IBM Network Printers
IBM InfoPrint 20
IBM InfoPrint 32

PCL5e/PostScript Technical Reference

S544-5344-02

Note

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About This Book

Purpose of This Book

This book contains technical reference information about how Network Printers support PCL5e and PostScript data streams. It is intended for the system programmers, application programmers, and systems engineers who write or modify programs to operate Network Printers with PCL5e and PostScript data streams.

Note: This books assumes readers are familiar with the data stream they write programs for. It is intended only as a supplement to the following non-IBM publications:

- *PostScript Language Reference Manual* second edition, by Adobe Systems, Inc.
- *PCL 5 Printer Language Technical Reference Manual* by Hewlett-Packard, Inc.
- *PCL 5 Comparison Guide* by Hewlett-Packard, Inc.
- *Printer Job Language Technical Reference Manual* by Hewlett-Packard, Inc.

Terminology

Network Printers

In this book, the generic term *network printer* refers to:

- Network Printer 12 (NP 12)
- Network Printer 17 (NP 17)
- Network Printer 24 (NP 24)
- InfoPrint 20 (IP 20)
- InfoPrint 32 (IP 32)

Paper Input and Output Receptacles

Input receptacles are called trays. Output receptacles are called stackers or bins.

Related Publications

Each network printer includes documentation that shows how to set up and operate the printer.

Other publications include:

- *IBM Network Printers: IPDS and SCS Technical Reference*, S544-5312
- *IBM Network Printers: Ethernet and Token Ring Configuration Guide*, G544-5499
- *IBM Network Printers: Twinax/Coax Configuration Guide*, G544-5241

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Conventions Used

The following typeface conventions are used in this publication.

Table 1. Typographic Conventions

Typographic Convention	**Meaning**
clearable warnings	Italics are used for variables
-**duplex** *boolean*	Plain italics and lowercase are used for options and switches for either commands or variables
[. . . .]	Items in brackets [.....] indicate optional parameters. (Do not type the brackets when you enter the command.)
< >	Identifies a control code character, such as <CR> for carriage return, or a special identifier.
<	Indicates that the current line of code is a continuation of the previous line.

Chapter 1. PostScript Interpreter

Chapter Overview

This chapter describes the parameters and resources present in the PostScript interpreter for network printers. This information is intended to be used with the *PostScript Language Reference Manual* second edition, by Adobe Systems, Inc.

The following topics are discussed in this chapter:

- Device setup
- Interpreter parameters
- Resource categories
- Compatibility operators
- PostScript fonts

Important! Network Printer 12, Network Printer 17, and Network Printer 24, support PostScript 2. InfoPrint 20 and InfoPrint 32 support PostScript 3.

Paper Source Selection

PostScript paper tray selection conforms to the media selection concepts detailed in the *PostScript Language Reference Manual*.

Media selection occurs by means of a match between what a job says it needs and what the printer says is available. Both “what is needed” and “ what is known” are expressed as media attributes.

To contain what is known, the printer builds an InputAttributes dictionary at the beginning of each job; the dictionary contains an entry for each available tray.

The entry for each tray contains attributes for the media in that tray. PostScript defines four attributes: PageSize, MediaColor, MediaType, and MediaWeight. PageSize is the numerical dimensions of the paper in the tray. The remaining attributes are descriptive strings.

Table 2 lists PostScript tray attributes and related parameters, how their default values are determined, and how these default values can be changed.

Table 2. PostScript Tray Attributes and Feeder Parameters

Tray/Attribute	Default	Menu	PostScript Job
Standard Tray (Tray 1)			
PageSize	autosensed[1]	no	read-only
MediaColor	null	no	yes
MediaType	null	no	yes
MediaWeight	null	no	yes
High Capacity Trays			
PageSize	autosensed	no	read-only
MediaColor	null	no	yes

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Table 2. PostScript Tray Attributes and Feeder Parameters (continued)

Tray/Attribute	Default	Menu	PostScript Job
MediaType	null	no	yes
MediaWeight	null	no	yes
Auxiliary Tray			
PageSize	AUXSIZE=	yes	yes
MediaColor	null	no	yes
MediaType	null	no	yes
MediaWeight	null	no	yes
Envelope Feeder			
PageSize	ENVSIZE=	yes	yes
MediaColor	null	no	yes
MediaType	null	no	yes
MediaWeight	null	no	yes
Other Parameters			
Priority Array	SOURCE=	yes	no
ManualFeed	MANUAL=	yes	yes
ManualFeedTimeout	print stream only	no	yes
DUPLEX	DUPLEX=	yes	yes
Tumble	BINDING=	yes	yes

Note:

1. "autosensed" means that the printer can automatically determine the size of the paper in a tray.
2. AUXSIZE, ENVSIZE, SOURCE, MANUAL, DUPLEX, and BINDING are all items on the Paper Menu.

What is needed by a job is also expressed using PageSize, MediaColor, MediaType, and MediaWeight attributes. Default values for these are determined at the beginning of every job. A job may freely change these or not according to its requirements as it executes.

For network printers, the default values for MediaColor, MediaType, and MediaWeight are null objects. However, the default value for PageSize is determined as follows.

1. If the Paper Menu setting for MANUAL is ON, then AUXSIZE is used.
2. Otherwise, if the default source tray (specified by SOURCE on the Paper Menu) is installed, its paper size is used.
3. Otherwise, Letter is used if it is available in some tray.
4. Otherwise, the page size of the first tray in the InputAttributes dictionary will be used.

Note: If an executing job turns manual feeding on (and MANUAL is OFF in the Paper Menu), the PageSize value is not changed to match AUXSIZE.

Given what is needed and what is known in the above format, media selection occurs by scanning the InputAttributes dictionary in search of an entry whose attributes match what is needed. Three cases can occur:

- Exactly one match—the matching tray is used.

- More than one match—the tray which appears first in the Priority array is used. See “InputAttributes” on page 6 for more information about priority array settings.
- No match—media selection resorts to the Policies dictionary to decide how to proceed. There are seven possible actions for PageSize mismatch. All seven actions are implemented in network printers. The default PageSize policy is 0.

  The most common media selection failure is due to a requested paper size which is not present in the printer at that moment. Of the seven actions, the two most common are to abort and flush the job with a PostScript error (Policy 0), or to pause the job to await front panel operator interaction (Policy 2).

  A tray that is empty does not affect media selection and the resulting feed tray. Standard PostScript behavior in this circumstance is to display a “LOAD paper” message and wait for operator intervention. Also, due to pipelining, media selection occurs earlier than actual paper feed which allows for the possibility that engine tray states differ when actual printing occurs.

Device Setup

The page device parameters represent particular raster output device features or processing options; the values represent the current settings of those features or options. The setpagedevice operator is used to set the values of the page device parameters and the currentpagedevice operator is used to get the current values of these parameters.

Page Device Parameters

Table 3 lists all the page device parameters present in network printers. Unless otherwise noted, these parameters apply to all network printers.

Table 3. Page Device Parameters for a /Printer device

Key	Type	Default
Note: *Value remains across power cycles or printer **Value is a constant		
BeginPage	procedure	{pop}
Collate	boolean	false
DeferredMediaSelection	boolean	false Setting DeferredMediaSelection to true enables custom page size selection. When DeferredMediaSelection is true, the page device PageSize array can be set to any size whose width is between 249 and 935, and whose height is between 419 and 1440, inclusive.
DeviceRenderingInfo*	dictionary	<</Type5 /BandPage true>> **Note:** The DeviceRenderingInfo dictionary contains information to determine whether or not banding will be used. The Type is a constant assigned by Adobe. When BandPage is true, banding will be used to render the page. When BandPage is false, enough memory is reserved to build the entire page, or pages if Duplex is true, in memory for the current PageSize. The amount of memory needed depends upon the HWResolution setting.
Duplex*	boolean	false
EndPage	procedure	{exch pop 2 ne}

Table 3. Page Device Parameters for a /Printer device (continued)

Key	Type	Default
ExitJam Recovery*	boolean	false
HW Resolution*	array	[600 600] [1200 1200] (IP 20) **Note:** The key HWResolution is used in conjunction with the Policies dictionary (see Policies below) and the amount of available memory in the printer.
ImagingBBox	array or null	null
InputAttributes	dictionary	See “InputAttributes” on page 6 for details on how slots correspond to input sources.
Install (IP 20)	procedure	The default Install procedure is as follows: { /DefaultHalftone600x600 /DefaultHalftone1200x1200 exch get /Halftone findresource sethalftone /DefaultColorRendering600x600 /DefaultColorRendering1200x1200 exch get /ColorRendering findresource setcolorrendering {} settransfer false setstrokeadjust } bind
Install (IP 32)	procedure	The default Install procedure is as follows: { /DefaultHalftone600x600 /Halftone findresource sethalftone /DefaultColorRendering600x600 /ColorRendering findresource setcolorrendering {} settransfer false setstrokeadjust } bind
Jog*	integer	0 **Note:** The Jog parameter is an integer whose value is either 0, 2 or 3. 0 requests that the output pages not be jogged, 2 requests jogging at the end of each job, and 3 requests jogging at the end of each set (a “set” consists of all copies of one page, when multiple copies are requested). For NP 17, the offset paper output bin must be installed for jogging to occur. For IP 32, the 2000-Sheet Finisher must be installed for jogging to occur, and output must be face-down.
ManualFeed*	boolean	false
ManualFeedTimeout*	integer	60 **Note:** The ManualFeedTimeout parameter controls the length of time the printer waits for requested paper to be inserted into the manual feed tray. After the manual feed timeout has expired, the printer pulls the current paper in the manual feed tray regardless of whether it is the requested size. If there is no paper in the manual feed tray after the manual feed timeout has expired, then the printer will continue to wait for the paper to be inserted.
Margins*	array	[0 0] **Note:** The Margins parameter is a two element array [x y] in which both the x and y values are expressed in units of 1/(hardware resolution) of an inch.
MaxSeparations	integer	1
MediaColor	string or null	null
MediaType	string or null	null
MediaWeight	number or null	null

Table 3. Page Device Parameters for a /Printer device (continued)

Key	Type	Default
NumCopies*	integer or null	null
OutputAttributes	dictionary	See “OutputAttributes” on page 7 for details on how slots correspond to output trays.
OutputDevice	name	/Printer
OutputPage	boolean	true
OutputType	string or null	(STD) **Note:** OutputType can be used to select either the standard output tray, or if installed, one of the optional output trays. Refer to “OutputAttributes” on page 7 for additional details.
PageDeviceName	string, name or null	null
PageSize	array	See “PageSize” on page 9 for page size values.
Policies	dictionary	Varies by printer. See “Policies” on page 10 for more information. << /Duplex 2 /DeviceRenderingInfo 2 /HWResolution 2 /OutputDevice 0 /OutputType 2 /PolicyNotFound 1 /PageSize 0 /Policy Report {pop} /PostRendering EnhanceDetails 2 /ProcessColorModel 0 /StapleDetails 2 (NP 24, IP 32) >>
PostRenderingEnhance	boolean	true **Note:** The boolean parameter PostRenderingEnhance and its associated PostRenderingEnhanceDetails dictionary determine whether or not resolution enhancement (TrueRes) or toner saving is used. If PostRenderingEnhance is false, the PostRenderingEnhanceDetails dictionary is ignored. However, if PostRenderingEnhance is true, the PostRenderingEnhanceDetails dictionary values are used as follows. When REValue is 1, resolution enhancement is used to render the page; when it is 0, resolution enhancement is turned off. When TonerSaver is 1, the toner saver is turned on; when it is 0, the toner saver is turned off. Type is a constant assigned by Adobe. The PostRenderingEnhanceDetails dictionary is used in conjunction with the Policies dictionary. An attempt to set either REValue or TonerSaver to a value other than 0 or 1 is handled by consulting the current policy. REValue and TonerSaver cannot both be set to 1 simultaneously; this case is also handled by consulting the current policy.

Table 3. Page Device Parameters for a /Printer device (continued)

Key	Type	Default
PostRenderingEnhanceDetails*	dictionary	<< /Type18 /REValue 1 /TonerSaver 0 >> **Note:** The boolean parameter PostRenderingEnhance and its associated PostRenderingEnhanceDetails dictionary determine whether or not resolution enhancement (TrueRes) or toner saving is used. If PostRenderingEnhance is false, the PostRenderingEnhanceDetails dictionary is ignored. However, if PostRenderingEnhance is true, the PostRenderingEnhanceDetails dictionary values are used as follows. When REValue is 1, resolution enhancement is used to render the page; when it is 0, resolution enhancement is turned off. When TonerSaver is 1, the toner saver is turned on; when it is 0, the toner saver is turned off. Type is a constant assigned by Adobe. The PostRenderingEnhanceDetails dictionary is used in conjunction with the Policies dictionary. An attempt to set either REValue or TonerSaver to a value other than 0 or 1 is handled by consulting the current policy. REValue and TonerSaver cannot both be set to 1 simultaneously; this case is also handled by consulting the current policy.
ProcessColorModel**	name or string	/DeviceGray
Staple	integer	0 The Staple parameter requests that the job be stapled. The job will be stapled at the time indicated by an integer code. The following list shows the Staple parameter values. • 0 Do not staple • 2 Staple at end of job Setting the Staple parameter to a value other than 0 or 2 has the same effect as setting it to 0.
StapleDetails*	dictionary	The StapleDetails dictionary specifies the location of the staple on the finished document, in conjunction with the Staple parameter. Staples are placed appropriately relative to the orientation of the page. Type 5 is a constant assigned by Adobe. The list shows the StapleDetails dictionary Position parameter values. • SinglePortrait: Single staple, portrait • DoublePortrait: Double staple, portrait • SingleLandscape: Single staple, landscape • DoubleLandscape: Double staple, landscape
Separations	boolean	false
TraySwitch*	boolean	true
Tumble*	boolean	false
UseCIEColor*	boolean	false

InputAttributes

The entries for the slots in the InputAttributes dictionary correspond to the following input sources.

Table 4. Slot Numbers and Corresponding Input Sources

Slot Number	NP 12	NP 17	IP 20	NP 24	IP 32
0	Main tray	Main tray	Main tray	Upper 500-sheet tray	Upper 500-sheet tray
1	Auxiliary tray	Auxiliary tray	Auxiliary tray	Auxiliary tray	Auxiliary tray
2	Envelope tray/500-sheet tray (optional)	500-sheet tray[1] (optional)	500-sheet tray[2] 2000-sheet input	Lower 500-sheet tray	Lower 500-sheet tray
3	n/a	500-sheet tray (optional)	500-sheet tray[2] 2000-sheet input	2000-Sheet Paper Input Drawer (optional)	2500-Sheet Paper Input, upper drawer (Tray 3)
4	n/a	Envelope Feeder (optional)	n/a	Envelope Feeder (optional)	Envelope Feeder (installs in place of auxiliary tray)
5	n/a	n/a	n/a	n/a	2500-Sheet Paper Input, lower left drawer (Tray 4)
6	n/a	n/a	n/a	n/a	2500-Sheet Paper Input, lower right drawer (Tray 5)

Note:

1. Network Printer 17 supports up to two optional 500-sheet trays, which stack one on top of the other. If one is installed it is slot number 2. If two are installed, the top one is slot number 2 and the bottom one is slot number 3.
2. InfoPrint 20 supports up to two optional drawers, which stack one on top of the other. If one is installed it is slot number 2. If two are installed, the top one is slot number 2 and the bottom one is slot number 3. The optional trays can be two 500-sheet trays, one 500-sheet tray and one 2000-sheet input drawer, or just one 500-sheet tray or 2000-sheet input drawer. The 2000-sheet input drawer must always be the lowest tray.

The Priority Array: The Priority array for each printer is as follows:

- For NP 12, the InputAttributes default Priority array is [2 0 1], omitting the optional tray if not installed.
- For NP 17, the InputAttributes default Priority array is [2 3 0 1 4], omitting any optional trays that are not installed.
- For IP 20, the InputAttributes default Priority array is [0 3 2 1], omitting any optional trays that are not installed.
- For NP 24, the InputAttributes default Priority array is [0 3 2 1 4], omitting any optional trays that are not installed.
- For IP 32, the InputAttributes default Priority array is [6 5 3 2 0 4], omitting any optional trays that are not installed.

Note: If a physical tray is not installed in the printer, the corresponding entry in the InputAttributes dictionary is set to null. Also, If a job is sent to the printer and the tray is removed, the PostScript interpreter assumes the user will replace it with the same size paper tray and sets the attributes accordingly. If a different size tray is installed, the attributes will change to reflect the characteristics of the new tray on the next job boundary.

OutputAttributes

The entries for the slots in the OutputAttributes dictionary correspond to the output trays shown in the following tables.

NP 12 OutputAttributes:

Slot Number	OutputType value	Output Tray
0	STD	Standard Tray (face-down)
1	BACK	Face-up Paper Output Tray (optional)

For NP 12 the OutputAttributes default Priority array is [0 1].

NP 17 OutputAttributes:

Slot Number	OutputType value	Output Tray
0	STD	Standard Tray (face-down)
1	OCT	Offset Paper Output Bin (optional)
2	COL	Mailbox (optional)
3	BIN1	Mailbox Bin 1
4	BIN2	Mailbox Bin 2
5	BIN3	Mailbox Bin 3
6	BIN4	Mailbox Bin 4
7	BIN5	Mailbox Bin 5
8	BIN6	Mailbox Bin 6
9	BIN7	Mailbox Bin 7
10	BIN8	Mailbox Bin 8
11	BIN9	Mailbox Bin 9
12	BIN10	Mailbox Bin 10

The OutputAttributes default Priority array is [0] if neither the offset paper output bin nor the Mailbox is installed. It is [0 1] if the offset paper output bin is installed, and [0 2 3 4 5 6 7 8 9 10 11 12] if the Mailbox is installed.

IP 20 OutputAttributes:

Slot Number	OutputType value	Output Tray
0	STD	Standard Tray (face-down)

The OutputAttributes default Priority array is [0].

NP 24 OutputAttributes:

Slot Number	OutputType value	Output Tray
0	STD	Standard Tray (face-down)
1	FACE UP	Face-up tray
3	BIN UP FD	Optional finisher, upper tray, face down
4	BIN MID FD	Optional finisher, middle tray, face down
5	BIN LO FD	Optional finisher, lower tray, face down
6	BIN UP FU	Optional finisher, upper tray, face up
7	BIN MID FU	Optional finisher, middle tray, face up
8	BIN LO FU	Optional finisher, lower tray, face up
9	BIN CONT	Optional finisher, continuous, face down

The OutputAttributes default Priority array is [0 1] if the finisher is not installed and [0 1 3 4 5 6 7 8 9] if the finisher is installed.

IP 32 OutputAttributes:

Slot Number	OutputType value	Output Tray
0	STD	Standard Tray (face-down)
1	FACE UP	Face-up tray
2	FINISHER TOP	2000-Sheet Finisher, top tray, face down
3	FINISHER MIDDLE	2000-Sheet Finisher, middle tray, face down
4	FINISHER BOTTOM	2000-Sheet Finisher, bottom tray, face down
5	FINISHER AUTO	2000-Sheet Finisher, continuous, face down (IP 32)

The OutputAttributes default Priority array is [0] if neither the face-up tray nor the 2000-Sheet Finisher is installed. It is [0 1] if the face-up tray is installed, and [0 1 2 3 4 5] if the 2000-Sheet Finisher is installed.

PageSize

The following paper and envelope size values are permissible.

Notes:

1. The A6 paper size may be input only from the auxiliary tray.
2. Envelope paper sizes may only be input from the envelope feeder or auxiliary tray.
3. For InfoPrint 20 and InfoPrint 32, SEF = short-edge feed, LEF = long-edge feed, and LEDGER = 11x17.

Table 5. Paper Sizes and Corresponding Paper Size Names

Paper Sizes	Paper Size Name	NP 12	NP 17	IP 20	NP 24	IP 32
[612 792]	Letter	yes	yes	SEF, LEF	yes	SEF, LEF
[612 1008]	Legal	yes	yes	SEF	yes	SEF
[841 1190]	A3	no	no	SEF	yes	SEF
[595 841]	A4	yes	yes	SEF, LEF	yes	LEF
[419 595]	A5	yes	yes	LEF	no	LEF
[298 420]	A6	yes	yes	no	no	no
[728 1031]	B4 (JIS)	no	no	SEF	yes	SEF
[499 709]	B5 ISO	yes	yes	no	no	no
[515 728]	B5 JIS	yes	yes	SEF, LEF	yes	LEF
[612 936]	Folio	yes	yes	SEF	no	SEF
[522 756]	Executive	yes	yes	LEF	no	LEF
[792 1224]	Ledger	no	no	SEF	yes	SEF
[396 612]	Statement	yes	yes	LEF	no	LEF
[297 684]	COM10 Envelope	yes	yes	yes	yes	yes
[459 649]	C5 Envelope	yes	yes	yes	yes	yes
[323 459]	C6 Envelope	no	no	no	no	no

Table 5. Paper Sizes and Corresponding Paper Size Names (continued)

Paper Sizes	Paper Size Name	NP 12	NP 17	IP 20	NP 24	IP 32
[311 623]	DL Envelope	yes	yes	yes	yes	yes
[279 540]	Monarch Envelope	yes	yes	yes	yes	yes
[283 419]	Postcard	no	no	yes	no	yes
[936 1440]	Universal Paper	no	no	yes	no	yes
[936 1440]	Universal Env	no	no	yes	no	yes

Policies

In addition to the standard PostScript implementation of Policies, HWResolution, DeviceRenderingInfo, Duplex and PostRenderingEnhanceDetails policies are included by default. Three policies are available for each. They specify the recovery policy to use when the values selected for HWResolution, BandPage, Duplex or PostRenderingEnhanceDetails parameters cannot be satisfied. A value selected for HWResolution or Duplex may not be satisfied because it is not supported or because of memory limitations. The latter case, memory limitations, can only occur when the BandPage parameter in the DeviceRenderingInfo dictionary is false.

Table 6 describes the meanings of the policies for DeviceRenderingInfo.

Table 6. DeviceRenderingInfo Policy Values

Value	Description
0	Generate a configurationerror
1	Ignore the request
2	Force Type parameter to 5 and BandPage to true.

Table 7 describes the meanings of the policies for HWResolution.

Table 7. HWResolution Policy Values

Value	Description
0	Generate a configurationerror
1	Ignore the request
2	Provide the best resolution possible, considering the requested resolution first, and successively dropping to an achievable resolution. If resolution can not be achieved and banding is disabled, enable banding, considering the requested resolution first and successively dropping to an achievable resolution.

Table 8 describes the meanings of the policies for Duplex.

Table 8. Duplex Policy Values

Value	Description
0	Generate a configurationerror
1	Ignore the request
2	Force Duplex to false.

Table 9 on page 11 describes the meanings of the policies for PostRenderingEnhanceDetails.

Table 9. PostRenderingEnhanceDetails Policy Values

Value	Description
0	Generate a configurationerror
1	Ignore the request
2	A request to set REValue to 1 and TonerSaver to 1 is not supported and will result in an REValue value of 1 and an TonerSaver value of 0.

Table 10 describes the meanings of the policies for Staple.

Table 10. Staple Policy Values

Value	Description
0	Generate a configurationerror
1	Ignore the request
2	Turn Staple off (Staple = 0)

Interpreter Parameters

User Parameters

User parameters can be altered, within reasonable limits, by any PostScript language program without requiring a password. The user parameters establish temporary policies on matters such as whether to insert new items into caches.

The setuserparams and currentuserparams operators are used to set and get the current values of the user parameters. The initial value of user parameters at the time the printer is turned on for the first time is product dependent. Unless otherwise specified, all user parameters are subject to save and restore.

Table 11 lists the user parameters present in network printers.

Table 11. User Parameters

Key	Type	Default
Note: *Value is a function of RAM size		
AccurateScreens	boolean	false
HalftoneMode	integer	0
IdiomRecognition	boolean	true
JobName	string	( )
JobTimeout	integer	0
MaxDictStack	integer	530
MaxExecStack	integer	10015
MaxFontItem	integer	12500
MaxFormItem	integer	100000
MaxLocalVM	integer	2147483647
MaxOpStack	integer	100000
MaxPatternItem	integer	100000 (NP 17, NP 12, IP 20, IP 32) 20000 (NP 24)

Table 11. User Parameters (continued)

Key	Type	Default
MaxScreenItem*	integer	The value of MaxScreenItem varies dependent upon the amount of installed RAM. **RAM Size** **MaxScreenItem** **less than 6MB** 13000 **6MB or greater** 26000 (NP 12, NP 17, NP 24) 48000 (IP 20, IP 32)
MaxSuperScreen	integer	1024
MaxUPathItem	integer	5000
MinFontCompress	integer	The value of MinFontCompress varies dependent upon the amount of installed RAM. **RAM Size** **MinFontCompress** **less than 6MB** 1250 **6MB or greater** 2500
Sysstartpath	string	none **Note:** If the value of the system parameter StartupMode is 1 when the printer power is turned on and a Sys/Start file is found during initialization, then the user parameter Sysstartpath contains the complete path name of the Sys/Start file that was found and executed (for example, %disk%Sys/Start). Otherwise, Sysstartpath is not defined.
VMReclaim	integer	0
VMThreshold	integer	40000
WaitTimeout	integer	300 (NP 12 and NP 17) 0 (NP 24) **Note:** Each communications port has an I/O timeout value assigned to it in NVRAM via the front panel user interface. This non-zero value may be greater than, equal to, or less than the WaitTimeout value. When the I/O timeout value of the communications port from which data is being received is less than the WaitTimeout value, the I/O timeout will supersede WaitTimeout. Conversely, when the WaitTimeout value is less than the I/O timeout value on the port from which data is being received, the WaitTimeout value will supersede. Since the I/O timeout is always finite, an infinite WaitTimeout value (for example, zero) will never be effective.

System Parameters

System parameters, in many cases, permanently alter the overall configuration of a product. They are set using the operator setsystemparams and read using the operator currentsystemparams. In general, setting system parameters requires a password. System parameters are not subject to save and restore. Their values persist across jobs and may persist across power cycling the printer.

Table 12 lists the system parameters present in network printers.

Table 12. System Parameters

Key	Type	Default
Note: * Value is a read-only constant ** Value is read-only but changes † Value remains across power cycles or printer restarts ‡ Value is write-only and remains across power cycles or printer restarts		
BuildTime*	integer	time PostScript ROM image was built
ByteOrder*	boolean	true
CurDisplayList**	integer	0
CurFontCache**	integer	0
CurFormCache**	integer	0
CurInputDevice**	string	current value
CurOutlineCache**	integer	0
CurOutputDevice**	string	current value
CurPatternCache**	integer	0
CurScreenStorage**	integer	0
CurSourceList**	integer	0
CurUPathCache**	integer	0
DoPrintErrors‡	boolean	false **Note:** When this parameter is set to true, an error page is printed automatically whenever a PostScript language error is raised. This page contains information about the nature of the error and the state of the interpreter at the time the error occurred.
FactoryDefaults	boolean	false
FatalErrorAddress‡	integer	0
FontResourceDir	string	(fonts/)
GenericResourceDir	string	(Resource/)
GenericResourcePathSep	string	(/)
JobTimeout‡	integer	0
LicenseID*	string	(LN-052-001) (NP 12 and NP 17) (LN-052-014) (IP 20) (LN-052-003) (NP 24) (LN-052-018) (IP 32)
MaxDisplayList	integer	0 (NP 12, NP 17, NP 24) 20000 (IP 20, IP 32)
MaxDisplayList and SourceList	integer	10000000
MaxFontCache	integer	See “MaxFontCache” on page 14.
MaxFormCache	integer	100000 (NP 12, NP 17, NP 24) 200000 (IP 20, IP 32)
MaxImageBuffer	integer	65536
MaxOutlineCache	integer	65536
MaxPatternCache	integer	100000

Table 12. System Parameters (continued)

Key	Type	Default
MaxScreenStorage‡	integer	The Initial Values for MaxScreenStorage are the same for all network printers and are shown below. • 2-5 MB: 60000 • 6-64 MB: 120000
MaxSourceList‡	integer	0
MaxUPathCache	integer	300000
PageCount	integer	current value
PrinterName‡	string	**IBM 4312** (Network Printer 12) **IBM 4317** (Network Printer 17) **IBM 4320** (InfoPrint 20) **IBM 4324** (Network Printer 24) **IBM InfoPrint 32** (InfoPrint 32)
RamSize**	integer	The value for this parameter is memory dependent.
RealFormat‡	string	(IEEE)
Revision	integer	The default value for this is the value of the systemdict value of revision.
SourceListBypass	boolean	false
StartJobPassword‡	string	( )
StartupMode‡	integer	0 (NP 12, NP 17, NP 24) 1 (IP 20)
SystemParamsPassword	string	( )
ValidNV**	boolean	true
WaitTimeout	integer	0 **Note:** Each communications port has an I/O timeout value assigned to it in NVRAM via the front panel user interface. This non-zero value may be greater than, equal to, or less than the WaitTimeout value. When the I/O timeout value of the communications port from which data is being received is less than the WaitTimeout value, the I/O timeout will supercede WaitTimeout. Conversely, when the WaitTimeout value is less than the I/O timeout value on the port from which data is being received, the WaitTimeout value will supercede. Since the I/O timeout is always finite, an infinite WaitTimeout value (zero) will never be effective.

MaxFontCache

MaxFontCache (NP 12, NP 17, NP 24)

The default values for these parameters are memory dependent and are summarized in the table below. The PostScript Segment column defines the size of the memory segment allocated solely for PostScript's use. MaxFontCache is taken from that segment.

Note: NP 24 requires a minimum of 4 MB.

Table 13. Initial Values for MaxFontCache by Available RAM

RAM	PostScript Segment	MaxFontCache
2 MB	.656 MB	125,000
3 MB	1.00 MB	125,000
4-7 MB	1.35 MB	500,000
8-11 MB	2.00 MB	734,100
12-15 MB	2.50 MB	917,600
16-19 MB	3.00 MB	1,101,100
20-23 MB	4.00 MB	1,468,100
24 MB or more	6.00 MB	2,202,100

MaxFontCache (IP 20)

The default values are memory dependent and are summarized in the table below.

Table 14. Initial Values for MaxFontCache by Available RAM

RAM	MaxFontCache
4 MB	500,000
8 MB	917,600
12 MB	1,101,100
16 MB	1,284,600
20 MB	1,468,100
24 MB	1,835,100
28 MB	2,202,100
32 MB	2,569,100
36 MB	2,569,100
40 MB	2,936,100
44 MB	2,936,100
48 MB	2,936,100
52 MB	2,936,100
56 MB	3,303,100
64 MB	3,670,100
68 MB	4,037,100
72 MB	4,404,100
80 MB	4,771,100
96 MB	5,138,100

MaxFontCache (IP 32)

The default values are memory dependent and are summarized in the table below.

Table 15. Initial Values for MaxFontCache by Available RAM

RAM	MaxFontCache
4 MB	500,000
8 MB	917,600

Table 15. Initial Values for MaxFontCache by Available RAM (continued)

RAM	MaxFontCache
12 MB	1,101,100
16 MB	1,284,600
20 MB	1,468,100
24 MB	2,202,100
28 MB	2,202,100
32 MB or more	2,569,100

Product Strings

The systemdict operators languagelevel, product, revision, serialnumber, and version have the following values.

Table 16. Product String Values

String Name	Type	Value
languagelevel	integer	2 (NP 12, NP 17, NP 24) 3 (IP 20, IP 32)
product (also defined in statusdict)	string	**IBM 4312** (Network Printer 12) **IBM 4317** (Network Printer 17) **IBM 4320** (InfoPrint 20) **IBM 4324** (Network Printer 24) **IBM 4332** (InfoPrint 32)
revision	integer	102 (NP 12, NP 17, NP 24) 403 (IP 32)
serialnumber	integer	printer specific
version	string	2015.103 (NP 12, NP 17, NP 24) 3010.104 (IP 32)

Device Parameters

Device parameters are set using the operator setdevparams and read using the operator currentdevparams. Device parameters are similar to system parameters in that they require a password, are global to the PostScript environment, and have similar persistence characteristics. As with system parameters, some of these parameters can be stored in non-volatile memory.

One property that distinguishes device parameters from both system and user parameters is that device parameters may be interdependent; the legality of a value for a given parameter might depend on the value of another parameter.

Some device parameters are subdivided into sets that correspond to a particular device (%Parallel%, %disk%, and so on). Some device parameters correspond to a software entity such as a language.

Note: Even if two products have the same device parameter set name, the parameters in the set might differ, for example, because the hardware support for that device differs.

Device Parameters of Type /FileSystem

The following section describes File system access from PostScript programs.

Parameters for %disk%

Table 17 shows the parameters for %disk%.

Table 17. Parameters for %disk%

Key	Type	Default
Note: * Value is a read-only constant ** Value is derived from the disk media † Value is read-only but changes and value is derived from the disk media		
BlockSize*	integer	512
Free‡	integer	disk dependent
HasNames*	boolean	true
InitializeAction	integer	0 Initializing the disk causes the printer to reboot
LogicalSize**	integer	disk dependent
Mounted	boolean	true
PhysicalSize‡	integer	disk dependent
Removable*	boolean	false
Searchable	boolean	true
SearchOrder	integer	10 (NP 12, NP 24) 1 (NP 17, IP 20, IP 32)
Type*	name	/FileSystem
Writeable	boolean	true

Parameters for %rom%

Table 18 shows the parameters for %rom%.

Table 18. Parameters for %rom%

Key	Type	Default
Note: *Value is a read-only constant ** Value is read-only but changes and value is derived from the cartridge media		
BlockSize*	integer	1
CartridgeID**	integer	9120 (NP 12, NP 17, NP 24) %rom% 9120 (IP 20) %rom1% 1 (IP 20, IP 32)

Table 18. Parameters for %rom% (continued)

Key	Type	Default
CartridgeType**	integer	4 (NP 12, NP 17, NP 24) %rom% 12 (IP 20) %rom1% 28 (IP 20, IP 32)
Free	integer	0
HasNames*	boolean	true
InitializeAction	integer	0
LogicalSize**	integer	ROM dependent
Mounted	boolean	true
PhysicalSize**	integer	ROM dependent
Removable*	boolean	false
Searchable	boolean	true
SearchOrder	integer	35 (NP 12, NP 17, NP 24) %rom% 15 (IP 20) %rom1% 20 (IP 20, IP 32)
Type*	name	/FileSystem
Writeable*	boolean	false

Parameters for %flash%

Table 19 shows the parameters for %flash%.

Table 19. Parameters for %flash%

Key	Type	Default
Note: * Value is a read-only constant ** Value is derived from the flash media † Value is read-only but changes and value is derived from the flash media		
BlockSize*	integer	512 (NP 12, NP 17, NP 24) 748 (IP 20, IP 32)
Free‡	integer	flash dependent
HasNames*	boolean	true
InitializeAction	integer	0* *Flash devices can not be updated in sections (the entire flash device must be updated as a single unit). Selective updates within the flash device are not permitted.
LogicalSize**	integer	flash dependent
Mounted	boolean	true
PhysicalSize‡	integer	flash dependent
Removable*	boolean	false
Searchable	boolean	true
SearchOrder	integer	1 (NP 12, NP 17, NP 24) 10 (IP 20, IP 32)
Type*	name	/FileSystem
Writeable	boolean	true

Device Parameters of Type /Communications

The physical channels in network printers are %Parallel%, %Ethertalk% and %Tokentalk%. The %Ethertalk% and %Tokentalk% channels are present only when the corresponding optional I/O expansion cards are installed.

For each channel, other than the optional I/O expansion card, there are three related parameter sets: non-volatile, pending, and RAM. The following tables list the factory default values of the parameter sets.

Parameters for %LocalTalk%, %LocalTalk_NV%, and %LocalTalk_Pending%

Note: The supported Interpreter values are /AutoSelect, /PostScript, and /PCL. Use care when selecting /AutoSelect. Because there are print jobs that are valid in multiple languages, there is no guarantee that this algorithm will choose the desired language. Additionally, /AutoSelect does not support asynchronous status inquiries, and thus can render many host print drivers and spoolers unusable.

Table 20. Parameters for %LocalTalk%, %LocalTalk_NV%, and %LocalTalk_Pending%

Key	Type	Default
Note: *Value remains across power cycles or printer restarts		
HasNames	boolean	false
Interpreter	name	/AutoSelect /PostScript (IP 32)
LocalTalkType*	string	(LaserWriter)
NodeID	integer	0
PrinterControl	name	/PSPrinter
Type	name	/Communications

Parameters for %EtherTalk%, %EtherTalk_NV%, and %EtherTalk_Pending%

Note: The supported Interpreter values are /AutoSelect, /PostScript, and /PCL. Use care when selecting /AutoSelect. Because there are print jobs that are valid in multiple languages, there is no guarantee that this algorithm will choose the desired language. Additionally, /AutoSelect does not support asynchronous status inquiries, and thus can render many host print drivers and spoolers unusable.

Table 21. Parameters for %EtherTalk%, %EtherTalk_NV%, and %EtherTalk_Pending%

Key	Type	Default
Note: *Value remains across power cycles or printer restarts ** Value is a read-only constant		
EthernetAddress*	string	(*)
EtherTalkType*	string	(LaserWriter)
EtherTalkZone*	string	(*)
HasNames**	boolean	false

Table 21. Parameters for %EtherTalk%, %EtherTalk_NV%, and %EtherTalk_Pending% (continued)

Key	Type	Default
Interpreter*	name	/AutoSelect
PrinterControl*	name	/PJL
Type**	name	/Communications

Parameters for %TokenTalk, %TokenTalk_NV%, and %TokenTalk_Pending%

Note: The supported Interpreter values are /AutoSelect, /PostScript, and /PCL. Use care when selecting /AutoSelect. Because there are print jobs that are valid in multiple languages, there is no guarantee that this algorithm will choose the desired language. Additionally, /AutoSelect does not support asynchronous status inquiries, and thus can render many host print drivers and spoolers unusable.

Table 22. Parameters for %TokenTalk%, %TokenTalk_NV%, and %TokenTalk_Pending%

Key	Type	Default
Note: *Value is a read-only constant ** Value remains across power cycles or printer restarts		
Address (IP 20, IP 32)	string	(*)
HasNames*	boolean	false
Interpreter**	name	/AutoSelect
PrinterControl**	name	/PJL
TokenRingAddress*	string	printer specific
TokenTalkType**	string	(LaserWriter)
TokenTalkZone**	string	(*)
Type*	name	/Communications

Parameters for %Parallel%, %Parallel_NV%, and %Parallel_Pending%

Notes:

1. The supported Interpreter values are /AutoSelect, /PostScript, and /PCL. Use care when selecting /AutoSelect. Because there are print jobs that are valid in multiple languages, there is no guarantee that this algorithm will choose the desired language. Additionally, /AutoSelect does not support asynchronous status inquiries, and thus can render many host print drivers and spoolers unusable.
2. The Handshake parameter controls special handshaking present on the parallel port. A value of 0, 3, 4, or 5 indicates unidirectional parallel. A value of 1 indicates that handshaking should occur per the Hewlett-Packard “Boise” Parallel Port Interface Specification, Revision 0.6. A value of 2, 6, 7 or 8 reflects IEEE 1284 specifications (either version 1.00 or 2.00 draft). Setting the OutputDevice (see OutputDevice below) to (%Parallel%) is required to take advantage of this handshaking protocol.

Table 23. Parameters for %Parallel%, %Parallel_NV%, and %Parallel_Pending%

Key	Type	Default
Note: * Value is a read-only constant ** Value remains across power cycles or printer restarts		
Handshake*	integer	2
HasNames**	boolean	false
Interpreter	name	/AutoSelect
PrinterControl*	name	/PJL
Type**	name	/Communications

Parameters for %Engine% Device

Table 24. Parameters for %Engine% Device

Key	Type	Default
Darkness	real	0.2 (NP 12, NP 17) 0.25 (IP 20, IP 32) 0.5 (NP 24)
TimeToStandby	integer	30 (NP 12, IP 20, NP 24, IP 32) 60 (NP 17)
Type	name	/Parameters

Parameters for %Console% Device (IP 20)

The %Console% Country device parameter controls the natural language used on the printer's front panel display. The values and corresponding languages and supported are defined in the following table.

Table 25. Parameters for %Console% Device

Key	Type	Default
Country	/DK Danish /NL Dutch /US English /FI Finnish /FR French /DE German /IT Italian /NO Norwegian /PT Portuguese /ES Spanish /SE Swedish	/US
Type	name	/Parameters

Resource Categories

Categories and Resource Instances

Table 26 on page 22, Table 27 on page 22, and Table 28 on page 23 list the factory-installed categories and resource instances. New resources of the regular resource categories can be installed by the customer. For example, font and pattern resources can be added. The categories of implicit resources represent built-in

capabilities of the interpreter. For example, the FormType category indicates that the interpreter understands Type1 only. There are also categories used to define new categories.

Regular Resources

Table 26. Regular Resources

Category Name	Instances
CID Font	No instances defined
CMap	No instances defined
ColorRendering	DefaultColorRendering DefaultColorRendering600x600 DefaultColorRendering1200x600 (NP 17 only) DefaultColorRendering1200x1200 (IP 20 only)
ColorSpace	No instances defined (NP 12, NP 17, NP 24) DefaultCMYK (IP 20, IP 32) DefaultGray (IP 20, IP 32) DefaultRGB (IP 20, IP 32)
Control Language	PJL
Encoding	ISOLatin1 Encoding Standard Encoding
Font	See “PostScript Fonts” on page 31.
Fontset (IP 20, IP 32)	AdobeRomanDescriptors AdobeRomanMaster CFFRoman27
Form	No instances defined
Halftone	DefaultHalftone DefaultHalftone600x600 DefaultHalftone1200x1200 (IP 20)
HWOptions	No instances defined
IdiomSet (IP 20, IP 32)	AlGradients CorelFFills FreeHand7IdiomSet QuarkXPressBlends
OutputDevice	Printer
Pattern	No instances defined
PDL	PostScript PCL
ProcSet	CIDInit CIDInitN ColorRendering DemoPage FontList FontSetInit BitmapFontInit

Resource Dictionary for OutputDevice Type /Printer

Table 27. Resource Dictionary for OutputDevice Type /Printer

Category Name	Instances
Note that paper sizes are in points	

Table 27. Resource Dictionary for OutputDevice Type /Printer (continued)

Category Name	Instances
HWResolution	[[600 600]] [[1200 1200]][1] [1] IP 20 only
ManualSize	See “PageSize” on page 9 for paper sizes.
PageSize	See “PageSize” on page 9 for paper sizes.
ProcessColorModel	[/DeviceGray]

Implicit Resources

Table 28. Implicit Resources

Category Name	Instances
ColorRenderingType	1
ColorSpaceFamily	CIEBasedA CIEBasedABC CIEBasedDEF (IP 20, IP 32) CIEBasedDEFG (IP 20, IP 32) DeviceCMYK DeviceGray DeviceN (IP 20, IP 32) DeviceRGB Indexed Pattern Separation
Emulator	No instances defined
Filter	ASCII85Decode ASCII85Encode ASCIIHexDecode ASCIIHexEncode CCITTFaxDecode CCITTFaxEncode DCTDecode DCTEncode FlateDecode FlateEncode LZWDecode LZWEncode NullEncode ReusableStreamDecode RunLengthDecode RunLengthEncode SubFileDecode
FMapType	2, 3, 4, 5, 6, 7, 8, 9
FontType	0, 1, 3, 4, 5, 6, 9, 10, 11, 14 (IP 20, IP 32), 32 (IP 20, IP 32), 42
FormType	1
HalftoneType	1, 2, 3, 4, 5, 6, 7 (NP 12 and NP 17), 10, 16 (IP 20)
ImageType	1, 3 (IP 20), 4 (IP 20)

Table 28. Implicit Resources (continued)

Category Name	Instances
IODevice	%Console% (IP 20, IP 32) %disk% %Engine% %EtherTalk% %EtherTalk_NV% %EtherTalk_Pending% %flash% (not on NP 17) %fontset% (IP 32) %LocalTalk% %LocalTalk_NV% %LocalTalk_Pending% %Parallel% %Parallel_NV% %Parallel_Pending% %ram% %rom% %rom1% %TokenTalk% %TokenTalk_NV% %TokenTalk_Pending%
PatternType	1, 2 (IP 20, IP 32)

Resources for Defining New Resources

Table 29. Resources for Defining New Resources

Category Name	Instances
Category	Category CIDFont CMap ColorRendering ColorRenderingType ColorSpace ColorSpaceFamily ControlLanguage Emulator Encoding Filter FMapType Font FontSet FontType Form FormType FunctionType Generic Halftone HalftoneType HWOptions IdiomSet ImageType IODevice OutputDevice Pattern PatternType PDL ProcSet ShadingType
Generic	No instances defines

PostScript 1 Compatibility Operators

The following operators are included for compatibility with existing PostScript 1 language driver software. These compatibility operators are present in PostScript 2 printers for compatibility purposes only and their use in PostScript 2 or PostScript 3 language programs is strongly discouraged.

The following lists show the compatibility operators in statusdict, userdict, and systemdict, respectively.

Statusdict Operators

11x17tray
a3tray
a4tray
a5tray
a6tray
appletalktype
b5tray
buildtime
byteorder
c5envelopetray
c6envelopetray
checkpassword
com10envelopetray
defaultduplexmode
defaultenvelopetraysize
defaultmansize
defaultpapertray
defaulttimeouts
defaulttumble
diskonline
diskstatus

dlenvelopetray	dosysstart	duplexmode
envelopetray	executivetray	firstside
foliotray	initializedisk	jobname
jobtimeout	legaltray	ledgertray
lettertray	margins	manualfeed
monarchtray	newsheet	pagecount
pagestackorder	papertray	printername
product	ramsize	realformat
revision	sccbatch	sccinteractive
setdefaultenvelopetraysize	setdefaultduplexmode	setdefaultmansize
setdefaulttimeouts	setdefaulttumble	setdosysstart
setduplexmode	setjobtimeout	setmargins
setpagestackorder	setpapertray	setdefaultpapertray
setprintername	setsccbatch	setsccinteractive
settumble	setuserdiskpercent	statementtray
tumble	userdiskpercent	waittimeout

Userdict Operators

#copies	11x17	a3
a4	a4small	a5
a6	b4	b5
c5envelope	c6envelope	com10envelope
copypage	dlenvelope	executivepage
folio	ledger	legal
letter	lettersmall	monarch
monarchenvelope	postcard	statement
tabloid		

Note: *The copypage operator is redefined in userdict as the following procedure:

```
{gsave showpage grestore}
```

Systemdict Operators

devdismount	devforall	devformat
devmount	devstatus	

Compatibility Operator Descriptions

Some of the following compatibility operators use tray numbers to represent paper tray locations or feeding methods. Table 30 lists the tray numbers and corresponding meaning.

Table 30. Tray Numbers and Corresponding Meanings

Tray Number	NP 12	NP 17	IP 20	NP 24	IP 32
0	Main Tray	Main Tray	Main Tray	Upper 500-sheet tray	Upper 500-sheet tray
1	Auxiliary tray	Auxiliary tray	Auxiliary tray	Auxiliary tray	Auxiliary tray
2	Envelope Tray/500-Sheet Tray (optional)	500-Sheet Tray[1] (optional)	500-Sheet Tray[2] 2000-Sheet Input Drawer	Lower 500-sheet tray	Lower 500-sheet tray

Table 30. Tray Numbers and Corresponding Meanings (continued)

Tray Number	NP 12	NP 17	IP 20	NP 24	IP 32
3	n/a	500-Sheet Tray (optional)	500-Sheet Tray[2] 2000-Sheet Input Drawer	2000-Sheet Paper Input Drawer (optional)	2500-Sheet Paper Input, top drawer
4	n/a	Envelope Feeder (optional)	n/a	Envelope Feeder (optional)	Envelope Feeder (optional)
5	n/a	n/a	n/a	n/a	2500-Sheet Paper Input, lower left drawer
6	n/a	n/a	n/a	n/a	2500-Sheet Paper Input, lower right drawer

Note:

1. NP 17 supports up to two optional 500-sheet trays, which stack one on top of the other. If one is installed, it is always Tray 2. If two are installed, the top one is Tray 2 and the bottom one is Tray 3.
2. InfoPrint 20 supports up to two optional drawers, which stack one on top of the other. If one is installed it is slot number 2. If two are installed, the top one is slot number 2 and the bottom one is slot number 3. The optional trays can be two 500-sheet trays, one 500-sheet tray and one 2000-sheet input drawer, or just one 500-sheet tray or 2000-sheet input drawer. The 2000-sheet input drawer must always be the lowest tray.

Table 31 lists the Compatibility Operators.

Table 31. Other Compatibility Operators

Operator	Syntax/Description	Errors
defaultduplexmode	- defaultduplexmode *bool* If the Duplex Key exists in the pagedevice dictionary, this operator returns the value of the Duplex Key.	stackoverflow
defaultenvelopetraysize	- defaultenvelopetraysize *literal bool* Returns the default envelope size for the envelope feeder. A configuration error will occur if the envelope feeder is not installed. When true, the boolean value indicates a short-edge feed direction.	configurationerror, stackoverflow
defaultmansize	- defaultmansize *literal bool* Returns the default paper size for the front tray (that is, the auxiliary tray). The boolean value, when true, indicates a short-edge feed direction.	stackoverflow
defaultpapertray	- defaultpapertray *integer* Returns the first element of the Priority array in the InputAttributes dictionary found within the current page device. This number represents the default paper tray slot which may or may not be installed. If there is no Priority array within InputAttributes at the time that the defaultpapertray is executed, an arbitrary slot number will be returned.	stackoverflow

Table 31. Other Compatibility Operators (continued)

Operator	Syntax/Description	Errors
defaulttumble	- defaulttumble *bool* Returns the value of the Tumble Key if the Tumble Key exists in the pagedevice dictionary; otherwise returns false.	stackoverflow
executivetray	- executivetray - Selects the executive tray as the paper source for the current job.	limitcheck, rangecheck
papersize	- papersize *name bool* Returns the name of the compatibility operator that would select a tray containing the current media size. For example, letter size paper will result in /lettertray being returned by papersize. The boolean bool is true if the paper feeds short edge first, false is the paper feeds long edge first.* *Executing the operator returned by papersize at some later point may not select the same tray if mutliple trays have the same size paper installed.	stackoverflow
papertray	- papertray *int* Returns the first element of the Priority array in the InputAttributes dictionary found within the current page device. This number represents the current paper tray slot which may or may not be installed. If there is no Priority array within InputAttributes at the time that papertray is executed, some arbitrary slot number will be returned.	stackoverflow
setdefaultduplexmode	*bool* setdefaultduplexmode - Sets the Duplex Key in the pagedevice dictionary.	stackunderflow, typecheck
setdefaultenvelopetraysize	*literal bool* setdefaultenvelopetraysize - Sets the PageSize of the envelope feeder slot in the InputAttributes dictionary. The boolean value, when true, indicates a short-edge feed direction. If the setdefaultenvelopetraysize operator is invoked at a non-zero save level, an invalidaccess error occurs.	invalidaccess, rangecheck, stackunderflow, typecheck
setdefaultmansize	*literal bool* setdefaultmansize - Sets the PageSize of the auxiliary tray in the InputAttributes dictionary. The boolean value, when true, indicates a short-edge feed direction. If the setdefaultmansize operator is invoked at a non-zero save level, an invalidaccess error occurs.	invalidaccess, rangecheck, stackunderflow, typecheck

Table 31. Other Compatibility Operators (continued)

Operator	Syntax/Description	Errors
setdefaultpapertray (NP 12 and NP 17 only)	*int* setdefaultpapertray - Copies the value of PageSize, MediaType, MediaColor, and MediaWeight found in the InputAttributes dictionary for the specified tray into a dictionary for the specified tray into a dictionary with keys for the PageSize, MediaType, MediaColor, and MediaWeight. It also writes the requested tray number into the first element of the Priority array in the InputAttributes dictionary and places this entry in the dictionary it is building. This dictionary is then passed to setpagedevice. The result is that the requested tray will be selected as a default and will be used by any PostScript language job that does not expressly select a paper size or medium. If the setdefaultpapertray operator is invoked at a level othen than zero, an invalidaccess error occurs.	rangecheck stackunderflow stypecheck
setdefaulttumble	*int* setdefaulttumble - Sets the Tumble key in the pagedevice dictionary.	stackunderflow, typecheck
setpapertray	*int* setpapertray - Copies the value of PageSize, MediaType, MediaColor, and MediaWeight found in the InputAttributes dictionary for the specified tray into a dictionary for the specified tray into a dictionary with keys for the PageSize, MediaType, MediaColor, and MediaWeight. It also writes the requested tray number into the first element of the Priority array in the InputAttributes dictionary and places this entry in the dictionary it is building. This dictionary is then passed to setpagedevice. The result is that the requested tray will be selected until some other operation or tray selection operator causes a different tray to be selected.	rangecheck, stackunderflow, typecheck

Paper Size Compatibility Operators

The following table describes the paper size compatibility operators.

Table 32. Paper Size Compatibility Operators

		Imaging BBox				
Operator	**Page Size**	**NP 12**	**NP 17**	**IP 20**	**NP 24**	**IP 32**
11x17	[792 1224]	n/a	n/a	null	n/a	null
a3	[841 1190]	null	null	n/a	null	n/a
a4	[595 841]	null	null	null	null	null
a4small	[595 842]	n/a	[25 25 570 817]	n/a	n/a	n/a
a5	[420 595]	null	n/a	null	null	null

Table 32. Paper Size Compatibility Operators (continued)

Operator	Page Size	Imaging BBox				
		NP 12	**NP 17**	**IP 20**	**NP 24**	**IP 32**
a6	[298 420]	null	null	null	null	null
b4	[728 1031]	n/a	n/a	null	n/a	null
b5 iso	[499 709]	null	null	n/a	null	n/a
b5 jis	[515 728]	n/a	n/a	null	n/a	null
c5envelope	[459 649]	null	null	null	null	null
c6envelope	[323 459]	null	n/a	n/a	n/a	n/a
com10envelope	[297 684]	null	null	null	null	null
dlenvelope	[312 624]	null	null	null	null	null
executivepage	[522 756]	null	null	null	null	null
folio	[612 936]	null	null	null	n/a	null
ledger	[792 1224]	n/a	n/a	null	n/a	null
legal	[612 1008]	null	null	null	null	null
letter	[612 792]	null	null	null	null	null
lettersmall	[612 792]	n/a	[25 25 587 767]	n/a	n/a	n/a
monarchenvelope	[279 540]	null	null	null	null	null
postcard	[283 419]	n/a	n/a	null	n/a	null
statement	[396 612]	null	null	null	n/a	n/a
tabloid	[792 1224]	n/a	n/a	null	n/a	

Paper Tray Compatibility Operators

The following table describes the paper tray compatibility operators.

Table 33. Paper Tray Compatibility Operators

Operator	Page Size	Imaging BBox				
		NP 12	**NP 17**	**IP 20**	**NP 24**	**IP 32**
11x17	[792 1224]	n/a	n/a	null	n/a	null
a3tray	[841 1190]	n/a	n/a	null	n/a	null
a4tray	[595 842]	null	null	null	null	null
a5tray	[420 595]	null	n/a	n/a	null	n/a
a6tray	[298 420]	null	null	n/a	null	n/a
b5tray	[499 649]	null	null	null	null	null
c5envelopetray	[459 649]	null	null	n/a	null	n/a
c6envelopetray	[323 459]	n/a	null	n/a	n/a	n/a
com10envelopetray	[297 684]	null	null	n/a	null	n/a
dlenvelopetray	[312 624]	null	null	n/a	null	n/a
executivetray	[522 756]	null	null	n/a	null	n/a
foliotray	[612 936]	null	null	n/a	n/a	n/a
ledgertray	[792 1224]	n/a	n/a	null	n/a	null

Table 33. Paper Tray Compatibility Operators (continued)

Operator	Page Size	Imaging BBox				
		NP 12	NP 17	IP 20	NP 24	IP 32
legaltray	[612 1008]	null	null	null	null	null
lettertray	[612 792]	null	null	null	null	null
monarchtray	[279 540]	null	null	n/a	null	n/a
statementtray	[396 612]	null	null	n/a	n/a	n/a

PostScript Fonts

PostScript Fonts (NP 12, NP 17, NP 24)

The Adobe PostScript 2 SIMM contains the following fonts:

Typeface	Number of Fonts
ACaslon	4
Palatino	4
Garamond	4
Parisian	1
Americana	2
ParkAvenue	1
AvantGarde	4
Poetica-SuppOrnaments	1
Barmeno	4
Symbol	1
Blackoak	1
Tekton	2
Bookman	4
Times	4
Carta	1
Trajan-Bold	1
Courier	4
WoodtypeOrnaments-Two	1
Formata	4
ZapfChancery-MediumItalic	1
Helvetica	8
ZapfDingbats	1
Kaufmann	1
Lithos	2
NewCenturySchlbk	4

PostScript fonts are not accessible via IPDS, nor can PostScript access IPDS fonts.

PostScript Fonts (IP 20, IP 32)

The following 136 PostScript fonts are supported in the standard IP 20 PostScript 3 Personality and stored in the CFF or Chameleon formats.

Note: PostScript 3 uses the ARES Font Management subsystem by Adobe. The CFF and Chameleon compressions used can contain over 100 fonts in 1 MB of memory.

Downloading of PostScript Type 1 fonts is supported. PostScript will include a rasterizer for TrueType fonts which will allow TrueType fonts to be downloaded as soft fonts. No resident TrueType fonts are supported by the PostScript personality. (Note: PostScript Type 1 fonts and PCL TrueType fonts are accessible by the respective personalities).

AlbertusMT	AlbertusMT-Italic
AlbertusMT-Light	AntiqueOlive-Bold
AntiqueOlive-Compact	AntiqueOlive-Italic
AntiqueOlive-Roman	Apple-Chancery
Arial-BoldItalicMT	Arial-BoldMT
Arial-ItalicMT	ArialMT
AvantGarde-Book	AvantGarde-BookOblique
AvantGarde-Demi	AvantGarde-DemiOblique
Bodoni	Bodoni-Bold
Bodoni-BoldItalic	Bodoni-Italic
Bodoni-Poster	Bodoni-PosterCompressed
Bookman-Demi	Bookman-DemiItalic
Bookman-Light	Bookman-LightItalic
Carta	Chicago
Clarendon	Clarendon-Bold
Clarendon-Light	CooperBlack
CooperBlack-Italic	Copperplate-ThirtyThreeBC
Copperplate-ThirtyTwoBC	Coronet-Regular
Courier	Courier-Bold
Courier-BoldOblique	Courier-Oblique
Eurostile	Eurostile-Bold
Eurostile-BoldExtendedTwo	Eurostile-ExtendedTwo
Geneva	GillSans
GillSans-Bold	GillSans-BoldItalic
GillSans-Condensed	GillSans-CondensedBold
GillSans-ExtraBold	GillSans-Italic
GillSans-Light	GillSans-LightItalic
Goudy	Goudy-Bold
Goudy-BoldItalic	Goudy-ExtraBold

Goudy-Italic	Helvetica
Helvetica-Bold	Helvetica-BoldOblique
Helvetica-Condensed	Helvetica-CondensedBold
Helvetica-CondensedBoldOblique	Helvetica-CondensedOblique
Helvetica-Narrow	Helvetica-Narrow-Bold
Helvetica-Narrow-BoldOblique	Helvetica-Narrow-Oblique
Helvetica-Oblique	HoeflerText-Black
HoeflerText-BlackItalic	HoeflerText-Italic
HoeflerText-Ornaments	HoeflerText-Regular
JoannaMT	JoannaMT-Bold
JoannaMT-BoldItalic	JoannaMT-Italic
LetterGothic	LetterGothic-Bold
LetterGothic-BoldSlanted	LetterGothic-Slanted
LubalinGraph-Book	LubalinGraph-BookOblique
LubalinGraph-Demi	LubalinGraph-DemiOblique
Marigold	Monaco
MonaLisa-Recut	NewCenturySchlbk-Bold
NewCenturySchlbk-BoldItalic	NewCenturySchlbk-Italic
NewCenturySchlbk-Roman	NewYork
Optima	Optima-Bold
Optima-BoldItalic	Optima-Italic
Oxford	Palatino-Bold
Palatino-BoldItalic	Palatino-Italic
Palatino-Roman	StempelGaramond-Bold
StempelGaramond-BoldItalic	StempelGaramond-Italic
StempelGaramond-Roman	Symbol
Tekton	Times- Bold
Times-BoldItalic	Times-Italic
Times-Roman	TimesNewRomanPS-BoldItalicMT
TimesNewRomanPS-BoldMT	TimesNewRomanPS-ItalicMT
TimesNewRomanPSMT	Univers
Univers-Bold	Univers-BoldExt
Univers-BoldExtObl	Univers-BoldOblique
Univers-Condensed	Univers-Condensed-Bold
Univers-Condensed-BoldOblique	Univers-CondensedOblique
Univers-Extended	Univers-ExtendedObl
Univers-Light	Univers-LightOblique
Univers-Oblique	Wingdings-Regular
ZapfChancery-MediumItalic	ZapfDingbats

The following fonts were included in the Network Printer 12, Network Printer 17 and Network Printer 24 font set but are not included in IP 20. They are available as downloaded fonts.

ACaslon-Italic	ACaslon-Regular
ACaslon-SemiBold	ACaslon-SemiBoldItalic
AdobeGaramond-Bold	AdobeGaramond-BoldItalic
AdobeGaramond-Italic	AdobeGaramond-Roman
Americana	Americana-ExtraBold
Barmeno-Bold	Barmeno-ExtraBold
Barmeno-Medium	Barmeno-Regular
BlackOak	Formata-Italic
Formata-Medium	Formata-MediumItalic
Formata-Regular	Kaufmann
Lithos-Black	Lithos-Regular
Parisian	ParkAvenue
Poetica-SuppOrnaments	TektonBold
Trajan-Bold	WoodtypeOrnaments-Two

Chapter 2. PCL 5 Emulation

Chapter Overview

The following topics are covered in this chapter:

- Page Dimensions
- Paper Bin Assignments
- Resident PCL Fonts
- Resident Symbol Sets
- PCL Commands
- HP-GL/2 Commands
- Programming Hints

For more information on topics covered in this section, please refer to the *PCL 5 Printer Language Technical Reference Manual* and the *PCL 5 Comparison Guide* (both by Hewlett-Packard, Inc.).

PCL5e Emulation

For the most part, network printers emulate PCL5e as it is implemented on Hewlett-Packard's LaserJet Printer 4ML. For detailed information on this support, see the *PCL 5 Printer Language Technical Reference Manual* and the *PCL 5 Comparison Guide* (both by Hewlett-Packard, Inc.).

NP 12 PCL Exceptions

This section documents exceptions between the NP 12 PCL implementation and the specifications in the "PCL Feature Support Matrix" in the *PCL5E Comparison Guide for the 4ML* published by Hewlett-Packard.

Function	Command
Job Control	
Simplex/Duplex Print	<ESC>&l#S
Page Control	
Page (Job) Size	<ESC>&l#A **# Page Size** 100 ISO B5
Job Separation (offseting/jogging)	<ESC>&l1T

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Function	Command
Paper Source	<ESC>&l#H **# Input Source** 0 Use Current Source 1 Tray 1 2 Auxiliary Tray - Manual Feed (for papers) 3 Auxiliary Tray - Manual Feed (for envelopes) 3 Envelope tray if installed, otherwise auxiliary tray 4 Auxiliary Tray (automatic) 5 Tray 2 if installed, otherwise Tray 1 6 If an envelope tray with the correct size envelope is installed, use it. Otherwise, use AUX tray.
Output Bin	<ESC>&l#G **# Output Bin** 1 Main 2 Face-up **Note:** If a requested bin is not installed and enabled, another bin is used.
Raster Graphics	
Resolution	<ESC>*t#R **# Resolution** 200 200 dpi 600 600 dpi

NP 17 PCL Exceptions

This section documents exceptions between the NP 17 PCL implementation and the specifications in the “PCL Feature Support Matrix” in the *PCL5E Comparison Guide for the 4ML* published by Hewlett-Packard.

Function	Command
Job Control	
Simplex/Duplex Print	<ESC>&l#S
Page Control	
Page (Job) Size	<ESC>&l#A **# Page Size** 100 ISO B5 2000 A5 (148.5 x 210 mm) 2001 A6 2007 Folio (8.5 x 13 in) 2008 Statement (8.5 x 5.5 in)
Job Separation (offseting/jogging)	<ESC>&l1T

Function	Command
Paper Source	<ESC>&l#H **# Input Source** 0 Use Current Source 1 Tray 1 2 Auxiliary Tray - Manual Feed (for papers) 3 Auxiliary Tray - Manual Feed (for envelopes) 4 Auxiliary Tray (automatic) 5 Tray 2 if installed, otherwise Tray 1 6 If an envelope tray with the correct size envelope is installed, use it. Otherwise, use AUX tray. 7 Tray 3 if installed, otherwise Tray 2 or Tray 1
Output Bin	<ESC>&l#G **# Output Bin** 1 Main 2 Offset Paper Output Bin 4 Mailbox bin 1 5 Mailbox bin 2 6 Mailbox bin 3 7 Mailbox bin 4 8 Mailbox bin 5 9 Mailbox bin 6 10 Mailbox bin 7 11 Mailbox bin 8 12 Mailbox bin 9 13 Mailbox bin 10 **Note:** If a requested bin is not installed and enabled, another bin is used.
Raster Graphics	
Resolution	<ESC>*t#R **# Resolution** 200 200 dpi 600 600 dpi

IP 20 PCL Exceptions

This section documents exceptions between the IP 20 PCL implementation and the specifications in the “PCL Feature Support Matrix” in the *PCL5E Comparison Guide for the 4ML* published by Hewlett-Packard.

Function	Command
Job Control	
Simplex/Duplex Print	<ESC>&l#S
Page Control	

Function	Command
Page (Job) Size	<ESC>&l#A **# Page Size** 1 Executive (7.25 x 10.5 in) 2 Letter (8.5 x 11 in) 3 Legal (8.5 x 14 in) 6 Ledger (11 x 17 in) 26 A4 (210 x 297 mm) 27 A3 (420 x 297 mm) 45 B5-JIS (182 x 257 mm) 46 B4 (364 x 257 mm) 71 HAGAKI (100 x 148 mm) 80 Monarch Envelope (3.875 x 7.5 in) 81 COM10 Business Envelope (4.125 x 9.5 in) 90 DL Envelope (110 x 220 mm) 91 C5 Envelope (162 x 229 mm) 101 Universal (330 x 508 mm) 102 Universal Envelope (330 x 508 mm) 2000 A5 (148.5 x 210 mm) 2007 Folio (8.5 x 13 in) 2008 Statement (8.5 x 5.5 in)
Job Separation (offseting/jogging)	<ESC>&l1T
Paper Source	<ESC>&l#H **# Input Source** 0 Use Current Source 1 Tray 1 2 Auxiliary Tray - Manual Feed (for papers) 3 Auxiliary Tray - Manual Feed (for envelopes) 4 Auxiliary Tray (automatic) 5 Tray 2 6 If an envelope tray with the correct size envelope is installed, use it. Otherwise, use AUX tray. 7 Tray 3 9 High Cap Feeder
Output Bin	<ESC>&l#G **# Output Bin** 1 Main
Raster Graphics	
Resolution	<ESC>*t#R **# Resolution** 200 200 dpi 600 600 dpi 1200 1200 dpi

NP 24 PCL Exceptions

This section documents exceptions between the NP 24 PCL implementation and the specifications in the “PCL Feature Support Matrix” in the *PCL5E Comparison Guide for the 4ML* published by Hewlett-Packard.

Function	Command
Job Control	
Simplex/Duplex Print	<ESC>&l#S
Page Control	
Page (Job) Size	<ESC>&l#A **# Page Size** 100 ISO B5 2007 Folio 2000 A5 2001 A6 2003 Universal
Job Separation (offseting/jogging)	<ESC>&l1T
Paper Source	<ESC>&l#H **# Input Source** 0 Use Current Source 1 Tray 1 (upper 500-sheet tray) 2 Auxiliary Tray - Manual Feed (for papers) 3 Envelope feeder if installed, otherwise auxiliary tray - manual feed (for envelopes) 4 Auxiliary Tray (automatic) 5 Tray 2 (lower 500-sheet tray) 6 If an envelope tray with the correct size envelope is installed, use it. Otherwise, use AUX tray. 7 High capacity feeder if installed, otherwise Tray 2
Output Bin	<ESC>&l#G **# Output Bin** 1 Main 2 Face-up 3 Finisher top bin, face down 4 Finisher middle bin, face down 5 Finisher lower bin, face down 6 Finisher top bin, face up 7 Finisher middle bin, face up 8 Finisher lower bin, face up 9 Finisher auto output **Note:** If a requested bin is not installed and enabled, another bin is used.
Raster Graphics	
Resolution	<ESC>*t#R **# Resolution** 200 200 dpi 600 600 dpi

NP 24 Finisher

With the finisher is installed, paper can be output face-up or face-down and stapled. The “Auto Output Tray” mode causes automatic bin switching when each bin fills, according to the following order:

1. At power on of the printer or anytime Auto Output Tray is selected, the finisher output bins will be used in order from Bin 1 to Bin 3. The order returns to Bin 1 after Bin 3 is filled.
2. If a bin fills during the middle of a print job, the next bin in order becomes the new output tray. If the next bin in order already has paper present, printing will halt and a Bin Full message dispalys on the operator panel. Printing resumes when the full bin is emptied.
3. If a job begins and a bin full condition is detected, the next bin is selected even if paper is detected in that next bin (assuming that bin is not full).

If a specific output bin is selected, output will be directed only to that bin. If the bin becomes full, a bin full message occurs, and printing resumes after the bin has been emptied.

IP 32 PCL Exceptions

This section documents exceptions between the IP 32 PCL implementation and the specifications in the “PCL Feature Support Matrix” in the *PCL5E Comparison Guide for the 4ML* published by Hewlett-Packard.

Function	Command
Job Control	
Simplex/Duplex Print	<ESC>&l#S
Page Control	
Page (Job) Size	<ESC>&l#A **# Page Size** 1 Executive (7.25 x 10.5 in) 2 Letter (8.5 x 11 in) 3 Legal (8.5 x 14 in) 6 Ledger (11 x 17 in) 26 A4 (210 x 297 mm) 27 A3 (420 x 297 mm) 45 B5-JIS (182 x 257 mm) 46 B4 (364 x 257 mm) 71 HAGAKI (100 x 148 mm) 80 Monarch Envelope (3.875 x 7.5 in) 81 COM10 Business Envelope (4.125 x 9.5 in) 90 DL Envelope (110 x 220 mm) 91 C5 Envelope (162 x 229 mm) 101 Universal (297 x 431.8 mm) 102 Universal Envelope (215.9 x 245 mm) 2000 A5 (148.5 x 210 mm) 2007 Folio (8.5 x 13 in) 2008 Statement (8.5 x 5.5 in)
Job Separation (offseting/jogging)	<ESC>&l1T

Function	Command
Paper Source	<ESC>&l#H **# Input Source** 0 Use Current Source 1 Tray 1 2 Auxiliary Tray - Manual Feed (for papers) 3 Auxiliary Tray - Manual Feed (for envelopes) 4 Auxiliary Tray (automatic) 5 Tray 2 6 Envelope feeder 7 Tray 3 8 Tray 4 9 Tray 5
Output Bin	<ESC>&l#G **# Output Bin** 0 Auto (panel default) 1 Main (face-down) 2 Face-up tray 3 Finisher (upper bin) 4 Finisher (middle bin) 5 Finisher (lower bin) 9 Finisher (any bin) **Note:** If a requested bin is not installed and enabled, another bin is used.
Raster Graphics	
Resolution	<ESC>*t#R **# Resolution** 600 600 dpi

IP 32 Extensions for Chinese PCL support

Function	Command
Text Parsing Method	<ESC>&t#P **# Encoding** 0,1 All character codes are processed as one-byte characters 21 Character code are processed as one-byte codes if the first byte is outside of the range of x21-xFF. Otherwise, the characters are processed as two byte codes 31 Character codes are processed as one or two-byte characters. All character codes outside the ranges of x81-x9fF and xE0-xFC are processed as one byte code.Otherwise, the characters are processed as two-byte codes. 32 38-character codes are processed as one or two-byte characters. All character codes outside the ranges of x80-xFF are processed as one-byte codes. Otherwise, the characters are processed as two-byte codes.

Function	Command
Character Text path direction	<ESC>&l1T **# direction** 0 Horizontal 1 Vertical rotated printing
Type 16 format soft fonts	Large font support This printer will support the Format 16 large font specification except large bitmapped font Changes to support this function are described in the Type 16 font header description
Fonts	For Simplfied Chinese, the printer supports MHeiGB-medium, MKaiGB-medium and MsungGB-light fonts. For Traditional Chinese, the printer supports MHeiGB5-medium and MsunGB5-Light. These fonts are all fixed pitch fonts, but the implementation of the fonts calls for uses of a proportional font selection parameter.
Page Sizes	<ESC>&l#A **# media** 45 JIS B5 71 Hagaki postcard 72 Oufuk-Hagaki postcard

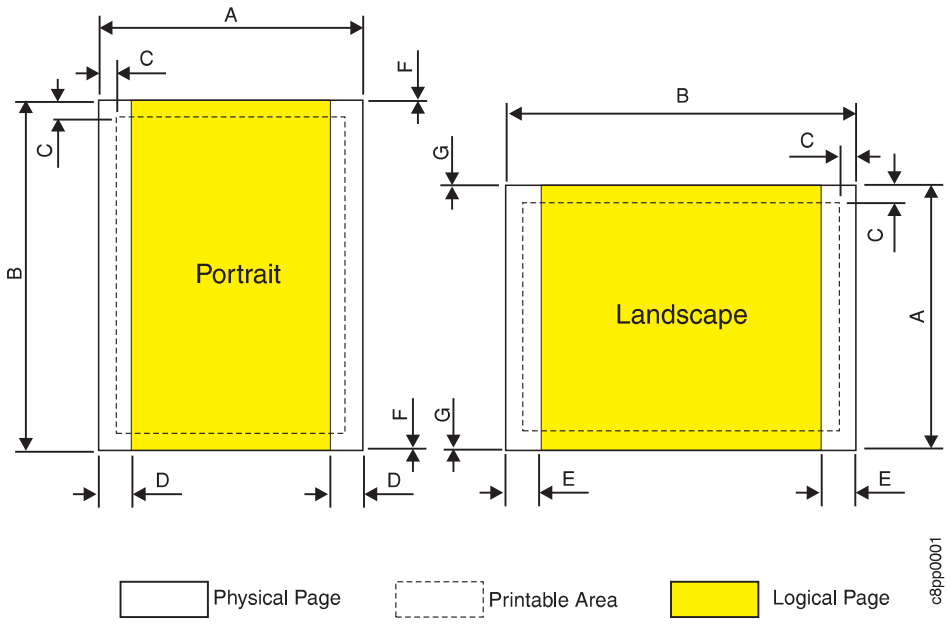
PCL5e Flash ROM Support

Network printers read font data via a flash ROM SIMM. Font data is in TrueType format. At power-up, the printer builds a font directory of an installed flash ROM SIMM. As PCL print jobs are processed and fonts are selected from the font directory, the data for the individual characters that are referenced are cached in DRAM for as long as they are required for imaging. Only those characters imaged will be read from the SIMM.

Network printers also support downloading of fonts and macros to flash and usage of PCL macros from flash. See “Chapter 4. Disk/Flash Command Formats” on page 75 for more information.

Page Dimensions

Within a logical page, certain areas are printable and unprintable in PCL Emulation. The following illustration shows these areas relative to each other.



Key:

A Physical page width (portrait); length (landscape)

B Physical page length (portrait); width (landscape)

C Distance between edge of physical page and printable area

D Distance between left or right edge of the physical page compared to the logical page (portrait)

E Distance between left or right edge of the physical page compared to the logical page (landscape)

F Distance between top or bottom edge of the physical page compared to the logical page (portrait)

G Distance between top or bottom edge of the physical page compared to the logical page (landscape)

The page dimensions for PCL Emulation are shown in the following table.

Table 34. Logical Page and Printable Area Dimensions for PCL Emulation

Selection	Dimensions		Dimensions by Area (pels at 600dpi)*						
	Millimeters	Inches	A	B	C	D	E	F	G
Paper									
Letter	216 x 279	8.5 x 11	5100	6600	100	150	120	0	0
Executive	185 x 267	7.25 x 10.5	4350	6300	100	150	120	0	0
Folio (Legal 13)	216 x 330	8.5 x 13	5100	7800	100	150	120	0	0
A5	148 x 210		3498	4960	100	142	118	0	0
A6	105 x 148		2480	3496	100	142	118	0	0
Statement		8.5 x 5.5	3300	5100	100	150	120	0	0
Legal	216 x 356	8.5 x 14	5100	8400	100	150	120	0	0
Ledger	279 x 432	11 x 17	6600	10200	100	150	120	0	0

Table 34. Logical Page and Printable Area Dimensions for PCL Emulation (continued)

Selection	Dimensions		Dimensions by Area (pels at 600dpi)*						
	Millimeters	Inches	A	B	C	D	E	F	G
A4	210 x 297	8.3 x 11.7	4960	7014	100	142	118	0	0
A3	297 x 420	11.7 x 16.5	7014	9920	100	142	118	0	0
JIS B5	182 x 257	7.2 x 10.1	4300	6070	100	142	118	0	0
JIS B4	257 x 364	10.1 x 14.3	6070	8598	100	142	118	0	0
UNIV (IP 20)	Minimum: 88 x 148 mm Maximum: 330 x 508 mm	Minimum: 3.5 x 5.8 in Maximum: 13 x 20 in	7794	12000	100	150	120	0	0
UNIV (IP 32)	Minimum: 100 x 148 mm Maximum: 297 x 431 mm	Minimum: 3.9 x 5.8 in Maximum: 11.7 x 17 in	7014	10200	100	150	120	0	0
Envelopes and Postcards									
HAGAKI	100 x 148	3.94 x 5.83	2362	3496	100	142	118	0	0
COM 10	105 x 241	4.1 x 9.5	2474	5700	100	150	120	0	0
InternationalDL	110 x 220	4.3 x 8.7	2598	5196	100	142	118	0	0
Monarch	98 x 190	3.875 x 7.5	2324	4500	100	150	120	0	0
C5	162 x 229	6.48 x 9.16	3826	5408	100	142	118	0	0
UNI-ENV IP 20	Minimum: 88 x 148 mm Maximum: 330 x 508 mm	Minimum: 3.5 x 5.8 in Maximum: 13 x 20 in	7794	12000	100	150	120	0	0
UNI-ENV (IP 32)	Minimum: 100 x 148 mm Maximum: 215 x 245 mm	Minimum: 3.9 x 5.8 in Maximum: 8.5 x 9.6 in	7014	10200	100	150	120	0	0

Resident PCL Fonts

The following are the resident PCL fonts available in network printers.

Note: All IP 32 resident fonts contain a Euro character.

Table 35. Resident PCL Fonts in network printers

Typeface	Font Format
Albertus Extra Bold	Intellifont
Albertus Medium	Intellifont
Antique Olive	Intellifont
Antique Olive Bold	Intellifont
Antique Olive Italic	Intellifont
CG Omega	Intellifont
CG Omega Bold	Intellifont
CG Omega Bold Italic	Intellifont
CG Omega Italic	Intellifont

Table 35. Resident PCL Fonts in network printers (continued)

Typeface	Font Format
CG Times	Intellifont
CG Times Bold	Intellifont
CG Times Bold Italic	Intellifont
CG Times Italic	Intellifont
Clarendon Condensed	Intellifont
Coronet	Intellifont
Courier	Intellifont
Courier Bold	Intellifont
Courier Bold Italic	Intellifont
Courier Italic	Intellifont
Garamond Antiqua	Intellifont
Garamond Halbfett	Intellifont
Garamond Kursiv	Intellifont
Garamond Kursiv Halbfett	Intellifont
Letter Gothic	Intellifont
Letter Gothic Bold	Intellifont
Letter Gothic Italic	Intellifont
Marigold	Intellifont
Univers	Intellifont
Univers Bold	Intellifont
Univers Bold Italic	Intellifont
Univers Condensed	Intellifont
Univers Condensed Bold	Intellifont
Univers Condensed Bold Italic	Intellifont
Univers Condensed Italic	Intellifont
Univers Italic	Intellifont
Arial	True Type
Arial Bold	True Type
Arial Bold Italic	True Type
Arial Italic	True Type
Century-Schoolbook (IP 20, IP 32)	True Type
Century-Schoolbook Bold (IP 20, IP 32)	True Type
Century-Schoolbook Bold Italic (IP 20, IP 32)	True Type
Century-Schoolbook Italic (IP 20, IP 32)	True Type
Prestige (IP 20, IP 32)	True Type
Prestige Bold (IP 20, IP 32)	True Type
Prestige Bold Italic (IP 20, IP 32)	True Type
Prestige Italic (IP 20, IP 32)	True Type

Table 35. Resident PCL Fonts in network printers (continued)

Typeface	Font Format
Symbol	True Type
Times New Roman	True Type
Times New Roman Bold	True Type
Times New Roman Bold Italic	True Type
Times New Roman Italic	True Type
Wingdings	True Type
Line Printer 16.7 pitch, 8.5 pt (portrait)	Bitmapped
Line Printer 16.7 pitch, 8.5 pt (landscape)	Bitmapped

Table 36. Traditional Chinese Fonts

Typeface	Typeface Number	Font Type	Font Format
MHeiGB5-medium	20953	Outline	TrueType
MsungGB5-Light	20957	Outline	TrueType

Table 37. Simplified Chinese Fonts

Typeface	Typeface Number	Font Type	Font Format
MHeiGB-medium	20970	Outline	TrueType
MKaiGB-medium	20971	Outline	TrueType
MsungGB-light	20972	Outline	Truetype

Resident Symbol Sets

The following are the resident symbol sets available in network printers.

Table 38. Resident Symbol Sets

Symbol Set Name (Operator Panel Selection)	Symbol Set ID	Language	PJL Value
ROMAN-8	8U	Roman-8	ROMAN8
ISO L1	0N	Latin 1	ISOL1
ISO L2	2N	Latin 2	ISOL2
ISO L5	5N	Latin 5	ISOL5
PC-8	10U	Multilingual	PC8
PC-8 D/N	11U	Danish/Norwegian	PC8DN
PC-850[1]	12U	Multilingual	PC850
PC-852	17U	Latin 2	PC852
PC8-TK	9T	Turkish	PC8TK
WIN L1[2]	19U	Latin 1	WINL1
WIN L2[2]	9E	Latin 2	WINL2
WIN L5[2]	5T	Latin 5	WINL5
DESKTOP	7J	Multilingual	DESKTOP

Table 38. Resident Symbol Sets (continued)

Symbol Set Name (Operator Panel Selection)	Symbol Set ID	Language	PJL Value
PS TEXT	10J	Multilingual	PSTEXT
VN INTL	13J	Multilingual	VNINTL
VN US	14J	English	VNUS
MS PUBL	6J	Multilingual	MSPUBL
MATH-8	8M	Multilingual	MATH8
PS MATH	5M	Multilingual	PSMATH
VN MATH	6M	Multilingual	VNMATH
PI FONT	15U	Multilingual	PIFONT
LEGAL	1U	Multilingual	LEGAL
ISO 4	1E	UK	ISO4
ISO 6	0U	Multilingual	ISO6
ISO 11	0S	Swedish	ISO11
ISO 15	OI	Italian	ISO15
ISO 17	2S	Spanish	ISO17
ISO 21	1G	German	ISO21
ISO 60	0D	Norwegian	ISO60
ISO 69	1F	French	ISO69
WIN 3.0	9U	Latin 1	WIN30
MC TEXT[3]	12J	Multilingual	MCTEXT
WINGDINGS[3]	579L	Multilingual	WINGDINGS

Notes:

1. For IP 32 and other printers with Euro support, this symbol set replaces the dotless I character with the Euro character at code point X'D5'.
2. For IP 32 and other printers with Euro support, this symbol set includes the Euro character at code point X'80'.
3. This symbol set is not available from the operator panel.

PCL Resources in the Flash SIMM or Hard Disk

PCL Resources such as macros (overlays) can be downloaded to both the flash SIMM and the hard disk, as well as RAM. The resources loaded to the flash SIMM or hard disk remain on the printer until they are explicitly removed, even if the printer is powered off.

Special commands are used to manage the PCL5E fonts and macros on the flash SIMM and hard disk drive resources. The fonts in RAM are managed using the Hewlett-Packard font commands, and the macros in RAM are managed using the HP macro commands. The resources are loaded individually, and can be deleted individually or all at once with one command. See "Chapter 4. Disk/Flash Command Formats" on page 75 for more information about managing flash and hard disk drive resources.

Font Commands (RAM)

Downloading PLC fonts to printer RAM is handled in two ways: temporary (the font is lost after the job), and permanent (the font is lost after the printer is powered off).

Function	Command
Font ID Number	<ESC>*c#D # = Font ID number 0-32767 for use in subsequent font management commands.
Font Control	<ESC>*c#F **# Font Control** 0 Delete all soft fonts 1 Delete all temporary soft fonts 2 Delete soft font (last ID sepcified) 3 Delete Character Code (last ID and character code) 4 Make soft font temporary (last ID specified) 5 Make soft font permanent (last ID specified) 6 Copy/Assign current invoked font as temporary

Cartridge Support

Font cartridges are not supported.

Font Support

The IP 20 and IP 32 resident PCL fonts consist of 53 scalable typefaces in 14 typeface families (35 Intellifont format and 18 TrueType format fonts). In addition, 1 typeface in the Line Printer typeface family will be available. The bitmapped font is created for 300 dpi, and scaled for 600 and 1200 dpi.

Font data is licensed separately from the AGFA Division of Miles. See “Resident PCL Fonts” on page 44 and “Resident Symbol Sets” on page 46.

Personality Sensing and Switching

Personality sensing may be accomplished by one of the following three possible methods:

1. Port Binding through the Control Panel

   Each input port can be “bound” to a specific personality (language) using the PERSONALITY item in each of the installed port menus (Parallel, Token Ring, Ethernet).

   Note: Even though a port is bound to a language, personality switching can still be accomplished explicitly through PJL commands.

2. PJL Language Entry Commands

   PJL can provide explicit selection of a particular personality. The general form of the PJL command to switch to a particular personality is:

   ```
   @PJL ENTER LANGUAGE = personality[<CR>] <LF>
   ```

   To switch to PCL:

```
<ESC>%-12345X [<CR>]<LF>
@PJL ENTER LANGUAGE = PCL[<CR>] <LF>
```

To switch to PostScript:

```
<ESC>%-12345X [<CR>]<LF>
@PJL ENTER LANGUAGE = POSTSCRIPT[<CR>] <LF>
```

Chapter 3. Printer Job Language

Chapter Overview

This chapter describes the network printer implementation of the Hewlett Packard Printer Job Language (PJL). It focuses on the differences between the network printer implementation and the Hewlett Packard implementation as described in *Printer Job Language Technical Reference Manual* published by Hewlett Packard.

Specifically, this chapter:

- Summarizes differences in how network printer implement PJL commands
- Lists programming tips
- Summarizes product specific support
- Lists codes and their meanings
- Lists variables

PJL Command Syntax and Format

The following syntax conventions are used to describe PJL commands in this section:

Notation	Meaning
variables or values	Items in italics indicate names of variables or their values.
COMMANDS	Items in uppercase letters indicate PJL commands names and words that must be entered verbatim. PJL command names referred to in text are also in uppercase.
[ ]	Items in brackets [...] indicate optional parameters. The brackets themselves are not entered when constructing PJL commands.
< >	Identifies a control code character, such as <CR> for carriage return, or a special identifier. The table that follows lists the control codes and special identifiers used in PJL.
<	This character indicates that the current line of code is a continuation of the previous line.

The following illustrates a PJL command line containing the ENTER command:

@PJL ENTER LANGUAGE=*personality* [<CR>] <LF>

The table below lists the control codes and special identifiers used in this section:

Code/Special Identifier	Meaning
<HT>	Horizontal tab character (ASCII 9).
<LF>	Line feed character (ASCII 10).
<CR>	Carriage return character (ASCII 13).
<SP>	Space character (ASCII 32).
<ESC>	Escape character (ASCII 27).
<FF>	Form feed character (ASCII 12).

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Code/Special Identifier	Meaning
<WS>	White space, a result of one or more <SP> or <HT>.
<words>	Printable characters (ASCII characters 33 through 255) and <WS>, starting with a printable character.
^D	PostScript end-of-file indication. It is not part of PJL, but is used to end PostScript examples.

Using PJL

In general, the command usage of network printer PJL is the same as in *Printer Job Language Technical Reference Manual*

network printer PJL resides “above” other printer languages such as PCL5E and PostScript. PJL commands encapsulate the printer language jobs, allowing PJL to control the print environment on a job-by-job basis.

The Universal Exit Language (UEL) command instructs the printer to begin interpreting PJL commands. After PJL commands have been consumed, a printer language processes the input stream until another UEL command is found. When the subsequent UEL command is found, the printer begins interpreting PJL again, and this process continues indefinitely.

Kernel Commands

Universal Exit Language (UEL) Command

The syntax of the UEL command is:

<ESC>%-12345X

Note: In a network printer environment, I/O switching occurs only when an I/O time-out occurs on the active port. A UEL is not a signal to the network printer to begin I/O port switching.

In PostScript, a ^D is a language-specific exit command. When a ^D is encountered, it becomes a “tentative” UEL command. In this fashion, PJL commands may immediately follow as if a UEL command was encountered. If the next sequence of characters after the ^D is not @PJL, then the behavior depends upon job history.

ENTER Command

The syntax of the ENTER command is:

@PJL ENTER LANGUAGE= *personality* [<CR>] <LF>

Note: In some network printer environments, the default personality is I/O port specific. The selection of a default personality in network printer PJL uses the one associated to the port in which the PJL or print-stream data was received.

COMMENT Command

The syntax of the COMMENT command is:

@PJL COMMENT <*words*> [<CR>] <LF>

Note: A PJL comment extends until the end of the COMMENT command. The COMMENT command ends with a UEL, a time-out, or the following sequence:

[<CR>]<LF>

Methods Of Printer Language Switching

The methods of printer language switching described in *Printer Job Language Technical Reference Manual* are augmented by network printer PJL. The list below shows the methods in priority order that network printer PJL does language switching.

1. Explicit, via the PJL ENTER command;
2. Automatic, using intelligent personality selection;
3. Default for the I/O port;
4. Default for system;
5. Currently active language; or
6. Initial default language;

On any specific implementation of network printer PJL and system configuration, some or all of these may be active. Note that the term intelligent personality selection is used in network printer PJL instead of context switching.

In the above list, if either default for the I/O port or system is available on a platform, the currently active language and initial default choices will never be applied.

The method of intelligently selecting a personality is subjective. network printer PJL might not behave identically to a LaserJet 4 series product when this mode is used.

When performing intelligent personality selection, network printer PJL may scan up to 512 bytes of the print-stream data to make its decision. If network printer PJL cannot decide after scanning 512 bytes, then it resorts to the next lowest priority selection method available.

Job Separation Commands

network printer PJL supports the EOJ command, the JOB command, and PJL job security as described in *Printer Job Language Technical Reference Manual*.

JOB Command

The syntax of the JOB command is:

@PJL JOB [NAME=*string*] [START=*number*]
[END=*number*] [PASSWORD=*number*] [<CR>] <LF>

EOJ Command

The syntax of the EOJ command is:

@PJL EOJ [NAME=*string*][<CR>]<LF>

Environment Commands

The PJL environment commands, DEFAULT, INITIALIZE, RESET, and SET, manipulate the variables in the Current PJL Environment and User Default Environment. This section summarizes the differences between network printer PJL and the implementation described in the “Environment Commands” section in *Printer Job Language Technical Reference Manual*. “Product-Specific Feature Support” on page 63 lists the supported variables, default settings, and ranges of values for network printer PJL.

Print Environments

network printer PJL supports the set of four print environments described in *Printer Job Language Technical Reference Manual* . The Modified Print Environment, however, is not managed by network printer PJL. Rather, this environment is managed by the active printer language interpreter. The printer language interpreter may make changes to the Modified Print Environment without informing network printer PJL. In some cases, however (for example, in an unencapsulated PostScript job), those changes may be committed to NVRAM thereby affecting the User Default Environment.

Changing Environment Settings

The discussions in *Printer Job Language Technical Reference Manual* concerning this topic also apply to network printer PJL. However, an operator panel change is not reflected in the User Default Environment unless it is entered on a job boundary or until the next job boundary is encountered. To force a new job boundary, the user can press the Cancel Print key on the operator panel.

PJL Reset Conditions

network printer PJL supports the list of PJL reset conditions listed in *Printer Job Language Technical Reference Manual*

In PostScript, a ^D is interpreted as a language-specific exit command. A language-specific exit command is a PJL reset condition if it is not enclosed in a JOB/EOJ pair.

PJL Environment Variables

network printer PJL extends the concepts presented in *Printer Job Language Technical Reference Manual* for some environment variables. In particular, some general environment variables such as RESOLUTION and PAGEPROTECT in *Printer Job Language Technical Reference Manual* have personality specific instances in network printer PJL.

The discussion and guidelines in *Printer Job Language Technical Reference Manual* for this section also apply to network printer PJL. “Product-Specific Feature Support” on page 63 specifies the modifiable environment variables in the NP 24 version of network printer PJL.

DEFAULT Command

The syntax of the DEFAULT command is:

@PJL DEFAULT[LPARM:*personality*]*variable=value*[<CR>]<LF>

See “Personality-Specific Instances Of General Environment Variables” on page 56 for additional discussion about network printer PJL’s extension for personality specific instances of general environment variables.

INITIALIZE Command

The syntax of the INITIALIZE command is:

@PJL INITIALIZE [<CR>]<LF>

“Product-Specific Feature Support” on page 63 specifies the PJL environment variables affected by the INITIALIZE command for network printer PJL.

Although network printer allow a personality to be dynamically added, no provision is made to allow a dynamically added personality to have personality-specific environment variables.

RESET Command

The syntax of the RESET command is:

@PJL RESET [<CR>]<LF>

“Product-Specific Feature Support” on page 63 specifies the PJL environment variables affected by the RESET command for network printer PJL.

Although network printer allows a personality to be dynamically added, no provision is made to allow a dynamically added personality to have personality-specific environment variables.

SET Command

The syntax of the SET command is:

@PJL SET[LPARM:*personality*]*variable=value*[<CR>]<LF>

See “Personality-Specific Instances Of General Environment Variables” on page 56 for additional discussion about network printer PJL’s extension for personality specific instances of general environment variables

Personality-Specific Instances Of General Environment Variables

network printer PJL allows some general environment variables in to have personality-specific instances. Examples of these variables include PAGEPROTECT and RESOLUTION. See “Product-Specific Feature Support” on page 63 for a complete list of the environment variables in network printer PJL.

Variables of this class are called bi-modal. Their behavior depends upon whether they are being treated generally or specifically via an LPARM command modifier.

Each bi-modal environment variable has two modes of access: a standard mode and a personality-specific mode. This allows network printer PJL to behave properly if one is using a Hewlett Packard driver while also providing the flexibility of personality-specific access.

When a bi-modal environment variable is modified with a SET or DEFAULT without an LPARM command modifier, then both PCL and PostScript variables are affected. However, if a bi-modal environment variable is modified with an LPARM, then only the instance specific to the named personality is affected.

This has the property that if one is always modifying a bi-modal environment variable without an LPARM, then the values of both instances will be the same. This will be the case if a Hewlett Packard driver is always used. If, however, one is always modifying using the personality specific instances, then only those instances will be of importance. In this case, the standard mode is of no practical value and may not reflect the actual value used by a given personality.

Note: If a bi-modal variable is obtained via INQUIRE or DINQUIRE without an LPARM specifier, then the PCL value for that variable is obtained.

Staple Command on the NP 24 and IP 32

The syntax of the STAPLE command is:

@PJL SET STAPLE=*[variable]*

Where *[variable]* =

NONE
ONEPORT
ONELAND
TWO
TWOPORT (IP 32 only)
TWOLAND (IP 32 only)

ONEPORT calls for one staple in portrait orientation; ONELAND calls for one staple in landscape orientation; TWO calls for two staples, which has the same result in either orientation.

The following conditions must be met for stapling to occur:

- The finisher must be installed on the NP 24 or IP 32. (Stapling is available only on the NP 24 and IP 32.)

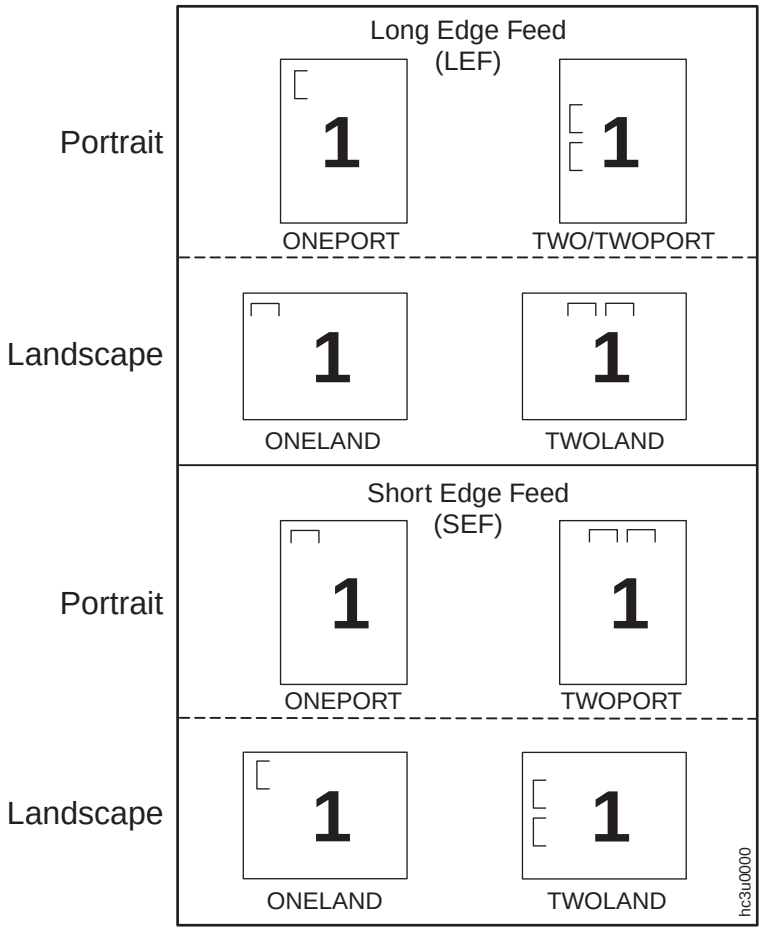
- Output must be directed to a finisher bin. For NP 24 output must also be specified as face-down.
- For NP 24 the specified job must consist of at least two sheets of paper to not more than 20 sheets. Each bin can hold up to 30 sets or 300 sheets (for example, 15 sets of 20 sheets, 20 sets of 15 sheets, or 30 sets of 10 sheets).
- For IP 32 the specified job must consist of at least two sheets of paper to not more than 50 sheets. Each bin can hold up to 100 sets or 600 sheets (for example, 12 sets of 50 sheets, 20 sets of 30 sheets, or 100 sets of 6 sheets).
- The specified job must be of only one paper size. For IP 32 any supported paper size, except UNIVERSAL, can be stapled. For NP 24 allowable sizes are one of A3, A4, B4, LEDGER, Letter, or Legal.

Stapling Location

Three factors determine the location of the staples:

- The staple option you select. For NP 24, the options are ONEPORT, ONELAND, and TWO. For IP 32, the options are ONEPORT, ONELAND, TWO, TWOPORT, and TWOLAND.
- The paper orientation you select (portrait or landscape)
- The paper feed orientation (short-edge or long-edge)

These factors combine to yield the staple placements shown in the following figure. The diagram shows the print-side of a simplex document or the front-side of a duplex document.



Status Readback Commands

The PJL status readback commands, INQUIRE, DINQUIRE, ECHO, INFO, USTATUS, and USTATUSOFF, instruct network printer PJL to provide configuration and status information to a host application.

INQUIRE Command

The syntax of the INQUIRE command is:

@PJL INQUIRE[LPARM:*personality*]*variable* [<CR>]<LF>

The response syntax of the INQUIRE command is:

@PJL INQUIRE [LPARM:*personality*]*variable*<CR><LF>
value<CR><LF><FF>

Note: Normally the INQUIRE command returns a value of the variable that can be used on the SET command. PASSWORD, however, is not available to the SET command (it is read-only in the PJL Current Environment). The value of PASSWORD is always the same as the value returned by the DINQUIRE command.

DINQUIRE Command

The syntax of the DINQUIRE command is:

@PJL DINQUIRE[LPARM:*personality*] *variable*[<CR>]<LF>

The response syntax of the DINQUIRE command is:

@PJL DINQUIRE [LPARM:*personality*]*variable* <CR><LF>
value<CR><LF><FF>

Note: Normally the DINQUIRE command returns a value of the variable that can be used on the DEFAULT command. When the variable is PASSWORD, however, the value returned by DINQUIRE is either

- DISABLED—the value is zero
- ENABLED—the value is between one and 65535

ECHO Command

The syntax of the ECHO command is:

@PJL ECHO [<*words*>] [<CR>]<LF>

The response syntax of the ECHO command is:

@PJL ECHO [<*words*>] <CR><LF><FF>

INFO Command

The syntax of the INFO command is:

@PJL INFO*category*[<CR>]<LF>

The response syntax of the INFO command is:

@PJL INFO *category*<CR><LF>[
1 or more lines of printable characters or <WS> followed by <CR><LF>]<FF>

The list of categories is ID, CONFIG, DISK (IP 20 only), MEMORY, PAGECOUNT, SIMM (NP 17, IP 20 only), STATUS, VARIABLES, and USTATUS.

The content of the response messages is tailored as follows.

ID Category Response Message Format

@PJL INFO ID<CR><LF>*printer-name*<CR><LF><FF>

CONFIG Category Response Message Format

Note: The following example is for an NP 24. Paper and tray values will vary dpending on the printer you use and the way you have it configured.

@PJL INFO CONFIG<CR><LF>
IN TRAYS [4 ENUMERATED]<CR><LF>
INTRAY1 MP<CR><LF>
INTRAY2 PC<CR><LF>
INTRAY3 PC<CR><LF>
INTRAY4 LC<CR><LF>
ENVELOPE TRAY<CR><LF>
OUT TRAYS [2 ENUMERATED]<CR><LF>
FACEDOWN<CR><LF>
FACEUP<CR><LF>
PAPERS [12 ENUMERATED]<CR><LF>
LETTER<CR><LF>
LEGAL<CR><LF>
A3<CR><LF>
A4<CR><LF>
B4<CR><LF>
B5<CR><LF>
LEDGER<CR><LF>
EXECUTIVE<CR><LF>
COM10 <CR><LF>
MONARCH<CR><LF>
C5<CR><LF>
DL<CR><LF>
LANGUAGES [3 ENUMERATED]<CR><LF>
PCL<CR><LF>
POSTSCRIPT<CR><LF>
IPDS<CR><LF>
USTATUS [4 ENUMERATED]<CR><LF>
DEVICE<CR><LF>
JOB<CR><LF>
PAGE<CR><LF>

TIMED<CR><LF>
MEMORY=2097152<CR><LF>
DISPLAY LINES=1<CR><LF>
DISPLAY CHARACTER SIZE=16<CR><LF><FF>

DISK Category Response Message Format

@PJL INFO DISK<CR><LF>
TOTAL=*number*<CR><LF>
FREE=*number* <CR><LF><FF>

If DISK is not installed, the message will be

NOT INSTALLED<CR><LF>

MEMORY Category Response Message Format

@PJL INFO MEMORY<CR><LF>
TOTAL=*number*<CR><LF>
LARGEST=*number* <CR><LF><FF>

PAGECOUNT Category Response Message Format

@PJL INFO PAGECOUNT<CR><LF>
PAGECOUNT=*number*<CR><LF><FF>

SIMM Category Response Message Format

@PJL INFO SIMM<CR><LF>
TOTAL=*number*<CR><LF>
FREE=*number*<CR><LF><FF>

If the SIMM is not installed:

NOT INSTALLED<CR><LF><FF>

STATUS Category Response Message Format

@PJL INFO STATUS<CR><LF>
CODE=*number*<CR><LF>
DISPLAY=*string* <CR><LF>
ONLINE=*alphanumeric*<CR><LF><FF>

VARIABLES Category Response Message Format

Note: The following example shows default values. The actual response varies depending on which network printer you use and how you have set it up. See “PJL Environment Variable Support” on page 63 for a complete description of PJL variables.

@PJL INFO VARIABLES
COPIES=1
DUPLEX=ON
BINDING=LONGEDGE
PAPER=LETTER
ORIENTATION=PORTRAIT

FORMLINES=60
MANUALFEED=OFF
PAGEPROTECT=AUTO
RESOLUTION=600
PERSONALITY=AUTO
TIMEOUT=15
MPTRAY=CASSETTE
INTRAY1=UNLOCKED
INTRAY2=UNLOCKED
INTRAY3=UNLOCKED
INTRAY4=UNLOCKED
TRAYSWITCH=ON
CLEARABLEWARNINGS=ON
AUTOCONT=OFF
DENSITY=3
LOWTONER=CONT
EDGETOEDGE=OFF
OUTBIN=FACEDOWN
OUTBIN=STANDARD
INTRAY1SIZE=LETTER
INTRAY2SIZE=LETTER
INTRAY3SIZE=LETTER
INTRAY4SIZE=LETTER
INTRAY4SIZE=LETTER
CPLOCK=OFF
ECONOMODE=OFF
PASSWORD=DISABLED
LPARM:PCL FONTSOURCE=I
LPARM:PCL FONTNUMBER=0
LPARM:PCL PITCH=10.00
LPARM:PCL PTSIZE=12.00
LPARM:PCL SYMSET=ROMAN8
LPARM:PCL PAGEPROTECT=AUTO
LPARM:PCL EDGETOEDGE=OFF
LPARM:POSTSCRIPT PRTPSERRS=OFF
LPARM:POSTSCRIPT EDGETOEDGE=ON
LPARM:POSTSCRIPT JAMRECOVERY=OFF
LPARM:POSTSCRIPT PAGEPROTECT=AUTO
LPARM:POSTSCRIPT RESOLUTION=600

USTATUS Category Response Message Format

@PJL INFO USTATUS<CR><LF>
  <DEVICE=*alphanumeric*[3 ENUMERATED]<CR><LF>
    OFF<CR><LF>
    ON<CR><LF>
    VERBOSE<CR><LF>
  <JOB=*alphanumeric* [2 ENUMERATED]<CR><LF>
    OFF<CR><LF>
    ON<CR><LF>
  <PAGE=*alphanumeric* [2 ENUMERATED]<CR><LF>
    OFF<CR><LF>
    ON<CR><LF>
  <TIMED=*number* [2 RANGE]<CR><LF>
    5<CR><LF>
    300<CR><LF><FF>

USTATUS Command

The syntax of the USTATUS command is:

@
PJL USTATUS*variable=value*[<CR>]<LF>

The response syntax of the USTATUS command is:

@PJL USTATUS *variable*<CR><LF>
<[1 or more lines of printable characters or <WS> followed by <CR><LF>]<FF>

The set of variables include DEVICE, JOB, PAGE, and TIMED.

DEVICE Variable Response Message Format

@PJL USTATUS DEVICE<CR><LF>CODE=*number*<CR><LF>
[DISPLAY=*string*<CR><LF>]
<[ONLINE=*alphanumeric*<CR><LF><FF>]

JOB Variable Response Message Format

Job Start:

@PJL USTATUS JOB<CR><LF>
START<CR><LF>NAME=*string*<CR><LF><FF>

Job End:

@PJL USTATUS JOB<CR><LF>END<CR><LF>
NAME=*string*<CR><LF>
PAGES=*number*<CR><LF><FF>

PAGE Variable Response Message Format

@PJL USTATUS PAGE<CR><LF>*number*<CR><LF><FF>

TIMED Variable Response Message Format

@PJL USTATUS TIMED<CR><LF>
CODE=*number*<CR><LF>
DISPLAY=*string* <CR><LF>
ONLINE=*alphanumeric*<CR><LF><FF>

USTATUSOFF Command

The syntax of the USTATUSOFF command is:

@PJL USTATUSOFF [<CR>]<LF>

Device Attendance Commands

The device attendance commands, RDYMSG, OPMSG, and STMSG instruct network printer PJL to interact with the operator panel display, and, in some cases to take the printer offline.

RDYMSG Command

The syntax of the RDYMSG command is:

@PJL RDYMSG DISPLAY = *string* [<CR>]<LF>

OPMSG Command

The syntax of the OPMSG command is:

@PJL OPMSG DISPLAY = *string* [<CR>]<LF>

STMSG Command

Network printer PJL does not support STMSG.

Product-Specific Feature Support

This section shows the commands and environment variables, and their possible values, supported by network printers.

PJL Command Support

PJL Command	Supported?
COMMENT	YES
DEFAULT	YES
DINQUIRE	YES
ECHO	YES
ENTER	YES
EOJ	YES
INFO	YES
INITIALIZE	YES
INQUIRE	YES
JOB	YES
OPMSG	YES
@PJL[<CR>]<LF>	YES
RDYMSG	YES
RESET	YES
SET	YES
STMSG	NO
UEL	YES
USTATUS	YES
USTATUSOFF	YES

PJL Environment Variable Support

The table below indicates the set of general environment variables supported by network printer PJL. This is followed by two tables for the personality-specific variables of PCL5e and PostScript. All variables included in the Appendix A of *Printer Job Language Technical Reference Manual* are listed.

Each variable has the following table indicators:

- Access
  - RO—read only.
  - RW—read write.
  - RO/RW—read only in the PJL Current Environment, Read/Write in the User Default Environment.
  - NS—not supported.
- Values—a list or description of the values the variable may assume.
- Default Value—the factory default value for the variable.
- Bi-modal (see “Personality-Specific Instances Of General Environment Variables” on page 56)

Variables that do not apply to network printers, either because of engine characteristics, or the lack of supporting function in network printers are classified as read only with an appropriate initial value.

General Environment Variables:

Variable Name	Access	Values	Default Value	Bi-Modal
AUTOCONT	RO	OFF ON	OFF	NO
AUTOSELECT	NS			
BINDING	RW	LONGEDGE SHORTEDGE	LONGEDGE	NO
CLEARABLE-WARNINGS	RO	ON	ON	NO
CONTEXTSWITCH	NS			
COPIES	RW	1 to 999	1	YES
CPLOCK	RW	OFF ON (locks op panel, cannot change values or settings)	OFF	NO
COURIER	NS			
DENSITY	RO	0 to 12 (NP 17) 0 to 4 (NP 12, IP 20, IP 32) 0 to 15 (NP 24)	3	NO
DISKLOCK	NS			
DUPLEX	RW	OFF ON	OFF	NO
ECONOMODE	RW	OFF ON	OFF	NO
EDGETOEDGE (NP 12, NP 17, NP 24)	RW	OFF ON	OFF	NO
FINISH	NS			
FORMLINES	RW	5 to 128	60	NO
IMAGEADAPT	NS			

Variable Name	Access	Values	Default Value	Bi-Modal
Note: See “INTRAY Variable Tray Assignments” on page 69 for a description of how INTRAY variables correspond to trays on the various printers.				
INTRAY1	RO	UNLOCKED LOCKED	UNLOCKED	NO
INTRAY2	RO	UNLOCKED LOCKED	UNLOCKED	NO
INTRAY3	RO	UNLOCKED LOCKED	UNLOCKED	NO
INTRAY4	RO	UNLOCKED LOCKED	UNLOCKED	NO
INTRAY5	RO	UNLOCKED LOCKED	UNLOCKED	NO
INTRAY6	RO	UNLOCKED LOCKED	UNLOCKED	NO
INTRAY1SIZE	RO	NP 12—LETTER, LEGAL, FOLIO, A4, B5JIS, EXECUTIVE, STATEMENT, COM10, MONARCH, C5, DL, B5-ISO NP 17—LETTER, LEGAL, FOLIO, A4, B5JIS, EXECUTIVE, STATEMENT, COM10, MONARCH, C5, DL, B5-ISO IP 20—LETTER, LEGAL, FOLIO, LEDGER, A3, A4, A5, B4, B5JIS, EXECUTIVE, STATEMENT, COM10, MONARCH, C5, DL, HAGAKI, UNIV, UNI-ENV NP 24—LETTER, LEGAL, A3, A4, B4, B5JIS, LEDGER, EXECUTIVE, COM10, MONARCH, C5, DL, IP 32—LETTER, LEGAL, FOLIO, LEDGER, A3, A4, A5, B4, B5JIS, EXECUTIVE, STATEMENT	LETTER	NO
INTRAY2SIZE	RO	NP 12—LETTER, LEGAL, A4, B5JIS, FOLIO, EXECUTIVE NP 17—LETTER, LEGAL, A4, B5JIS, FOLIO, EXECUTIVE IP 20—LETTER, LEGAL, FOLIO, LEDGER, A3, A4, A5, B4, B5JIS, EXECUTIVE, STATEMENT, COM10, MONARCH, C5, DL NP 24—LETTER, LEGAL, A4, B5JIS, A3, B4, LEDGER IP 32—LETTER, LEGAL, FOLIO, LEDGER, A3, A4, B4, B5JIS, EXECUTIVE	LETTER	NO

Variable Name	Access	Values	Default Value	Bi-Modal
INTRAY3SIZE	RO	NP 12—LETTER, LEGAL, A4, FOLIO NP 17—LETTER, LEGAL, A4, FOLIO IP 20—LETTER, LEGAL, FOLIO, LEDGER, A3, A4, A5, B4, B5JIS, EXECUTIVE, STATEMENT, COM10, MONARCH, C5, DL NP 24—LETTER, LEGAL, A4, B5JIS, A3, B4, LEDGER IP 32—LETTER, LEGAL, FOLIO, LEDGER, A3, A4, B4, B5JIS, EXECUTIVE	LETTER	NO
INTRAY4SIZE	RO	NP 12—n/a NP 17—LETTER, LEGAL, A4, FOLIO IP 20—LETTER, LEGAL, FOLIO, LEDGER, A3, A4, A5, B4, B5JIS, EXECUTIVE, STATEMENT, COM10, MONARCH, C5, DL NP 24—LETTER, LEGAL, A4, A3, B4, LEDGER IP 32—MONARCH, COM10, C5, DL	LETTER	NO
INTRAY5SIZE	RO	NP 12—n/a NP 17—COM10, MONARCH, C5, DL IP 20—n/a NP 24—COM10, MONARCH, C5, DL IP 32—LETTER, A4, B5JIS, EXECUTIVE	COM10	NO
INTRAY6SIZE	RO	IP 32—LETTER, A4, B5JIS, EXECUTIVE	COM10	NO
IOBUFFER	NS			
IOSIZE	NS			
JOBOFFSET	NS			
LANGUAGE	RW	ENGLISH GERMAN FRENCH SPANISH ITALIAN DUTCH PORTUGUESE DANISH FINNISH SWEDISH NORWEGIAN KATAKANA	ENGLISH	NO

Variable Name	Access	Values	Default Value	Bi-Modal
LANG (IP 32)	RW	ENGLISH DEUTSCH FRANCAIS ESPANOL ITALIANO NEDERLANDS BRAZ PORT DANSK SUOMI SVENSKA NORSK KATAKANA	ENGLISH	NO
LOWTONER	RO	ON	ON	NO
LOWTONER (IP 20 IP 32)	RW	CONT STOP	CONT	NO
MANUALFEED	RW	OFF ON	OFF	NO
MEDIASOURCE	NS			
MEDIATYPE	NS			
MEDIATYPE (IP 32)	PLAIN PREPUNCHED TRANSPAREN LABELS			
MPTRAY	RO	MANUAL CASSETTE FIRST	CASSETTE	NO
ORIENTATION	RW	PORTRAIT LANDSCAPE	PORTRAIT	NO
OUTBIN	RW	NP 12—FACEUP, FACEDOWN NP 17—STANDARD, COLLATOR, BIN1, BIN2, BIN3, BIN4, BIN5, BIN6, BIN7, BIN8, BIN9, BIN10 IP 20—STANDARD NP 24—FACEUP, FACEDOWN	NP 12: FACEDOWN NP 17: STANDARD IP 20: STANDARD NP 24: FACEDOWN IP 32: MAIN, FACE-UP, TOP, MIDDLE, LOWER, AUTO	NO
PAGEPROTECT	RW	AUTO ON	AUTO	YES

Variable Name	Access	Values	Default Value	Bi-Modal
PAPER	RW	NP 12 and NP 17—LETTER, LEGAL, A4, B5JIS, B5-ISO, EXECUTIVE, STATEMENT, COM10, MONARCH, C5, DL, A6, FOLIO IP 20—LETTER, LEGAL, FOLIO, LEDGER, A3, A4, A5, B4, B5JIS, EXECUTIVE, STATEMENT, COM10, MONARCH, C5, DL, HAGAKI, UNIV, UNI-ENV NP 24—LETTER, LEGAL, A3, A4, B4, B5JIS, LEDGER, COM10, MONARCH, C5, DL IP 32—LETTER, LEGAL, FOLIO, LEDGER, A3, A4, A5, B4, B5JIS, EXECUTIVE, STATEMENT, COM10, MONARCH, C5, DL, HAGAKI, UNIV, UNI-ENV	LETTER	NO
PARALLEL	NS			
PASSWORD[1]	RO/RW	0 to 65535	0	NO
PERSONALITY	RW	AUTO PCL POSTSCRIPT IPDS	AUTO	NO
POWERSAVE	NS			
POWERSAVETIME	NS			
PRINTQUALITY	NS			
QTY	NS			
QTY	RO	1 to 999	1	NO
RENDERMODE	NS			
REPRINT	NS			
RESOLUTION	RO	600	600	NO
RESOLUTION (IP 20)	RW	600 1200	600	NO
RESOURCESAVE	NS			
RESOURCESAVETIME	NS			
RET	RW	OFF ON	OFF	NO
STAPLE	RW	NONE ONEPORT ONELAND TWO	NONE	NO
TIMEOUT	RW	5 TO 300	15	NO
TRAYSWITCH	RW	ON OFF	ON	NO
WIDEA4	NS			

Variable Name	Access	Values	Default Value	Bi-Modal
Notes: 1. Although a password may range in value from 0 to 65535, its returned value on the INQUIRE and DINQUIRE commands are DISABLED (0) or ENABLED (from 1 to 65535).				

INTRAY Variable Tray Assignments:

Variable	NP 12	NP 17	IP 20	NP 24	IP 32
INTRAY1	Auxiliary tray	Auxiliary tray	Auxiliary tray	Auxiliary tray	Upper 500-sheet tray
INTRAY2	250-sheet tray	250-sheet tray	500-sheet tray or Envelope tray[2]	Upper 500-sheet tray	Lower 500-sheet tray
INTRAY3	500-sheet tray	500-sheet tray[1]	500-sheet tray Envelope tray[2] or 2000-sheet feeder[3]	Lower 500-sheet tray	2000-sheet input, upper tray
INTRAY4	n/a	500-sheet tray[1]	500-sheet tray Envelope tray[2] or 2000-sheet feeder[3]	2000-sheet tray	Envelope feeder
INTRAY5	n/a	Envelope feeder	n/a	Envelope feeder	2000-sheet input, lower left tray
INTRAY6	n/a	n/a	n/a	n/a	2000-sheet input, lower right tray

Note:

1. NP 17 supports up to two optional 500-sheet trays, which stack one on top of the other. If one is installed, it is INTRAY3. If two are installed, the top one is INTRAY3 and the bottom one is INTRAY4.
2. The IP 20 envelope tray can replace any 500-sheet tray.
3. IP 20 supports up to two optional paper trays, which can be two 500-sheet trays, or one 500-sheet tray and one 2000-sheet feeder. The 2000-sheet feeder is always the lowest tray.

PCL-Specific Environment Variables:

Variable Name	Access	Values	Default Value	Bi-Modal
COPIES	RW	1 to 999	1	YES
EDGETOEDGE	RW	OFF ON	OFF	YES
FONT-SOURCE	RW	I S DISK FLASH **Note:** Values C, C1, C2, M1, M2,..., Mn are not supported	I	NO
FONTNUMBER	RW	0 to n **Note:** maximum number n depends on the currently active font source	0	NO
PAGEPROTECT	RW	AUTO ON	AUTO	YES
PITCH	RW	0.44 to 99.99 (in increments of 0.01)	10.00	NO
PTSIZE	RW	4.00 to 99.75 (in increments of 0.25)	12.00	NO

Variable Name	Access	Values	Default Value	Bi-Modal
SYMSET	RW	ROMAN8, ISOL1, ISOL2, ISOL5, PC8, PC8DN, PC850, PC852, PC8TK, WINL1, WINL2, WINL5, DESKTOP, PSTEXT, VNINTL,VNUS, MSPUBL, MATH8, PSMATH, VNMATH, PIFONT, LEGAL, ISO4, ISO6, ISO11, ISO15, ISO17, ISO21, ISO60, ISO69, WIN30	ROMAN8	NO

PostScript-Specific Environment Variables:

Variable Name	Access	Values	Default Value	Bi-Modal
COPIES	RW	1 to 999	1	YES
EDGETOEDGE	RW	ON OFF	ON	YES
JAMRECOVERY	RW	OFF ON	OFF	NO
PAGEPROTECT	RW	AUTO ON	AUTO	YES
PRTPSERRS	RW	OFF ON	OFF	NO

Variables Affected By INITIALIZE And RESET:

General Variable Names		
BINDING	COPIES	DUPLEX
FORMLINES	MANUALFEED	ORIENTATION
PAGEPROTECT	PAPER	PASSWORD
PERSONALITY	RESOLUTION	RET
TIMEOUT		
PCL-Specific Variable Names		
FONTNUMBER	FONTSOURCE	PAGEPROTECT
PTSIZE	SYMSET	PITCH
PostScript-Specific Variable Names		
JAMRECOVERY	PAGEPROTECT	PSPRTERRS

Status Codes

Informational Messages (10xxx)

Status Code	Control Panel Display String
10001	READY/IDLE
10002	PAUSED
10003	Warming Up
10004	Self Test
10005	Resetting
10006	Toner Low
10015	PCL Font List PS Font List
10018	Resetting menus

Status Code	Control Panel Display String
10020	Resetting comm
10021	COLD RESET
10022	Start Page

Background Paper Loading (11xyy)

Network printers do not support Background Paper Loading. See “Foreground Paper Loading (41xyy)” on page 72.

PJL Parser Errors (20xxx)

Error Code	Code Meaning
20001	Syntax Error
20002	Unsupported command
20004	Unsupported personality
20006	Illegal character/line terminated by UEL
20009	Invalid character in numeric field
20010	Invalid character in at start of sting or numeric value
20011	String missing end quote
20012	Numeric value starts with decimal point
20013	Numeric value does not contain any digits
20019	Numeric value instead of alphanumeric
20020	String value instead of alphanumeric
20021	Unsupported command modifier
20025	Two decimal points in numeric value

PJL Parser Warnings (25xxx)

Error Code	Code Meaning
25004	String too long
25006	Unsupported option name
25007	Option name requires a value which is missing
25008	Option name requires a value of a different type
25010	Same option name received more than once
25011	Value overflow/underflow - option ignored
25012	Value truncated
25013	Value out of range - closest limit used
25014	Value out of range - ignored

PJL Semantic Errors (27xxx)

Error Code	Code Meaning
27002	An EOJ command was encountered without a previously matching JOB command.
27004	Cannot modify the value of a read-only variable.

Auto-Continuable Conditions (30xxx)

Error Code	Code Meaning
30016	Memory overflow
35029	MRT Compression

Operator Intervention Conditions (40xxx)

Error Code	Display String
40000	Power Saver Mode On (not and error)
40010	No Toner Cart
40021	Printer Open
40022	Paper Jam
40050	50 Error - Fuser Overheating
40051	51 Error - Beam detect error
40052	52 Error - Scanner speed error
40057	57 Service - Main motor failure
40058	58 Service - Fan failure

Foreground Paper Loading (41xyy)

X = Tray Code	NP 12	NP 17	IP 20	NP 24	IP 32
0	Auxiliary tray	Auxiliary tray	Auxiliary tray	Auxiliary tray	n/a
1	Manual Feed	Manual Feed	Manual Feed	Manual Feed	Lower 500-sheet tray
2	250-sheet tray	250-sheet tray	500-sheet tray[2]	Upper 500-sheet tray	Manual Feed Paper
3	500-sheet tray	500-sheet tray[1]	500-sheet tray[2, 3] 2000-sheet feeder	Lower 500-sheet tray	Manual feed envelope
4	n/a	500-sheet tray[1]	500-sheet tray[2, 3] 2000-sheet feeder	2000-sheet tray (optional)	Alternate paper source
5	n/a	Envelope Feeder	n/a	Envelope Feeder	Lower 500-sheet tray
6	n/a	n/a	n/a	n/a	Envelope Feeder
7	n/a	n/a	n/a	n/a	2500-sheet input, upper tray
8	n/a	n/a	n/a	n/a	Envelope Feeder
9	n/a	n/a	n/a	n/a	2500-sheet input, lower right tray

Note:

1. NP 17 supports up to two optional 500-sheet trays, which stack one on top of the other. If one is installed, its tray code is 3. If two are installed, the top one is 3 and the bottom one is 4.
2. The IP 20 envelope tray can replace any 500-sheet tray.
3. IP 20 supports up to two optional paper trays, which can be two 500-sheet trays, or one 500-sheet tray and one 2000-sheet feeder. The 2000-sheet feeder is always the lowest tray.

YY = Media Code	Media Size
00	Unknown Paper

YY = Media Code	Media Size
01	Unknown Envelope
02	Letter
03	Legal
04	A4
05	Exec
06	LEDGER
07	A3
08	COM10
09	Monarch
10	C5 Envelope
11	DL Envelope
12	B4
13	B5 Paper
14	B5 Envelope
16	A5
17	Statement
18	Folio
19	A6
22	HAGAKI
23	UNIV
24	UNI-ENV

Chapter 4. Disk/Flash Command Formats

This chapter describes the command syntax for downloading and deleting PCL fonts and macros to the 2MB or 4MB Flash SIMM or the optional hard drive.

Command General Syntax

```
<UEL>      (where <UEL> is <ESC>%-12345X)
[Disk/Flash  Command]
[Disk/Flash  Command]
[Disk/Flash  Command]
  :
  :
<UEL>
```

Note: IBM recommends putting the Disk/Flash commands within a pair of UEL commands as shown above. Each of the following examples is written as a stand alone file. You may concatenate several Disk/Flash command strings together within one pair of <UEL>'s

In the following command definitions,

- ESC stands for the character code x'1b'
- SOH stands for the character code x'01'
- STX stands for the character code x'02'
- ETX stands for the character code x'03'

All of the Disk/Flash commands will begin with **1B0102** and end with **03**.

Download Macro Command

```
<ESC>
<SOH>
<STX>
MACRO
L
<loc>,
<macro_id>,
<len>,
<macro_data>
<ETX>
```

Where:

```
<L> := indicates a Macro Download
<loc> := D | S

         D specifies the disk drive.
         S specifies the SIMM memory device.

<macro_id> := 0 <= macro_id < 32768. This is the id
              by which the application references the macro.

<len> := length of the macro data in bytes; 0 <len <2**32-1.
```

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The length does not include the <ETX> following the macro data.

<macro_data> := the macro text. This text does not include the start macro definition command (<esc>&f0X) or the stop macro definition command (<esc>&f1X).

The following is a macro download example. The following example file when sent to the printer over any of its ASCII data attachments (Parallel, Serial, Token-Ring, Ethernet or Coax/Twinax with ASCII transparency commands), will store the 495-byte macro contained with a macro ID of 4 to the disk drive. The words `FILE: MACRO4 FOR HARD DISK` will print on the paper when this file is sent to the printer.

```
Hex  0 1  2 3  4 5  6 7  8 9  A B  C D  E F        Dec  0123456789012345

  0  1B25 2D31 3233 3435 581B 0102 4D41 4352         0  .%-12345X...MACR
 10  4F4C 442C 342C 3439 352C 4649 4C45 3A20        16  OLD,4,495,FILE:
 20  4D41 4352 4F34 2046 4F52 2048 4152 4420        32  MACRO4 FOR HARD
 30  4449 534B 1B25 3042 494E 3B53 5031 3B0D        48  DISK.%0BIN;SP1;.
 40  0A53 4431 2C32 312C 322C 312C 342C 3530        64  .SD1,21,2,1,4,50
 50  2C35 2C30 2C36 2C33 2C37 2C34 3134 383B        80  ,5,0,6,3,7,4148;
 60  5353 3B0D 0A50 4132 3830 2C39 3339 303B        96  SS;..PA280,9390;
 70  4454 2A3B 0D0A 4346 312C 313B 4C42 502A       112  DT*;..CF1,1;LBP*
 80  3B50 5231 3030 2C30 3B0D 0A43 4631 2C31       128  ;PR100,0;..CF1,1
 90  3B4C 4245 2A3B 5052 3130 302C 303B 0D0A       144  ;LBE*;PR100,0;..
 A0  4346 312C 313B 4C42 452A 3B50 5231 3030       160  CF1,1;LBE*;PR100
 B0  2C30 3B0D 0A43 4631 2C31 3B4C 4252 2A3B       176  ,0;..CF1,1;LBR*;
 C0  5052 3130 302C 303B 0D0A 4346 312C 313B       192  PR100,0;..CF1,1;
 D0  4C42 4C2A 3B50 5231 3030 2C30 3B0D 0A43       208  LBL*;PR100,0;..C
 E0  4631 2C31 3B4C 4245 2A3B 5052 3130 302C       224  F1,1;LBE*;PR100,
 F0  303B 0D0A 4346 312C 313B 4C42 532A 3B50       240  0;..CF1,1;LBS*;P
100  5231 3030 2C30 3B0D 0A43 4631 2C31 3B4C       256  R100,0;..CF1,1;L
110  4253 2A3B 0D0A 5343 302C 3135 302C 302C       272  BS*;..SC0,150,0,
120  3135 302C 313B 0D0A 5041 302E 352C 3135       288  150,1;..PA0.5,15
130  333B 0D0A 4541 3833 2E35 2C31 3635 433B       304  3;..EA83.5,165C;
140  0D0A 1B25 3041 0D0A 0D0A 0D0A 1B26 6C34       320  ...%0A.......&l4
150  441B 2838 551B 2873 3170 3976 3073 3062       336  D.(8U.(s1p9v0s0b
160  3431 3438 541B 2664 3044 0D0A 0D0A 5468       352  4148T.&d0D....Th
170  6973 2061 2074 6573 7420 6F66 2074 6865       368  is a test of the
180  4D61 6372 6F20 646F 776E 6C6F 6164 2066       384  Macro download f
190  696C 652E 0A0D 5468 6973 2063 616E 2062       400  ile...This can b
1A0  6520 6361 6C6C 6564 2061 6E79 7768 6572       416  e called anywher
1B0  6520 696E 0D0A 6120 5043 4C20 6461 7461       432  e in..a PCL data
1C0  7374 6561 6D2E 0A0D 5365 6520 6966 2079       448  steam...See if y
1D0  6F75 2063 616E 206D 616B 6520 6F6E 6520       464  ou can make one
1E0  7468 6174 206C 6F6F 6B73 206C 696B 6520       480  that looks like
1F0  7468 6973 2E0A 0D49 2062 6574 2079 6F75       496  this...I bet you
200  2063 616E 2E2E 2E2E 2E03 2E25 2D31 3233       512   can.......%-123
210  3435 58** **** **** **** **** **** ****       528  45X*************
```

Delete Macro Command

<ESC>
<SOH>
<STX>
MACRO
D
<loc>,
<macro_id>
<ETX>

Where:

D := indicates Delete a Downloaded Macro

<loc> := D | S

D specifies the disk driver
S specifies the SIMM memory device.

<macro_id> := 0 <= macro_id < 32768. This is the id by which the application references the macro.

The following example file, when sent to the printer over any of its ASCII data attachments (Parallel, Serial, Token-Ring, Ethernet or Coax/Twinax with ASCII transparency commands), will delete the macro that was stored in the Flash SIMM with a macro ID of 24. The file will do nothing if there is no macro ID of 24 in the Flash SIMM.

```
Hex  0 1  2 3  4 5  6 7  8 9  A B  C D  E F        Dec  0123456789012345

  0  1B25 2D31 3233 3435 581B 0102 4D41 4352         0  .%-12345X...MACR
 10  4F44 532C 3234 031B 252D 3132 3334 3558        16  ODS,24..%-12345X
```

Purge All Macros Command

<ESC>
<SOH>
<STX>
MACRO
P
<loc>
<ETX>

Where:

P := indicates Purge all downloaded Macros

<loc> := D | S

D specifies the disk drive.
S specifies the SIMM memory device.

The following example file, when sent to the printer over any of its ASCII data attachments (Parallel, Serial, Token-Ring, Ethernet or Coax/Twinax with ASCII transparency commands), will delete all macros that were stored on the disk drive.

```
Hex  0 1  2 3  4 5  6 7  8 9  A B  C D  E F        Dec  0123456789012345

  0  1B25 2D31 3233 3435 581B 0102 4D41 4352         0  .%-12345X...MACR
 10  4F50 4403 1B25 2D31 3233 3435 58** ****        16  OPD..%-12345X***
```

Download HP Softfont Command

<ESC>
<SOH>
<STX>
FONT
L
2

<loc>,
<hp_font_id>,
<len>,
<HP softfont data>
<ETX>

Where:

L := indicates a Font Download

<loc> := D | S

D specifies the disk drive.
S specifies the SIMM memory device.

<hp_font_id> := 0 <= hp_font_id < 32768.
This integer identifies the font to the TFM. Applications do not reference the font by its TFM id. These fonts are always selected by characteristics.

<len> := length of the font data in bytes; 0 < len < 2**32-1.
The length does not include the <ETX> following the font data.

<HP softfont data> := the HP soft font data including the <ESC>)s#W, <ESC>*c#E and <ESC>*c#E PCL commands.

The following example file, when sent to the printer over any of its ASCII data attachments (Parallel, Serial, Token-Ring, Ethernet or Coax/Twinax with ASCII transparency commands), will download the included soft font file (which has TFM ID 4 and length 38,558 bytes) to the Flash SIMM. The introductory UEL command, although encouraged, is not included here.

```
 Hex  0 1  2 3  4 5  6 7  8 9  A B  C D  E F         Dec  0123456789012345

   0  1B01 0246 4F4E 544C 3253 2C34 2C33 3835          0  ...FONTL2S,4,385
  10  3538 2C1B 2973 3437 3936 5700 480F 0100         16  58,.)s4796W.H...
  20  0000 0009 5609 AE00 0101 1502 3D00 0002         32  ....V.......=...
  30  ..............                                  48  ......
      and on and on for 38,000 some odd bytes
      ..............                                      ........
96B0  3E03 **** **** **** **** **** ****      38576  >.**************
```

To verify the file has been correctly sent, do the following to print the list of PCL fonts:

1. Press the **Online** key to take the printer offline.
2. Press the **Menu** key. TEST MENU appears in the display area.
3. Press the **Item** key until you see PRINT PCL FONTS.
4. Press the **Enter** key to print the PCL5e fonts list. The new font should be on the list.
5. After the page prints, press the **Online** key to restore the printer to READY status.

Delete Font Command

<ESC>
<SOH>
<STX>
FONT
D
2
<loc>,
<hp_font_id>,
<ETX>

Where:

D := indicates Delete a Downloaded Font

<loc> := D | S

D specifies the disk drive.
S specifies the SIMM memory device.

<hp_font_id> := 0 <= hp_font_id < 32768. This is the id by which the TFM references the font.

The following example file, when sent to the printer over any of its ASCII data attachments (Parallel, Serial, Token-Ring, Ethernet or Coax/Twinax with ASCII transparency commands) will delete the soft font file which has TFM ID 88 from the disk drive. The introductory and trailing UEL commands, although encouraged, are not included here.

```
Hex  0 1  2 3  4 5  6 7  8 9  A B  C D  E F         Dec  0123456789012345

  0  1B01 0246 4F4E 5444 3244 2C38 382C 03**          0  ...FONTD2D,88,.*
```

Purge All Downloaded Fonts Command

<ESC>
<SOH>
<STX>
FONT
P
2
<loc>
<ETX>

Where:

P := indicates Purge all downloaded Fonts

<loc> := D | S

D specifies the disk drive.
S specifies the SIMM memory device.

The following example file, when sent to the printer over any of its ASCII data attachments (Parallel, Serial, Token-Ring, Ethernet or Coax/Twinax with ASCII transparency commands) will delete all fonts that are stored on the Flash SIMM.

```
Hex  0 1  2 3  4 5  6 7  8 9  A B  C D  E F         Dec  0123456789012345

  0  1B25 2D31 3233 3435 581B 0102 464F 4E54          0  .%-12345X...FONT
 10  5032 5303 1B25 2D31 3233 3435 58** ****         16  P2S.%-12345X****
```

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Special Characters

A

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C

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