
# IPDS Reference Manual

# Copyright and Trademark Notices



Document Number: SWPSMS-OMAN03-113
September 2006

I-O Corporation
1490 North 2200 West, Suite100
Salt Lake City, UT 84116
801-973-6767
www.iocorp.com

# Preface

I-O's IPDS Printer Emulation runs on a number of different print server, display and thin client products from I-O Corporation. Please refer to the user's guide for the specific product for instructions on installation and setup of the product. Those guides will refer to this document for instructions on IPDS printing. Through out this document, "print server" and "product" will refer to the specific I-O Print Server, Print Box, Ethernet Display, Thin Client, or Software Print Server, etc.

The guide consists of the following chapters:

- **Introduction**: Provides an overview of the product.
- **IBM Host Configuration**: Provides an overview of setting up the IBM host and LaserJet configuration for IPDS printing.
- **IPDS Printer Operation**: Provides a brief overview of the process of printing IPDS documents.
- **Troubleshooting**: Provides solutions to problems that you may encounter while using the product.
- **IPDS Fonts**: Identifies the fonts reported to the IBM host that the I-O IPDS Printer Emulation will support by mapping the IBM fonts to the printer's internal fonts.

The following symbols are used in the guide:

**Caution**: This symbol highlights procedures that, if not correctly performed or adhered to, could damage or corrupt the product or adversely affect the security and functionality of the product. Do not proceed beyond such points until the required conditions are fully understood and achieved.

**Note**: This symbol denotes useful additional information that is relevant to the procedure or feature being described.

**Tip**: This symbol denotes a hint, shortcut or alternate method to aid or supplement the procedure being described.

**Consistent with our policy of continuous development, the product you received may have features different from to those described in this guide. Please visit our web-site www.iocorp.com for current information.**

# Table of Contents

# Introduction

This chapter provides a brief overview of I-O's IPDS Printer Emulation.

I-O's IPDS Printer Emulation is designed to enable standard PCL5e compatible laser printers to print IBM AFP/IPDS print jobs.

Connection of the I-O product to the IBM host is accomplished over the Ethernet link using IBM's proprietary TCP/IP protocol called PPR/PPD. For older legacy IBM hosts, Twinax and Coax cabling topologies will use either SNA or AnyNet protocols. IBM hosts that are supported include IBM eServer i5, iSeries and AS/400 midrange hosts, and zSeries and S/390 mainframe host systems.

Configuration is required at the both the I-O product and the IBM host. Because of the complexity of configuring printers, a knowledgeable host system administrator or IBM specialist should perform the process. The instructions contained in this document are intended to only provide a brief overview of the process.

Once the I-O product and IBM host are properly configured, print jobs sent from the IBM host are issued in IBM's proprietary EBCDIC character set and the IPDS (Intelligent Printer Data Stream) command structure. The I-O IPDS Printer Emulation converts EBCDIC to ASCII and IPDS to PCL 5e. The I-O IPDS Printer Emulation can be customized to change the way the IPDS job is handled by the PCL 5e printer.

I-O's IPDS Printer Emulation provides full IBM 3812-2, 3816 and 4028 functionality on PCL 5e compatible laser printers.

**NOTE**: FOR BREVITY, THE TERMS "PRINT SERVER", "PRODUCT" AND "I-O PRODUCT" WILL REFER TO THE SPECIFIC I-O PRINT SERVER, PRINT BOX, ETHERNET DISPLAY, THIN CLIENT, SOFTWARE PRINT SERVER, ETC. HOST PRINTING SOLUTION THAT YOU ARE USING. THE TERM IBM HOST AND HOST WILL REFER TO THE APPROPRIATE IBM ESERVER I5, ISERIES, AS/400, ZSERIES AND S/390 MAINFRAME HOST WITHIN THE CONTEXT OF THE TOPIC BEING DISCUSSED.

**TIP:** REFER TO THE APPROPRIATE I-O USER'S GUIDE FOR SPECIFIC INSTRUCTIONS ON INSTALLING AND SETTING UP THE I-O PRODUCT. THOSE GUIDES WILL REFER TO THIS DOCUMENT FOR INSTRUCTIONS ON IPDS PRINTING.

# eServer i5, iSeries and AS/400 Setup

This chapter describes the configuration of the IBM host.

Configuration of the I-O IPDS Printer Emulation requires involves the following steps:

- Setup the IBM host.
  - Ensure PSF/400 is installed
  - Ensure latest PTF's are applied
  - Configure PSF and Print Device objects
- Setup the I-O product.
- Customization, as needed, of the I-O IPDS Printer Emulation configuration parameters at the I-O product to adjust the final printing output.

Instructions for setting up the IBM host is found in this chapter. Instructions for setting up the I-O product are found in the appropriate I-O product user's guide. Customization instructions are found later in this manual.

## *Requirements*

Make sure the AS/400 host is running a version of OS/400 that supports TCP/IP, has PSF/400 installed, and has the most recent PTF's installed and configured.

The PTF information presented below may have been superseded with more recent releases. For versions not shown below, check with IBM for the appropriate PTF information. Additional information about PTF's to use can be obtained from IBM's AS/400 service Web site.
**http://as400service.rochester.ibm.com**

**OS/400 V3R1**

| | |
|---|---|
| General | C6198310 Cumulative tape or later |
| | SF35164 TCP/IP for PSF/400 (order cover letter only) |
| | SF24140 IPDS pass through (order cover letter only) |
| Sockets | SF30018 |
| WRKAFP2 | SF40039 |
| PSF/400 | APAR SA44304 |

**OS/400 V3R2**

| | |
|---|---|
| PSF/400 | APAR SA44304 |

**OS/400 V3R6**

| | |
|---|---|
| General | C5346360 Cumulative tape or later |
| | SF45620 TCP/IP for PSF/400 (order cover letter only) |
| | SF45624 IPDS pass through |
| Sockets | SF30508 |
| WRKAFP2 | SF31461 |

PSF/400 APAR SA44304

**OS/400 V3R7**

PSF/400 APAR SA44304

# *Creating a Line Description on the Host*

If the I-O product and the AS/400 host are not on the same LAN segment, have the system administrator verify that there is a route defined in the TCP/IP route List. If there is not a route defined, use the host **ADDTCPRTE** COMMAND to create a route definition.

Also, verify if a line description has been created for the line the I-O product will be attached to. If there is not a line description, have the system administrator use the host **CRTLINETH** to create an Ethernet line description.

# *Configuring a TCP/IP Host Table Entry*

*This step is optional* – IBM suggests that a host entry may be created in the TCP/IP table. Have the system administrator use the host **CFGTCP** command to add the host name and TCP/IP address of the printer's Ethernet connection.

# *Configuring V3R1 or V3R6*

## PSF/400 for V3R1 or V3R6

The following instructions are used to create a printer device description:

1. At the AS/400 command line, enter the command **CRTDEVPRT.**
2. Press the F11 key to display the keywords.
3. In the "Device Description" **(DEVD)** field, enter the name of the printer. The name may be comprise of the letters A-Z and numerals 0-9. It must begin with a letter, and a maximum of 10 characters is allowed. This name must be unique to the host.
4. In the "Device Class" **(DEVCLS)** field, enter ***RMT**.
5. In the "Device Type" **(TYPE)** field, enter ***IPDS.**
6. In the "Device Model" **(MODEL)** field, enter **0.**
7. In the "Advanced Function Printing" **(AFP)** field, enter ***YES.**
8. In the "AFP Attachment" **(AFPATTACH)** field, enter ***APPC.**
9. In the "Font" **(FONT)** field, enter an appropriate value such as **11.**
10. In the "Form Feed" **(FORMFEED)** field, enter ***AUTOCUT.**
11. In the "Remote Location" **(RMTLOCNAME)** field, enter **TCPIP.**

## AFP for V3R1 or V3R6

The following instructions are used to create a data area that is used by PSF/400:

1. At the AS/400 command line, enter the command **WRKAFP2.**
2. Press the F11 key to display the keywords, then press F10 to display additional values.

3. In the “Printer Device Name **(DEVD)** field, enter the name of the printer. This name must be identical to the name entered for the device name in the DEVD field in the CRTDEVPRT command.

4. In the “IPDS Pass Through” (**IPDSPASTHR**) field, enter ***NO**.

   You may to set this value to *YES if you have applications that generate SCS or IPDS data streams that are printed to an AFP printer if the following uses apply: 1) An application like Business Graphics Utilities, GDDM, or Virtual Print that does not support AFPDS is used; or 2) The SCS or IPDS application does not contain any reference to overlay page segments or host font character sets. Certain limitations and other configuration considerations are discussed in IBM’s *Printer Device Programming Version 5 (SC41-5713-05)* publication.

5. In the “TCP/IP Support” **(TCPIP)** field, enter ***YES.**

6. In the “Remote System” **(RMTSYS)** field, enter the TCP/IP address of one of the following:

   - The IP address of the printer if using an I-O DIMM/Flash/USB print server device
   - The IP address of the I-O Print Server (such as a 5755e)
   - The IP address of the PC server running the I-O print server software.

   You may also enter the host name if you used the optional CFGTCP command to create a TCP/IP Host Table entry.

7. In the “Port” **(PORT)** field, enter **9100** for HP LaserJet printers equipped with an I-O DIMM/Flash/USB print server device; **5001, 5002 or 5003** for external I-O print servers; **or 5001 thru 5128** for I-O print server software.

8. In the “Activation Timer” **(ACTTMR)** field, enter ***NOMAX.** This will cause PSF/400 to wait indefinitely for a response to an activation request.

9. In the “Inactivity Timer” **(INACTTMR)** field for V3R1, or “Release Timer” **(RLSTMR)** field for V3R6, enter ***SEC15.** This parameter should be set to a value less than the timeout value on the printer. This is the time PSF/400 will maintain a session with the I-O Printer while there are no spooled files with a status of RDY.

# *Configuring V3R2*

## PSF/400 for V3R2

The following instructions are used to create a printer device description:

1. At the AS/400 command line, enter the command **CRTDEVPRT.**

2. Press the F11 key to display the keywords.

3. In the “Device Description” **(DEVD)** field, enter the name of the I-O product. The name may be comprise of the letters AZ and numerals 0-9. It must begin with a letter, and a maximum of 10 characters is allowed.

4. In the “Device Class” **(DEVCLS)** field, enter ***RMT.**

5. In the “Device Type” **(TYPE)** field, enter ***IPDS.**

6. In the “Device Model” **(MODEL)** field, enter **0.**

7. In the “Advanced Function Printing” **(AFP)** field, enter ***YES.**

8. In the “AFP Attachment” **(AFPATTACH)** field, enter ***APPC.**

9. In the “Font” **(FONT)** field, enter an appropriate value such as **11.**

10. In the “Form Feed” **(FORMFEED)** field, enter ***AUTOCUT.**

11. In the “Remote Location” **(RMTLOCNAME)** field, enter the TCP/IP address of one of the following:

    - The IP address of the printer if using an I-O DIMM/Flash/USB device

- The IP address of the I-O Print Server (such as an 5755e)
- The IP address of the PC server running the I-O print server software.

You may also enter the host name if you used the optional CFGTCP command to create a TCP/IP Host Table entry.

### AFP for V3R2

The following instructions are used to create a data area that is used by PSF/400:

1. At the AS/400 command line, enter the command **CRTPSFCFG.**
2. Press F11 to display the keywords, then press F10 to display additional values.
3. In the "PSF Configuration" **(PSFCFG)** field, enter the name of the printer.
4. In the "Library" field, enter **QGPL.**
5. In the "IPDS Pass Through" (**IPDSPASTHR**) field, ***NO**.

   You may to set this value to *YES if you have applications that generate SCS or IPDS data streams that are printed to an AFP printer if the following uses apply: 1) An application like Business Graphics Utilities, GDDM, or Virtual Print that does not support AFPDS is used; or 2) The SCS or IPDS application does not contain any reference to overlay page segments or host font character sets. Certain limitations and other configuration considerations are discussed in IBM's *Printer Device Programming Version 5 (SC41-5713-05)* publication.
6. In the "Activation Release Timer" **(ACTRLSTMR)** field, enter ***NORDYF.** This will cause PSF/400 to print all spooled files with a status of RDY before releasing the session (which does not terminate the writer).
7. In the "Release Timer" **(RLSTMR)** field, enter ***SEC15.** This parameter should be set to a value less than the timeout value on the printer. This is the time PSF/400 will maintain a session with the printer while there are no spooled files with a status of RDY.
8. In the "Remote Location Name or Address" (RMTLOCNAME) field, enter the TCP/IP address of the printer. You may also enter the host name if you used the optional CFGTCP command to create a TCP/IP Host Table entry.
9. In the "Port" **(PORT)** field, enter **9100** for HP LaserJet printers equipped with an I-O DIMM/Flash/USB device; **5001, 5002 or 5003** for external I-O print servers; **or 5001 thru 5128** for I-O print server software.
10. In the "TCP/IP Activation Timer" **(ACTTMR)** field, enter ***NOMAX.** This will cause PSF/400 to wait indefinitely for a response to an activation request.

## *Configuring V3R7 or V4R1*

### AFP for V3R7 or V4R1

At the AS/400 command line, enter the command **CRTPSFCFG.**

1. Press Enter or F4 to display the keywords.
2. In the "PSF Configuration" **(PSFCFG)** field, enter the name of the printer. This name will be entered in the User-Defined Object (USRDFNOBJ) field in the printer device description created in the next section.
3. In the "IPDS Pass Through" (**IPDSPASTHR**) field, enter ***NO**.

   You may want to set this value to *YES if you have applications that generate SCS or IPDS data streams that are printed to an AFP printer if the following uses apply: 1) An application like Business Graphics Utilities, GDDM, or Virtual Print that does not support AFPDS is used; or 2) The SCS or IPDS application does not contain any reference to overlay page segments or host

font character sets. Certain limitations and other configuration considerations are discussed in IBM's *Printer Device Programming Version 5 (SC41-5713-05)* publication.

4. In the "Activation Release Timer" **(ACTRLSTMR)** field, enter ***NORDYF.** This will cause PSF/400 to print all spooled files with a status of RDY before releasing the session (which does not terminate the writer).

5. In the "Release Timer" **(RLSTMR)** field, enter ***SEC15.** This parameter should be set to a value less than the timeout value on the printer. This is the time PSF/400 will maintain a session with the printer while there are no spooled files with a status of RDY.

## SF/400 for V3R7 or V4R1

The following instructions are used to create a printer device description:

1. At the AS/400 command line, enter the command **CRTDEVPRT.**

2. Press the F4 key to display the keywords.

3. In the "Device Description" **(DEVD)** field, enter the name of the printer. The name may be comprise of the letters A-Z and numerals 0-9, must begin with a letter, with a maximum of 10 characters allowed.

4. In the "Device Class" **(DEVCLS)** field, enter ***LAN.**

5. In the "Device Type" **(TYPE)** field, enter ***IPDS.**

6. In the "Device Model" **(MODEL)** field, enter **0.**

7. In the "LAN Attachment" **(LANATTACH)** field, enter ***IP.** Then press F10.

8. In the "Advanced Function Printing" field, enter ***YES.**

9. In the "Port Number **(PORT)** field, enter **9100** for HP LaserJet printers equipped with an I-O DIMM/Flash/USB device; **5001, 5002 or 5003** for external I-O print servers; **or 5001 thru 5128** for I-O print server software.

10. In the "Font" **(FONT)** field, enter an appropriate value such as **11.**

11. In the "Form Feed" **(FORMFEED)** field, enter ***AUTOCUT.**

12. In the "Activation Timer" **(ACTTMR)** field, enter ***NOMAX.** This will cause the AS/400 host to wait indefinitely for a response to an activation request.

13. In the "Remote Location" **(RMTLOCNAME)** field, enter the TCP/IP address of one of the following:

    - The IP address of the printer if using an I-O DIMM/Flash/USB print server device
    - The IP address of the I-O Print Server (such as a 5755e)
    - The IP address of the PC server running the I-O print server software.

    You may also enter the host name if you used the optional CFGTCP command to create a TCP/IP Host Table entry.

14. In the "User-Defined Object" **(USRDFNOBJ)** field enter the name entered in the PSF Configuration (PSFCFG) field when setting up AFP (section 3.1.6.1, step 3 above). This is the PSF configuration object used internally by the AS/400 when referring the to I-O print server device.

15. Leave the "Library" blank unless you know its name.

16. Enter *PSFCFG as the "Object Type".

# *Configuring V4R2 and Above*

## AFP for V4R2 and Above

At the AS/400 command line, enter the command **CRTPSFCFG.**

1. Press Enter or F4 to display the keywords.
2. In the "PSF Configuration" **(PSFCFG)** field, enter the name of the printer. This name will also be entered in the User-Defined Object (USRDFNOBJ) field in the printer device description created in the next section.
3. In the "IPDS Pass Through" **(IPDSPASTHR)** field, enter ***NO.**

   You may want to set this value to *YES if you have applications that generate SCS or IPDS data streams that are printed to an AFP printer if the following uses apply: 1) An application like Business Graphics Utilities, GDDM, or Virtual Print that does not support AFPDS is used; or 2) The SCS or IPDS application does not contain any reference to overlay page segments or host font character sets. Certain limitations and other configuration considerations are discussed in IBM's *Printer Device Programming Version 5 (SC41-5713-05)* publication.
4. In the "Activation Release Timer" **(ACTRLSTMR)** field, enter ***NORDYF.** This will cause PSF/400 to print all spooled files with a status of RDY before releasing the session (which does not terminate the writer).
5. In the "Release Timer" **(RLSTMR)** field, enter ***SEC15.** This parameter should be set to a value less than the timeout value on the printer. This is the time PSF/400 will maintain a session with the printer while there are no spooled files with a status of RDY.
6. In the "**Automatic Session Recovery**" field, enter ***YES.** This causes the PSF/400 to automatically attempt to resume printing when a session has been unexpectedly ended.
7. In the "**Acknowledgement Frequency**" field, enter "**10**". This value is the frequency, in number of pages, that the AS/400 sends an acknowledgement request to the printer for status of pages printed. This value is used to determine where to restart printing after a connection has been lost and re-established. However, if acknowledgement frequency requests are made with great frequency, such as once per page, a performance degradation may be noticed.
8. Optional selection – In the "Page Size Control" field, enter *YES**.** This causes PSF/400 to set the page size (forms) in lieu of using the printer's default size. Generally this parameter is used when a 4028 printer emulation is selected.
9. Optional Selection – In the "Edge Orien", enter *YES**.** When the page rotation value of a spooled file is *COR or *AUTO and the system rotates the output, 90 degree rotation is normally used. When this parameter is *Yes, PSF/400 rotates the output 270 degrees instead of 90 degrees.

## PSF/400 for V4R2 and Above

The following instructions are used to create a printer device description:

1. At the AS/400 command line, enter the command **CRTDEVPRT.**
2. Press the F4 key to display the keywords.
3. In the "Device Description" **(DEVD)** field, enter the name of the printer. The name may comprise of the letters A-Z and numerals 0-9, must begin with a letter, with a maximum of 10 characters allowed. This name must be unique to the host.
4. In the "Device Class" **(DEVCLS)** field, enter ***LAN.**
5. In the "Device Type" **(TYPE)** field, enter ***IPDS.**
6. In the "Device Model" **(MODEL)** field, enter **0.**
7. In the "LAN Attachment" **(LANATTACH)** field, enter ***IP.** Then press F10.
8. In the "Advanced Function Printing" field, enter ***YES.**

9. In the “Port Number **(PORT)** field, enter **9100** for HP LaserJet printers equipped with an I-O DIMM/Flash/USB device; **5001, 5002 or 5003** for external I-O print servers; or **5001 thru 5128** for I-O print server software.
10. In the “Font” **(FONT)** field, enter an appropriate value such as **11.**
11. In the “Form Feed” **(FORMFEED)** field, enter ***AUTOCUT.**
12. In the “Activation Timer” **(ACTTMR)** field, enter ***NOMAX.** This will cause the IBM host to wait indefinitely for a response to an activation request.
13. In the “Remote Location” **(RMTLOCNAME)** field, enter the TCP/IP address of one of the following:
    - The IP address of the printer if using an I-O DIMM/Flash/USB print server device
    - The IP address of the I-O Print Server (such as a 5755e)
    - The IP address of the PC server running the I-O print server software.

    You may also enter the host name if you used the optional CFGTCP command to create a TCP/IP Host Table entry.
14. In the “User-Defined Object” **(USRDFNOBJ)** field, enter the name used in the PSF Configuration (PSFCFG) field when setting up AFP (section 3.1.7.1, step 3 above). This is the PSF configuration object used internally by the AS/400 when referring the to I-O print server device.
15. Leave the “Library” blank unless you know its name.
16. Enter ***PSFCFG** as the **“Object Type”**.

## *Verifying the IPDS Configuration on the IBM Host*

To test communication between the AS/400 and the printer, ping the printer from an IBM host workstation with the following command:

**PING ‘TCP/IP ADDRESS’ or PING HOST NAME**

‘TCP/IP Address’ is the address of the printer (be sure to include the single quote marks around the address). Host name is the optional name you may have defined for the printer if you created an optional TCP/IP Host Table entry. If the pings are successful, vary on the printer’s device description by typing this command (all on one line):

**VRYCFG(printer device name) CFGTYPE(*DEV) STATUS(*ON)**

Start the IPDS printer writer with the following command.

**STRPRTWTR DEV(printer device name)**

# *I-O Product Setup*

I-O's IPDS Printer Emulation runs on a number of different print server, display and thin client products from I-O Corporation. Please refer to the user's guide for the specific product for instructions on installation and setup of the product.

After printer sessions have been configured on both the I-O product and the IBM host, the IBM host will connect to the I-O product whenever print jobs need to be processed.

If there is a need to customize the way the print jobs are being handled by the I-O IPDS Printer Emulation, refer to the ***IPDS Customization*** chapter***.***

# zSeries, S/390 Mainframe Setup

This chapter describes the configuration of the IBM host.

Configuration of the I-O IPDS Printer Emulation involves the following steps:

- Setup the IBM host.
  - Ensure PSF/MVS, MVS Scheduler and TCP/IP are installed
  - Ensure latest PTF's are applied
  - Configure MVS Communication Units, JES and PSF objects
- Setup the I-O product.
- Customization, as needed, of the I-O IPDS Printer Emulation configuration parameters at the I-O product to adjust the final printing output.

Instructions for setting up the IBM host is found in this chapter. Instructions for setting up the I-O product are found in the appropriate I-O product user's guide. Customization instructions are found later in this manual.

**NOTE:** THIS SECTION DOES NOT PROVIDE ALL THE INFORMATION YOU NEED TO INSTALL AND CONFIGURE TCP/IP ON YOUR MVS SYSTEM.

FOR MORE INFORMATION, REFER TO IBM PUBLICATIONS *TCP/IP FOR MVS: CUSTOMIZATION AND ADMINISTRATION GUIDE,* OR *PSF V3R1.0 FOR OS/390 CUSTOMIZATION,* OR *PSF/MVS: SYSTEM PROGRAMMING GUIDE.*

## *Requirements*

Make sure your system has at least the following or newer, installed and configured:

- PSF/MVS Version 2.2.0 with APAR OW15599
- MVS Scheduler with APRA 0212236
- TCP/IP Version 3 Release 1 or higher, installed and configured on MVS

To obtain the PTF's associated with these APAR's, contact the IBM Support Center.

## *Define the Communications Control Unit to MVS*

If you have not already done so, define the communications control unit (such as a 3172) on the MVS system. Use either an MVS configuration program (MVSCP) or a hardware configuration definition (HCD), depending on the version of your MVS system:

- When using a version earlier than MVS 4.1.0, use an MVSCP.
- When using a version of MVS 4.1.0 or later, use an HCD or an MVSCP

**NOTE:** FOR MORE INFORMATION ABOUT USING THESE METHODS, REFER TO THE IBM PUBLICATIONS MVS/ESA MIGRATION PLANNING: DYNAMIC I/O CONFIGURATION OR MVS/ESA HARDWARE CONFIGURATION: USING THE DIALOG.

# *Modify the TCP/IP Profile in MVS*

The TCP/IP profile contains system configuration statements used to initialize the TCP/IP address space. Some statements require special considerations when you are printing from PSF/MVS. The following bolded text requires specific attention.

| | | |
|---|---|---|
| ACBPOOLSIZE | 1000 | |
| ADDRESSTRANSLATIONPOOLSIZE | 1500 | |
| CCBPOOLSIZE | 150 | |
| **DATABUFFERPOOLSIZE** | **160** | **32768** |
| ENVELOPEPOOLSIZE | 750 | |
| IPROUTEPOOLSIZE | 300 | |
| LARGEENVELOPEPOOLSIZE | 50 | |
| RCBPOOLSIZE | 50 | |
| SCBPOOLSIZE | 256 | |
| SKCBPOOLSIZE | 256 | |
| **SMALLDATABUFFERPOOLSIZE** | **256** | |
| TCBPOOLSIZE | 512 | |
| **TINYDATABUFFERPOOLSIZE** | **256** | |
| UCBPOOLSIZE | 100 | |
| **KEEPALIVEOPTIONS INTERVAL** | **10** | |
| **SENDGARBAGE** | **FALSE** | |
| **ENDKEEPALIVEOPTIONS** | | |
| **GATEWAY** | | |

| ; *Network First hop | Linkname | **Packet Size** | Subnet mask | Subnet value |
|---|---|---|---|---|
| 9 = | BPCLAN | 2000 | 0.255.255.0 | 0.99.12.0 |
| DEFAULTNET 9.99.12.254 | BPCLAN | 2000 | 0.255.255.0 | 0 |

The following is a description of each statement needing special consideration, the application and the changes they make necessary. Be aware if you change any of the values in the TCP/IP profile, you will need to restart TCP/IP for the changes to take effect.

**DATABUFFERPOOLSIZE -** defines the number and size of the data buffers. It is recommended that you specify 160 data buffers and a buffer size of 32768.

**SMALLDATABUFFERPOOLSIZE -** defines the number of small data buffers. It is recommended that you specify at least 256 small data buffers.

**TINYDATABUFFERPOOLSIZE -** defines the number of tiny data buffers. It is recommended that you specify at least 256 tiny data buffers.

**KEEPALIVEOPTIONS -** PSF relies on TCP to detect when a connection with a printer is no longer usable. When no data has been exchanged between PSF/MVS and the printer, TCP periodically sends keep-alive probes to the printer. These periodic probes, called keep-alive transmissions, enable TCP to discover when a connection is no longer usable, even if the printer is abruptly powered off or is no longer accessible through the network.

The frequency of keep-alive transmissions is controlled by the INTERVAL parameter on the KEEPALIVEOPTIONS statement. The frequency applies to all TCP applications that direct TCP to send keep-alive transmissions. The default frequency is after about two hours of inactivity.

It is recommended you specify a shorter interval than the default, (10 minutes), for the interval between keep-alive transmissions. Also, if any target host requires the keep-alive packet contain data, include the statement SENDGARBAGETRUE.

**GATEWAY -** The Packet size parameter of the GATEWAY statement defines the maximum transmission unit (MTU) for the MVS host. For network printers, the MTU size is fixed at 1024 bytes. The value cannot be adjusted.

# *Verify the Printer Connection*

## Ping the Printer

To verify IBM MVS communications with the printer, ping the printer from the MVS system. From a TSO session, enter the following:

**TSO Ping ip_address**

In JES2, enter the following command from the System Display and Search Facility (SDSF) menu 6:

**ping ip_address**

The **ip_address** specifies the IP address of the I-O product. The following shows examples of a successful ping and an unsuccessful ping.

The following is an example of a successful ping:

EZA04581 Ping V3R1: Pinging host 9.99.12.33

(Use ATTN to interrupt.)

EZA04631 PING: Ping #1 response took 0.084 seconds. Successes so far = 1.

The following is an example of an unsuccessful ping:

EZA04581 Ping V3R1: Pinging host 9.99.12.33

(Use ATTN to interrupt.)

EZA04631 PING: Ping #1 timed out.

# *Handling MVS Connectivity Problems*

## Ping is not Successful

If the ping fails, verify the following:

- The I-O product and associated printers are powered on.
- The IP address is unique in the TCP/IP network. If the IP address of the MVS system is not unique, contact your system administrator.

- The Maximum Transmission Unit (MTU) size of the IP packet for the MVS system is equal to the MTU size of the network printer that is fixed at 1024. To change the MTU size for the MVS system, change the GATEWAY statement in the MVS TCP/IP profile and restart TCP/IP to activate the changes. If these items are in order, consult your system administrator about a possible network problem.

### Ping is Successful

A successful ping usually indicates that the MVS system can communicate with the printer. However, you might receive a successful ping even though the IP address of the I-O product is a duplicate of another device's IP address. If PSF is unable to establish a network connection with the I-O product or if PSF output destined for the I-O product prints on a different printer , follow these steps to determine if the IP address of the I-O product is unique:

1. Turn off the printer.
2. Wait at least 5 minutes for TCP/IP to clear the Address Resolution Protocol (ARP) tables. (If your installation specified a longer interval on the ARPAGE configuration statement in the TCP/IP profile, you may need to wait longer. For information about the ARPAGE statement, refer to the *IBM TCP/IP MVS Customization and Administration Guide.)*
3. Enter the ping command again from the MVS system. If you receive a successful response to the ping command, there is a duplicate IP address. Consult your system administrator.

## *Define the Printer to JES*

When an I-O product is used with JES, the product must be defined for deferred printing mode with JES.

The JES2 printer definition initialization member, located in the system PARMLIB is shown below:

```
FSS (FSS1), PROC=PSFPROC,HASPFSSM=HASPFSSM

PRT1    FSS=FSS1,MODE=FSS,PRMODE= (LINE,PAGE,SOSI1),

CLASS=C, UCS=0, SEP, NOSPEPDS, CKPTPAGE=100

DRAIN, MARK, TRKCELL=YES
```

The above example is correct for JES2 3.11 and above. For earlier versions of JES2, the statement is FSSDEF and would be stated as FSSDEF FSSNAME=FSS1.

The value specified for the PROC parameter must match the name on the PSF/MVS startup procedure.

The JES3 printer definition is shown below. This example is not executable, but is intended to help the JES3 systems programmer define the printer to the MVS host.

```
FSSDEF, TYPE=WTR, FSSNAME=FSS1, PNAME=PSFPROC, SYSTEM=SYS1,
TERM=NODEVICE, JNAME=PRT1, JUNIT=(,SYS1,,OFF), FSSNAME=FSS1, MODE=FSS,
PM=(LINE,PAGE,SOSI1),CHARS=(YES,GT12),
```

The value specified for the JNAME parameter must match the name of the printer in the PSF/MVS startup procedure.

The value specified for the PNAME parameter must match the name on the PSF/MVS startup procedure.

## *Define the Printer to PSF/MVS*

Each printer session configured on the I-O product must be defined to PSF with a PRINTDEV statement in the PSF/MVS startup procedure.

Currently, IBM does not supply a network printer-specific writer procedure. (Remember the printer appears to the IBM mainframe as a network printer.) However, the APSWPROT sample from the APAR medium (noted above in Section 8.2.1) can be copied and modified for network printers.

Make sure you specify 300-pel font libraries even though the printer may support higher resolutions. The following is a sample procedure (PSFPROC) that can be modified to suit your installation.

The following is a description of the statements to be used in the PSF Startup Proc:

**FAILURE –** Specifies the action PFS/MVS to take after a printing failure or a TCP/IP network failure. If FAILURE=WCONNECT and the printer is connected to another host when PSF/MVS attempts to establish a connection on TCP/IP, PSF/MVS continuously retries (up to the limit specified in CONNINTV) until the printer becomes available. FAILURE=STOP stops the attempt to connect the printer.

**TIMEOUT –** Specifies the action that PSF/MVS takes after a timeout when on output is available on JES. The DISCINTV parameter specifies the timeout interval. TIMEOUT=REDRIVE requests that PSF/MVS redrive the printer FSA using the value of the MGMTMODE parameter. TIMEOUT=STOP requests that PSF/MSV stop the printer FSA, which can then be restarted only by an operator command.

**MGMTMODE –** Set this parameter to OUTAVAIL. OUTAVAIL requests that PSF start a communications session with the printer only when output is available on the JES spool.

**DISCINTV –** Specifies the disconnect interval in seconds. The value can range from zero to 86,400. It is suggested that the setting be 15. When no output is available from JES for this time period, PSF/MSV ends the session with the printer. If the value is set to zero, PSF/MSV does not end the session because there is no output.

**IPADDR –** Specifies the IP address of the printer. Replace the xxx.xxx.xxx.xxx with the IP address of the printer's Ethernet connection.

**PORTNO** – Specifies the TCP/IP socket that is used for AFP/IPDS printing. This parameter must be 9100.

**NOTE:** FOR MORE INFORMATION ON THE PRINTDEV STATEMENT, SEE THE IBM PUBLICATION PSF/MSV SYSTEM PROGRAMMING GUIDE.

# *Running an IPDS Session with an I-O Product*

In normal operation, a session with the I-O product is maintained while there is output on the JES spool and the printer is available. When there is no more output on the spool and the disconnect interval expires, PSF/MVS ends the session with the printer. PSF/MVS attempts to restart the session when there is more work on the spool for the printer. After the session is restarted, PSF/MVS must reload the resources required for the print jobs.

To use an I-O product with your MVS system, use the following JES operator commands.

## Starting a Host Session

To start the printer on MVS, do the following:

1. Start TCP/IP.
2. Start the I-O product and its associated IPDS sessions.
3. Start the printer FSA.

For JES2:

**$Sprinter-name**

For JES3:

**VARY printer-name, ON**

### Stopping a Host Session

You can stop the printer on MVS in the following ways:

The preferred method is to first stop the PSF FSA for the printer session by entering the following command from the MVS console:

For JES2:

**$Printer-name**

For JES3:

**VARY printer-name, OFF**

**CANCEL printer-name** where printer-name specifies the name of the printer FSA. The I-O product and associates printers can then be turned off.

To end the PSF FSA for the printer session, use the JES commands. If you are unable to purge or cancel the printer using the JES commands, enter the following command:

**MODIFY FFSname, FORCE, printer-name**

## *I-O Product Setup*

I-O's IPDS Printer Emulation runs on a number of different print server, display and thin client products from I-O Corporation. Please refer to the product specific user's guide for instructions on installation and setup.

After printer sessions have been configured on both the I-O product and the IBM host, the IBM host will connect to the I-O product whenever print jobs need to be processed.

If there is a need to customize the way the print jobs are being handled by the I-O IPDS Printer Emulation, refer to the ***IPDS Customization*** chapter***.***

# IPDS Customization

This chapter describes how to customize the I-O IPDS Printer Emulation.

I-O's IPDS Printer Emulation can be configured to change the way IBM host print jobs are actually printed. Options include the ability to shift the text margin, activate edge-to-edge and simulated edge-to-edge alignment, change fonts, etc.

## *Customization Methods*

Customization can be done in a number of different ways depending upon the I-O product:

- Use one of I-O's management or configuration utilities for the software print servers and external network attached print servers.
- Use the HP LaserJet's Web page or front panel for internal DIMM, CompactFlash or USB device.
- Use I-O's robust and feature-rich Host Download Commands, available on all I-O products.

Please refer to the user's guide for the appropriate I-O product for specific instructions on customize the IPDS printing.

## *Host Download Commands*

Host download commands sent from the IBM host to the I-O product, can change some of the configuration parameters.

Host download commands are placed in a host document or on the terminal's screen. When the print job or screen print is sent to the printer, the download command is recognized as a configuration command and the appropriate configuration values are changed. The command itself will not be printed if it was entered correctly. If any part of the command is printed, the I-O product did not recognize the command because of a problem in the format or because the printscreen was not properly sent to the printer.

Most host download commands sent to the I-O product take effect immediately but stay only in the printer's active memory. To save the changed configuration beyond a power OFF, host download command &%I99,0 must the last command sent to the printer.

Take the following steps to enter a host download command.

1. Type the Command Pass-Thru delimiter &% in the document at the point where the command is to take effect, or on a host command entry line.
2. Type an upper case "I".
3. Type the command number for the desired configuration option (see the configuration options in the next section). Always use two digits for the command number (i.e. &%I05,)
4. Type a comma.
5. Type the value representing the desired selection. No spaces are allowed. A space or invalid character in a command causes the IPDS Printer Emulation to ignore the command and resume printing from the point the error occurred.
6. A space or control character (i.e., NL, FF, CR, LF) signals the end of the download command.
7. Multiple commands can be chained together by using a slash (/) or back slash (\) to separate the commands (no spaces allowed). For example, to set the Default Code Page (Command 30) to Canadian/French (Value 0260) and set the Code Page Version to version 0, type:

&%I30,0260/31,0

**NOTE:** NOT ALL IPDS CONFIGURATION OPTIONS HAVE HOST DOWNLOAD COMMANDS. REFER TO THE CONFIGURATION OPTIONS IN THE NEXT SECTION FOR A DESCRIPTION OF EACH CONFIGURATION OPTION AND THE APPROPRIATE HOST DOWNLOAD COMMAND SYNTAX WHEN APPLICABLE.

## *IPDS Configuration Options*

The following table shows a complete listing of configuration options in alphabetical order and the associated Host Download Command Number. .A numerically listed detailed description of each command follows the table.

**NOTE**: NOT ALL HOST DOWNLOAD COMMANDS ARE AVAILABLE IN EVERY I-O PRODUCT. REFER TO THE I-O PRODUCT USER'S GUIDE FOR A LISTING OF SUPPORTED HOST DOWNLOAD COMMANDS.

The following table shows the available configuration options in alphabetical order.

| Configuration Parameter | Command Number |
|---|---|
| 600 DPI Graphics | 22 |
| Compression Ratio | 41 |
| Code Page Version | 30 |
| Default Code Page (Host Language) | 30 |
| Default Font | 32 |
| Font Mapping | 34 |
| Font Strings | 33 |
| Horizontal Margin Offset | 42 |
| Host Port Initialization String | 04 |
| Input Tray Mapping | 50 |
| Output Tray Mapping | 52 |
| Overlay Stored in Printer Memory | 24 |
| Paper Size | 51 |
| Print Self-Test | 98 |
| Restore Factory Defaults | 98 |
| Restore Previous Settings | 98 |
| Text Compression | 40 |
| True Print Complete | 25 |

**NOTE**: IN THE DESCRIPTION OF EACH HOST DOWNLOAD COMMAND, ASTERISKS (*) IDENTIFY FACTORY DEFAULT SETTINGS.

## Command No. 04: Host Port Initialization String

Stores a twinax port initialization string (up to 25 hex pairs) in the I-O Print Server's permanent memory. This string will be sent to the printer every time a twinax job is printed. The string will be sent AFTER the print server has reconfigured the printer for host printing. However, formatting instructions sent with the host data generally override this setting.

| *Value* | *Description* |
|---|---|
| (ab cd..) | up to 25 ASCII hex bytes defining the string embedded in () |
| ( ) | deletes unit string |
| *Example:* | &%I04,(1B 26 6C 38 44) |
| | Sets LPI to 8LPI |

## Command No. 22: 600 DPI Graphics Conversion

Allows the conversion of 600 dpi graphics to 300 dpi graphics for faster downloads.

| *Value* | *Description* |
|---|---|
| 0 | Causes the graphics to be converted and printed at 300 dpi |
| 1 | Causes the graphics to be printed at 600 dpi |
| *Example:* | &%I22,1 |
| | Graphics are printed at 600 dpi |

## Command No. 24: Store Overlay In Printer Memory

The I-O product will store overlays in its own memory. When an IPDS command is received to activate the overlay, the overlay is converted to PCL commands and sent to the printer with the accompanying text sent by the AS/400. This method sends the overlay from the I-O product to the printer for each page printed.

The overlay can also be converted to a PCL macro stored in the printer. When an IPDS command activates the overlay, the I-O product passes a start macro command to the printer. This method results in faster printing as the I-O product sends the macro to the printer only once and then simply activates the macro as required by the host job.

NOTE: THERE IS A POSSIBILITY A PRINT JOB COMING FROM THE SHARED PRINTER PORT COULD DELETE OR REPLACE THE OVERLAY'S MACRO AS STORED IN THE PRINTER. IF THIS HAPPENS, STORE THE OVERLAY IN THE I-O PRODUCT.

| *Value* | *Description* |
|---|---|
| 0* | The overlay is stored and activated from the I-O Print Server. |

| | |
|---|---|
| 1 | The overlay is stored in the printer |
| *Example:* | &%I24,1 |
| | Causes the I-O product to convert the overlay to a PCL macro stored in the printer. When an IPDS command activates the overlay, the I-O product sends a macro start command to the printer for the specific overlay. |

## Command No. 25: True Print Complete

Determines if the I-O product reports a print complete to the host after a page has actually been printed, or if the print complete message is sent as soon as the printer has started processing the page of the host print job. Setting True Print Complete to ON decrease printing speed.

| *Value* | *Description* |
|---|---|
| 0* | True Print Complete is OFF. |
| 1 | True Print Complete is ON |
| *Example:* | &%I25,1 |
| | Causes the I-O product to post a "print complete" message to the host when each page is actually printed. |

## Command No. 26: Edge-to-Edge

Some printers have the capability of printing from one edge of the paper to the other edge. Non edge-to-edge printers have an unprintable area around the entire page. The printable area of an edge-to-edge printer is essentially the same as the physical page size. For a non edge-to-edge printer, the printable area is smaller than the physical page. For example, an HP 4050 printer has a printable area of 8" x 10.5" on a 8.5" x 11" page, while an HP 9000 (in edge to edge mode) has a printable area that is almost as large as the page (the 9000 can print to within 1.5 mm of the edge of the page).

When a document designed to use the full page is printed on a non edge-to-edge printer, the document may not print correctly, i.e. the document may not be aligned correctly or data may be missing on one or more of the edges Choosing this edge-to-edge option when using a non edge-to-edge printer may help improve the alignment. Using horizontal and vertical offsets may also improve the alignment of the document.

| *Value* | *Description* |
|---|---|
| 0 | No edge-to-edge adjustments are applied to the print job |
| 1 | Simulates edge-to-edge output for non-edge-to-edge printers. |
| 2 | Adjusts the output for an edge-to-edge capable printer |
| *Example:* | &%I26,1 |
| | Sets simulated edge-to-edge on |

NOTE: IF THE I-O PRODUCT IS AN IPDS DIMM/FLASH CARD, AND IF THE PRINTER IS HAS EDGE-TO-EDGE CAPABILITY SUCH AS THE HP 9000 LASERJET, SETTING THE PRINTER'S FRONT PANEL OPTION (NOT THE IPDS EDGE-TO-EDGE OPTION) WILL CAUSE THE IPDS DIMM/FLASH TO AUTOMATICALLY SET ITSELF TO "TRUE" EDGE-TO-EDGE PROCESSING.

## Command No. 30: Default Code Page (Host Language)

Selects the default code page (EBCDIC) used in the EBCDIC - ASCII conversion. These code pages are resident in the print server:

| *Value* | *Description* |
|---|---|
| 0275 | Brazilian |
| 0276 | Canadian French |
| 0277 | Danish/Norwegian |
| 0278 | Finnish/Swedish |
| 0280 | Italian |
| 0281 | Japanese/English |
| 0282 | Portuguese |
| 0284 | Spanish/Spanish Speaking |
| 0285 | English (UK) |
| 0286 | Austrian/German (alt) |
| 0287 | Danish/Norwegian (alt) |
| 0288 | Finnish/Swedish (alt) |
| 0289 | Spanish (alt) |
| 0290 | Japanese/Katakana |
| 0297 | French |
| 0500 | Int'l Set 5, Swiss Bilingual |

*Example:* &%I30,0500

Selects Code Page 500, Int'l Set5, as the default code page for EBCDIC-ASCII conversion.

## Command No. 31: Code Page Version

Selects the code page version used, if more than one is available.

| *Value* | *Description* |
|---|---|
| 0* | Version 0 |
| 1 | Version 1 |

*Example:* &%I31,1

Selects version 1

## Command No. 32: Default Font

Selects the font to be loaded/mapped by the I-O product when the host requests the "default font". The default font can be any font from the list in *Appendix E* or any other downloadable font supported by the AS/400. Some of the IPDS fonts reside directly on the print server and are downloaded to the attached printer when requested. Other IPDS fonts are mapped to printer resident fonts. Refer to *Appendix E* for more information. Also check Command 33 for related information.

| *Value* | *Description* |
|---|---|
| XXXXX | FGID number of fonts listed in Appendix E or downloadable font. |

*Example:* &%I32,00019

Selects OCR-A (FGID#00019) to be the default font.

## Command No. 33: Font Strings

Assigns a valid font ID to a font. The first number (0-9) is one of 10 available strings. The second number (0-65535) is the host font number. The characters shown in parentheses are sent to the printer when the host font number is received. Refer to *IPDS Fonts Appendix* for a list of supported/valid font numbers. Refer to the printer's user's guide or the documentation accompanying the font cartridge/SIMM/DIMM/Soft font for a list of available fonts and their respective strings. Use the <(insert a space here)character to indicate the ESCape character.

| *Value* | *Description* |
|---|---|
| 0-9, | One of ten available strings |
| 0-65535 | Host font number |
| (ASCII Char) | Up to 25 ASCII characters representing the desired font. |

*Example:* &%I33,3,751(<(12U<(s0p12h10v1s3b6T)

This Host Download command selects the third font string to be font #751 and selects for a PCL 5e laser printer the following:

| | |
|---|---|
| 12U | = code page 850 |
| 0p | = fixed spacing |
| 12h | = 12 pitch |
| 10v | = 10 point |
| 1s | = italic |
| 3b | = bold |
| 6T | = letter gothic |

## Command No. 34: Font Mapping

Selects how IPDS font commands from the host are mapped to printer resident PCL fonts. Refer to *Appendix E* for a detailed list of font mappings. "Best Fit" maps the IPDS font to a printer resident font most closely resembling the original IPDS font. "4028/43XX Compatible" maps the IPDS font like an IBM 4028/43XX series printer would (i.e. including font substitutions). Selecting "3812/16 Compatible" maps the IPDS font like IBM 3812/16 printers.

**NOTE:** AFTER CHANGING THE FONT MAPPING, YOU NEED TO POWER THE I-O PRODUCT OFF AND THEN ON AGAIN OR SHUT DOWN AND RESTART THE PRINTER SESSION TO ACTIVATE THE NEW SELECTION.

| *Value* | *Description* |
|---|---|
| 0 | Best Fit |
| 1* | 4028/43XX Compatible |
| 2 | 3812/16 Compatible |

*Example:* &%I34,1

Configures the IPDS I-O product to map IPDS fonts to PCL fonts most closely representing fonts an IBM 4028/43XX printer would have printed.

For example, when the IBM host requests font 204 (IPDS: Matrix Gothic 13 CPI), "Best Fit" would have mapped FGID 204 to a Letter Gothic 16 CPI with adjusted spacing to most closely resemble the requested Matrix Gothic 13 font.

An IBM 4028/43XX printer, however, would have substituted this font with a Courier 15 CPI font. By selecting "4028/43XX Compatible", the I-O product will also map the requested FGID 204 to a Courier 15 CPI font.

## Command No. 40: Text Compression

Determines the direction of compression of host text data to fit the logical page into the printable area of the physical page. The compression ratio is set through Command 41: Compression Ratio. Note: Compressing AFP/IPDS documents containing images, graphics or bar codes in addition to text may cause alignment problems, since only text is compressed.

| *Value* | *Description* |
|---|---|
| 0* | No Compression |
| 1 | Compress LPI (vertical compression) |
| 2 | Compress LPI and CPI (vertical and horizontal compression) |

*Example:* &%I40,1

Causes vertical (LPI) compression of host data.

## Command No. 41: Compression Ratio

Determines the percentage of compression of host text data to fit the logical page into the printable area of the physical page. This command only takes affect if Command 41: Text Compression is set to 1 (Compress LPI) or 2 (Compress LPI&CPI).

| *Value* | *Description* |
|---|---|
| 00 to 99 | 0 to 99% |
| 05* | 5% (default) |

*Example:* &%I41,50

Causes compression of all host sourced text data by 50% in the direction specified through Command 40.

## Command No. 42: Horizontal Margin Offset

Selects the horizontal offset of the logical page on the physical page in 1/60 of an inch. If parts of the logical page containing data are moved off the physical page, this data will not print!

**NOTE:** THE DEFAULT VALUES OF COMMAND 42 AND 43 ALIGN THE LOGICAL PAGE WITH THE TOP LEFT-HAND CORNER OF THE PHYSICAL PAGE. SINCE LASER PRINTERS GENERALLY HAVE A NON-PRINTABLE AREA OF APPROX. 1/4 INCH AROUND THE OUTSIDE OF THE PHYSICAL PAGE, HOST DATA THAT FALLS WITHIN THIS 1/4 INCH AREA WOULD BE LOST. TO REMEDY THIS, YOU MAY WANT TO ADJUST THE MARGIN OFFSETS BY THE VALUE 15 (15/60=1/4): &%I42,15/I43,15.

| *Value* | *Description* |
|---|---|
| -127 to 127 | -127 to 127 /60 of inch |
| 0* | no offset (default) |

*Example:* &%I42,-60

Causes the I-O product to move the logical page 1 inch (60/60) to the left.

## Command No. 43: Vertical Margin Offset

Selects the vertical offset of the logical page on the physical page in 1/60 of an inch. If parts of the logical page containing data are moved off the physical page, this data will not print!

**NOTE:** THE DEFAULT VALUES OF COMMAND 42 AND 43 ALIGN THE LOGICAL PAGE WITH THE TOP LEFT-HAND CORNER OF THE PHYSICAL PAGE. SINCE LASER PRINTERS GENERALLY HAVE A NON-PRINTABLE AREA OF APPROX. 1/4 INCH AROUND THE OUTSIDE OF THE PHYSICAL PAGE, HOST DATA THAT FALLS WITHIN THIS 1/4 INCH AREA WOULD BE LOST. TO REMEDY THIS, YOU MAY WANT TO ADJUST THE MARGIN OFFSETS BY THE VALUE 15 (15/60=1/4): &%I42,15/I43,15.

| *Value* | *Description* |
|---|---|
| -127 to 127 | -127 to 127 /60 of inch |

| | |
|---|---|
| 0* | no offset (default) |
| *Example:* | &%I43,-60<br>Causes the I-O product to move the logical page 1 inch (60/60) towards the tope of the page. |

## Command No. 50: Input Tray Mapping

The I-O product provides a method of mapping the IBM requested source drawer to the laser printer's input trays. This is done by identifying the IBM input drawer ID coming from the IBM host, and associating this number with the PCL command number assigned by the printer manufacturer to the printers desired input tray.

The typical IBM drawer assignments are as follows:

| IBM Drawer ID | IBM Printer Input Tray |
|---|---|
| 01 | Paper Drawer 1 |
| 02 | Paper Drawer 2 |
| 65 | Envelope Feed |
| 100 | Manual Feed |

The host download command is structured as follows:

| *Value* | *Description* |
|---|---|
| xx | The IBM drawer ID |
| yy | The PCL value for the desired input paper tray on the printer |
| *Example:* | &%I50,01,02<br>Causes the I-O product to pull a sheet of paper from the printer's manual feed tray when it receives an IBM drawer ID of 2. |

**NOTE:** IF USING A CANON IMAGERUNNER, SELECTING "00" FOR THIS COMMAND WILL FORCE THE PRINTER TO PULL THE SAME SIZE PAPER FROM ANOTHER TRAY WHEN THE INITIAL TRAY IS EMPTY.

## Command No. 51: Paper Size

Selects the paper size used in each supported input paper tray. A paper size cannot be assigned to the envelope feeder.

| *Value* | *Description* |
|---|---|
| xx | The number representing the IBM paper drawer ID |
| yy | Identifies the selected paper size according to the table below |

| yy-value | Description |
|---|---|

| | |
|---|---|
| 00 | US-Letter |
| 01 | US-Legal |
| 02 | A4 |
| 03 | US-11x17 |
| 04 | A4 |

*Example:* &%I51,00,02

Causes the printer to use A4 paper when IBM drawer ID 00 is received.

## Command No. 52: Output Tray Mapping

The I-O product allows the user to select the printers output tray. This is done by matching the IBM printer output tray ID to the PCL tray ID assigned by the printer manufacturer for the printers desired output tray..

| *Value* | *Description* |
|---|---|
| aa | The number of the IBM output paper tray ID (01 to 10); |
| bb | The value representing the printer's output tray (00 to 99). |

*Example:* &%I52,03,02

Causes the I-O product to direct the printer to send the printed pages to the printer's ID 02 output tray when the I-O product receives an IBM output printer tray ID 03 instruction.

**NOTE:** THE I-O PRODUCT WILL SEND THE SAME ID NUMBER RECEIVED FROM THE IBM HOST TO THE PRINTERUNLESS THE IBM OUTPUT PAPER TRAY ID HAS BEEN REMAPPED USING THIS COMMAND. ONLY IBM OUTPUT TRAYS 01 TO 10 CAN BE REMAPPED. THE OTHER REMAINING OUTPUT TRAY IDS (11 TO 256) WILL BE PASSED ON TO THE PRINTER AS RECEIVED.

## Command No. 98: Restore Defaults Or Print Self-Test

Restores the factory default configuration selections (except for settings set through the DIP switches and the Default Code Page (Command 30)). Also prints out a copy of the active configuration selections ( I-O print server self-test), or restores the most recent permanently saved configuration selections.

| *Value* | *Description* |
|---|---|
| 0 | Restores factory defaults |
| 1 | Prints out active configuration selections |
| 2 | Restores most recent permanently saved configuration settings |

*Example:* &%I98,1

Prints out the active setup selections.

## Command No. 99: Save All Current Settings

Saves all current settings specified through host download commands into the permanent memory of the I-O Print Server.

| *Value* | *Description* |
|---|---|
| 0 | Saves all current settings. |

*Example:* %I99,0

Saves all current settings

# IPDS Printer Operation

This chapter describes the IPDS printer operation.

Connection to the IBM host is  via Ethernet using IBM's proprietary TCP/IP printing protocol of PPR/PPD.  Older legacy IBM hosts may require Twinax or Coax cabling and will utilize AnyNet or SNA protocols.  Many of I-O's products will also support AnyNet and SNA in these legacy environments.

On the IBM host  side, (there was an extra space here)  the PSF object and printer device description files must be setup.  The printer device must also be varied on and the writer started.  Refer to the appropriate host setup chapters earlier in this document.

When the host side and the I-O product side have been configured, host jobs can be sent to the I-O product.  To the IBM host, the I-O product looks and acts just like a 3812/16 or 4028 IPDS printer.  Host users do not need to learn any new operational commands or functions as the I-O product emulates the IBM IPDS printer.

Host print jobs are sent to printer in the EBCDIC character set and with IPDS commands.  The EBCDIC characters are converted into ASCII and the IPDS commands are converted into PCL 5e, PGL and PJL.  The laser printer then interprets the commands generating the printed output.

When the IBM host's printer queue has been emptied of all jobs for a specific printer, the host will wait for a period of time as defined in the PSF object, and then terminate the connection between the I-O product and the host.  When new jobs are posted to the queue, the IBM host will then reestablish connection with the I-O product.

## *Running an IPDS Printer Session*

The IPDS Printer Emulation session will automatically connect to the IBM host when the following occurs:

- On software print server products, when the session is started.
- On external hardware products such as print servers or thin clients, when the product is restarted.
- In the case of internal HP LaserJet DIMMs, CompactFlash or USB device when the printer is powered up.

To end the connection with the IBM host, do one of the following:

- On software print server products and some thin client models, stop the session.
- On external hardware products,  power down the product.

# *Digital Printer Finishing Features*

Digital printers offer more functionality than line or laser printers in the form of "finishing features". Finishing features includes stapling, stitching, folding, inserting, punching and so on. Document management features (such as queuing, multiple copies, etc.) are also considered to be part of the finishing feature set.

Finishing features can be accessed through two different methods - through issuance of native IPDS commands or through I-O's Configuration Utility or ***adaptio*** Management Utility.

## Canon

Canon imageRUNNER models that are supported by I-O Print Servers are:

| | |
|---|---|
| I-O 5435dp: | Models with a fully functional parallel port including: |
| | imageRUNNER 330, 400, 550, 600, 60, 2200, 3300, 3800, 5000, 6000 |
| I-O 5755dp: | All imageRUNNER models with output speeds of 22 ppm and greater |
| I-O 5435dp: | All imageRUNNER models with output speeds of 22 ppm and greater |

### Configure the imageRUNNER

For models 330, 400, 550, 600 and 60, the following configuration settings must be made before using the I-O Print Server with the imageRUNNER:

| | |
|---|---|
| Server Version: | 2.0 or higher |
| Enable Parallel Port: | Yes |
| Port Timeout in Seconds: | 30 |
| Ignore EOF Character: | Yes |
| Parallel Connection: | Direct Connection |
| Font Source: | Internal |

For models 2200, 3300, 3800, 5000, and 6000, make certain that the parallel port is enabled and the time out has been set at 30 seconds or longer.

The following imageRUNNER models must be equipped with the latest firmware that supports the EFI Compatibility Mode. Also, make certain that the EFI Compatibility Mode has be activated. The minimum system firmware version must be:

| | |
|---|---|
| imageRUNNER models 2200/2800/3300 | Version 34.04 |
| imageRUNNER models 5000/6000 | Version 72.01 |
| imageRUNNER models 7200/8500/105 | Version 63.01 |

When using an I-O 5755dp or 5735dp gateway print server, the bi-directional setting in the imageRUNNER printer must be activated. To turn on the bidirectional setting at the imageRUNNER:

1. Press the Additional Functions button on the panel.
2. Select System Settings on the touch screen.
3. Select Network Settings.
4. Select TCP/IP Settings.
5. Select RAW Settings.
6. Within the Raw Settings screen, select ON.

7. With the RAW / Use Bidirectional screen, select ON.
8. Press OK.
9. Press DONE repeatedly until returned to the normal operating screen.

When the bi-directional setting is turned on, the imageRUNNER will report the following conditions to the I-O Print Server. The print server will in turn report the appropriate printer status to the IBM host:

- Power Off is reported as Device Not Ready
- Paper Jam is reported as Device Not Ready
- Cover Open is reported as Device Not Ready
- Paper Out is reported as Paper Out
- True Print Complete reporting via PCL Echo is available.

True Print Complete Note: When the bi-directional setting is turned on, the I-O Print Server's IPDS "true print complete" function will also be available to use. It should be noted that even though the I-O Print Server reports the page as being printed to the IBM Host, the actual page may still be in the imageRUNNER printer's spool awaiting printing.

**Using Native IPDS Commands**

When using native IPDS commands, the user enters the appropriate IPDS command in printer file or form definition file. The I-O IPDS Print Server converts those commands into Canon's PJL and passes them on to the Canon printer. This method allows document level control of finishing features (each document may have its own unique combination of finishing functions that are applied to it).

IBM's native IPDS finishing features that can be accessed in this manner include the following:

| FINISHING FEATURE | OPTIONS |
|---|---|
| Staple | Top-Right Corner<br>Top-Left Corner<br>Bottom-Left Corner<br>Two Up<br>Two Low<br>Two Lef |
| Stitch | Saddle<br>Edge |
| Cut | Separation<br>Perforation |
| Fold<br>Z-Fold<br>Punch | |

For more information, refer to the following IBM publications:

*AS/400 Guide to AFP and PSF S544-5319*
*AS/400 Printer Device Programming SC41-3713*
*IBM AS/400 Printing IV GG24-4289*
*Print Services Facility/MVS: Application Programming Guide S544-3673*
*Print Services Facility/MVS: System Programming Guide S544-3672*
*IBM Page Printer Formatting Aid: User's Guide S544-5284*

## Using the I-O Configuration Utility

This method of accessing the printer's finishing features uses I-O's Configuration Utility. This utility allows the user to create a "finishing profile" that is made up of different finishing functions to be applied to jobs that are being sent from the IBM host. Several finishing profiles can be

setup and saved. Then when a particular print job needs a finishing profile applied to it, a simple instruction can be sent from the IBM host to activate the desired combination of finishing features.

From the host, the user selects an output bin or "drawer" as the target location for the printed job. The drawer can be selected in a printer file or form definition file. When the IPDS print job along with the drawer selection that is associated with a finishing profile are received by the I-O IPDS Print Server, they are converted into the appropriate Canon PJL commands and sent on to the Canon printer.

The following steps describe how to use the I-O Configuration Utility to access finishing features:

1. Open the I-O Configuration Utility.
2. From List of Devices screen, double click on an 5435dp, 5755dp or 5735dp Gateway Print Server.
3. Select the IPDS/AFP tab.
4. Under the desired session (you may have up to three sessions), click the Advanced button.
5. Click on the Finishing Profile tab.
6. Check the Enable Host Finishing Commands box.
7. In the IBM Drawer field, select the IBM Host output drawer for which you want to setup finishing functions.
8. To choose a finishing function, check the box next to the option where the finishing function is either on or off. For those finishing functions where multiple options are available, click on the drop down box to select the desired option. Up to four different commands may be selected for each finishing profile.
9. Click OK when finished.
10. Make any other changes as appropriate, then reset the print server to save the settings.

Refer to the Help file for specific details on each of the options.

This method allows the user to define different combinations of finishing functions that can be called at any time by simply sending to the I-O Print Server an IPDS print job that includes an output drawer selection that will trigger the appropriate finishing functions.

### Using the *adaptio* Management Utility

This method of accessing the printer's finishing features uses I-O's ***adaptio*** Management Utility. This utility allows the user to create a “finishing profile” that is made up of different finishing functions to be applied to jobs that are being sent from the IBM host. Several finishing profiles can be setup and saved. Then when a particular print job needs a finishing profile applied to it, a simple instruction can be sent from the IBM host to activate the desired combination of finishing features.

From the host, the user selects an output bin or "drawer" as the target location for the printed job. The drawer can be selected in a printer file or form definition file. When the IPDS print job along with the drawer selection that is associated with a finishing profile are received by the I-O IPDS Print Server, they are converted into the appropriate Canon PJL commands and sent on to the Canon printer.

The following steps describe how to use the ***adaptio*** Management Utility to access finishing features:

1. Open the Management Utility.
2. From List of Sessions screen, double click on an IPDS session.
3. Click the Advanced Setup Options button.

4. Click on the Finishing Profile tab.
5. In the IBM Drawer field, select the IBM Host output drawer for which you want to setup a finishing profile.
6. To choose a finishing function, check the box next to the option where the finishing function is either on or off. For those finishing functions where multiple options are available, click on the drop down box to select the desired option. Up to four different commands may be selected for each finishing profile.
7. Click OK when finished.
8. Make any other changes as appropriate, then reset the print server to save the settings.

Refer to the Help file for specific details on each of the options.

This method allows the user to define different combinations of finishing functions that can be called at any time by simply sending to the I-O Print Server an IPDS print job that includes an output drawer selection that will trigger the appropriate finishing functions.

## PCL Tray Assignment for Input Trays

The following table has been included to aid in mapping IBM Drawers to the imageRUNNER printer's input trays. This is done through the I-O Configuration Utility by associating the IBM Drawer number with the appropriate Canon input tray using that tray's PCL reference number. Please refer to the printer's user's guide for models not included.

| **Models 330/400** | **Models 550/600** | **Models 2200/2800/3300<br>Models 2220/2820/3320/4520<br>Models 2270/2870/3570/4570<br>Models C3100/C3200/C6800** |
|---|---|---|
| | | |
| 8- Paper Cassette 1 | 8- Drawer 1 | 1- Paper Cassette 1 |
| 4- Paper Cassette 2 | 4- Drawer 2 | 4- Paper Cassette 2 |
| 5- Paper Cassette 3 | 5- Drawer 3 | 5- Paper Cassette 3 |
| 20-Paper Cassette 4 | 20-Drawer 4 | 20-Paper Cassette 4 |
| 21-Paper Cassette 5 | | |
| 22-Paper Cassette 6 | | |
| 2- Manual Feed / Stack Bypass | 2- Main Feed/ Stack Bypass | 2- Multipurpose Tray |
| 23-Side Pack Deck | 23-Side Paper Deck | 21-Side Paper Deck |
| | 3- Manual Envelope | |
| | 6- Envelope Feeder | 6- Envelope Feeder |
| | 7- Auto Select | |
| 1- Main Paper Source (defined in copier setup) | 1- Main Paper Source (defined in copier setup) | |

| **Models 5000/6000** | **Models 7200/8500/105**<br>**Models 7086/7095/7105**<br>**Models C5870/6870**<br>**Models 5570/6570** |
|---|---|
| | |
| 5- Right Deck (1) | 1- Right Deck (1) |
| 1- Left Deck (2) | 4- Left Deck (2) |
| 4- Upper Cassette (3) | 5- Upper Cassette (3) |
| 6- Lower Cassette (4) | 20-Lower Cassette (4) |
| | |
| | |
| 2- Multipurpose Tray | 2- Multipurpose Tray |
| | |
| 8- Paper Deck | 21-Side Paper Deck |
| | |
| | |
| | 7- Auto Select (undocumented) |

The main paper source can be any tray as defined in the printer's setup. For models not included here, please refer to the printers user's guide for the Input Tray PCL command number.

## Operational Notes

Not all finishing options listed in the previous section are available on every imageRUNNER model.

**Preset Mail Boxes:** Preset mail box assignments are embedded in the print server. A finishing profile is not required to use the preset mail box assignments. A user only needs to select at the IBM host an IBM output drawer number of 150 through 249 to cause their print jobs to be redirected to the imageRUNNER mail boxes.

The check box in front of Mail Box must be checked for the finishing profile's mail box selection to be active. (The check box is not used for preset mail box assignments.)

**Department ID:** If the Department ID function has been setup on the imageRUNNER printer to control what print jobs may be sent to that printer, you will need to enter that value in the Department ID field (a numeric value from 1 to 7 digits in length) as well as a Password (a numeric value from 1 to 10 digits in length). These are global values (they are the same for all finishing profiles). Only IBM host jobs sent via a finishing profile will include the Department ID.

**Booklets:** When printing and 8 ½ x 11" booklet using 11 x 17" paper, in the Configuration or Management Utility's paper handling section, you will need to map the printer's 11 x 17" paper tray as 8 ½ x 11". Then when printing from the IBM host, send the input paper bin that coordinates with this new tray mapping. The printer will recognize that it is receiving 8 ½ x 11" pages, but will be using 11x 17" paper. The stapling option of Saddlestitch must also be selected to cause the imageRUNNER to fold and staple booklet.

Do not use the finishing profile's option for number of pages when using booklet. The number of copies must be specified at the IBM host.

**Auto Roll of Paper Trays:** It may be desirable to have the printer automatically switch from one paper tray to another of the same page size when the first tray is emptied. This can be accomplished by select "0" as the PCL tray ID in the Configuration or Management Utility's paper handling section. The paper size must be specified. For example, if the high capacity tray, trays 1 and 2 all contained 8 ½ x 11" paper and you wanted the printer to automatically roll from one tray to the next when a tray becomes empty, you would use this option.

**Proof Copy:** This option must be used in conjunction with the Mailbox option. The entire job will be stored in the mail box and the first five pages will be printed for the user's review.

**Sorter Mode:** This option must be used in conjunction with the Copies option. Selecting Off will cause multiple copy jobs to be grouped and offset in the out put tray. Selecting collate will cause the job to be printed in sequence, with each copy offset in the out put tray. Selecting Group will cause all copies of page 1 to be printed, then offset for page 2, and so on. Note that when multiple copies are selected at the IBM host, these sorter mode options are not in effect.

**Interleave:** This option will cause the output to go to the top tray.

**Number of Copies**: Use this option to print multiple copies of a job that does not require any other finishing operations. Do not use this option in conjunction with any other finishing operation. For example, if multiple copies were desired of a booklet, set this option to 1 and at the IBM host, set the host to print the number of copies desired.

# Troubleshooting

This chapter contains solutions for problems you may encounter while using the IPDS Printer Emulation product. If a problem persists even after you implement the solutions provided here, or if you encounter a problem not listed here, please refer to the following resources:

- The I-O Knowledge Base at www.iocorp.com.
- The user's guide for the specific I-O product.
- Your I-O Dealer
- I-O's Technical Support Group at 801-973-6767 or by email at support@iocorp.com.

| ***Problem*** | ***Solution*** |
|---|---|
| • The target printer will not respond to a Ping. | ✓ If you have problems pinging the printer:<br>▪ Verify the configuration of the I-O product, including the printer's correct TCP/IP address and any intervening devices such as routers and bridges.<br>▪ Verify the I-O product (if applicable) is turned on, and the printer is turned on and in a READY state.<br>▪ Verify the IBM host's TCP/IP interface is active. |
| • The Print Writer ends | ✓ If I have not heard of this and neither has Gary M.when you initialize, if for IPDS printing and issues a message PQT3603, check for the following error codes:<br>• "10" means an incorrect RMTSYS (V3R1 or V3R6) or RMTLOCNAME (V3R2, V3R7, or above) has been specified for the printer.<br>• "15" means that PSF/400 timed out waiting for the printer's response. Check the Activation Timer value entered when using WRKAFP2 (V3R1 or V3R6), CRTPSFCFG (V3R2), or CRTDEVPRT (V3R7 or above).<br>• Codes "20-39" indicate a general communications failure. Make sure all of the network components are operational.<br>• Codes "40-59" indicate a logic error between PSF and the printer control unit. Contact IBM support. |
| • Spooled print file remains in PND status. | ✓ Check the output queue with the command WRKOUTQ OUTQ (queuename)<br><br>This typically indicates PSF/400 is waiting for a response from the printer. This can be verified by displaying the QSPL subsystem. WRKACTJOB SBS(QSPL). If the status of the PDJ job for the printer is SELW, then PSF/400 is waiting for a response from the printer. Make sure the printer is online and |

| | |
|---|---|
| | in READY status and all network connections between the AS/400 and the printer are active. |
| • Spooled files disappear without printing. | ✓ To resolve this problem:<br>• Check the correct printer queue name and IP address have been used.<br>• Ping the IP address. If the ping is successful, disconnect the network cable from the printer, and ping the address again. If the ping is still successful, there is another network device using the IP address |
| • Data is being clipped. | ✓ To resolve this problem, set the PSC (Page Size Control) parameter to *YES in the WRKAFP2 (V3R1 and V3R6) command or in the CRTPSFCFG command (V3R2, V3R7 or above). |
| • Euro symbol is not printing. | ✓ Check the following:<br>• Make certain the most recent version of the Windows 3.1 Latin 1 character set containing the Euro symbol is resident in the printer.<br>• Make certain your AS/400 has the latest PTFs installed<br>• Make certain your AS/400 is sending out one of the following Euro Country Extended Code Pages:<br>Code Page — Description<br>1140 — USA, Canada<br>1141 — Austria, Germany<br>1142 — Denmark, Norway<br>1143 — Finland, Sweden<br>1144 — Italy<br>1145 — Spain, Latin America<br>1146 — UK<br>1147 — France<br>1148 — International<br>• When one of these code pages is sent by the AS/400, the I-O product will automatically convert the AS/400's Euro Country Extended Code Page into the Windows 3.1 Latin 1 (Euro version) character set and send the instruction to the laser printer to print the Euro symbol. The laser printer must have the Windows 3.1 Latin 1 Euro character set resident in order to print the Euro symbol. |
| • IBM host pages get printed in with LAN pages. | ✓ The laser printer's i/o time out value must be set to a minimum of 15 seconds longer than the IBM host's PSF "Release Timer" setting. By default, the host setting is for 15 seconds. Therefore the printers i/o time out value would be 30 seconds. |

# Appendix A - IPDS Fonts

The IPDS Printer Emulation generally maps IPDS fonts requested from the host to PCL fonts resident in the printer. The following table shows how IPDS fonts are mapped to PCL fonts, depending on which “Font Mapping” parameter is active. When the pitch of the PCL font is not identical to the pitch of the original IPDS font, the I-O product causes the spacing between the characters to be adjusted to produce comparable print output. In some cases where the font in the printer differs drastically from the IBM host, the IBM font has been stored in the I-O product and is downloaded to the printer. Fonts not included in this listing are downloaded form the IBM host.

| IBM | | | Best Fit | | 4028/43xx Compatible | | 3812/16 Compatible | |
|---|---|---|---|---|---|---|---|---|
| **FGID** | **Name** | **CPI/pt** | **PCL Font** | **CPI/pt** | **PCL Font** | **CPI/pt** | **PCL Font** | **CPI/pt** |
| 0003 | OCR B | 10 CPI | Resident in the I-O product | | | | | |
| 0005 | Rhetoric | 10 CPI | Letter Gothic | 10 CPI | Courier | 10 CPI | Letter Gothic | 10 CPI |
| 0011 | Courier | 10 CPI | Courier | 10 CPI | Courier | 10 CPI | Courier | 10 CPI |
| 0012 | Prestige Pica | 10 CPI | Courier | 10 CPI | Courier | 10 CPI | Courier | 10 CPI |
| 0013 | Artisian | 10 CPI | Courier | 10 CPI | Courier | 10 CPI | Courier | 10 CPI |
| 0018 | Courier italic | 10 CPI | Courier italic | 10 CPI | Courier italic | 10 CPI | Courier italic | 10 CPI |
| 0019 | OCR A | 10 CPI | Resident in the I-O product | | | | | |
| 0020 | Pica | 10 CPI | Courier | 10 CPI | Courier | 10 CPI | Courier | 10 CPI |
| 0026 | Matrix Gothic | 10 CPI | Courier | 10 CPI | Courier | 10 CPI | Courier | 10 CPI |
| 0030 | Math Symbol | 10 CPI | Courier | 10 CPI | Courier | 10 CPI | Courier | 10 CPI |
| 0031 | Aviv | 10 CPI | Courier | 10 CPI | Courier | 10 CPI | Courier | 10 CPI |
| 0038 | Orator bold | 10 CPI | Letter Gothic bold | 10 CPI | Courier bold | 10 CPI | Letter Gothic bold | 10 CPI |
| 0039 | Gothic bold | 10 CPI | Letter Gothic bold | 12 CPI | Courier bold | 10 CPI | Letter Gothic bold | 12 CPI |
| 0040 | Gothic | 10 CPI | Letter Gothic | 12 CPI | Courier | 10 CPI | Letter Gothic | 12 CPI |
| 0041 | Roman | 10 CPI | Letter Gothic | 12 CPI | Courier | 10 CPI | Letter Gothic | 12 CPI |
| 0042 | Serif Text | 10 CPI | Letter Gothic | 12 CPI | Courier | 10 CPI | Letter Gothic | 12 CPI |
| 0043 | Serif italic | 10 CPI | Letter Gothic italic | 12 CPI | Courier italic | 10 CPI | Letter Gothic italic | 12 CPI |
| 0044 | Katakana Gothic | 10 CPI | Letter Gothic | 10 CPI | Courier | 10 CPI | Letter Gothic | 10 CPI |
| 0046 | Courier bold | 10 CPI | Courier bold | 10 CPI | Courier bold | 10 CPI | Courier bold | 10 CPI |
| 0049 | Shalom | 10 CPI | Letter Gothic | 10 CPI | Courier | 10 CPI | Letter Gothic | 10 CPI |
| 0050 | Shalom bold | 10 CPI | Courier | 10 CPI | Courier bold | 10 CPI | Courier | 10 CPI |
| 0051 | Matrix Gothic | 10 CPI | Letter Gothic | 10 CPI | Courier | 10 CPI | Letter Gothic | 10 CPI |
| 0052 | Courier | 10 CPI | Courier | 10 CPI | Courier | 10 CPI | Courier | 10 CPI |
| 0055 | Aviv bold | 10 CPI | Courier | 10 CPI | Courier bold | 10 CPI | Courier bold | 10 CPI |
| 0066 | Gothic | 12 CPI | Letter Gothic | 14 CPI | Courier | 12 CPI | Letter Gothic | 14 CPI |
| 0068 | Gothic italic | 12 CPI | Letter Gothic italic | 14 CPI | Courier italic | 12 CPI | Letter Gothic italic | 14 CPI |
| 0069 | Gothic bold | 12 CPI | Letter Gothic bold | 14 CPI | Courier bold | 12 CPI | Letter Gothic bold | 14 CPI |
| 0070 | Serif Text | 12 CPI | Letter Gothic | 12 CPI | Courier | 12 CPI | Letter Gothic | 12 CPI |
| 0071 | Serif italic | 12 CPI | Letter Gothic italic | 12 CPI | Courier italic | 12 CPI | Letter Gothic italic | 12 CPI |
| 0072 | Serif bold | 12 CPI | Letter Gothic bold | 12 CPI | Courier bold | 12 CPI | Letter Gothic bold | 12 CPI |
| 0076 | APL/TN | 12 CPI | Courier | 12 CPI | Courier | 12 CPI | Courier | 12 CPI |
| 0080 | Math Symbol | 12 CPI | Courier | 12 CPI | Courier | 12 CPI | Courier | 12 CPI |
| 0084 | Script | 12 CPI | Courier | 12 CPI | Courier | 12 CPI | Courier | 12 CPI |
| 0085 | Courier | 12 CPI | Courier | 12 CPI | Courier | 12 CPI | Courier | 12 CPI |
| 0086 | Prestige Elite | 12 CPI | Courier | 12 CPI | Courier | 12 CPI | Courier | 12 CPI |
| 0087 | Letter Gothic | 12 CPI | Resident in the I-O product | | | | | |
| 0091 | Light italic | 12 CPI | Letter Gothic italic | 12 CPI | Courier italic | 12 CPI | Courier italic | 12 CPI |
| 0092 | Courier italic | 12 CPI | Courier italic | 12 CPI | Courier italic | 12 CPI | Courier | 12 CPI |
| 0098 | Shalom | 12 CPI | Letter Gothic | 12 CPI | Courier | 12 CPI | Courier | 12 CPI |
| 0099 | Aviv | 12CPI | Letter Gothic | 12 CPI | Courier | 12 CPI | Courier | 12 CPI |
| 0101 | Shalom bold | 12 CPI | Courier bold | 12 CPI | Courier bold | 12 CPI | Courier bold | 12 CPI |
| 0102 | Aviv bold | 12 CPI | Courier bold | 12 CPI | Courier bold | 12 CPI | Courier bold | 12 CPI |
| 0110 | Letter Gothic bold | 12 CPI | Resident in the I-O product | | | | | |
| 0111 | Prestige Elite bold | 12 CPI | Courier bold | 12 CPI | Courier bold | 12 CPI | Courier bold | 12 CPI |

| IBM | | | Best Fit | | 4028/43xx Compatible | | 3812/16 Compatible | |
|---|---|---|---|---|---|---|---|---|
| **FGID** | **Name** | **CPI/pt** | **PCL Font** | **CPI/pt** | **PCL Font** | **CPI/pt** | **PCL Font** | **CPI/pt** |
| 0112 | Prestige Elite italic | 12 CPI | Courier italic | 12 CPI | Courier italic | 12 CPI | Courier italic | 12 CPI |
| 0155 | Boldface italic | 10 Pt | Times New italic | 10 Pt | Times New | 11 Pt | Times New italic | 10 Pt |
| 0158 | Modern | 11 Pt | Times New | 11 Pt | | | Times New | 11 Pt |
| 0159 | Boldface | 11 Pt | Times New bold | 11 Pt | Times New | 11 Pt | Times New bold | 11 Pt |
| 0160 | Essay | 10 Pt | Arial | 11 Pt | Courier | 11 Pt | Arial | 11 Pt |
| 0162 | Essay italic | 10 Pt | Arial italic | 11 Pt | Courier | 11 Pt | Arial italic | 11 Pt |
| 0163 | Essay bold | 10 Pt | Arial bold | 11 Pt | Times New | 11 Pt | Arial | 11 Pt |
| 0164 | Prestige | 12 Pt | Courier | 12 Pt | Courier | 11 Pt | Arial | 11 Pt |
| 0167 | Barak | 10 Pt | Times New | 11 Pt | Courier | 11 Pt | Times New | 11 Pt |
| 0168 | Barak bold | 10 Pt | Times New bold | 11 Pt | Times New | 11 Pt | Times New bold | 11 Pt |
| 0173 | Essay light | 10 Pt | Arial light | 11 Pt | Courier | 11 Pt | Courier | 11 Pt |
| 0175 | Document | 12 Pt | Times New | 11 Pt | Courier | 11 Pt | Times New | 11 Pt |
| 0178 | Barak | 7 Pt | Times New | 7 Pt | Letter Gothic | 20 CPI | Times New bold | 11 Pt |
| 0179 | Barak bold | 7 Pt | Times New bold | 7 Pt | Letter Gothic | 20 CPI | Times New bold | 11 Pt |
| 0180 | Barak | 9 Pt | Times New | 9 Pt | Courier | 15 CPI | Times New bold | 11 Pt |
| 0181 | Barak bold | 9 Pt | Times New bold | 9 Pt | Courier | 15 CPI | Times New bold | 11 Pt |
| 0182 | Barak | 22 Pt | Times New | 22 Pt | Courier | 10 CPI | Times New bold | 11 Pt |
| 0183 | Barak bold | 22 CPI | Times New bold | 22 CPI | Courier bold | 10 CPI | Times New bold | 11 CPI |
| 0204 | Gothic Text | 13.3CPI | Letter Gothic | 13.3CPI | Courier | 15 CPI | Letter Gothic | 13.3CPI |
| 0211 | Shalom | 15 CPI | Letter Gothic | 15 CPI | Courier | 15 CPI | Letter Gothic | 15 CPI |
| 0212 | Shalom bold | 15 CPI | Courier bold | 15 CPI | Courier | 15 CPI | Courier | 15 CPI |
| 0221 | Prestige Elite italic | 15 CPI | Gothic | 15 CPI | Gothic | 15 CPI | Gothic | 15 CPI |
| 0222 | Gothic | 15 CPI | Letter Gothic | 15 CPI | Courier | 15 CPI | Letter Gothic | 16.7CPI |
| 0223 | Courier | 15 CPI | Courier | 15 CPI | Courier | 15 CPI | Courier | 15 CPI |
| 0225 | Math Symbol | 15 CPI | Courier | 12 CPI | Courier | 15 CPI | Courier | 12 CPI |
| 0226 | Shalom | 15 CPI | Letter Gothic | 15 CPI | Courier | 15 CPI | Letter Gothic | 16.7CPI |
| 0229 | Serif Text | 15 CPI | Courier | 15 CPI | Courier | 15 CPI | Courier | 15 CPI |
| 0230 | Gothic | 15 CPI | Letter Gothic | 16.7CPI | Courier | 15 CPI | Letter Gothic | 16.7CPI |
| 0234 | Shalom bold | 15 CPI | Letter Gothic bold | 16.7CPI | Courier | 15 CPI | Letter Gothic bold | 16.7CPI |
| 0244 | Courier | 5 CPI | Courier light | 8 CPI | Courier | 10 CPI | Courier light | 8 CPI |
| 0245 | Courier bold | 5 CPI | Courier bold | 8 CPI | Courier bold | 10 CPI | Courier bold | 8 CPI |
| 0247 | Shalom bold | 17 CPI | Courier bold | 17 CPI | Courier | 17.1CPI | Courier bold | 17 CPI |
| 0248 | Shalom | 17 CPI | Courier | 17 CPI | Courier | 17.1CPI | Courier | 17.1CPI |
| 0252 | Courier | 17 CPI | Courier | 14 CPI | Courier | 17.1CPI | Courier | 14 CPI |
| 0253 | Courier bold | 17.1CPI | Courier bold | 14 CPI | Courier | 17.1CPI | Courier bold | 14 CPI |
| 0254 | Courier | 17.1CPI | Courier | 17.1CPI | Courier | 17.1CPI | Courier | 14 CPI |
| 0256 | Prestige | 17.1CPI | Courier | 17.1CPI | Courier | 17.1CPI | Courier | 14 CPI |
| 0281 | Letter Gothic | 20 CPI | Letter Gothic | 20 CPI | Letter Gothic | 20 CPI | Letter Gothic | 20 CPI |
| 0282 | Aviv | 20 CPI | Letter Gothic | 20 CPI | Letter Gothic | 20 CPI | Letter Gothic | 20 CPI |
| 0290 | Letter Gothic | 27 CPI | Letter Gothic | 27 CPI | Letter Gothic | 20 CPI | Letter Gothic | 20 CPI |
| 0416 | Courier | Scalable | | | Courier | Scalable | | |
| 0420 | Courier bold | Scalable | | | Courier bold | Scalable | | |
| 0424 | Courier italic | Scalable | | | Courier italic | Scalable | | |
| 0428 | Courier italic bold | Scalable | | | Courier italic bold | Scalable | | |
| 0751 | Sonoran Serif | 8 Pt | CG Times | 8 Pt | CG Times | 8 Pt | CG Times | 8 Pt |

| IBM | | | Best Fit | | 4028/43xx Compatible | | 3812/16 Compatible | |
|---|---|---|---|---|---|---|---|---|
| **FGID** | **Name** | **CPI/pt** | **PCL Font** | **CPI/pt** | **PCL Font** | **CPI/pt** | **PCL Font** | **CPI/pt** |
| 0752 | Naseem | 8 Pt | CG Times | 8 Pt | Courier | 12 CPI | Letter Gothic | 20 CPI |
| 0753 | Naseem bold | 8 Pt | CG Times bold | 8 Pt | Courier | 12 CPI | Letter Gothic | 20 CPI |
| 0754 | Naseem bold | 10 Pt | CG Times | 10 Pt | Courier | 12 CPI | Courier | 12 CPI |
| 0755 | Naseem bold | 14 Pt | CG Times | 14 Pt | Courier | 12 CPI | Courier | 10 CPI |
| 0756 | Naseem italic | 8 Pt | CG Times italic | 8 Pt | Courier | 12 CPI | Letter Gothic | 20 CPI |
| 0757 | Naseem italic bold | 8 Pt | CG Times italic bold | 8 Pt | Courier | 12 CPI | Letter Gothic | 20 CPI |
| 0758 | Naseem italic bold | 10 Pt | CG Times italic bold | 10 Pt | Courier | 12 CPI | Courier | 12 CPI |
| 0759 | Naseem italic bold | 14 Pt | CG Times italic bold | 14 Pt | Courier | 12 CPI | Courier | 10 CPI |
| 0760 | Times Roman | 6 Pt | CG Times | 6 Pt | CG Times | 6 Pt | Letter Gothic | 27 CPI |
| 0761 | Times Roman bold | 12 Pt | CG Times bold | 12 Pt | CG Times bold | 12 Pt | Letter Gothic | 20 CPI |
| 0762 | Times Roman bold | 14 Pt | CG Times bold | 14 Pt | CG Times bold | 14 Pt | Letter Gothic | 16.7CPI |
| 0763 | Times Roman italic | 12 Pt | CG Times italic | 12 Pt | CG Times italic | 12 Pt | Letter Gothic | 20 CPI |
| 0764 | Times Roman italic bold | 10 Pt | CG Times bold italic | 10 Pt | Letter Gothic | 10 Pt | Letter Gothic | 27 CPI |
| 0765 | Times Roman italic bold | 12 Pt | CG Times bold italic | 12 Pt | Letter Gothic | 12 Pt | Letter Gothic | 20 CPI |
| 1051 | Sonoran Serif | 10 Pt | CG Times | 10 Pt | CG Times | 10 Pt | CG Times | 11 Pt |
| 1053 | Sonoran Serif bold | 10 Pt | CG Times bold | 10 Pt | CG Times bold | 10 Pt | CG Times bold | 11 Pt |
| 1056 | Sonoran Serif italic | 10 Pt | CG Times italic | 10 Pt | CG Times italic | 10.5 Pt | CG Times italic | 11 Pt |
| 1351 | Sonoran Serif | 12 Pt | CG Times | 12 Pt | CG Times | 12 Pt | CG Times | 13 Pt |
| 1653 | Sonoran Serif bold | 16 Pt | CG Times bold | 16 Pt | CG Times bold | 16 Pt | CG Times bold | 16 Pt |
| 1803 | Sonoran Serif bold | 18 Pt | CG Times bold | 18 Pt | CG Times bold | 18 Pt | CG Times bold | 12 CPI |
| 2103 | Sonoran Serif bold | 24 Pt | CG Times bold | 24 Pt | CG Times bold | 24 Pt | CG Times bold | 22 Pt |
| 2304 | Helvetica | Scalable | | | Arial | Scalable | | |
| 2305 | Helvetica bold | Scalable | | | Arial bold | Scalable | | |
| 2306 | Helvetica italic | Scalable | | | Arial italic | Scalable | | |
| 2307 | Helvetica italic bold | Scalable | | | Arial italic bold | Scalable | | |
| 2308 | Times New Roman | Scalable | | | Times New | Scalable | | |
| 2309 | Times New Roman bold | Scalable | | | Times New bold | Scalable | | |
| 2310 | Times New Roman italic | Scalable | | | Times New italic | Scalable | | |
| 2311 | Times New Roman italic bold | Scalable | | | Times New italic bold | Scalable | | |
| 4407 | Sonoran Serif med. | 6 Pt | CG Times | 6 Pt | | | | |
| 4427 | Sonoran Serif bold | 9 Pt | CG Times bold | 9 Pt | | | | |
| 4535 | Sonoran Serif italic | 9 CPI | CG Times italic | 9 CPI | | | | |
| 4555 | Sonoran Serif italic bold | 10 CPI | CG Times italic bold | 10 CPI | | | | |
| 5067 | Goudy bold italic | 10 Pt | CG Times bold | 11 Pt | CG Times bold | 11 Pt | CG Times bold | 11 Pt |
| 5687 | Sonoran Serif med. | 8 CPI | CG Times | 8 CPI | CG Times bold | 8 CPI | | |
| 5707 | Times Roman bold | 12 CPI | CG Times bold | 15.75CPI | CG Times bold | 15.75CPI | | |
| 5815 | Times Roman italic | 12 CPI | CG Times italic | 12 CPI | CG Times italic | 12 CPI | | |
| 5835 | Times Roman italic bold | 10 CPI | CG Times bold italic | 10 CPI | CG Times bold italic | 10 CPI | | |
| 16951 | Sonoran Serif med. | 12 CPI | CG Times | 12 CPI | | | | |
| 16971 | Sonoran Ser med bold | 12 CPI | CG Times bold | 12 CPI | | | | |
| 17079 | Sonoran Serif med italic | 12 CPI | CG Times italic | 12 CPI | | | | |
| 17099 | Sonoran Ser med ital bold | 12 CPI | CG Times italic bold | 12 CPI | | | | |