS UNIX System Services Command Reference* for information about file permissions and the file mode creation mask.

## Using the apshhsb exit program

The receiver can call the **apshhsb** exit program to process jobs that it receives from the sender. You can specify **apshhsb** in these cases:

- You are processing individual jobs from the sender.
- You have a multiple data set job that contains line data.

**Note:** If you have a multiple data set job that contains MO:DCA-P data only, specify the **apshhmds** exit program (see [“Using the apshhmds exit program” on page 169](#)).

You can specify special parameters for **apshhsb** to use, specify an attribute mapping file so **apshhsb** can reassigned job attributes, and monitor messages from **apshhsb**.

## Specifying special parameters

The **apshhsb** exit program uses special parameters to control its operation. You specify these special parameters with the -X option on the **apshhrcd** command. For example:

```
apshhrcd -p PortNum -d Directory -x apshhsb -X "afpstats=yes sdsname=nodeid"
```

These are the special parameters that you can specify for the **apshhsb** exit program:

### **afpstats={yes | no}**

Indicates whether the exit program requests an AFPSTATS report for the file that is processed (see Appendix C, [“AFPSTATS report,” on page 185](#)). The default is no.

### **debug={yes | no}**

Indicates whether the exit program is run in debug mode. In debug mode, the exit program keeps the original data file for the job and a messages file in the working directory. The messages file has the same name syntax as the syntax for Parameter 1 in [“Creating your own exit program” on page 171](#) (see Appendix A, [“Syntax for file names,” on page 181](#)). The default is no.

### **intids={yes | no}**

Indicates whether the exit program adds internal message identifiers to the beginning of messages that it writes to the log file. Internal message identifiers contain the source file name and line number for where the message was issued. The default is no.

### **jobhold={yes | no}**

Indicates whether the exit program holds the job after it is spooled. The default is no.

### **jobinfo={sender | generate}**

Indicates whether the job name and job identifier the exit program assigns to the job it submits are from the sender or generated from the system.

The values are:

#### **sender**

The exit program uses the original job name and job identifier that is passed by the sender. This is the default unless either the job name or job identifier is missing, in which case the exit program uses the job name and job identifier that the system generates.

#### **generate**

The exit program uses the job name and job identifier that the system generates.

### **log={error | all | none}**

Indicates which messages the exit program saves to the log file when it processes jobs.

The values are:

#### **error**

The exit program saves messages only for jobs for which it finds problems. This is the default.

**all**

The exit program saves messages for every job it processes.

**none**

The exit program does not save any messages.

See [“Viewing messages issued from apshhsub” on page 168](#) for an example of the message log file.

**mapfile=FileName**

Indicates the directory and file name of the attribute mapping file that the exit program uses to reassign job attributes when it submits a job. For example:

```
mapfile=/var/psf/xyz.map
```

If the file is in the receiver working directory, you only need to specify the file name. For example:

```
mapfile=xyz.map
```

See [“Specifying mapping attributes” on page 166](#) for more information about the attribute mapping file.

**sdsname={userid | nodeid | segmentid}**

Indicates which 1 - 8 character identifier the exit program appends to the end of the spool data set name.

The values are:

**userid**

The exit program appends the user ID that is received from the sender. This is the default.

**nodeid**

The exit program appends the node ID that is received from the sender.

**segmentid**

The exit program appends the segment ID that is received from the sender.

For example, if **sdsname=userid**, the user ID from the sender is JOED0E, and the data set name is MYJOB.SIMPLE.STC02523.D0000103, the exit program appends the user ID to the end of the spool data set name, like this:

```
MYJOB.SIMPLE.STC02523.D0000103.JOED0E
```

**Notes:**

1. Each special parameter must be entered in lowercase with no blank spaces before or after the equal sign.
2. If you separate two or more special parameters with blank spaces, the special parameters must be enclosed in double quotation marks.

**Specifying mapping attributes**

The **apshhsub** exit program typically uses the original attributes from the sender when it submits the job. However, because work-selection criteria can vary between systems, **apshhsub** can use an attribute mapping file to modify job attributes for the receiving system.

With an attribute mapping file, you can specify that jobs that match certain criteria are assigned new job attributes. For example, you can specify that jobs from a certain user ID on one system are sent to a particular destination on the receiver system. Based on the criteria you specify in the attribute mapping file, the **apshhsub** exit program automatically reassigns the job attributes. The **mapfile** special parameter identifies the name of the attribute mapping file to **apshhsub** (see [“Specifying special parameters” on page 165](#)).

The attribute mapping file lists criteria values that map to one or more attributes. The criteria values start in the first column of the file. Each attribute is placed on its own line after the criteria values and is

preceded by one or more blank spaces. If a job meets the criteria, **apshhsub** uses the attributes on the next lines.

In this example, `class=T` and `class=R` are criteria values, while `destination=PRT007` and `destination=PRT016` are attributes. Class T jobs are assigned the destination PRT007 and class R jobs are assigned the destination PRT016:

```
class=T
  destination=PRT007

class=R
  destination=PRT016
```

#### Notes:

1. Because **apshhsub** checks all criteria values in the file, more than one criteria value can apply to a specific job. Therefore, the associated mapping attributes can complement or override each other.
2. **apshhsub** does not validate the attribute values from the mapping file. If you provide a value that is not valid, **apshhsub** either assigns a default value or ignores the entry.

## Formatting conventions

The criteria values and attributes are simple keyword=value pairs. The keywords are the **-o** attributes that are passed from the sender to the receiver (see [“JCL parameters sent as -o attributes”](#) on page 144). The exception is that instead of the **-opa** attributes, the keywords **class**, **destination**, **forms**, **jobid**, and **segmentid** are used. Spaces are not allowed between the keyword and its value.

Conventions specific for criteria are:

- Values can be any string of characters, but cannot contain spaces.
- Values can contain the wildcard characters `?` and `*`, where `?` matches any single character and `*` matches any number of characters.
- The keyword=value pair, `*=*`, can be used for criteria that applies to all jobs.
- Two or more keyword=value pairs on the same line that are separated by a blank space, indicate an AND condition. A job must meet all the criteria to map to the attribute.
- Two or more keyword=value pairs on separate, consecutive lines indicate an OR condition. A job can meet any of the criteria to map to the attribute.

Conventions specific for attributes are:

- Multiple attributes can be listed for a criteria value. The attributes are on separate, consecutive lines that follow the criteria value.
- Values can be any string of characters if they conform to the syntax rules for the attribute.
- Values for **-o** attributes can be substituted by delimiting the keyword with two leading and two trailing percent signs. For example, to add the sender’s node at the end of the title for all jobs, use this:

```
***
  -oti=My node is %%-ono%%
```

If the job was sent from node ACME, the title on the receiving system becomes `My node is ACME`.

**Keep in mind:** If **apshhsub** does not recognize the substitution keyword, it cannot substitute the value. For example, if you typed **-omo** instead of **-ono**, the title becomes `My node is %%-omo%%`.

The attribute mapping file can contain comments and blank lines; however, lines with criteria values or attributes cannot contain comments. A comment line starts with `#`.

## Attribute mapping file example

This example shows different mapping criteria in an attribute mapping file:

```
#-----#
# Example of a simple attribute assignment:      #
# Jobs from userid SMITH are sent to the        #
# destination "PRT123".                        #
#-----#
-ous=SMITH
  destination=PRT123

#-----#
# Example of a *==* wildcard:                  #
# All jobs are redirected to class A.           #
#-----#
*==*
  class=A

#-----#
# Example of an OR condition with wildcards:   #
# Jobs whose name starts with INV* or ACCT* are #
# redirected to class J.                       #
#-----#
-ojobn=INV*
-ojobn=ACCT*
  class=J

#-----#
# Example of AND condition & multiple attributes: #
# Jobs from node ACME with forms INSURE are     #
# redirected to class L and the FORMS value is   #
# changed to ACINSURE.                         #
#-----#
-ono=ACME forms=INSURE
  class=L
  forms=ACINSURE

#-----#
# Example of substitution:                     #
# Add the sender's node and user ID to the      #
# beginning of the title for all jobs. If the job #
# is sent from node ACME by user SMITH, and the #
# title is "TEST JOB", the title becomes        #
# "ACME.SMITH.TEST JOB".                       #
#-----#
*==*
  -oti=%%-ono%%.%%-ous.%%.%%-oti%%
```

## Viewing messages issued from apshhsub

When the **apshhsub** exit program finishes processing the job, **apshhsub** either saves the messages to a log file in the receiver working directory or it discards all the messages. The **log** special parameter determines whether **apshhsub** saves all messages to the log file, saves only messages for problems, or discards all messages (see [“Specifying special parameters”](#) on page 165).

The log file in which **apshhsub** saves the messages is named `apshhsub.PortNum.log`, where *PortNum* is the port number that the receiver monitors. For example, assume that you start the receiver with this command:

```
apshhrcd -p 6250 -d /var/psf/myreceiver -x apshhsub
```

The message log file for **apshhsub** is:

```
/var/psf/myreceiver/apshhsub.6250.log
```

You can view the messages in the log file. The messages for a successfully processed job look like this:

```
APSH0007 2005-08-25 10:14:21 MDT - submit started.
APSH0009 Parameters:
APSH0009   Input file:      'AFPDP.BLDPSRV5.PRT660.COBRYJ.JOB04740.COBRY521.STE
P1.SYSUT2.STD.2005237.10142007473.PRD'
APSH0009   Options:        '-odatat=af -oburst=no -occ=yes -occtype=m -ocop=1
```

```

-odatac=unblock -ofileformat=stream -of=F1A10110 -ojobn=PAYROLL -ono=ACME
-opr=AFPRM521 -ous=SMITH
-opa=class=L,destination=LOCAL,forms=STD,jobid=JOB04740'
APSH0009 Queue: ''
APSH0009 Port: '6250'
APSH0009 Extra arguments: 'afpstats=yes log=all mapfile=6250.map'
APSH0009 Trace: '0'
APSH0011 Options mapped from attrib.map:
APSH0012 Line 2: 'class=J'
APSH0019 The SYSOUT data set contains 500 records.
APSH0021 The final disposition is NORMAL.
APSH0008 2005-08-25 10:14:21 MDT - submit ended (rc 0).

```

Messages APSH0007 and APSH0008 show the start and end time for the submit process, along with the return code. If an error occurs during processing, the file contains a message specific to the problem and the return code is a number other than 0.

Message APSH0009 shows the input parameters that were passed from the receiver (**apshhrcd**). These parameters include the **-o** attributes from the sender.

Messages APSH0011 and APSH0012 show an attribute that **apshhsub** reassigned from the attribute mapping file, `attrib.map`.

Messages APSH0019 and APSH0021 show the number of records and the final data set disposition.

## Using the apshhmds exit program

The receiver can call the **apshhmds** exit program to process multiple data set jobs that it receives from the sender, put the data sets into a single data set, and place the job on the JES spool. You specify **apshhmds** when you have a multiple data set job that contains MO:DCA-P data only; otherwise, if the multiple data set job contains line data, you must use **apshhsub** (see [“Using the apshhsub exit program” on page 165](#)).

Use **apshhmds** when you want to:

- Process all the data sets as one data set.
- Print the data sets in the order they are transmitted.
- Generate copies of one or more data sets in the job.

**apshhmds** uses the **afpconcat** program to put multiple data sets into a single data set, and then uses the **apshhsub** exit program to put the job on the JES spool. The **afpconcat** program can support MO:DCA-P data only and might fail if a data set contains line data. The **afpconcat** program supports these MO:DCA interchange sets:

- IS/3
- IS/3 with function sets
- AFP/A
- AFP/A, IS/3

### Notes:

1. In this release of AFP Download Plus, the **apshhmds** exit program concatenates multiple data sets that all specify the same supported MO:DCA interchange set, which results in a file that is compliant with that interchange set.
2. AFP Download Plus supports MO:DCA IS/3 with function sets. Before you transmit files with this designation on the BPF structured field of the print file, be sure that the receiver supports the same level of MO:DCA IS/3 with function sets.

Because **apshhmds** uses **apshhsub** during processing, you can specify **apshhsub** special parameters, including an attribute mapping file, with the **-X** option on the **apshhrcd** command. For example:

```
apshhrcd -p PortNum -d Directory -x apshhmds -X "debug=yes log=all" -n 1 -m 1 &
```

**Important:** When you specify the **apshhmds** exit program on the **apshhrcd** command, be sure to:

- Make sure **afpconcat** and **apshhsub** are in the same directory as **apshhmds**.
- Specify the **-n 1** and **-m 1** options.
- Specify the **&** option if you want to run the receiver as a background process.

See [“Specifying special parameters” on page 165](#) and [“Specifying mapping attributes” on page 166](#) for more information.

#### Keep in mind:

1. When PSF prints a multiple data set job that AFP Download Plus processed with the **apshhmds** exit program and you specified that PSF produce a data set header page for each data set, only one data set header page is printed.
2. If you want data set separator pages in between each data set, you must enable them on AFP Download Plus. See [“Sending z/OS separator pages” on page 124](#).
3. **-o** attributes are not derived from each data set in a multiple data set job. Instead, **-o** attributes are selected from the first user data set and are used in all other data sets, including the data sets for header and trailer pages.

## Viewing messages issued from apshhmds

When the **apshhmds** exit program finishes processing the job, **apshhmds** either saves the messages to a log file in the receiver working directory or it discards all the messages. The **log** special parameter determines whether **apshhmds** saves all messages to the log file (**log=all**), saves only messages for problems (**log=error**), or discards all messages (**log=none**). See [“Specifying special parameters” on page 165](#).

The log file in which **apshhmds** saves the messages is named `apshhmds.PortNum.log`, where *PortNum* is the port number that the receiver monitors. For example, assume that you start the receiver with this command:

```
apshhrcd -p 6250 -d /var/psf/myreceiver -x apshhmds -X log=all -n 1 -m 1 &
```

The message log file for **apshhmds** is:

```
/var/psf/myreceiver/apshhmds.6250.log
```

When messages are saved to a log file with **log=error** or **log=all**, **apshhmds** also creates a file that contains status information for each job that is processed. Each file is appended to the `apshhmds.PortNum.log` file with the name *JobName*.MDSLOG, where *JobName* is the file name for the job.

You can view the messages in the log file. When you use **debug=no**, the messages **apshhmds** saves to the log for a successfully processed job look like this:

```
APSH0049 2006-11-19 13:55:33 EST - submit started.
APSH0062 Processing completed successfully for job
AFPDP.BLDPTCP5.PRT660.JULMER.JOB00141.MULTI5.STEP1.SYSUT2.STD.2006323.13553138861.JOB.
```

**apshhmds** saves more information to the log when you use **debug=yes**. For example, the messages for a successfully processed job look like this:

```
APSH0049 2006-11-19 13:31:48 EST - submit started.
APSH0064 Parmlist:
  Base: /usr/lpp/psf/bin/
  Parm list file:
    AFPDP.BLDPTCP5.PRT660.JULMER.JOB00139.MULTI5.STEP1.SYSUT2.STD.2006323.13314647129.JOB
  Queue:
  Null parm:
  Port: 6100
  -X arguments: debug=yes log=all
  Trace: 1
APSH0064 Parmlist:
  /usr/lpp/psf/bin/apshhsub
  AFPDP.BLDPTCP5.PRT660.JULMER.JOB00139.MULTI5.STEP1.SYSUT2.STD.2006323.13314647129.PR
  " -odatat=af -oburst=no -occ=yes -occtype=m -ocop=1 -odatac=block -ofileformat=stream
```

```
-of=F1A10110 -ojobn=MULTI5 -ono=BLDPTCP5 -opagecount=5 -opr=1EMRFF -osheetcount=5
-ous=JULMER -opa=class=S,destination=LOCAL,forms=STD,jobid=JOB00139 " " " " 6100
'debug=yes log=all' 1
APSH0062 Processing completed successfully for job
AFDPD.BLDPTCP5.PRT660.JULMER.JOB00139.MULTI5.STEP1.SYSUT2.STD.2006323.13314647129.JOB.
```

Message APSH0049 shows the start time for the submit process and message APSH0062 shows that processing completed successfully. If an error occurs during processing, message APSH0063 indicates that processing failed for the job.

Message APSH0064 shows the input parameters that were passed from the receiver (**apshhrcd**). These parameters include the **-o** attributes from the sender.

## Creating your own exit program

You can create your own exit program to use with the receiver. The exit program can be a script or an executable file. When the receiver calls the exit program, the current working directory is the value that is specified for **apshhrcd -d** when the receiver was started. All files that are associated with the job are in the current working directory.

### Notes:

1. When you are using an exit program that you created, make sure that you do not specify the **m -1** option with the **apshhrcd** startup command.

The receiver passes a positional parameter list to the exit program. The parameter list consists of these items:

#### Parameter 1

Specifies the name of the file that contains the job data. See [Appendix A, “Syntax for file names,” on page 181](#) for the file name syntax.

#### Parameter 2

Specifies the attribute list that goes with the job data. The attribute list contains information from the sending z/OS system and the JCL that was used to submit the job to the sender. See [“Using the attributes from the sender” on page 171](#) for details.

#### Parameter 3

Specifies the queue name that was specified when the receiver was started (**apshhrcd -q**).

#### Parameter 4

Reserved for future use.

#### Parameter 5

Reserved for future use.

#### Parameter 6

Specifies the port number that was specified when the receiver was started (**apshhrcd -p**).

#### Parameter 7

Specifies the extra arguments that were specified when the receiver was started (**apshhrcd -X**).

#### Parameter 8

Specifies 1 if **apshhrcd -t** is used; otherwise, specifies 0.

## Using the attributes from the sender

The sender passes a number of attributes through **apshhrcd** to the exit program. The sender components of AFP Download Plus and Download for z/OS send similar attributes; however, they are not identical. Table 25 on page 172 shows the attributes, their descriptions, which senders pass them (AFP Download Plus or Download for z/OS), and a description of how the exit program uses them.

Table 25. Attributes from the sender. AFPDP = AFP Download Plus; Downld = Download for z/OS; MFP = Message file processing (generic message APS8239I only)

Attribute	Description	From AFPDP	From Downld	Exit Program Usage
-oaddress1=string1 -oaddress2=string2 -oaddress3=string3 -oaddress4=string4	These attributes come from the ADDRESS parameter of the OUTPUT JCL statement. The values are strings of up to 60 characters.	Yes	Yes	ADDRESS text unit
-obu=string	This attribute comes from the BUILDING parameter of the OUTPUT JCL statement. The value is a string of up to 60 characters.	Yes	Yes	BUILDING text unit
-oburst=yes   no	This attribute comes from the BURST parameter of the OUTPUT JCL statement. The value is either <b>yes</b> or <b>no</b> .	Yes	No	BURST text unit
-occ=yes   no -occtype=m   a   z	These attributes come from the input data set. If <b>-occ=yes</b> , then <b>-occtype</b> is one of these: <ul style="list-style-type: none"> <li>• <b>m</b> for machine</li> <li>• <b>a</b> for ANSI-EBCDIC</li> <li>• <b>z</b> for ANSI-ASCII</li> </ul>	Yes	Yes	Data set attribute
-ochars=list	This attribute comes from the CHARS parameter of the OUTPUT JCL statement. The value is a list of fonts. Each font name is separated by a comma.	MFP only <sup>1</sup>	Yes	CHARS text unit
-ocolormap=name	This attribute comes from the COLORMAP parameter of the OUTPUT JCL statement. The value is the name of a color map resource.	Yes	No	COLORMAP text unit
-ocomsetup=name	This attribute comes from the COMSETUP parameter of the OUTPUT JCL statement. The value is the name of a microfilm setup resource.	Yes	No	COMSETUP text unit
-ocop=nnn	This attribute comes from the COPIES parameter of the OUTPUT JCL statement. The value is the number of copies to print.	Yes	Yes	COPIES text unit
-odatac=unblock   blkpos   blkchar   block	This attribute comes from the DATAACK parameter of the OUTPUT JCL statement.	Yes	Yes	DATAACK text unit
-odatat=af   line	This attribute is generated by the sender. For AFP Download Plus, the value is <b>af</b> , which means the input is MO:DCA-P. For Download for z/OS, the value is <b>line</b> , which means the input is line data.	Yes	Yes	Determine type of I/O for AFP versus line data



Table 25. Attributes from the sender. AFPDP = AFP Download Plus; Downld = Download for z/OS; MFP = Message file processing (generic message APS8239I only) (continued)

Attribute	Description	From AFPDP	From Downld	Exit Program Usage
<b>-ode=string</b>	This attribute comes from the DEPT parameter of the OUTPUT JCL statement. The value is a string of up to 60 characters.	Yes	Yes	DEPT text unit
<b>-odu=tumble   normal   no</b>	This attribute comes from the DUPLEX parameter of the OUTPUT JCL statement.	Yes	Yes	DUPLEX text unit
<b>-of=name</b>	This attribute comes from the FORMDEF parameter of the OUTPUT JCL statement. The value name is the name of a form definition.	Yes	Yes	FORMDEF text unit
<b>-ofileformat=stream   record</b>	This attribute is generated by the sender. For AFP Download Plus, the value is <b>stream</b> . For Download for z/OS, the value is <b>record</b> .	Yes	Yes	Not used
<b>-ofiletype=dshdr   jobhdr   jobtrl   message</b>	This attribute specifies that the file sent is a separator page file or a message file. Message files are sent when an error stops transformation.	Yes (separator s and messages)	No	Determine type of file received
<b>-oflash=name,n -oflash=name -oflash=,n</b>	This attribute comes from the FLASH parameter of the OUTPUT JCL statement. The value name is the name of an overlay. The value <i>n</i> is the number of copies to flash with the overlay.	Yes	No	FLASH text unit

Table 25. Attributes from the sender. AFPDP = AFP Download Plus; Downld = Download for z/OS; MFP = Message file processing (generic message APS8239I only) (continued)

Attribute	Description	From AFPDP	From Downld	Exit Program Usage
<b>-oformlength=nn[.mm]IN   CM</b>	This attribute comes from the FORMLEN parameter of the OUTPUT JCL statement. The value specifies the length of pages to print.	Yes	Yes	<p>FORMLEN text unit</p> <p>AFP Download Plus sets this attribute exactly as FORMLEN is specified on the OUTPUT statement.</p> <p>Download for z/OS converts the FORMLEN value from the OUTPUT statement to millimeters and does not specify a unit.</p> <p>You can change theAFP Download Plus format of sending this attribute to match Download for z/OS by specifying the AFPPARMS <b>match-download-format=formlen</b> parameter. Do not specify <b>match-download-format</b> if you are using the AFP Download Plus z/OS receiver.</p>
<b>-oin=nnn</b>	This attribute comes from the INTRAY parameter of the OUTPUT JCL statement. The value is the number of the input tray to use.	Yes	Yes	INTRAY text unit
<b>-oipdest=string</b>	This attribute comes from the DEST parameter of the OUTPUT JCL statement. The value is the text that comes after the string IP: in the value of the original DEST parameter.	Yes	Yes	DEST text unit (when <b>-opa destination=&lt;IP&gt;</b> )
<b>-ojobn=jobname</b>	This attribute comes from the JOB JCL statement. The value is the job name.	Yes	Yes	Job scheduler block

Table 25. Attributes from the sender. AFPDP = AFP Download Plus; Downld = Download for z/OS; MFP = Message file processing (generic message APS8239I only) (continued)

Attribute	Description	From AFPDP	From Downld	Exit Program Usage
<b>-ona=string</b>	This attribute comes from the NAME parameter of the OUTPUT JCL statement. The value is a string of up to 60 characters.	Yes	Yes	NAME text unit
<b>-ono=nodeid</b>	This attribute comes from the sender. The value is the name of the system where the job was submitted.	Yes	Yes	Optionally reused in short data set name
<b>-ooffxb=offset</b> <b>-ooffxf=offset</b> <b>-ooffyb=offset</b> <b>-ooffyf=offset</b>	These attributes come from the OFFSETxx parameters of the OUTPUT JCL statement. The value that is offset is the offset amount and units that were specified in the job.	Yes	Yes	OFFSETxx text units
<b>-ooutbin=nnnnn</b>	This attribute comes from the OUTBIN parameter of the OUTPUT JCL statement. The value is the number of the input tray to use.	Yes	Yes	OUTBIN text unit
<b>-oovlyb=name</b> <b>-oovlyf=name</b>	These attributes come from the OVERLAYx parameter of the OUTPUT JCL statement. The value is the name of an overlay.	Yes	Yes	OVERLAYx text units
<b>-opa class=class</b>	This attribute comes from the CLASS parameter of the OUTPUT JCL statement.	Yes	Yes	CLASS text unit
<b>-opa destination=dest</b> <b>-opa destination=&lt;IP&gt;</b>	This attribute comes from the DEST parameter of the OUTPUT JCL statement. A value of <IP> indicates <b>-oipdest</b> contains a TCP/IP routing destination.	Yes	Yes	DEST text unit; see <b>-oipdest</b> .
<b>-opa forms=formname</b>	This attribute comes from the FORMS parameter of the OUTPUT JCL statement.	Yes	Yes	FORMS text unit
<b>-opa jobid=jobid</b>	This attribute is generated by the sending system. The value is the job identifier for the job.	Yes	Yes	Job scheduler block

Table 25. Attributes from the sender. AFPDP = AFP Download Plus; Downld = Download for z/OS; MFP = Message file processing (generic message APS8239I only) (continued)

Attribute	Description	From AFPDP	From Downld	Exit Program Usage
<b>-opa OUTGRP=FIRST   NEXT   LAST</b>	This attribute comes from Exit 15. It indicates the sequence for a multiple data set job.  <b>Note:</b> Download for z/OS uses the OUTGRP parameter on Exit 15 to process multiple data set jobs. However, AFP Download Plus ignores the OUTGRP parameter on Exit 15 and uses the parameter in the AFPPARMS control statement or Printer Inventory instead (see <b>dataset-grouping</b> in “Parameters for the AFPPARMS control statement” on page 45 or <b>Data set grouping</b> in “FSA Printer Inventory parameters” on page 80).	No	Yes	Not used
<b>-opa segmentid=segment</b>	This attribute is generated based on the SEGMENT parameter of the DD JCL statement. The sending system generates segment identifiers as it segments the job.	Yes	Yes	Optionally reused in short data set name
<b>-opagecount=nnn</b>	This attribute specifies the number of pages in the data set.	Yes	No	Not used
<b>-opagedef=name</b>	This attribute comes from the PAGEDEF parameter of the OUTPUT JCL statement. The value is the name of a page definition.	MFP only <sup>1</sup>	Yes	PAGEDEF text unit
<b>-opr=string</b>	This attribute comes from the JOB JCL statement. The value is a string of up to 20 characters.	Yes	Yes	Not used
<b>-oprmode=LINE   PAGE   mode</b>	This attribute comes from the PRMODE parameter of the OUTPUT JCL statement. The value can be <b>LINE</b> , <b>PAGE</b> , or a 1 - 8 character process mode.	No	Yes	PRMODE text unit
<b>-oprqueue=string</b>	This attribute comes from the PRTQUEUE parameter of the OUTPUT JCL statement. The value is a string of up to 127 characters.	Yes	Yes	PRTQUEUE text unit
<b>-ore=240   300</b>	This attribute comes from the RESFMT parameter of the OUTPUT JCL statement.	Yes	Yes	RESFMT text unit

Table 25. Attributes from the sender. AFPDP = AFP Download Plus; Downld = Download for z/OS; MFP = Message file processing (generic message APS8239I only) (continued)

Attribute	Description	From AFPDP	From Downld	Exit Program Usage
<b>-oro=string</b>	This attribute comes from the ROOM parameter of the OUTPUT JCL statement. The value is a string of up to 60 characters.	Yes	Yes	ROOM text unit
<b>-osheetcount=nnn</b>	This attribute specifies the number of sheets in the data set.	Yes	No	Not used
<b>-oti=string</b>	This attribute comes from the TITLE parameter of the OUTPUT JCL statement. The value is a string of up to 60 characters in length.	Yes	Yes	TITLE text unit
<b>-otrc=yes   no</b>	This attribute comes from the TRC parameter of the OUTPUT JCL statement.	MFP only <sup>1</sup>	Yes	TRC text unit
<b>-ous=userid</b>	This attribute comes from the sender. The value is the user ID of the person who submitted the job.	Yes	Yes	Optionally reused in short data set name

**Table footnotes:**

1. When **send-messages-on-failure=generic-only**.
2. Some translation occurs with string values. Blank spaces in the original string are translated to 0X'FF'. Also, any single or double quotation marks (' or ") are translated to accent characters (').

## Starting the receiver automatically

You can start the AFP Download Plus receiver automatically during system initialization. Do this:

1. Edit `/etc/rc`, which is a script that z/OS runs whenever the system is started.
2. Add the **apshhrcd** command at the end of the script. If timing issues exist with the startup of TCP/IP (for example, **apshhrcd** starts before TCP/IP is ready), place a sleep command just before the **apshhrcd** command.

**Note:** To save any error messages that might be written by the receiver, redirect **stderr** to a file.

## Stopping and querying the receiver

When you start the AFP Download Plus receiver, it creates a script file that you can use to stop the receiver or check its status. The script file contains a comment with the **apshhrcd** command that was issued so you can see how the receiver was started.

**Keep in mind:** Only the user who started the receiver or a superuser can use the script file.

## Stopping the receiver

To stop the receiver, run this script file:

```
/tmp/apshhrcd.PortNum.sh
```

where *PortNum* is the port number you specified to start the receiver. The file contains a command that stops the receiver process.

## Querying the status of the receiver

To determine whether the receiver is running, do one of these:

- Enter the UNIX **fuser** command with the script file to list which processes have a file open:

```
fuser /tmp/apshhrcd.PortNum.sh
```

where *PortNum* is the port number you specified to start the receiver. When the receiver creates the script, the file is left open. If the receiver stops, the system closes the file. Therefore, if the **fuser** command reports a process identifier, the receiver is running. Otherwise, the receiver is stopped.

- Enter the UNIX **ps** and **grep** commands to query the processes on the system and report the ones that correspond to the receiver:

```
ps -ef | grep "apshhrcd"
```

## Locating files on the receiver

---

When the receiver stores data from the sender, it uses a file name that is based on information from the sender. The format of the file name depends on the sender. [Appendix A, “Syntax for file names,” on page 181](#) shows the file format for AFP Download Plus and Download for z/OS files to help you locate files on the receiver.

---

## Chapter 10. Diagnosing errors with the AFP Download Plus receiver

This information helps the diagnostician identify a problem with the receiver component of AFP Download Plus on z/OS and report it to IBM. The information describes:

- Diagnosing problems with the **apshhr** command
- Diagnosing problems with the **apshhs** or **apshhmd** exit program

---

### Diagnosing problems with apshhr

If you have problems while you are using **apshhr**, rerun the command with these changes:

- Redirect **stderr** to a file. This example tells the shell that **stderr** is redirected to a file that is called `some.file`:

```
apshhr... 2> some.file &
```

This might work to find messages that cannot be written to the message log file.

- Specify the **-t** option to enable the **apshhr** trace mechanism. This option writes a file called `trace.log.PortNum` to the receiver's working directory. This trace can get as large as 10 KB. After it reaches that level, the file is renamed `trace.log.BAK.PortNum` and the receiver creates a new `trace.log.PortNum` file.

---

### Diagnosing problems with an exit program

If you have problems while you are using the **apshhs** or **apshhmd** exit program, try these suggestions:

- Look at messages in the message log. See [“Viewing messages issued from apshhs” on page 168](#) or [“Viewing messages issued from apshhmd” on page 170](#).
- Rerun the **apshhr** command with these changes:
  - Redirect **stderr** to a file. This example tells the shell that **stderr** is redirected to a file called `some.file`:

```
apshhr... 2> some.file &
```

This might work to find messages that cannot be written to the message log file.

- Use **-X debug=yes** to keep and examine the original data file and a message file for the job in the working directory.
- Use **-X jobhold=yes** to hold the job on the spool so you can look at it before it is released to its destination.
- Use **-X intids=yes** to add internal message identifiers to the beginning of the messages that indicate where the messages are issued.

See [“Specifying special parameters” on page 165](#) for information about specifying the -X options.





## Appendix A. Syntax for file names

Figure 20 on page 181 shows the file name syntax for AFP Download Plusfiles.

### AFP Download Plus:

```
AFPDP.nodeid.fsa.userid.jobid.jobname.step.dd.form.yyyuyddd.time.ext
```

**Where:**

**nodeid** = Node ID. This value is obtained from the first 1-8 characters, up to but not including the period (.), of JSPCEDSN (dataset resource name) in the IAZJSPA (Job Separator Page Data Area).

```

fsa           = Name of the FSA that processed the data set
userid        = User who submitted the job
jobid         = Job identifier that was assigned by the z/OS system
jobname       = Job name from the job
step          = Step name from the job
dd            = DD name from the job
form          = FORMS name from the job
yyyy          = Four-digit year the job was processed
dd            = Julian date the job was processed
time          = Time the job was processed in the form hhmmssstuvwx where:
                hh: hours
                mm: minutes
                ss: seconds
                t:  tenths of a second
                u:  hundredths of a second
                v:  thousandths of a second
                w:  ten-thousandths of a second
                x:  hundred-thousandths of a second.

```

```

ext      = Extension:
          Receiver files--
            PRD:      Data files
            JOB:      JRD file names in multiple data set job
            JCL/OPT:  JCL parameters
            LOG:      Message log files
            MDSLOG:   Temporary message log for apshhmds
            TZ:       Compressed files
            CONCAT:   afpconcat parameter file
            CNTL:     Control file (internal use only)
          Sender files--
            MSG:      Message files
            AFP:      MO:DCA-P data files
            RGP:      Resource group files
            RVF:      Recovery files
            JCL:      JCL parameters

```

Figure 20. File format for file names

The file names for Download for z/OS are described in *PSF for z/OS: Download for z/OS*.

All of the components of the file name come from the sender's z/OS system. For example, the *userid* is that of the user who originally submitted the job. These characters in the file name are converted to an underscore:

```
$ * # % & | , > < ( ) \ " ' @ ? = ; ~ ` blank (X'40') null (X'00')
```

**Note:** These are working files; therefore, the receiver typically deletes them after they are processed.



# Appendix B. SMF type 6 accounting records

AFP Download Plus creates a System Management Facility (SMF) type 6 record for each data set it processes, even if an error prevents transmission of the data. For example, AFP Download Plus writes a record even if a problem connecting to the receiver system exists. If AFP Download Plus releases the data set to the system and then processes the same data set again, AFP Download Plus writes another SMF record for the data set.

The mapping of the record is the same as the mapping of the SMF type 6 record for PSF. AFP Download Plus creates these sections in the SMF type 6 record:

- Base section
- First extension
- Common section
- Second extension
- Enhanced SYSOUT Support (ESS) section
- File-transfer section

See *PSF for z/OS: Customization* or *z/OS MVS System Management Facilities (SMF)* for the format of the SMF type 6 record for PSF.

**Note:** AFP Download Plus supports Exit 5 to allow modification of the SMF record.

Field SMF6PAD1 indicates whether the file-transfer section is present, as shown in [Table 26 on page 183](#).

Table 26. SMF type 6 record—Section Indicator Field				
Offsets	Name	Length	Format	Description
61 3D	SMFPAD1	1	binary	<b>Bit</b> <b>Meaning</b> <b>4</b> File-transfer section present.

The file-transfer section for AFP Download Plus has the format that is shown in [Table 27 on page 183](#).

Table 27. SMF type 6 File-Transfer Section				
Offsets	Name	Length	Format	Description
0 0	SMF6LN6	2	binary	Length of file-transfer section, including this field.
2 2	SMF6BYTE	4	binary	This field contains the total number of bytes that AFP Download Plus transmitted or attempted to transmit. If AFP Download Plus tried a transmission attempt again, this field contains the total number of bytes in all retry attempts. If AFP Download Plus detected an error and did not attempt to transmit any data, this field contains 0. If the total number of bytes transmitted is greater than or equal to 4 gigabytes (GB), this field contains X'FFFFFFFF'.
6 6	SMF6IPV4	4	binary	Formatted IPv4 address of the target system.
10 A	SMF6FTL	1	binary	Level indicator for file-transfer section. This field contains X'02'.
11 B		37		Reserved.

Table 27. SMF type 6 File-Transfer Section (continued)

Offsets	Name	Length	Format	Description
<b>48 30</b>	SMF6HWRD	4	binary	This field contains the high word of the total number of bytes that AFP Download Plus transmitted or attempted to transmit. If AFP Download Plus tried a transmission attempt again, this field contains the high word of the total number of bytes in all retry attempts. If AFP Download Plus detected an error and did not attempt to transmit any data, this field contains 0. If the total number of bytes transmitted is less than 4 GB, this field contains 0.
<b>52 34</b>	SMF6LWRD	4	binary	This field contains the low word of the total number of bytes that AFP Download Plus transmitted or attempted to transmit. If AFP Download Plus tried a transmission attempt again, this field contains the low word of the total number of bytes in all retry attempts. If AFP Download Plus detected an error and did not attempt to transmit any data, this field contains 0. If the total number of bytes transmitted is less than 4 GB, this field contains the total number of bytes transmitted or attempted to transmit.
<b>56 38</b>	SMF6IPV6	16	binary	Formatted IPv6 address of the target system.

---

## Appendix C. AFPSTATS report

While AFP Download Plus is processing a print file, it can collect detailed information about the file, such as:

- The MO:DCA interchange set level, which is indicated by the value specified in the MO:DCA Interchange Set triplet (X'18') and MO:DCA Function Set triplet (X'8F'). See *Mixed Object Document Content Architecture Reference* at [AFP Consortium Publications \(afpcinc.org/publications\)](http://afpcinc.org/publications) for more information.
- What resources are used.
- How the resources are referenced in the job.
- The data sets from which the resources are obtained.

AFP Download Plus writes the information to a file, and then presents it in an AFP Download Plus Statistics (AFPSTATS) report, which you can view online or print.

The AFPSTATS report summarizes these resource types:

- Character set
- Coded font
- Code page
- Form definition
- Object container
- Overlay
- Page definition
- Page segment
- TrueType and OpenType fonts

---

### The AFPSTATS repository

Before an AFPSTATS report can be generated, the system programmer must change the AFP Download Plus startup procedure to define the AFPSTATS repository (the file where AFPSTATS reports are written) and then allocate the data set. This repository must be an existing PDSE data set. For information about defining the AFPSTATS repository, see [PSF for z/OS: Customization](#).

AFP Download Plus adds a member to this data set for every request it gets to produce an AFPSTATS report. AFP Download Plus generates the member name and records this name in the zFS message file with message APS4001I. See the messages in the zFS message file to determine where AFP Download Plus placed the AFPSTATS report.

---

### Requesting an AFPSTATS report

You can request an AFPSTATS report for any AFP Download Plus file you own. However, the AFPSTATS report option is only activated if the system programmer adds the appropriate AFPSTATS DD statement to the AFP Download Plus startup procedure, such as:

```
//AFPSTATS DD DSN=INST.AFPPLUS.AFPSTATS,DISP=SHR
```

These are the ways that you can request an AFPSTATS report:

- To request a report from the sender, use the AFPSTATS keyword on the OUTPUT JCL statement (see [Table 22 on page 137](#)):

```
//OUT1 OUTPUT AFPSTATS=YES,...  
//PRINT1 DD SYSOUT=A,OUTPUT=*.OUT1...  
//
```

The valid values for AFPSTATS are YES, Y, NO, and N. NO is the default.

- To request a report from the AFP Download Plus receiver, use the **afpstats** special parameter with the **apshhsub** exit program to specify whether an AFPSTATS report is generated (see [“Using the apshhsub exit program”](#) on page 165).
- To request a report from the sender or the AFP Download Plus receiver, use XTP7ASAP in installation Exit 7 to specify whether an AFPSTATS report is generated. For information about using Exit 7 to request an AFPSTATS report, see [PSF for z/OS: Customization](#).

**Note:** Any value that you specify for AFPSTATS in the OUTPUT JCL or the **apshhsub** exit program can be overridden by XTP7ASAP in Exit 7. If the value is overridden by Exit 7, message APS7004I is printed in the message data set.

This example shows a job stream that produces a file and an AFPSTATS report.

```
//JOB1      JOB      ...
//STEP1     EXEC     PGM=MYAPPL
//OUTMP     OUTPUT   AFPSTATS=YES
//MYPRINT   DD       SYSOUT=A,OUTPUT=*.OUTMP
//
```

The softcopy AFPSTATS report is stored on your system in the AFPSTATS repository. You can view the report online or you can format it and print a hardcopy version.

## AFPSTATS report details

---

The AFPSTATS report that AFP Download Plus generates is similar to the AFPSTATS report that PSF generates. The information in this publication describes the softcopy record format for the SUMM-AFPDP record and the AFP Download Plus Summary section in the softcopy and hardcopy reports, which are specific to AFP Download Plus. For detailed information about other parts of the report, including the softcopy record format, descriptions of the individual report records, and descriptions of sections in a hardcopy report, see [PSF for z/OS: User's Guide](#).

### Softcopy report

The softcopy version of the AFPSTATS report is stored on your system in the AFPSTATS repository and can be viewed or formatted and printed. AFP Download Plus generates a unique member name for the report and records this name in message APS4001I in the zFS message file. The softcopy report is composed of variable-length records, with a maximum length of 512 characters per record. All records begin with a 10-character Layout ID or format identifier.

## SUMM-AFPDP record format

The SUMM-AFPDP record is specific for the AFP Download Plus AFPSTATS report and summarizes statistics about AFP Download Plus processing, including sheet count, index counts, and data set processing speed. [Figure 21 on page 187](#) shows the format and description of the SUMM-AFPDP record.

SUMM-AFPDP record contains statistics about AFP Download Plus processing					
OFFSET DECIMAL	OFFSET HEX	TYPE	LENGTH	NAME (DIM)	DESCRIPTION
13	(D)	STRUCTURE	208	ASP_SUMMAFPDP	
13	(D)	CHARACTER	8	ASPA_JOBID	Jes job identifier
21	(15)	CHARACTER	1	*	Column separator
22	(16)	CHARACTER	8	ASPA_JOBNAME	Job name from JCL
30	(1E)	CHARACTER	1	*	Column separator
31	(1F)	CHARACTER	8	ASPA_USERID	Job user ID
39	(27)	CHARACTER	1	*	Column separator
40	(28)	CHARACTER	8	ASPA_SUBDATE	Job submission date
48	(30)	CHARACTER	1	*	Column separator
49	(31)	CHARACTER	8	ASPA_SUBTIME	Job submission time
57	(39)	CHARACTER	1	*	Column separator
58	(3A)	CHARACTER	10	ASPA_STRTDATE	Job start date
68	(44)	CHARACTER	1	*	Column separator
69	(45)	CHARACTER	10	ASPA_ENDDATE	Job end date
79	(4F)	CHARACTER	1	*	Column separator
80	(50)	CHARACTER	10	ASPA_STRTTIME	Job start time
90	(5A)	CHARACTER	1	*	Column separator
91	(5B)	CHARACTER	10	ASPA_ENDTIME	Job end time
101	(65)	CHARACTER	1	*	Column separator
102	(66)	CHARACTER	14	ASPA_LOGICPAGE	Logical pages in print file
116	(74)	CHARACTER	1	*	Column separator
117	(75)	CHARACTER	14	ASPA_SHEETCNT	Sheet count in print file
131	(83)	CHARACTER	1	*	Column separator
132	(84)	CHARACTER	14	ASPA_TRANSBYTE	Number of bytes transformed
146	(92)	CHARACTER	1	*	Column separator
147	(93)	CHARACTER	14	ASPA_TRANSBPS	Transformed bytes per second
161	(A1)	CHARACTER	1	*	Column separator
162	(A2)	CHARACTER	14	ASPA_SENTBYTES	Number of bytes sent
176	(B0)	CHARACTER	1	*	Column separator
177	(B1)	CHARACTER	14	ASPA_SENTBPS	Bytes sent per second
191	(BF)	CHARACTER	1	*	Column separator
192	(C0)	CHARACTER	14	ASPA_TOTALBPS	Total bytes proc per second
206	(CE)	CHARACTER	1	*	Column separator
207	(CF)	CHARACTER	14	ASPA_INDEXCNT	Existing index counts

Figure 21. SUMM-AFPDP record format for summary of AFP Download Plus processing statistics

For detailed information about the softcopy record format and descriptions of other report records in the AFPSTATS report, see [PSF for z/OS: User's Guide](#).

## Sample softcopy report

Because each record in the softcopy AFPSTATS report can be 512 characters wide, you might need to scroll to see all of the information. The example in [Figure 22 on page 188](#)–[Figure 23 on page 189](#) is truncated to fit on the page. The SUMM-AFPDP record that is specific for AFP Download Plus is at the end of the softcopy report.

**Note:** This sample report is an example of an AFPSTATS report that you might see but it does not represent actual data.

```

REPORTLVL  AFPSTATS 4.7.0 0001 AFPDP Statistics Report
TITLE       Print File Information.
PAGEFOOTER Print File Information.
HEADING     Job ID Jobname Stepname Data Source Trans Date Trans Time Level FSA Attachment FSA Printer Title System CPU
ID          Type Intm Device Attachment Port Number Identifier
PRINTFILEP J0803605 DCMR103 STEP1 Deferred-spool 07/17/2019 14:47:18 AFPDP 4.7.0 FOR z/OS Deferred-printing PRT660 AFP DOWNLOAD PLUS DEV2
FF020F472827 AFPD-00 None TCP/IP 06100 CETTEST99 Not Specified
HEADING     Remote System OS Version OS Compile Date Operating System
PRINTFILLER INFOPRINT MANAGER/RICOH PROCESS DIRECTOR psf.10.2.u1 OS Compile Date Jul 9 2019 Linux cettest99 3.10.0-123.el7.x86_64 #1
SMP Mon May 5 11:16:57 EDT 2014 x86_64 x86_64 GNU/Linux
COMMENT
TITLE       Print File Extension Information.
PAGEFOOTER Print File Extension Information.
HEADING     BPF Interchange Set MO:DCA Function Set
PRINTFILEX Not Specified Not Specified
COMMENT
TITLE       Processing Detail.
PAGEFOOTER Processing Detail.
HEADING     Res Name Resource Type Lib Type Resource Size Relative Page Data Set Name Volume Disposition Transmission
Page Number
RESOURCE 1 P1CMR103 Page Definition User 1,298 1 PSFMVS.FVT.R420.RESOURCE USR085 PSF memory
1
RESOURCE 1 F10FF0 Form Definition User 331 1 PSFMVS.FVT.R420.RESOURCE USR085 PSF memory
1
RESOURCE00 M1RESET Object Container PSF defa 0
1 Disposition=Download Resource=M1RESET
Data set= Internal
VSR=n/a
CMRscope= n/a CMRPRMode= n/a Transmission= 1 Page number= 1
RESOURCE 1 X0GT12 Coded Font System 78 1 COMMON.FONT3820 PSF000 PSF memory
1
RESOURCE 1 CDCF Code Page System 1,592 1 COMMON.FONT3820 PSF000 Download
1
EVENT Event=Resource not found Page= 1 Resource=C0GT12M0 Transmission= 1 Page number= 1
EVENT Event=Early termination Page= 1 Transmission= 1 Page number= 1
COMMENT
NOTE The statistics in this report may contain inaccuracies caused by error recovery and operator actions making it unsuitable for accounting purposes.
COMMENT
TITLE Resource Summary by Name.
PAGEFOOTER Resource Summary by Name.
HEADING Res Name Resource Type Lib Type Total Mapped Included JCL Other Soft Inlined
Ignored Memory Exists
SUMM-NAME CDCF Code Page System 0 0 0 0 0 0
1 0 0 0
SUMM-NAME F10FF0 Form Definition User 1 0 0 1 0 0
0 0 0 0
SUMM-NAMEX M1RESET Object Container PSF default 1 0 0 1 0 0
1 0 0 0
SUMM-NAME P1CMR103 Page Definition User 1 0 0 1 0 0
0 0 0 0
SUMM-NAME X0GT12 Coded Font System 0 0 0 0 0 0
0 0 0 0
NOTE The statistics in this report may contain inaccuracies caused by error recovery and operator actions making it unsuitable for accounting purposes.
COMMENT
TITLE Resource Summary by Data Set.
PAGEFOOTER Resource Summary by Data Set.
COMMENT
SECTION User Libraries.
SUMM-DSN Data set=PSFMVS.FVT.R420.RESOURCE VOL=SER=USR085
SUMM-DSN-R F10FF0 P1CMR103
COMMENT
SECTION System Libraries.
SUMM-DSN Data set=COMMON.FONT3820 VOL=SER=PSF000
SUMM-DSN-R CDCF X0GT12
COMMENT
SECTION PSF Default.
SUMM-DSN-R M1RESET
COMMENT
NOTE The statistics in this report may contain inaccuracies caused by error recovery and operator actions making it unsuitable for accounting purposes.
COMMENT
TITLE Resource Summary by Resource Type.
PAGEFOOTER Resource Summary by Resource Type.
COMMENT
SECTION Reference Summary.
HEADING-REF Resource Type Unique JCL Mapped Included Other Total
SUMM-REF Page Definition 1 1 0 0 0 1
SUMM-REF Form Definition 1 1 0 0 0 1
SUMM-REF Coded Font 1 0 0 0 0 0
SUMM-REF Character Set 0 0 0 0 0 0
SUMM-REF Code Page 1 0 0 0 0 0
SUMM-REF Page Segment 0 0 0 0 0 0
SUMM-REF Overlay 0 0 0 0 0 0
SUMM-REF Object Container 1 1 0 0 0 1
SUMM-REF True/Open Type 0 0 0 0 0 0
COMMENT
SUMM-REF All resource types 5 3 0 0 0 3

```

Figure 22. AFPSTATS softcopy report (Part 1 of 2)



SECTION													
HEADING-LC Location Summary.													
Resource Type	Unique	Inline	User	Security	System	PSF	Default						
SUMM-LOC Page Definition	1	0	1	0	0	0	0						
SUMM-LOC Form Definition	1	0	1	0	0	0	0						
SUMM-LOC Coded Font	1	0	0	0	1	0	0						
SUMM-LOC Character Set	0	0	0	0	0	0	0						
SUMM-LOC Code Page	1	0	0	0	1	0	0						
SUMM-LOC Page Segment	0	0	0	0	0	0	0						
SUMM-LOC Overlay	0	0	0	0	0	0	0						
SUMM-LOC Object Container	1	0	0	0	0	1	1						
SUMM-LOC True/Open Type	0	0	0	0	0	0	0						
COMMENT													
SUMM-LOC All resource types	5	0	2	0	2	1							
SECTION													
HEADING-DP Disposition Summary.													
Resource Type	Unique	Soft	Inlined	Ignored	Memory	Exists							
SUMM-DISP Page Definition	1	0	0	0	1	0							
SUMM-DISP Form Definition	1	0	0	0	1	0							
SUMM-DISP Coded Font	1	0	0	0	1	0							
SUMM-DISP Character Set	0	0	0	0	0	0							
SUMM-DISP Code Page	1	0	0	0	0	0							
SUMM-DISP Page Segment	0	0	1	0	0	0							
SUMM-DISP Overlay	0	0	0	0	0	0							
SUMM-DISP Object Container	1	0	1	0	0	0							
SUMM-DISP True/Open Type	0	0	0	0	0	0							
COMMENT													
SUMM-DISP All resource types	5	0	2	0	3	0							
NOTE													
The statistics in this report may contain inaccuracies caused by error recovery and operator actions making it unsuitable for accounting purposes.													
COMMENT													
TITLE													
PAGEFOOTER Processing Summary.													
COMMENT													
SECTION													
HEADING-SP Summary of Pages.													
Total Pages	Records	File Size	Avg Page Size	Smallest	Largest	Small Page	Large Page	Xform					
SUMM-PAGE 1	1	0	?	0	0	1	0						
2287													
COMMENT													
NOTE													
The statistics in this report may contain inaccuracies caused by error recovery and operator actions making it unsuitable for accounting purposes.													
COMMENT													
SECTION													
HEADING-EL Significant Events.													
Page number	Event type	Resource											
1	Resource not found	C0GT12M0											
1	Early termination												
COMMENT													
SECTION													
HEADING-UU Unused Inline Resource.													
Resource Type	Res Name												
UIR-LIST NONE													
COMMENT													
SECTION													
HEADING-PM Inline Metadata.													
Name													
META-LIST NONE													
TITLE													
PAGEFOOTER AFP Download Plus Summary.													
COMMENT													
Job ID	Jobname	User ID	Sub Date	Sub Time	Start Date	End Date	Start Time	End Time	Logical Pages	Sheet Count	Transform Byte	Transform BPS	
Sent Bytes	Sent BPS	Total BPS	Index Count										
SUMM-AFPDP 0	J0B03605	DCMR103	DIMEYER	19198	14:47:18	07/17/2019	07/17/2019	14:47:18	14:47:18	1	1	2287	
	0	> 2287		0									
COMMENT													
NOTE													
The statistics in this report may contain inaccuracies caused by error recovery and operator actions making it unsuitable for accounting purposes.													

## Hardcopy report

*Table 28. AFP Download Plus summary section in the AFPSTATS Report*

For information about the other sections that make up a hardcopy report, see *PSF for z/OS: User's Guide*.

To generate a hardcopy AFPSTATS report, use this PSF-supplied page definition and form definition to format the softcopy report:

The page definition, P1ASAP04, uses PPFA record formatting and conditional processing constructs to define the resulting AFPSTATS report. It uses proportional spaced, sans-serif fonts from AFP Font

Collection, Program Number 5648–B33, or z/OS Font Collection, a base element of z/OS V2R2 and later releases, Program Number 5650–ZOS.

This example shows a job stream that formats an existing AFPSTATS report for printing:

```
//JOB1      JOB      ...
//STEP1     EXEC     PGM=IEBGENER
//SYSPRINT  DD       SYSOUT=*
//SYSIN     DD       DUMMY
//OUTRL     OUTPUT   PAGED=ASAP04,FORMDEF=ASAP01
//SYSUT2    DD       SYSOUT=*, OUTPUT=*.OUTRL
//SYSUT1    DD       DSN=WRTE5600.AFPSTATS(A0317900),DISP=SHR
//
```

## Sample hardcopy AFPSTATS report

The sample hardcopy AFPSTATS report contains the same information as in [Figure 22 on page 188](#)–[Figure 23 on page 189](#), but in printable format.

### Notes:

1. The fonts in the printed version of your AFPSTATS might be different than the fonts shown in the following figures.
2. This sample report is an example of an AFPSTATS report that you might see but it does not represent actual data.

AFPDP Statistics Report - 4.7.0 Level 0001			
Print File Information			
Print File Information		Sender	
Job ID	JOB03605	Level	AFPDP 4.7.0 for z/OS
Jobname	DCMR103	FSA	PRT660
Stepname	STEP1	System	DEV2
Data Source	Deferred-spool	CPU ID	FF020F472827
Trans Date	07/17/2019	FSA Attachment	Deferred-printing
Trans Time	14:47:18		
BPF Interchange	Not Specified		
Receiver			
Type	AFPD-00		
Printer Title	AFP DOWNLOAD PLUS		
Intm Device	None		
Attachment	TCP/IP		
Port Number	06100		
Identifier	CETTEST99		
Remote System	INFOPRINT MANAGER/RICOH PROCESS DIRECTOR		
OS Version OS	psf.10.2.u1		
Compile Date	Jul 92019		
Operating System Linux cettest993.10.0-123.e17.x86_64 #1 SMP Mon May 511:16:57 EDT 2014 x86_64 x86_64 x86_64 GNU/Linux			
Print File Information			Page - 1

Figure 24. AFPSTATS report (Page 1 of 8)

Print File Extension Information	
MQ:DCA Function Sets	
Not Specified	
Print File Extension Information	
Page - 2	

Figure 25. AFPSTATS report (Page 2 of 8)

Processing Detail			
<b>P1CMR103</b>	Resource type=Page Definition Size= 1,298 Transmission Count= 1	Library type=User Volume=USR085 Page number= 1	Relative page= 1 Disposition=PSF memory DSN=PSFMVS.FVT.R240.RESOURCE
<b>F10FF0</b>	Resource type=Form Definition Size= 331 Transmission Count= 1	Library type=User Volume=USR085 Page number= 1	Relative page= 1 Disposition=PSF memory DSN=PSFMVS.FVT.R240.RESOURCE
<b>M1RESET</b>	Resource type=Object Container Size= 0 Path=n/a Transmission Count= 1	Library type=PSF def a CMR Scope=n/a Page number= 1	Relative page= 1 Disposition=Download Processing mode=n/a File=Internal
<b>X0GT12</b>	Resource type=Coded Font Size= 79 Transmission Count= 1	Library type=System Volume=PSF000 Page number= 1	Relative page= 1 Disposition=Download DSN=COMMON.FONT3820
<b>CDCF</b>	Resource type=Code Page Size= 1,592 Transmission Count= 1	Library type=System Volume=PSF000 Page number= 1	Relative page= 1 Disposition=PSF memory DSN=COMMON.FONT3820
<b>Event=Resource not found</b>		Page = 1	Resource=C0GT12M0
<b>Event=Early termination</b>		Page number= 1	
		Page = 1	
		Page number= 1	
<b>Note:</b> The statistics in this report may contain inaccuracies caused by error recovery and operator actions making it unsuitable for accounting purposes.			
Processing Detail			Page - 3

Figure 26. AFPSTATS report (Page 3 of 8)

Resource Summary by Name												
Res Name	Resource Type	Lib Type	Reference				Disposition					
			Total	Mapped	Included	Igt	latia	3.9.1	ii.ed, ed	Ignored	Memory	Exists
CDCF	Code Page	System	0	0	0	0	0	1	1	0	0	0
F10FF0	Form Definition	User	1	0	0	1	0	0	1	0	1	0
M1RESET	Object Container	PSF default	1	0	0	1	0	0	1	0	0	0
P1CMR103	Page Definition	User	1	0	0	1	0	0	0	0	1	0
X0GT12	Coded Font	System	0	0	0	0	0	0	0	0	1	0
<b>Note:</b> The statistics in this report may contain inaccuracies caused by error recovery and operator actions making it unsuitable for accounting purposes.												
Resource Summay by Name												Page - 4

Figure 27. AFPSTATS report (Page 4 of 8)

Resource Summary by Data Set		
<b>User Libraries</b>	Data set=PSFMVS.FVT.R420.RESOURCE F10FF0 P1CMR103	VOL=SER=USR085
<b>System Libraries</b>	Data set=COMMON.FONT3820 CDCF X0GT12	VOL=SER=PSF000
<b>PSF Default</b>	M1RESET	
<b>Note:</b> The statistics in this report may contain inaccuracies caused by error recovery and operator actions making it unsuitable for accounting purposes.		
Resource Summary by Data Set		Page - 5

Figure 28. AFPSTATS report (Page 5 of 8)

Resource Summary by Resource Type						
Reference Summary						
Resource Type	1.111iotA	JCL	Mapped	Included	Other	Total
Page Definition	1	1	0	0	0	1
Form Definition	1	1	0	0	0	1
Coded Font	1	0	4	0	0	0
Character Set	0	0	0	0	0	0
Code Page	1	0	0	0	0	0
Page Segment	0	0	0	0	0	0
Overlay	0	0	0	0	0	0
Object Container	1	1	0	0	0	1
True/Open Type	0	0	0	0	0	0
All resource types	5	3	0	0	0	3
Location Summary						
Resource Type	UtotA	Inline	User	Security	System	PSF Default
Page Definition	1	0	1	0	0	0
Form Definition	1	0	1	0	0	0
Coded Font	1	0	0	0	1	0
Character Set	0	0	0	0	0	0
Code Page	1	0	0	0	1	0
Page Segment	0	0	0	0	0	0
Overlay	0	0	0	0	0	0
Object Container	1	0	0	0	0	1
True/Open Type	0	0	0	0	0	0
All resource types	5	0	2	0	2	1
Disposition Summary						
Resource Type	UtqL.te	Soft	Inlined	Ignored	Memory	Exists
Page Definition	1	0	0	0	1	0
Form Definition	1	0	0	0	1	0
Coded Font	1	0	0	0	1	0
Character Set	0	0	0	0	0	0
Code Page	1	0	1	0	0	0
Page Segment	0	0	0	0	0	0
Overlay	0	0	0	0	0	0
Object Container	1	0	0	0	0	0
True/Open Type	0	0	0	0	0	0
All resource types	5	0	2	0	3	0
<b>Note:</b> The statistics in this report may contain inaccuracies caused by error recovery and operator actions making it unsuitable for accounting purposes.						
Resource Summary by Resource Type						0
						Page - 6

Figure 29. AFPSTATS report (Page 6 of 8)

Processing Summary		
Summary of Pages		
Total pages	1	
Records	1	
File size	0	
Average page size		
Smallest page size	0	Page number= 1
Largest page size	0	Page number= 0
Transformed bytes	2287	
<b>Note:</b> The statistics in this report may contain inaccuracies caused by error recovery and operator actions making it unsuitable for accounting purposes.		
Significant Events		
Page number	Event type	Resource
1	Resource not found	COGT12M0
1	Early termination	
Unused Inline Resources		
Resource Type	Resource Name	
NONE		
Inline Metadata		
Name		
NONE		
Processing Summary		Page - 7

Figure 30. AFPSTATS report (Page 7 of 8)

AFP Download Plus Summary					
<u>Print File Information</u>					
<b>Job ID</b>	JOB03605	<b>Jobname</b>	DCMR103	<b>User ID</b>	JD0E
<b>Job submission:</b>	Date	19198	Time 14:47:18		
<u>AFP Download Plus Information</u>					
<b>Processing:</b>	Start Date	07/17/2019		End Date	07/25/2019
<b>Processing:</b>	Start Time	14:47:18		End Time	14:47:18
<b>AFP Download Plus Logical Pages</b>		1			
<b>AFP Download Plus Sheet Count</b>		1			
<b>Transformed Bytes</b>	2287	<b>Transformed Bytes per Second</b>		0	
<b>Sent Bytes</b>		<b>Sent Bytes per Second</b>		0	
<b>Total Processing Bytes per Second</b>		>2287			
<b>Existing Index Count</b>	0				
<b>Note:</b> The statistics in this report may contain inaccuracies caused by error recovery and operator actions making it unsuitable for accounting purposes.					
AFP Download Plus Summary					Page - 8

Figure 31. AFPSTATS report (Page 8 of 8)



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## Appendix D. Installation verification program example

Figure 32 on page 195 is a sample of the printed installation verification program (IVP) for AFP Download Plus.



Figure 32. IVP Example for AFP Download Plus





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## Appendix E. Connectivity test for AFP Download Plus

When you install AFP Download Plus for the first time, you might want to do a connectivity test to an existing receiver before you do a complete, customized installation. A connectivity test installs AFP Download Plus with all defaults, provided samples, and minimal space allocations to verify communication with the receiver.

To do a connectivity test for AFP Download Plus:

1. Make sure that the existing receiver is at the appropriate support level for AFP Download Plus.
2. Follow Steps “2” on page 23 through “8” on page 23 in Chapter 3, “Installing AFP Download Plus,” on page 23 and make these changes:
  - Create the default `/var/psf/` working directory with a size of 1 MB.
  - Configure the AFP Download Plus sender with these suggestions:
    - a. Define only one FSA.
    - b. If you already have PSF or Download for z/OS installed, use the same work-selection criteria or change the class.
    - c. Do not configure for MO:DCA interchange set compliant files.
    - d. If Download for z/OS is installed, update the EXEC statement to specify `PGM=APSHPOSE`; otherwise, do these to create a startup procedure:
      - i) Copy and use the `APSWAFPP` sample startup procedure in `SYS1.PROCLIB`.
      - ii) Follow the Required Actions in the sample prolog to change the procedure to run on your system.
      - iii) Comment out the `AFPPARMS` DD statement so you can use all the default `AFPPARMS` values.
      - iv) Delete all but one FSA.
      - v) Do not create an `AFPPARMS` data set or use the Printer Inventory.
    - e. Define either JES2 or JES3 initialization statements.
    - f. Do not use any installation exits.
    - g. Use the default program properties table (PPT) entry.
  - Start the sender. See “Starting the sender and FSAs” on page 121.
  - Update the `APSIVPAJ` sample installation verification program (IVP) to use the class that is defined for your AFP Download Plus FSA.
  - Submit the job to verify that no terminating errors are issued and the job is successfully processed by the receiver.



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# Glossary

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This glossary defines technical terms and abbreviations used in PSF for z/OS documentation.

These cross-references are used in this glossary:

**See**

Refers to preferred synonyms or to defined terms for acronyms and abbreviations.

**See also**

Refers to related terms that have similar, but not synonymous, meanings, or to contrasted terms that have opposite or substantively different meanings.

## A

**abend**

See [abnormal end of task](#).

**abnormal end of task (abend)**

The termination of a task, job, or subsystem because of an error condition that recovery facilities cannot resolve during processing

**above the bar storage**

Storage above the 2 GB bar. The system programmer can specify that all inline resources are stored in this area during job processing. This is useful when there might not be enough virtual storage in the region area (above the 16 MB line and below the 2 GB bar).

**ACIF**

See [AFP Conversion and Indexing Facility](#).

**Advanced Function Presentation (AFP)**

A set of licensed programs, together with user applications, that use the all-points-addressable concept to print data on a wide variety of printers or to display data on a variety of display devices. AFP includes creating, formatting, archiving, retrieving, viewing, distributing, and printing information.

**Advanced Interactive Executive (AIX)**

A UNIX operating system developed by IBM that is designed and optimized to run on POWER® microprocessor-based hardware, such as servers, workstations, and blades.

**AFP**

See [Advanced Function Presentation](#).

**AFP Conversion and Indexing Facility (ACIF)**

An optional feature of PSF for z/OS that converts a print file into a MO:DCA document, creates an index file for later retrieval and viewing, and retrieves resources used by an AFP document into a separate file.

**AFP Download Plus**

An optional feature of PSF for z/OS that distributes AFP data from a z/OS operating system to an AIX, Linux, Windows, or other z/OS operating system for printing, emailing, or faxing, or to an OnDemand server for archiving.

**AFP Download Plus receiver**

The component of AFP Download Plus that receives data from the sender and then distributes the data to a printer, email, or fax destination.

**AFP Download Plus sender**

The component of AFP Download Plus that initiates a TCP/IP connection and sends data to a receiver.

**AFP Font Collection**

An IBM licensed product that includes a set of utilities, and a single font source for all AFP operating systems.

**AFP Statistics (AFPSTATS) report**

Contains summary data about the resources used to print a document. The AFPSTATS report is used to indicate in which libraries AFP Download Plus found a resource, diagnose some resource selection problems, obtain statistical data about how a print file is printed, and diagnose some print file printing performance problems.

**AFPSTATS report**

See [AFP Statistics report](#).

**AFPSTATS repository**

A data set where AFP Statistics (AFPSTATS) reports are written.

**AIX**

See [Advanced Interactive Executive](#).

**alphanumeric**

Pertaining to a character set that contains letters, digits, and other characters, such as punctuation marks.

**American National Standards Institute (ANSI)**

A private, nonprofit organization whose membership includes private companies, US government agencies, and professional, technical, trade, labor, and consumer organizations. ANSI coordinates the development of voluntary consensus standards in the US.

**American Standard Code for Information Interchange (ASCII)**

A standard code used for information exchange among data processing systems, data communication systems, and associated equipment. ASCII uses a coded character set consisting of 7-bit coded characters. See also [Extended Binary Coded Decimal Interchange Code](#).

**ANSI**

See [American National Standards Institute](#).

**ASCII**

See [American Standard Code for Information Interchange](#).

**B****bar code**

An array of elements, such as bars, spaces, and two-dimensional modules, that encode data in a particular symbology. The elements are arranged in a predetermined pattern following unambiguous rules defined by the symbology.

**Bar Code Object Content Architecture (BCOCA)**

An architected collection of constructs used to interchange and present bar code data.

**BCOCA**

See [Bar Code Object Content Architecture](#).

**bin**

An enclosure on a printer that contains source or destination media, including paper, foils, labels, card stock, or microfilm.

**C****carriage control character**

A character that is used to specify a write, space, or skip operation. See also [control character](#).

**case-sensitive**

Pertaining to the ability to distinguish between uppercase and lowercase letters.

**character**

1. Any symbol that can be entered on a keyboard, printed, or displayed. For example, letters, numbers, and punctuation marks are all characters.
2. In a computer system, a member of a set of elements that is used for the representation, organization, or control of data. See also [control character](#).

3. In bar codes, a single group of bars and spaces that represent an individual number, letter, punctuation mark, or other symbol.

**character set**

A defined set of characters that can be recognized by a configured hardware or software system. A character set can be defined by alphabet, language, script, or any combination of these items. See also [font character set](#).

**checkpoint**

A place in a program at which a check is made, or at which a recording of data is made to allow the program to be restarted in case of interruption.

**CMR**

See [color management resource](#).

**coded font**

A font file that associates a code page and a font character set. For double-byte fonts, a coded font associates multiple pairs of code pages and font character sets.

**code page**

A particular assignment of code points to graphic characters. Within a given code page, a code point can only represent one character. A code page also identifies how undefined code points are handled. See also [coded font](#).

**colon hexadecimal notation**

The syntactical representation for a 128-bit integer that consists of eight groups of four hexadecimal numbers, separated by colons. IP addresses can be represented in colon hexadecimal notation. See also [dotted decimal notation](#) and [host name](#).

**color management resource (CMR)**

An object that provides color management in presentation environments.

**color mapping table**

A MO:DCA object that is used to map color values specified in a source color space to color values specified in a target color space. This object is loaded into printers that support the color mapping table.

**command**

A request from a terminal or automated operator for the performance of an operation or service, or a request in a batch-processing job or print file for the operation or execution of a particular program.

**communication**

See [data communication](#).

**complex text**

Unicode-encoded text that cannot be rendered in the traditional one-code-point to one-glyph fashion, such as bidirectional Arabic text or combined Hindi characters.

**connection**

In data communication, an association established between entities for conveying information.

**console**

A display station from which an operator can control and observe the system operation.

**continuous forms**

A series of connected forms that feed continuously through a printing device. The connection between the forms is perforated so that the user can tear them apart. Before printing, the forms are folded in a stack, with the folds along the perforations.

**control character**

1. A character that represents a command that is sent to an output device, such as a printer or monitor. Examples are line-feed, shift-in, shift-out, carriage return, font change, and end of transmission. See also [carriage control character](#).
2. A character whose occurrence in a particular context initiates, modifies, or stops a control function.

**copy group**

An internal object in a form definition or a print data set that controls such items as modifications to a form, page placement, and overlays.

**D****DASD**

See [direct access storage device](#).

**data check**

A synchronous or asynchronous indication of a condition caused by erroneous data or incorrect positioning of data. Some data checks can be suppressed.

**data communication**

Transfer of data among functional units by means of data transmission protocols.

**data control block (DCB)**

A control block used by access method routines in storing and retrieving data.

**data object resource**

An object container resource or IOCA image resource that is either printer resident or downloaded. Data object resources can be:

- Used to prepare for the presentation of a data object, such as with a resident color profile resource object
- Included in a page or overlay through the Include Object (IOB) structured field; for example, PDF single-page and multiple-page objects, Encapsulated PostScript (EPS) objects, and IOCA images
- Called from within a data object; for example, PDF resource objects

**data set**

The major unit of data storage and retrieval, consisting of a collection of data in one of several prescribed arrangements and described by control information to which the system has access. See also [file](#).

**data stream**

The commands, control codes, data, or structured fields that are transmitted between an application program and a device, such as printer or nonprogrammable display station.

**DCB**

See [data control block](#).

**default**

Pertaining to an attribute, value, or option that is assumed when none is explicitly specified.

**deferred-printing mode**

A printing mode that spools output through JES to a data set instead of printing it immediately. Output is controlled by using JCL statements. See also [direct-printing mode](#).

**destination control file**

In a Windows environment, a user-modifiable file for simpler mapping of JCL to the print server parameters.

**direct access storage device (DASD)**

A device that allows storage to be directly accessed, such as a disk drive.

**direct-printing mode**

A printing mode that gives PSF exclusive use of a channel-attached printer. Output is printed immediately and is not spooled through JES. See also [deferred-printing mode](#).

**document**

1. A machine-readable collection of one or more objects that represent a composition, a work, or a collection of data.
2. Data that has already been composed into pages and that contains a Begin Document and an End Document structured field.

**dotted decimal notation**

The syntactical representation for a 32-bit integer that consists of four 8-bit numbers written in base 10 and separated by periods (dots). IP addresses can be represented in dotted decimal notation. See also [colon hexadecimal notation](#) and [host name](#).

**double-byte coded font**

A font in which the characters are defined by 2 bytes. The first byte defines the coded font section; the second byte defines the code point in the code page specified for that section. See also [single-byte coded font](#).

**download**

To transfer data from a computer to a connected device, such as a workstation or a printer. Typically, users download from a large computer to a diskette or fixed disk on a smaller computer or from a system unit to an adapter.

**Download for z/OS**

An optional feature of PSF for z/OS that uses TCP/IP to automatically send data sets from the JES spool, without formatting them, directly to a PSF for z/OS, OnDemand, AIX, Linux, or Windows server.

**duplex**

Pertaining to printing on both sides of a sheet of paper.

**E****EBCDIC**

See [Extended Binary Coded Decimal Interchange Code](#).

**exception highlighting**

The markings placed on the printed page to indicate the location of a data-stream error.

**execution**

The process of carrying out an instruction or instructions of a computer program by a computer.

**exit**

An instruction in an application, routine, or subroutine that causes control to pass to another application, routine, or subroutine. See also [installation exit](#).

**exit routine**

A program that receives control from another program in order to perform specific functions.

**Extended Binary Coded Decimal Interchange Code (EBCDIC)**

A coded character set of 256 eight-bit characters developed for the representation of textual data. EBCDIC is not compatible with ASCII character coding. See also [American Standard Code for Information Interchange](#).

**extended code page**

A code page that is stored in a partitioned data set (PDS or PDSE) in a font resource library or in a UNIX file in a font path library. Extended code pages might contain Unicode values that a printer uses to print EBCDIC or ASCII encoded text strings with TrueType and OpenType fonts.

**F****file**

1. A collection of related data that is stored and retrieved by an assigned name. A file can include information that starts a program (program-file object), contains text or graphics (data-file object), or processes a series of commands (batch file).
2. See also [data set](#).

**flash**

See [forms flash](#).

**FOCA**

See [Font Object Content Architecture](#).

**font**

1. A family or assortment of characters of a given size and style, for example, 9-point Bodoni modern. A font has a unique name and might have a registry number.
2. A particular type style (for example, Bodoni or Times Roman) that contains definitions of character sets, marker sets, and pattern sets. See also [coded font](#) and [double-byte coded font](#).

**font character set**

1. Part of an AFP font that contains the raster patterns, identifiers, and descriptions of characters. See also [character set](#).
2. A Font Object Content Architecture (FOCA) resource containing descriptive information, font metrics, and the digital representation of character shapes for a specified graphic character set.

**Font Object Content Architecture (FOCA)**

An architecture that defines the content of digital font resources by means of a set of parameter definitions.

**form**

1. A physical piece of paper or other medium on which data is printed. See also [medium](#), [page](#), and [sheet](#).
2. A display screen, printed document, or file with defined spaces for information to be inserted.

**form definition**

An AFP resource object used by PSF that defines the characteristics of the form or printed media, including: overlays to be used, duplex printing, text suppression, the position of composed-text data on the form, and the number and modifications of a page.

**forms flash**

In AFP support on the 3800 Printing Subsystem, a means of printing an overlay by using a negative plate projected on a form.

**FSA**

See [functional subsystem application](#).

**FSI**

See [functional subsystem interface](#).

**FSS**

See [functional subsystem](#).

**functional subsystem (FSS)**

An extension of JES that runs in an address space separate from the JES address space. An FSS provides support for an auxiliary function to JES processing, such as a peripheral device or other component.

**functional subsystem application (FSA)**

1. An area within the functional subsystem (FSS) that drives and manages a single printer. FSAs are identified with JES printer definitions.
2. An application that uses the support facilities of the functional subsystem (FSS) to communicate with JES.

**functional subsystem interface (FSI)**

A set of services that allows communication between the JES address space or DPSS and the PSF functional subsystem.

**G****generalized trace facility (GTF)**

A z/OS service program that records significant system events such as I/O interrupts, SVC interrupts, program interrupts, or external interrupts.

**GOCA**

See [Graphics Object Content Architecture](#).

**Graphics Object Content Architecture (GOCA)**

An architecture that provides a collection of graphics values and control structures used to interchange and present graphics data.

**GTF**

See [generalized trace facility](#).

**H****hexadecimal**

Pertaining to a numbering system that has a base of 16.

**HFS**

See hierarchical file system.

**hierarchical file system (HFS)**

A system for organizing files in a hierarchy, as in a UNIX system.

**host address**

See [Internet Protocol address](#).

**host name**

The network name given to a computer. Sometimes, host name is used to mean the fully qualified domain name; other times, it is used to mean the most specific subname of a fully qualified domain name. For example, if `mycomputer.city.company.com` is the fully qualified domain name, either of these host names can be used: `mycomputer.city.company.com` or `mycomputer`. See also [colon hexadecimal notation](#) and [dotted decimal notation](#).

**I****Image Object Content Architecture (IOCA)**

An architecture that provides a collection of constructs used to interchange and present images, such as printing image data on a page, page segment, or overlay.

**Infoprint Server**

An element of z/OS that supports printing on local printers and remote printers in an Internet Protocol or SNA network. With Infoprint Server, users can submit print requests from remote workstations in an Internet Protocol network, from z/OS UNIX System Services applications, from batch applications, from VTAM® applications (such as CICS® or IMS), and from SAP R/3.

**inline**

Pertaining to spooled input data that is read into a job by a reader. See also [inline resource](#).

**inline resource**

A resource contained in a print file or a print data set.

**input/output (I/O)**

Pertaining to a device, process, channel, or communication path involved in data input, data output, or both.

**installation exit**

The means specifically described in an IBM software product's documentation by which an IBM software product can be modified by a customer's system programmers to change or extend the functions of the IBM software product. Such modifications consist of exit routines written to replace one or more existing modules of an IBM software product, or to add one or more modules or subroutines to an IBM software product.

**Intelligent Printer Data Stream (IPDS)**

An all-points-addressable data stream that lets users position text, images, graphics, and bar codes at any defined point on a printed page. IPDS is the strategic AFP printer data stream generated by PSF.

**Internet Protocol (IP)**

A protocol that routes data through a network or interconnected networks. This protocol acts as an intermediary between the higher protocol layers and the physical network. See also [Transmission Control Protocol](#) and [Transmission Control Protocol/Internet Protocol](#).

**Internet Protocol (IP) address**

A unique address for a device or logical unit on a network that uses the IP standard. See also [colon hexadecimal notation](#), [dotted decimal notation](#), and [host name](#).

**I/O**

See [input/output](#).

**IOCA**

See [Image Object Content Architecture](#).

**IP**

See [Internet Protocol](#).

**IP address**

See [Internet Protocol address](#).

**IPDS**

See [Intelligent Printer Data Stream](#).

**J****JCL**

See [job control language](#).

**JES**

See [Job Entry Subsystem](#).

**JES2**

An MVS subsystem that receives jobs into the system, converts them to internal format, selects them for processing, processes their output, and purges them from the system. In an installation with more than one processor, each JES2 processor independently controls its job input, scheduling, and output processing. See also [Job Entry Subsystem](#) and [JES3](#).

**JES3**

An MVS subsystem that receives jobs into the system, converts them to internal format, selects them for processing, processes their output, and purges them from the system. In complexes that have several loosely coupled processing units, the JES3 program manages processors so that the global processor exercises centralized control over the local processors and distributes jobs to them by using a common job queue. See also [Job Entry Subsystem](#) and [JES2](#).

**JES spool**

A program that performs a peripheral operation, such as printing, while the computer is busy with other work. A common name for the JES2 or JES3 spool.

**job control language (JCL)**

A command language that identifies a job to an operating system and describes the job's requirements.

**Job Entry Subsystem (JES)**

An IBM licensed program that receives jobs into the system and processes all output data that is produced by jobs. See also [JES2](#) and [JES3](#).

**L****library**

1. A system object that serves as a directory to other objects. A library groups related objects, and allows the user to find objects by name.
2. A data file that contains copies of a number of individual files and control information that allows them to be accessed individually.
3. A partitioned data set or a series of concatenated partitioned data sets.

**licensed program**

A separately priced program and its associated materials that bear a copyright and are offered to customers under the terms and conditions of a licensing agreement.



**line data**

Data prepared for printing on a line printer without any data placement or presentation information. Line data can contain carriage-control characters and table-reference characters (TRC) for spacing and font selections.

**logical page**

The defined presentation space on the physical form. All the text and images in the print data must fit within the boundaries of the logical page, which has specified characteristics, such as size, shape, orientation, and offset. See also [form](#) and [physical page](#).

**M****medium**

1. The material on which computer information is stored. Examples of media are diskettes, CDs, DVDs, and tape.
2. The physical material, such as paper, on which data is printed. See also [form](#), [page](#), and [sheet](#).

**medium overlay**

An electronic overlay that is called by the medium map of a form definition for printing at a fixed position on the form. See also [page overlay](#).

**microfilm**

A film containing a photographic record of printed matter, on a reduced scale.

**microfilm device**

An output device that presents a hardcopy on microfilm.

**microfilm setup resource**

A setup file that contains information used to present AFP data on microfilm. See also [object container](#).

**Mixed Object Document Content Architecture (MO:DCA)**

An architected, device-independent data stream for interchanging documents.

**Mixed Object Document Content Architecture for Presentation (MO:DCA-P)**

The subset of MO:DCA that defines presentation documents. PSF supports MO:DCA Presentation Interchange Set data streams.

**MO:DCA**

See [Mixed Object Document Content Architecture](#).

**MO:DCA AFP/Archive (MO:DCA AFP/A)**

An AFP document architecture interchange set that is used for long-term preservation and retrieval. This subset ensures page independence and eliminates images without clearly specified resolution, device default fonts, and external resources.

**MO:DCA AFP/A**

See [MO:DCA AFP/Archive](#).

**MO:DCA AFP/A, IS/3**

An AFP document architecture interchange set that complies with the rules and restrictions of both the AFP/Archive and IS/3 interchange sets.

**MO:DCA data**

Print data that has been composed into pages. Text-formatting programs (such as DCF) can produce composed text data consisting entirely of structured fields. ACIF or AFP Download Plus can transform line data or XML data to MO:DCA data.

**MO:DCA GA**

See [MO:DCA Graphic Arts Function Set](#).

**MO:DCA Graphic Arts Function Set (MO:DCA GA)**

An extension of MO:DCA IS/3 that provides support for PDF presentation object containers.

**MO:DCA IS/1**

See [MO:DCA Presentation Interchange Set 1](#).

**MO:DCA IS/3**

See [MO:DCA Presentation Interchange Set 3](#).

**MO:DCA-P**

See [Mixed Object Document Content Architecture for Presentation](#).

**MO:DCA Presentation Interchange Set 1 (MO:DCA IS/1)**

A subset of MO:DCA that defines an interchange format for presentation documents.

**MO:DCA Presentation Interchange Set 3 (MO:DCA IS/3)**

A subset of MO:DCA that defines an interchange format for presentation documents. The MO:DCA IS/3 data stream includes structured fields that are not found in MO:DCA IS/1.

**mount**

To make a file system accessible.

**Multiple Virtual Storage (MVS)**

An IBM operating system that accesses multiple address spaces in virtual storage.

**MVS**

See [Multiple Virtual Storage](#).

**O****object container**

A MO:DCA structure that carries object data, which might or might not be defined by a presentation architecture.

**OpenType font**

An extension of the TrueType font format that adds support for PostScript outlines and more support for international character sets and advanced typographic control.

**option**

A specification in a statement that can influence the running of the statement.

**outline font**

A font whose graphic character shapes are defined by mathematical equations rather than by raster patterns. See also [raster font](#).

**output writer**

A part of JES that receives job output from the system spool.

**overlay**

1. A resource object that contains predefined presentation data, such as text, image, graphics, and bar code data, that can be merged with variable data on a page or form while printing. See also [page overlay](#) and [medium overlay](#).
2. The final representation of a collection of predefined presentation data on a physical medium.

**P****page**

1. A collection of data that can be printed on one side of a sheet of paper or a form.
2. A data stream object delimited by a Begin Page structured field and an End Page structured field. A page can contain presentation data such as text, image, graphics, and bar code data. See also [logical page](#) and [physical page](#).

**page definition**

An AFP resource object used by PSF that defines the rules for transforming line data and XML data into MO:DCA data and text controls, such as width of margins and text orientation.

**page overlay**

An electronic overlay that can be called for printing and positioned at any point on the page by an Invoke Page Overlay structured field in the print data. See also [medium overlay](#).

**Page Printer Formatting Aid (PPFA)**

An IBM licensed program with which to create and store form definitions and page definitions, which are resource objects used for print-job management. These stored objects are used to format printed output.

**page segment**

An AFP resource object containing text, image, graphics, or bar code data that can be positioned on any addressable point on a page or an electronic overlay.

**parameter**

A value or reference passed to a function, command, or program that serves as input or controls actions. The value is supplied by a user or by another program or process.

**physical page**

A single surface (front or back) of a form. See also [form](#), [logical page](#), and [page](#).

**port**

1. A hardware interface to which an I/O device is attached for the purpose of sending and receiving data.
2. An end point for communication between applications, generally referring to a logical connection. A port provides queues for sending and receiving data. Each port has a port number for identification.

**PPFA**

See [Page Printer Formatting Aid](#).

**Presentation Text Object Content Architecture (PTOCA)**

An architecture that provides a collection of constructs used to interchange and present presentation text data, such as printing text data on a page, page segment, or overlay.

**print data set**

A data set created by an application program that contains the actual information to be printed and, optionally, some of the data that controls the format of the printing. The types of print data sets are composed text, line format, XML data, and mixed format. See also [print file](#).

**Printer Control Language (PCL)**

The Hewlett Packard page description language that is used in laser and ink-jet printers.

**Printer Inventory**

In Infoprint Server, a set of files that contain information about printers. The Printer Inventory includes such objects as printer definitions, functional subsystem (FSS) definitions, and job selection rules for IP PrintWay.

**print file**

A file that is created for the purpose of printing data. A print file includes information to be printed and, optionally, some of the data that controls the format of the printing. See also [print data set](#).

**print job**

One or more documents submitted in the same job to be printed on the same printer.

**print queue**

A list of print jobs waiting to be printed.

**Print Services Facility (PSF)**

An IBM licensed program that manages and controls the input data stream and output data stream required by supported page printers.

**processor**

In a computer, the part that interprets and processes instructions. Two typical components of a processor are a control unit and an arithmetic logic unit.

**program temporary fix (PTF)**

For System i, System p, and IBM Z products, a package containing individual or multiple fixes that is made available to all licensed customers. A PTF resolves defects and might provide enhancements.

**protocol**

A set of rules controlling the communication and transfer of data between two or more devices or systems in a communications network.

**PSF**

See [Print Services Facility](#).

**PTF**

See [program temporary fix](#).

**PTOCA**

See [Presentation Test Object Content Architecture](#).

**R****RACF**

See [Resource Access Control Facility](#).

**raster font**

A font in which the characters are defined directly by the raster bit map. See also [outline font](#).

**RAT**

See [resource access table](#).

**recovery point**

The number of pages or buffers from which AFP Download Plus retransmits data.

**region area**

Storage above the 16 MB line and below the 2 GB bar. By default, inline resources are stored in the region area during job processing. See also [above the bar storage](#).

**resolution**

A measure of the sharpness of an image, expressed as the number of lines per unit of length or the number of points per unit of area discernible in that image.

**resource**

A collection of printing instructions used, in addition to the print data set, to produce the printed output. Resources include coded fonts, font character sets, code pages, page segments, overlays, form definitions, and page definitions.

**Resource Access Control Facility (RACF)**

An IBM licensed program that provides for access control by identifying users to the system, verifying users of the system, authorizing access to protected resources, logging unauthorized attempts to enter the system, and logging accesses to protected resources.

**resource access table (RAT)**

An array of data that is used to map a resource name specified in the MO:DCA data stream to information used to find and process the resource on a given system.

**resource name**

The name under which an AFP resource object is stored, the first 2 characters of which indicate the resource type.

**S****SDSF**

See [System Display and Search Facility](#).

**sheet**

A division of the physical medium; multiple sheets can exist on a physical medium. For example, a roll of paper might be divided by a printer into rectangular pieces of paper, each representing a sheet. Envelopes are an example of a physical medium that comprises only one sheet. The IPDS architecture defines four types of sheets: cut-sheets, continuous forms, envelopes, and computer output on microfilm. Each type of sheet has a top edge. A sheet has two sides, a front side and a back side. See also [form](#).

**shell script**

A program or script, that is interpreted by the shell of an operating system.

**shift-out, shift-in (SOSI)**

Special EBCDIC or ASCII characters that exist in the data stream to indicate the switches between double-byte fonts and single-byte fonts.

**Simple Network Management Protocol (SNMP)**

A set of protocols for monitoring systems and devices in complex networks. Information about managed devices is defined and stored in a Management Information Base (MIB).

**single-byte coded font**

A font in which the characters are defined by a 1-byte code point. A single-byte coded font has only one coded font section. See also [double-byte coded font](#).

**SMF**

See [System Management Facilities](#).

**SMF type 6 record**

A record that AFP Download Plus uses to record data for each data set.

**SNMP**

See [Simple Network Management Protocol](#).

**SOSI**

See [shift-out, shift-in](#).

**spool**

The system function of putting files or jobs into disk storage for later processing or printing. An abbreviation for *simultaneous peripheral operations online*.

**startup procedure**

A program used to start an application and to specify initialization parameters, libraries that contain system resources, and routing-control information.

**structured field**

1. A self-identifying string of bytes and its data or parameters.
2. A mechanism that permits variable length data to be encoded for transmission in the data stream.

**syntax**

The rules for the construction of a command or statement.

**SYSIN**

See [system input stream](#).

**SYSOUT**

See [system output stream](#).

**System Display and Search Facility (SDSF)**

An IBM licensed program that provides a menu-driven, full-screen interface that is used to obtain detailed information about jobs and resources in a system.

**system input stream (SYSIN)**

A data definition (DD) statement used to begin an in-stream data set. See also [system output stream](#).

**system library**

A collection of data sets or files in which one or more system resources are stored.

**System Management Facilities (SMF)**

A component of z/OS that collects and records a variety of system and job-related information. Examples of information collected by SMF are statistics, accounting information, and performance data.

**system output stream (SYSOUT)**

A data definition (DD) statement used to identify a data set as a system output data set. See also [system input stream](#).

## T

### **table reference character (TRC)**

A numeric character corresponding to the order in which font character sets have been specified. The TRC is used to select a font character set during printing.

### **TCP/IP**

See [Transmission Control Protocol/Internet Protocol](#).

### **TCP/IP-attached**

Pertaining to a device that is linked to an operating system through an Internet Protocol network and receives data from the system by using an application-layer protocol for IPDS printers. Some TCP/IP-attached printers require the i-data 7913 IPDS Printer LAN Attachment.

### **trace**

1. A record of the processing of a computer program or transaction. The information collected from a trace can be used to assess problems and performance.
2. A Db2® for z/OS facility that provides the ability to collect monitoring, auditing, performance, accounting, statistics, and serviceability (global) data.

### **transmission**

The sending of data from one place for reception elsewhere.

### **Transmission Control Protocol (TCP)**

A communications protocol used in the Internet and in any network that follows the Internet Engineering Task Force (IETF) standards for internetwork protocol. TCP provides a reliable host-to-host protocol in packet-switched communications networks and in interconnected systems of such networks. See also [Internet Protocol](#).

### **Transmission Control Protocol/Internet Protocol (TCP/IP)**

An industry-standard, nonproprietary set of communications protocols that provide reliable end-to-end connections between applications over interconnected networks of different types.

### **TRC**

See [table reference character](#).

### **TrueType font**

A font format based on scalable outline technology in which the graphic character shapes are based on quadratic curves. The font is described with a set of tables contained in a TrueType font file.

## U

### **UCS**

See [universal character set](#).

### **Unicode**

A character encoding standard that supports the interchange, processing, and display of text that is written in the common languages around the world, plus some classical and historical texts. For example, the text name for \$ is *dollar sign* and its numeric value is X'0024'. The Unicode standard has a 16-bit character set defined by ISO 10646.

### **universal character set (UCS)**

A printer feature that permits the use of a variety of character arrays. See [font](#).

### **UNIX file**

An object that exists in a hierarchical file system. Examples of UNIX files are a DFSMS Hierarchical File System (HFS), a Network File System (NFS), a temporary file system (TFS), and the z/OS File System (zFS).

### **UNIX System Services**

See [z/OS UNIX System Services](#).

## **V**

### **value**

In programming, the alphabetic or numeric contents of a variable, parameter, special register, field, or storage location.

## **X**

### **XML data**

Data identified with the Extensible Markup Language (XML), which is a standard metalanguage for defining markup languages that is based on Standard Generalized Markup Language (SGML). For printing on page printers, a page definition is required to provide the data placement and presentation information. The XML data processed by PSF can be encoded in EBCDIC, ASCII, UTF-8 or UTF-16.

## **Z**

### **zFS**

See [z/OS File System](#).

### **z/OS**

An IBM mainframe operating system that uses 64-bit real storage.

### **z/OS File System (zFS)**

A type of file system that resides in a Virtual Storage Access Method (VSAM) linear data set (LDS). zFS contains files and directories that can be used by z/OS UNIX System Services to provide data access over IP networks.

### **z/OS Font Collection**

A base element of z/OS V2R2 or later that contains a comprehensive set of fonts, including AFP outline fonts, AFP raster fonts, and WorldType fonts (TrueType and OpenType fonts). The recommended source of AFP fonts for printing with PSF.

### **z/OS UNIX System Services**

An element of z/OS that creates a UNIX environment which conforms to the XPG4 UNIX 1995 specifications and provides two open systems interfaces on the z/OS operating system: an application program interface (API) and an interactive shell interface.





## Bibliography

This bibliography lists the titles of publications containing additional information about PSF, AFP, the z/OS operating system, and related products.

The titles and order numbers might change from time to time. To verify the current title or order number, consult your IBM marketing representative.

You can obtain many of the publications listed in this bibliography from the [AFP Consortium Publications](http://afpcinc.org/publications) ([afpcinc.org/publications](http://afpcinc.org/publications)) and the [IBM Documentation](http://www.ibm.com/docs/en) ([www.ibm.com/docs/en](http://www.ibm.com/docs/en)).

## Advanced Function Presentation (AFP)

The AFP publications in Table 29 on page 221 are available from [AFP Consortium Publications](http://afpcinc.org/publications) ([afpcinc.org/publications](http://afpcinc.org/publications)).

Table 29. AFP publications available from the AFP Consortium	
Publication	Order Number
<i>Advanced Function Presentation: Programming Guide and Line Data Reference</i>	S544-3884
<i>AFP Consortium: AFP Color Management Architecture (ACMA)</i>	AFPC
<i>Bar Code Object Content Architecture Reference</i>	AFPC-0005
<i>Color Management Object Content Architecture Reference</i>	AFPC-0006
<i>Font Object Content Architecture Reference</i>	AFPC-0007
<i>Graphics Object Content Architecture for AFP Reference</i>	AFPC-0008
<i>Guide to Advanced Function Presentation</i>	G544-3876
<i>IBM AFP Fonts: Font Summary for AFP Font Collection</i>	S544-5633
<i>IBM Infoprint Fonts: Font Summary</i>	G544-5846
<i>Image Object Content Architecture Reference</i>	AFPC-0003
<i>Intelligent Printer Data Stream Reference</i>	AFPC-0001
<i>Mixed Object Document Content Architecture Reference</i>	AFPC-0004
<i>Overlay Generation Language/370 User's Guide and Reference</i>	S544-3702
<i>Presentation Text Object Content Architecture Reference</i>	AFPC-0009
<i>Using OpenType Fonts in an AFP System</i>	G544-5876

The AFP publications in Table 30 on page 221 are available from the [IBM Documentation](http://www.ibm.com/docs/en) ([www.ibm.com/docs/en](http://www.ibm.com/docs/en)) and the [IBM Publications Center](http://www.ibm.com/e-business/linkweb/publications/servlet/pbi.wss) ([www.ibm.com/e-business/linkweb/publications/servlet/pbi.wss](http://www.ibm.com/e-business/linkweb/publications/servlet/pbi.wss)). For best results, search the IBM Publications Center by order number.

Table 30. AFP publications available from the IBM Documentation and the IBM Publications Center	
Publication	Order Number
<i>z/OS Font Collection</i>	GA32-1048

The AFP publications in Table 31 on page 222 are available from the [IBM Publications Center](http://www.ibm.com/e-business/linkweb/publications/servlet/pbi.wss) ([www.ibm.com/e-business/linkweb/publications/servlet/pbi.wss](http://www.ibm.com/e-business/linkweb/publications/servlet/pbi.wss)). For best results, search the IBM Publications Center by order number.

Table 31. AFP publications available from the IBM Publications Center

<b>Publication</b>	<b>Order Number</b>
<i>AFP Toolbox User's Guide</i>	S544-5292
<i>Guide to Advanced Function Presentation</i>	G544-3876
<i>IBM AFP Fonts: Font Summary for AFP Font Collection</i>	S544-5633
<i>IBM Infoprint Fonts: Font Summary</i>	G544-5846

## Content Manager OnDemand

<b>Publication</b>	<b>Order Number</b>
<i>IBM Content Manager OnDemand for Multiplatforms: Administration Guide</i>	SC19-3352
<i>IBM Content Manager OnDemand for Multiplatforms: Indexing Reference</i>	SC19-3354
<i>IBM Content Manager OnDemand for Multiplatforms: Installation and Configuration Guide</i>	GC19-3342
<i>IBM Content Manager OnDemand for Multiplatforms: Introduction and Planning Guide</i>	SC19-3351
<i>IBM Content Manager OnDemand: Messages and Codes</i>	SC19-3356
<i>IBM Content Manager OnDemand: User's Guide</i>	SC27-0836
<i>IBM Content Manager OnDemand for Multiplatforms: Web Enablement Kit Implementation Guide</i>	SC19-3353
<i>IBM Content Manager OnDemand: Windows Client Customization Guide</i>	SC27-0837

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