Optra S Technical Reference

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Chapter 1 Introduction

Basic Features

The Optra™ S network printer has the following basic features:

- Two standard printer languages:
  - PCL 6 emulation allows the printer to print text and graphics created from software applications using Hewlett-Packard Company's Printer Command Language (PCL) level 6 (supported by the Hewlett-Packard LaserJet 5 printer family). PCL 6 emulation is completely backward compatible with enhanced PCL 5 emulation, so it also allows the printer to print text and graphics created from software applications using Hewlett-Packard Company's PCL level 5 (supported by the Hewlett-Packard LaserJet 5 printer family). Lexmark PCL emulation also includes support for PCL 5 color extensions.
  - PostScript Level 2 emulation allows the printer to print files created for Adobe PostScript Level 2.
- Print addressability:
  - True 1200 x 1200 dots per inch (dpi)
  - Print Quality Enhancement Technology (PQET) at 300 and 600 dpi
  - 1200 Image Quality (See Table 7-1, “Pels Per Square Inch,” on page 7-1 for more information.)
- 1200 Image Quality that enhances 600 dpi images
- Five print darkness settings available for flexible image adjustment
- Print speed (A4 and letter-size paper):

	300 and 600 dpi	1200 Image Quality	1200 x 1200 dpi
Optra S1255	12 ppm	12 ppm	8 ppm
Optra S1625	16 ppm	16 ppm	8 ppm
Optra S1855	18 ppm	18 ppm	9 ppm
Optra S2455	24 ppm	24 ppm	12 ppm

- A wide variety of fonts: 39 Optra compatible, plus 36 additional for PostScript Level 2 emulation; 75 scalable fonts and two bitmapped fonts for PCL emulation
- Seventy-eight symbol sets to support special requirements of some languages and applications

- 4MB of standard printer memory for Optra S 1255, S 1625 and S 1855, and 8MB of standard printer memory for Optra S 2455.
- Slots for memory expansion on all models allowing a maximum configuration of 68MB for Optra S 1255 and S 1625, 132MB for Optra S 1855 and 136MB for Optra S 2455
- Two-line, 16-character liquid crystal display (LCD) on the operator panel, providing easy-to-use menus and detailed messages
- One standard 250-sheet input tray with auto size sensing and paper level sensing
- One dual 500-sheet drawer with two trays with auto size sensing and paper level sensing for Optra S 2455 only
- Standard 100-sheet multipurpose feeder that supports a wide range of media and paper sizes for Optra S 1255, S 1625 and S 1855
- One standard output bin that holds 250 sheets for Optra S 1255, S 1625 and S 1855, and 500 sheets for Optra S 2455
- Support for A4, A5, B5, letter, legal, executive, and custom-size paper
- Varied media support for occasional use of paper labels, envelopes, and transparencies
- Interface ports:
  - Parallel on all models
  - Parallel 1284-C Adapter on all models
  - Serial for Optra S 1885 only; however, serial is available on Optra S 1255, S 1625 and S 2455 with the Tri-Port interface option card
  - Input/output port (IOP) connector slots for internal network adapter (INA) cards, hard disk option card, and the Tri-Port interface option card: 1 IOP connector for Optra S 1255 and S 1625, 2 IOP connectors for Optra S 1855, and 3 IOP connectors for Optra S 2455
- Flexible input buffer management
- Bidirectional communication
- Power saver and toner saver features
- Printer drivers for Windows 98, Windows 95, Windows 3.1, Operating System/2 (OS/2) 2.1 or later, OS/2 Warp, and other operating systems, as well as some Disk Operating System (DOS) applications
- Installation utilities
- DOS and OS/2 Toolkits
- MarkVision™ printer utility that lets you view and change printer configuration, monitor printer status, and access a remote operator panel from a Windows, Windows 3.x, Windows 95, Windows 98, Windows NT, OS/2 Warp, or Macintosh workstation directly attached to the printer or a local area network (LAN)
- SmartSwitch feature that automatically changes to the correct printer language for each job
- Job buffering to the Disk Option
- Receive-only fax support
- Job Cancel

Options

The printer supports the following features and options. Contact your local Lexmark dealer to determine the options available in your country.

- 250-Sheet Drawer
- 500-Sheet Drawer
- 2000-Sheet Drawer
- Envelope Feeder, which accommodates 85 envelopes
- Duplex Option
- Optional Output Expander with output full and nearly full sensing
- Printer Cabinet
- 4MB, 8MB, 16MB, 32MB, or 64MB Memory Option
- 1MB, 2MB, or 4MB Flash Memory Option
- Hard Disk with Adapter
- Hard Disk Adapter
- Parallel 1284-C Adapter
- Tri-Port Interface Card supports serial RS-232C/RS-422A, high speed Infrared local connections, and provides the LocalTalk network connection
- Infrared Adapter for use with the Tri-Port interface card. It receives the infrared beam from the IrDA-compatible workstation.
- Network connectivity to industry-standard equipment with Lexmark's MarkNet™ S internal network adapter (INA) cards
  - Ethernet 10BaseT
  - Ethernet 10Base2
  - Ethernet 10/100BaseTX
  - Token-Ring
- Third party INAs for other network environments
- High speed bidirectional 10 foot and 20 foot parallel cables
- 50 foot serial cable

Additional Features

The Optra S network printer is functionally compatible with the Hewlett-Packard Company's LaserJet 5Si printer and also provides the additional standard features not available with the LaserJet 5Si printer. Each feature is described in more detail in the following sections.

- Standard PostScript Level 2 emulation
- 30 Type 1 format fonts available for use in PCL emulation
- Support of PCL 6 emulation
- Additional Printer Job Language (PJL) commands
- True 1200 x 1200 dpi printing
- 1200 Image Quality for enhanced image printing
- Computer attachment for both parallel and serial interfaces
- Additional PCL emulation raster image compressions
- Support for different paper and envelope sizes
- ImageQuick™ TIFF SIMM Option
- Kiosk adapter
- Receive-Only fax
- Additional parallel adapter option

Standard PostScript Level 2 Emulation

The printer supports PostScript Level 2 emulation. The PostScript Level 2 language is an interpretive programming language with page description and interactive graphics capabilities. See Chapter 4, "PostScript Level 2 Emulation" for more information.

Type 1 Format Fonts Available in PCL Emulation

Seventy-five scalable fonts, including 30 Type 1 format fonts, and two additional bitmapped fonts are available in PCL emulation. For more information, see "Font and Symbol Set Support" on page 2-6.

Additional Color Extensions for PCL Emulation

Your printer supports the color extensions for PCL emulation as defined for the Hewlett-Packard Company's Color LaserJet printer. Color images and color fills are converted to appropriate gray levels rather than being ignored or discarded. Lexmark drivers use these color extensions when 1200 Image Quality is set to send multi-bit images for improved print quality. See Table 2-22, "Color Extensions," on page 2-40 for more information.

Additional Printer Job Language Commands

For details, see “Unique PJL Commands” on page 3-52.

1200 Image Quality

1200 Image Quality provides improved image quality for non-binary images and improved fill quality when 600 dpi data is received. 1200 Image Quality is ignored for 300 dpi and 1200 jobs. This feature is available in PostScript Level 2 emulation or PCL emulation. 1200 Image Quality may be set On from the printer driver by using a PJL command, from MarkVision, or from the operator panel by selecting **1200 Image Q**.

With true 1200 dpi (1200 x 1200), more pels per square inch provides finer definition and provides more levels of gray than when using 600 dpi. With a higher pels per square inch, a higher screen frequency is used and provides smoother gray so images can simultaneously have a lot of detail as well as a rich range of gray.

1200 Image Quality provides multiple levels of gray control/intensities at 600 dpi. These amounts are possible since pels are turned on at various levels using 2 bits of binary information to describe each pel. It provides more levels of gray which is one type of higher resolution. This enables printing most typical images with a greater range of grays making the quality of the image closer to real 1200 dpi. However, it does not provide real improvement in image definition as a truly higher resolution provides, which is crucial to bring out the detail in some images. Examples would be photos in which you can see individual strands of a person’s hair or leaves on a tree.

Computer Attachment for Both Parallel and Serial Interfaces

Interface ports available are:

- Parallel on all models
- Parallel 1284-C Adapter on all models
- Serial for Optra S 1885 only; however, serial is available on Optra S 1255, S 1625 and S 2455 with the Tri-Port interface option card
- Input/output port (IOP) connector slots for internal network adapter (INA) cards, hard disk option card, and the Tri-Port interface option card: 1 for Optra S 1255 and S 1625, 2 for Optra S 1855, and 3 for Optra S 2455

Unlike many LaserJet printers, your printer can be reset with an INIT* signal when using the parallel interface if enabled.

When using the standard serial interface, your printer has the following differences from the LaserJet 4 Plus printer optional serial interface:

- The printer returns XON/XOFF with 2 stop bits in all cases.
- The printer does not support DTR inversion.

Additional PCL Emulation Raster Image Compressions

The following additional compression types for PCL emulation raster images are available:

Value	Description
1002	Group 4
1003	Group 3 one dimensional
1004	Group 3 two dimensional K=2
1005	Group 3 two dimensional K=4
1006	Tagged Image File Format (TIFF) word (16 bit)
1007	TIFF double-word (32 bit)
1008	Adaptive (includes TIFF word and TIFF double-word)

See the Set Raster Compression Mode command on page 2-38 for more information.

Support for Different Paper and Envelope Sizes

The printer supports one paper size and one envelope size not supported by the LaserJet 5Si printer.

The following table lists the additional paper and envelope sizes available for the Page Size command. For more information on how to select these sizes within a PCL emulation job, see the Page Size command in Table 2-11, “Page Control,” on page 2-26.

Table 1-1 Additional Sizes

Classification	Size (mm)	Size (inches)
A5 paper	148 x 210	5.83 x 8.27
9 envelope	98 x 225	3.875 x 8.875

Note: The LaserJet 5Si printer supports 11 x 17 in., 11 x 17 in. oversize, A3, B4, and double postcard (5.83 x 7.88 in.) which your printer does not support.

MarkNet S Internal Network Adapters

The printer offers unmatched connectivity to industry-standard network equipment. With the installation of one to three MarkNet S adapters, the printer can support various types of cabling and network protocols and receive print jobs from more than 13 leading network operating systems.

Flash Memory Option

The printer supports a Flash Memory Option. When a flash memory card is installed, you can write scalable and bitmapped fonts, symbol sets, macros for PCL emulation, and fonts and procedures for PostScript Level 2 emulation to flash memory, thus increasing the number of permanent resources available to the printer for print jobs and freeing Random Access Memory (RAM) for faster processing.

Hard Disk Option and Hard Disk Adapter

The Hard Disk Option is used to store permanent fonts and macros and to buffer print jobs. This option plugs into the hard disk adapter which attaches to a connector available for network and hard disk options. The printer supports up to and not including a 4 GB hard drive. See Chapter 6, “Flash Memory and Disk Options.”

Note: You can buy both the hard disk and hard disk adapter from Lexmark, or you can buy just the hard disk adapter and attach a hard disk from another supplier. The hard disk must meet the PCMCIA Type III APA protocol.

For information on installing cards, refer to the printer *User’s Guide*.

Job Buffering

Job buffering lets you store incoming print jobs on an optional disk installed on your printer. For more information, see “Job Buffering” on page 6-13.

Bibliography

For detailed information about PCL emulation printer commands and PostScript Level 2 emulation printer commands and operators, refer to the following documentation:

- *Hewlett-Packard DeskJet Printer Family Technical Reference*, C2121-90101
- *Hewlett-Packard PostScript SIMM Technical Reference*, C2080-90921
- *Hewlett-Packard Printer Job Language Technical Reference Manual*, 5961H0512
- *Hewlett-Packard LaserJet 4 Typography and Graphics*, Random House Electronic Publishing
- *Hewlett-Packard PCL 5 Printer Language Technical Reference Manual*, 5961-0509
- *Hewlett-Packard PCL 5 Color Technical Reference Manual*, 5961-0635
- *IBM Personal System/2 Hardware Interface Technical Reference*, S68X-2330
- *PostScript Language Reference Manual (Second Edition)*, Adobe Systems Incorporated, Addison-Wesley Publishing
- *PostScript Language Reference Manual Supplement*, Version 2016, Adobe Systems, Incorporated
- *Network Printing Alliance Protocol, A Printer/Host Control Specification Developed by the NPA*, Level 1, Revision N

Chapter 2 PCL 5 Emulation

When you select PCL emulation as the printer language, the printer supports the Hewlett-Packard Company LaserJet 5Si printer command language. This chapter shows how to select PCL emulation and discusses PCL emulation commands along with resident PCL emulation font and symbol set support.

Selecting PCL 5 Emulation

Using SmartSwitch

When SmartSwitch is enabled for both printer languages on an interface (for example, parallel, serial, or Network 1), the printer automatically switches to the printer language being sent by your software application. The printer is shipped with SmartSwitch enabled for both printer languages in all interfaces. The printer examines all print jobs and switches dynamically between PostScript Level 2 emulation and PCL emulation.

Using the Operator Panel

If SmartSwitch is set Off for both printer languages, you can select PCL emulation from the operator panel. Press **MENU>** and select **SETUP MENU**, **Printer Language**, **PCL Emulation**.

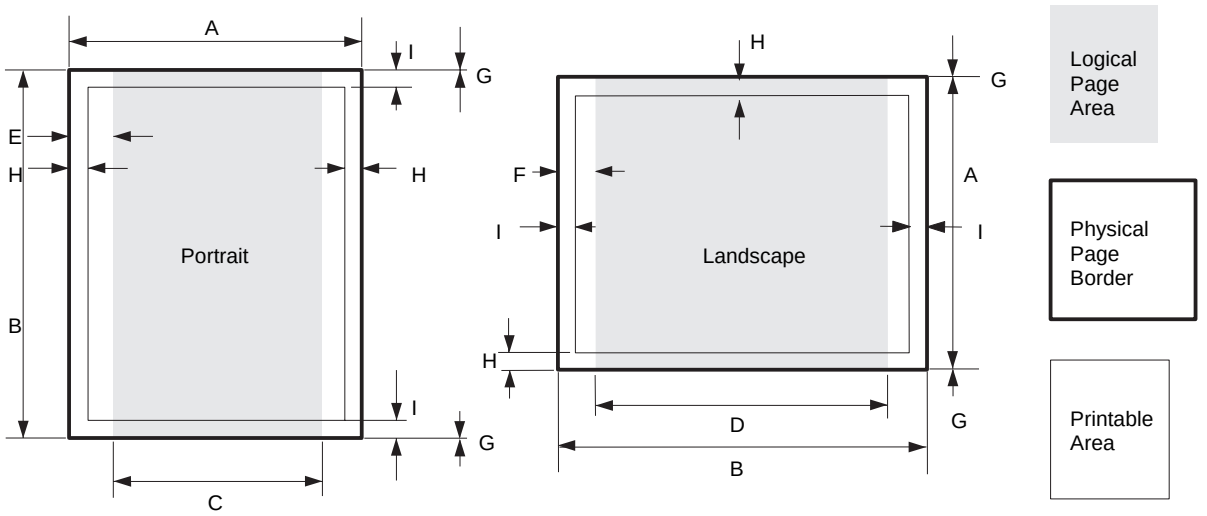
Using Application Software

To select PCL emulation from your application, use the Printer Job Language (PJL) Enter Language Command. See “ENTER LANGUAGE Command” on page 3-2 for more information and see “Printer Job Language” on page 3-1 for the syntax and use of PJL.

Warning: When you change printer languages, you may lose some or all previously downloaded permanent resources, unless Resource Save is On or the resources are stored in flash memory or disk.

Printable and Unprintable Areas

The printable areas and logical pages for PCL emulation (both portrait and landscape orientation) are illustrated below. A legend and a table of dimensions follow the illustration.



Legend:

A Portrait physical page width and landscape physical page length

B Portrait physical page length and landscape physical page width

C Portrait logical page width

D Landscape logical page width

E Distance between the side edge of the physical page and the logical page in portrait

F Distance between the side edge of the physical page and the logical page in landscape

G Distance between the top and bottom edge of the physical page and logical page

H Distance between the left and right edge of the physical page and the printable area in portrait or distance between the top and bottom edge of the physical page and printable area in landscape

I Distance between the top and bottom edge of the physical page and the printable area in portrait or distance between the left and right edge of the physical page and the printable area in landscape

Table 2-1 on page 2-3 lists the page dimensions and dimensions of each area labeled on the preceding diagram for all paper and envelope sizes this printer supports. Refer to the Legend for definitions of areas **A** through **I**.

Table 2-1 Paper and Envelope Dimensions

Selection		Paper/ Envelope Dimensions		Dimensions by Area (pels)[1]								
Page Size Parm[2]	Name	mm	inches	A	B	C	D	E	F	G	H	I
Paper												
2	Letter	216 x 279	8.5 x 11	2550	3300	2400	3180	75	60	0	50	50
3	Legal	216 x 356	8.5 x 14	2550	4200	2400	4080	75	60	0	50	50
45	B5 Paper	182 x 257	7.2 x 10.1	2150	3035	2000	2915	75	60	0	50	50
26	A4 (198 mm)[3]	210 x 297	8.3 x 11.7	2480	3507	2338	3389	71	59	0	40	50
26	A4 (203 mm)[3]	210 x 297	8.3 x 11.7	2480	3507	2400	3389	40	59	0	40	50
1	Executive	184 x 267	7.25 x 10.5	2175	3150	2025	3030	75	60	0	50	50
13, 25	A5	148 x 210	5.83 x 8.27	1748	2480	1598	2360	75	60	0	50	50
101	Universal	215.9 x 355.6	8.5 x 14	2550	4200	2400	4080	75	60	0	50	50
Envelopes												
80	7-3/4 Monarch	98 x 191	3.875 x 7.5	1162	2250	1012	2130	75	60	0	50	50
89	9 (Com 9)	98 x 225	3.875 x 8.875	1162	2662	1012	2542	75	60	0	50	50
81	10 (Com 10)	105 x 241	4.125 x 9.5	1237	2850	1087	2730	75	60	0	50	50
90	DL	110 x 220	4.33 x 8.66	1299	2598	1157	2480	71	59	0	50	50
91	C5	162 x 229	6.38 x 9.01	1913	2704	1771	2586	71	59	0	50	50
100	B5 Envelope	176 x 250	6.93 x 9.84	2078	2952	1936	2834	71	59	0	50	50
600	Other Envelope	229 x 355.6	9.01 x 14	2706	4200	2400	4080	75	60	0	50	50

[1] Pel dimensions are for 300 dots per inch (dpi). Double the dimensions for 600 dpi. Quadruple the dimensions for 1200 dpi.

[2] Page Size Parameters are explained in Table 2-11 on page 2-26.

[3] The width of the logical page for A4 paper can be changed from the printer operator panel.

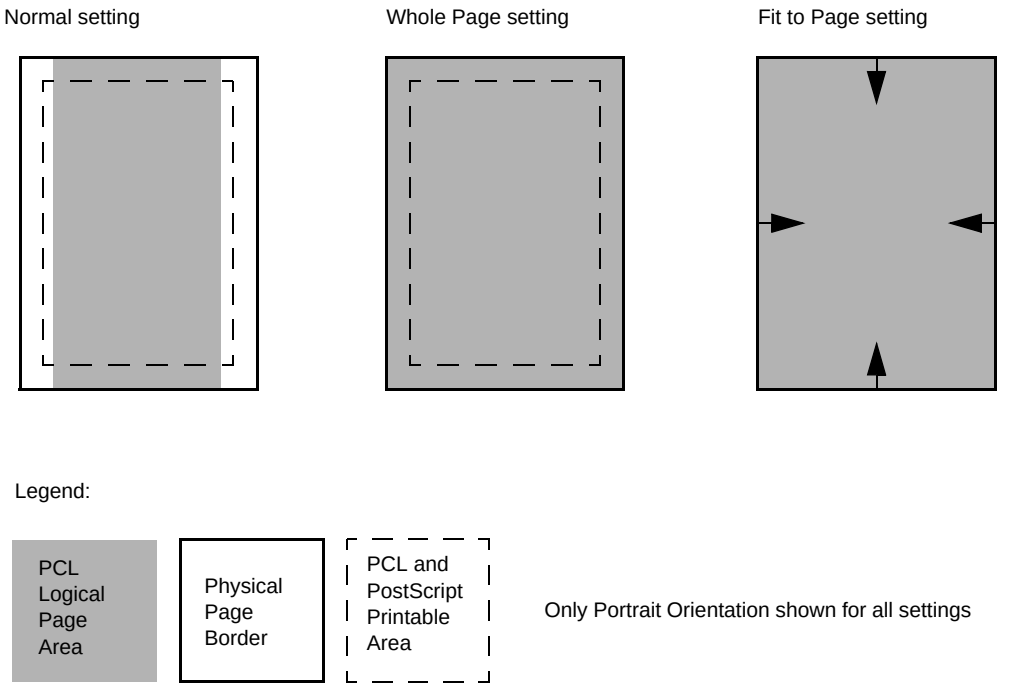
Note: The explanation of the printable area describes the Normal setting for the Print Area menu item available from the Setup Menu on the printer operator panel. For more information about the Print Area menu item, see page 2-4.

Print Area Menu Item

The *printable area* is the area on a sheet of paper within which a pel can be printed. *Logical page* is a conceptual entity that defines the area in which margins (top, bottom, left, right) may be set and the area in which the PCL cursor may be positioned.

The *physical page border* is the actual physical boundaries of a page.

The Setup Menu contains the Print Area menu item. Print Area supports three values: Normal, Whole Page, and Fit to Page.



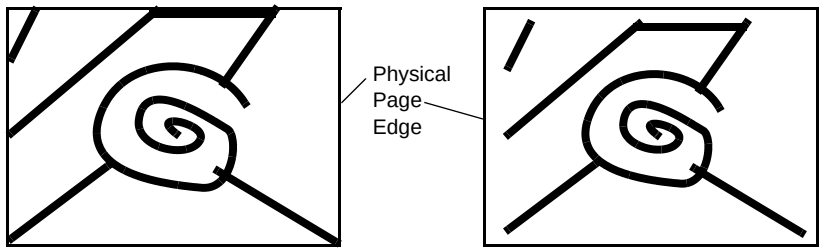
The *Normal setting*, which is the factory default, means the print area includes the entire page except the narrow border around the edge of the page. This is the non-printable area. The printer measures margin settings relative to the logical page.

For a more detailed explanation of the Normal setting, see “Printable and Unprintable Areas” on page 2-2.

The *Whole Page setting* only affects pages printed when using PCL 5 emulation. If Whole Page is selected, the PCL language sets the logical page area equal to the physical page dimensions. Since the logical page dimensions and the physical page dimensions are the same, in theory, the cursor may be positioned anywhere on the page. However, the PCL language clips the image to the printable area. So, the Whole Page setting is useful for printing scanned images that extend from edge to edge of a page.

When the *Fit to Page setting* is selected, PCL emulation or PostScript emulation formats a page using a printable area equal to the physical page, which is from one edge of the page to the other edge of the page. If you use this setting, no clipping occurs. In Fit to Page, the PCL emulation logical page dimensions are equal to the physical page dimensions as in the Whole Page setting.

The printer holds this formatted image in memory, but when the page prints, the image is compressed a small amount in both horizontal and vertical directions, and then centered on the physical page for letter-size paper only. This process gives a small margin around the image. This artificial margin is created to keep from printing from one edge to the other on a page since this could contaminate the printer and cause printing problems. The following shows an image held in memory for printing from one edge to the other and how the image would actually print based on the to Fit to Page setting. Notice that a small space remains at the edge of the page, and the image is compressed a small amount.



Formatted Image with Fit to Page

Printed Image with Fit to Page

Font and Symbol Set Support

The printer has 77 fonts in PCL emulation, which includes 75 scalable fonts and two bitmapped fonts.

Several parameters are used to select a font from the data stream. These include spacing, style, weight, and typeface number. These parameters are shown for each font on the font sample pages. For scalable fonts, the size of a font is varied by specifying pitch or point size. For bitmapped fonts, you must choose the pitch or point size listed on the font sample pages. You can print the font sample pages from the **Tests Menu**.

A symbol set defines which characters are available for a font and the code point for each of these characters. The tables beginning on page 2-7 show the symbol sets available for each font in PCL emulation. Not all fonts support all symbol sets. You can print samples of one or all of the symbols sets from the DOS Toolkit utility located on the CD shipped with your printer.

You can select a font as the PCL emulation default from the printer operator panel. Press **MENU>**, then select **PCL EMUL MENU**. In the **PCL EMUL MENU**, select the **Font Name**, **Point Size** or **Pitch**, and **Symbol Set**. In the **Symbol Set** menu item, only the symbol sets available for the selected font are listed.

The fonts are divided into two major groups. The first 47 fonts shown on the Print Fonts test page (R0 to R46) are the standard PCL 5 emulation fonts. Originally, the 30 remaining fonts (R47 to R76) were for PostScript emulation, but now they also work in PCL 5 emulation. These fonts are called Type 1 fonts for this reason.

For compatibility purposes, Type 1 fonts can be disabled by the Printer Job Language (PJL) LTYPE1FONTS command. The factory default for these fonts is Enabled.

Fonts can be selected using PJL commands, also. The selection parameter is the number portion from the font identifier shown on the Print Fonts test page, such as 0 or 76 from font identifiers R0 or R76. A symbol set is selected with PJL commands using PJL values shown in the following table. Symbol sets without a PJL value can be selected using the symbol set ID with the PJL command. A font selection can be temporary or made the default. The following PJL commands are used for font selection: FONTSOURCE, FONTNUMBER, PITCH, PTSIZE, SYMSET, SET, DEFAULT. See Table 3-5, “Common Variables for PCL 5 Emulation” on page 3-28 for more information.

Table 2-2 Key 24 PCL Emulation Symbol Sets

Typeface / Symbol Set ✓ Indicates Typeface supports specified Symbol Set. ✘ Indicates Typeface does not support specified Symbol Set.	Roman-8	PC-8, Code Page 437	PC-8 Danish/Norwegian (437N)	PC-850 Multilingual	ISO 8859-1 Latin 1	Legal	Desk Top	PS Text	Ventura International	Ventura US	Microsoft Publishing	Windows 3.0 Latin 1	Windows 3.1 Latin 1	MC Text	PC-852 Latin 2	PC-Turkish (437T)	Windows 3.1 Latin 2	Windows 3.1 Latin 5	ISO 8859-2 Latin 2	ISO 8859-9 Latin 5	PS Math	Ventura Math	Math-8	Pi font
PJL Value	ROMAN8	PC8	PC8DN	PC850	ISOL1	LEGAL	DESKTOP	PSTEXT	VNINTL	VNUS	MSPUBL	WIN30	WINL1	12J	PC852	PC8TK	WINL2	WINL5	ISOL2	ISOL5	PSMATH	VNMATH	MATH8	PIFONT
Two-character Symbol Set ID	R8	PC	PD	PM	E1	LG	DT	TS	VI	VU	PB	WO	W1	MC	PE	PT	WE	WT	E2	E5	MS	VM	M8	PI
Symbol Set ID	8U	10U	11U	12U	0N	1U	7J	10J	13J	14J	6J	9U	19U	12J	17U	9T	9E	5T	2N	5N	5M	6M	8M	15U
Courier	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Courier Italic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Courier Bold	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Courier Bold Italic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CG Times	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CG Times Italic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CG Times Bold	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CG Times Bold Italic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Univers Medium	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Univers Medium Italic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Univers Bold	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Univers Bold Italic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Letter Gothic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Letter Gothic Italic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Letter Gothic Bold	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Univers Condensed Medium	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Univers Condensed Medium Italic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Univers Condensed Bold	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Univers Condensed Bold Italic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Garamond Antiqua	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Table 2-2 Key 24 PCL Emulation Symbol Sets (Continued)

Typeface / Symbol Set ✓ Indicates Typeface supports specified Symbol Set. ✘ Indicates Typeface does not support specified Symbol Set.	Roman-8	PC-8, Code Page 437	PC-8 Danish/Norwegian (437N)	PC-850 Multilingual	ISO 8859-1 Latin 1	Legal	Desk Top	PS Text	Ventura International	Ventura US	Microsoft Publishing	Windows 3.0 Latin 1	Windows 3.1 Latin 1	MC Text	PC-852 Latin 2	PC-Turkish (437T)	Windows 3.1 Latin 2	Windows 3.1 Latin 5	ISO 8859-2 Latin 2	ISO 8859-9 Latin 5	PS Math	Ventura Math	Math-8	Pi font
PJL Value	ROMAN8	PC8	PC8DN	PC850	ISOL1	LEGAL	DESKTOP	PSTEXT	VNINTL	VNUS	MSPUBL	WIN30	WINL1	12J	PC852	PC8TK	WINL2	WINL5	ISOL2	ISOL5	PSMATH	VNMATH	MATH8	PIFONT
Two-character Symbol Set ID	R8	PC	PD	PM	E1	LG	DT	TS	VI	VU	PB	WO	W1	MC	PE	PT	WE	WT	E2	E5	MS	VM	M8	PI
Symbol Set ID	8U	10U	11U	12U	0N	1U	7J	10J	13J	14J	6J	9U	19U	12J	17U	9T	9E	5T	2N	5N	5M	6M	8M	15U
Garamond Kursiv	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Garamond Halbfett	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Garamond Kursiv Halbfett	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CG Omega	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CG Omega Italic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CG Omega Bold	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CG Omega Bold Italic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Antique Olive	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Antique Olive Italic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Antique Olive Bold	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Albertus Medium	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Albertus Extra Bold	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Clarendon Condensed Bold	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Marigold	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Coronet	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Times New Roman	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘
Times New Roman Italic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘
Times New Roman Bold	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘
Times New Roman BoldItalic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘
Arial	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘

Table 2-2 Key 24 PCL Emulation Symbol Sets (Continued)

Typeface / Symbol Set ✓ Indicates Typeface supports specified Symbol Set. ✘ Indicates Typeface does not support specified Symbol Set.	Roman-8	PC-8, Code Page 437	PC-8 Danish/Norwegian (437N)	PC-850 Multilingual	ISO 8859-1 Latin 1	Legal	Desk Top	PS Text	Ventura International	Ventura US	Microsoft Publishing	Windows 3.0 Latin 1	Windows 3.1 Latin 1	MC Text	PC-852 Latin 2	PC-Turkish (437T)	Windows 3.1 Latin 2	Windows 3.1 Latin 5	ISO 8859-2 Latin 2	ISO 8859-9 Latin 5	PS Math	Ventura Math	Math-8	Pi font
PJL Value	ROMAN8	PC8	PC8DN	PC850	ISOL1	LEGAL	DESKTOP	PSTEXT	VNINTL	VNUS	MSPUBL	WIN30	WINL1	12J	PC852	PC8TK	WINL2	WINL5	ISOL2	ISOL5	PSMATH	VNMATH	MATH8	PIFONT
Two-character Symbol Set ID	R8	PC	PD	PM	E1	LG	DT	TS	VI	VU	PB	WO	W1	MC	PE	PT	WE	WT	E2	E5	MS	VM	M8	PI
Symbol Set ID	8U	10U	11U	12U	0N	1U	7J	10J	13J	14J	6J	9U	19U	12J	17U	9T	9E	5T	2N	5N	5M	6M	8M	15U
Arial Italic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘
Arial Bold	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘
Arial Bold Italic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘
Line Printer 16	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Table 2-3 Additional PCL Emulation Symbol Sets

Typeface / Symbol Set ✓ Indicates Typeface supports specified Symbol Set. ✘ Indicates Typeface does not support specified Symbol Set.	Windows Baltic	ISO 8859-10 Latin 6	PC-775 Baltic	PC-1004 OS/2	PC-861 Iceland	PC-863 Canadian French	PC-865 Nordic	PC-860 Portugal	ABICOMP International	ABICOMP Brazil/Portugal	PC-8 PC Nova	PC-857 Latin 5, Turkey	Turkish-8	PC-853 Latin 3	PC-8 Polish Mazovia	Windows Cyrillic	ISO 8859-5 Latin/Cyrillic	PC-866 Cyrillic	PC-855 Cyrillic	Russian-GOST	PC-8 Bulgarian	PC Ukrainian	Windows Greek	ISO 8859-7 Latin/Greek	PC-869 Greece	PC-851 Greece	PC-8 Latin/Greek	Greek-8	PC-8 Greek Alternate (437G)	PC-911 Katakana
Two-character Symbol Set ID	WL	E6	PV	PU	IC	CN	NW	PP	P2	P1	PY	P5	TK	P3	PL	WR	ER	CP	PK	RG	BG	CU	WG	EG	IG	PG	GK	G8	GE	PJ
Symbol Set ID	19L	6N	26U	9J	21U	23U	25U	20U	14P	13P	27O	16U	8T	18U	24O	9R	10N	3R	10R	12R	13R	14R	9G	12N	11G	10G	12G	8G	14G	3K
Courier	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘
Courier Italic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘
Courier Bold	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘
Courier Bold Italic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘
CG Times	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘
CG Times Italic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘
CG Times Bold	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘
CG Times Bold Italic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘
Univers Medium	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘
Univers Medium Italic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘
Univers Bold	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘
Univers Bold Italic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘
Letter Gothic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Letter Gothic Italic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Letter Gothic Bold	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Univers Condensed Medium	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Univers Condensed Medium Italic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Univers Condensed Bold	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Univers Condensed Bold Italic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Garamond Antiqua	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Garamond Kursiv	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Garamond Halbfett	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Garamond Kursiv Halbfett	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘

Table 2-3 Additional PCL Emulation Symbol Sets (Continued)

Typeface / Symbol Set ✓ Indicates Typeface supports specified Symbol Set. ✘ Indicates Typeface does not support specified Symbol Set.	Windows Baltic	ISO 8859-10 Latin 6	PC-775 Baltic	PC-1004 OS/2	PC-861 Iceland	PC-863 Canadian French	PC-865 Nordic	PC-860 Portugal	ABICOMP International	ABICOMP Brazil/Portugal	PC-8 PC Nova	PC-857 Latin 5, Turkey	Turkish-8	PC-853 Latin 3	PC-8 Polish Mazovia	Windows Cyrillic	ISO 8859-5 Latin/Cyrillic	PC-866 Cyrillic	PC-855 Cyrillic	Russian-GOST	PC-8 Bulgarian	PC Ukrainian	Windows Greek	ISO 8859-7 Latin/Greek	PC-869 Greece	PC-851 Greece	PC-8 Latin/Greek	Greek-8	PC-8 Greek Alternate (437G)	PC-911 Katakana
Two-character Symbol Set ID	WL	E6	PV	PU	IC	CN	NW	PP	P2	P1	PY	P5	TK	P3	PL	WR	ER	CP	PK	RG	BG	CU	WG	EG	IG	PG	GK	G8	GE	PJ
Symbol Set ID	19L	6N	26U	9J	21U	23U	25U	20U	14P	13P	27O	16U	8T	18U	24O	9R	10N	3R	10R	12R	13R	14R	9G	12N	11G	10G	12G	8G	14G	3K
CG Omega	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
CG Omega Italic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
CG Omega Bold	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
CG Omega Bold Italic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Antique Olive	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Antique Olive Italic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Antique Olive Bold	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Albertus Medium	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Albertus Extra Bold	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Clarendon Condensed Bold	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Marigold	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Coronet	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Times New Roman	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Times New Roman Italic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Times New Roman Bold	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Times New Roman BoldItalic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Arial	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Arial Italic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Arial Bold	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Arial Bold Italic	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘	✘
Line Printer 16	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Table 2-4 PCL Emulation Type 1 Fonts

Typeface / Symbol Set ✓ Indicates Typeface supports specified Symbol Set. ✘ Indicates Typeface does not support specified Symbol Set.	**Roman-8**	**PC-8, Code Page 437**	**PC-850 Multilingual**	**Windows 3.0 Latin 1**	**Windows 3.1 Latin 1**
PJL Value	**ROMAN8**	**PC8**	**PC850**	**WIN30**	**WINL1**
Two-character Symbol Set ID	**R8**	**PC**	**PM**	**WO**	**W1**
Symbol Set ID	**8U**	**10U**	**12U**	**9U**	**19U**
Helvetica	✓	✓	✓	✓	✓
Helvetica-Italic	✓	✓	✓	✓	✓
Helvetica-Bold	✓	✓	✓	✓	✓
Helvetica-BoldItalic	✓	✓	✓	✓	✓
Helvetica-Narrow	✓	✓	✓	✓	✓
Helvetica-Narrow-Italic	✓	✓	✓	✓	✓
Helvetica-Narrow-Bold	✓	✓	✓	✓	✓
Helvetica-Narrow-BoldItalic	✓	✓	✓	✓	✓
Helvetica-Light	✓	✓	✓	✓	✓
Helvetica-LightOblique	✓	✓	✓	✓	✓
Helvetica-Black	✓	✓	✓	✓	✓
Helvetica-BlackOblique	✓	✓	✓	✓	✓
Palatino	✓	✓	✓	✓	✓
Palatino-Italic	✓	✓	✓	✓	✓
Palatino-Bold	✓	✓	✓	✓	✓
Palatino-BoldItalic	✓	✓	✓	✓	✓
Bookman-Light	✓	✓	✓	✓	✓
Bookman-LightItalic	✓	✓	✓	✓	✓
Bookman-Demi	✓	✓	✓	✓	✓
Bookman-DemiItalic	✓	✓	✓	✓	✓
AvanteGarde-Book	✓	✓	✓	✓	✓
AvanteGarde-BookOblique	✓	✓	✓	✓	✓
AvanteGarde-Demi	✓	✓	✓	✓	✓

Table 2-4 PCL Emulation Type 1 Fonts

Typeface / Symbol Set ✓ Indicates Typeface supports specified Symbol Set. ✘ Indicates Typeface does not support specified Symbol Set.	Roman-8	PC-8, Code Page 437	PC-850 Multilingual	Windows 3.0 Latin 1	Windows 3.1 Latin 1
PJL Value	ROMAN8	PC8	PC850	WIN30	WINL1
Two-character Symbol Set ID	R8	PC	PM	WO	W1
Symbol Set ID	8U	10U	12U	9U	19U
AvanteGarde-DemiOblique	✓	✓	✓	✓	✓
CenturySchlbk-Roman	✓	✓	✓	✓	✓
CenturySchlbk-Italic	✓	✓	✓	✓	✓
CenturySchlbk-Bold	✓	✓	✓	✓	✓
CenturySchlbk-BoldItalic	✓	✓	✓	✓	✓
ZapfChancery-MediumItalic	✓	✓	✓	✓	✓

Any font that supports the Roman-8 symbol set (8U) also supports the following 19 ISO symbol sets:

Table 2-5 19 ISO PCL 5 Emulation Symbol Sets

Symbol Set ID	Two-character Symbol Set ID	Symbol Set / Typeface
1E	UK	ISO 4: United Kingdom
0U	US	ISO 6: ASCII
0S	SW	ISO 11: Swedish for Names
0I	IT	ISO 15: Italian
2S	SP	ISO 17: Spanish
1G	GR	ISO 21: German
0D	DN	ISO 60: Norwegian version 1
1F	FR	ISO 69: French
2U	2U	ISO 2: IRV (International Ref Version)
0F	OF	ISO 25: French
0G	OG	ISO : HP German
0K	OK	ISO 14: JIS ASCII
2K	2K	ISO 57: Chinese
3S	3S	ISO 10: Swedish
1S	1S	ISO : HP Spanish
6S	6S	ISO 85: Spanish
4S	4S	ISO 16: Portuguese
5S	5S	ISO 84: Portuguese
1D	1D	ISO 61: Norwegian version 2

Table 2-6 Non-Text PCL Emulation Symbol Sets

Typeface / Symbol Set ✓ Indicates Typeface supports specified Symbol Set. ✘ Indicates Typeface does not support specified Symbol Set.	Symbol	Wingdings	POSTNET Barcode	Ventura ITC Zapf Dingbats	PS ITC Zapf Dingbats
Two-character Symbol Set ID	SY	WD		DV	DS
Symbol Set ID	19M	579L	15Y	9L	10L
Symbol	✓	✘	✘	✘	✘
Wingdings	✘	✓	✘	✘	✘
POSTNET Barcode	✘	✘	✓	✘	✘
Zapf Dingbats	✘	✘	✘	✓	✓

Command Structure

This section introduces the different types of PCL emulation commands and their structure, or syntax. It also demonstrates how you can link commands to abbreviate them.

Control Codes

Control Codes are single-character instructions.

Table 2-7 Control Codes

Code	Dec	Hex	Function	Result
BS	8	08	Backspace	Moves the cursor toward the left margin one horizontal space equal to the last printed character
HT	9	09	Horizontal Tab	Moves the cursor to the next defined tab stop
LF	10	0A	Line Feed	Advances the cursor to the same horizontal position on the following line as determined by either the Vertical Motion Index (VMI) or Set Line Spacing command
FF	12	0C	Form Feed	Advances the cursor to the same horizontal position at the top margin of the next page
CR	13	0D	Carriage Return	Moves the cursor to the left margin
SP	32	20	Space	Moves the cursor to the right one column
SI	15	0F	Primary Font	Selects the primary font
SO	14	0E	Secondary Font	Selects the secondary font

Commands

PCL commands are multibyte strings (also known as “escape sequences”) that begin with the Escape control code (ESC, ←, decimal 27, or hexadecimal 1B). The ESC control code notifies the printer that the characters that follow are to be interpreted as part of a command and are not control codes or data to be printed.

Command Structure

Most PCL emulation commands have the following structure. Spaces have been added to this example for readability. The command parameter variables are indicated by a number sign (#).

ESC & a # C

Table 2-8 Description of Command Structure

Element	Description
ESC	Decimal 27 or hex 1B
&	Parameterized character from American National Standard Code for Information Interchange (ASCII) table (range 33 to 47 decimal)
a	Group character from ASCII table (range 96 to 126 decimal) that specifies a group type of control
#	Decimal character string value within specified numeric ranges; may be preceded by a + or - sign and contain a decimal point
C	Termination character from ASCII table (range 64 to 94 decimal)

Command Parameters

A command parameter sets the value for a command. This value stays constant until either a different value resets the command or a command resets the printer to the default values. For example, after the printer receives a command that selects a right margin beginning at column 63, the right margin of each printed page begins at column 63. That margin stays constant until a right margin command with a different value resets it or until the printer is reset.

Parameters for each command are listed in the command tables beginning on page 2-25. Use the Symbol Set Tables to determine the decimal or hexadecimal value for each parameter. (Symbol Set Tables may be printed using the DOS Toolkit utility.) To determine a decimal or hex value, first locate the value of the parameter you require in the Symbol Set Table. The decimal value is the value shown in the bottom of the cell or box with that parameter. To find a hex value, go straight up the grid from the desired parameter and read the value in the top heading. This is the first character of the hex value. Next, go straight across the grid to the left of the parameter and read the value in the left column heading. This is the second character of the hex value. For example, ESC (←) is coded 1B in Hex and 27 in decimal. (Any one of the three values ←, 1B, or 27 might be used in your application. Read your documentation to determine which to use.) The following example sets the pitch of the primary font to 16.66 characters per inch.

Example:

ESC`(s16.66H`

- Decimal:`27 40 115 49 54 46 54 54 72`
- Hex:`1B 28  73 31 36 2E 36 36 48`

Linking Commands

You can combine PCL emulation commands by linking them *if* the first 3 bytes of the commands are identical. The combined, short form sends the first 3 bytes only once in the string. To combine commands:

- Use the first 3 bytes (characters) of the command only once at the start of the command string.
- Make the last letter of each command in the string lowercase.
- Capitalize the last letter of the string.

For example, notice that the first 3 bytes of these two commands are the same:

ESC(s10H (Select 10 Characters per Inch)
ESC(s4099T (Select Courier Typeface)

To combine these two commands, use this form:

ESC(s10h4099T

which is 3 bytes shorter than the long form:

ESC(s10H ESC(s4099T

You can combine more than two commands; for example, you can add Select Stroke Weight Bold (ESC(s3B) to the previous two commands:

ESC(s10h3b4099T

or in the long form:

ESC(s10hESC(s3bESC(s4099T

The plus symbol (+) and the minus symbol (-) may be used to select a position relative to the current cursor position. For example:

ESC&a6C Move to horizontal cursor position, column six
ESC&a+6C Move six columns to the right of the current position
ESC&a-6C Move six columns to the left of the current position

PCL Emulation Commands

Table 2-9 lists the PCL emulation commands. Refer to the page listed in the table for more information about a command. See page 2-25 for a listing of the commands grouped by function.

Table 2-9 PCL Emulation Commands

Command	Function	Page
ESCE	Printer Reset	2-25
ESCY	Display Functions-On	2-43
ESCZ	Display Functions-Off	2-43
ESC&a#C	Horizontal Cursor Positioning in Columns	2-30
ESC&a#G	Duplex Page Side Selection	2-28
ESC&a#H	Horizontal Cursor Positioning in Decipoints	2-30
ESC&a#L	Set Left Margin	2-27
ESC&a#M	Set Right Margin	2-27
ESC&a#P	Print Direction	2-26
ESC&a#R	Vertical Cursor Positioning in Rows	2-30
ESC&a#V	Vertical Cursor Positioning in Decipoints	2-30
ESC&b#M	Monochrome Print Mode	2-40
ESC&c#T	Character Text Path Direction	2-27
ESC&d@	Underline-Disable	2-33
ESC&d#D	Underline-Enable	2-33
ESC&f#S	Push / Pop Cursor Position	2-30
ESC&f#X	Macro Control	2-34
ESC&f#Y	Set Macro ID	2-34
ESC&k#G	Set Line Termination	2-30
ESC&k#H	Set Horizontal Motion Index	2-27
ESC&k#S	Select Primary and Secondary Pitch	2-33
ESC&l#A	Page Size	2-26
ESC&l#C	Set Vertical Motion Index	2-28
ESC&l#D	Set Line Spacing	2-28
ESC&l#E	Set Top Margin	2-27
ESC&l#F	Set Text Length	2-27

Table 2-9 PCL Emulation Commands (Continued)

Command	Function	Page
ESC&l#G	Set Output Bin	2-27
ESC&l#H	Paper Source	2-26
ESC&l#L	Skip Perforation	2-27
ESC&l#O	Select Orientation	2-26
ESC&l#P	Page Length	2-28
ESC&l#S	Simplex/Duplex Print	2-25
ESC&l1T	Job Separation	2-25
ESC&l#U	Long-Edge Offset Registration	2-25
ESC&l#X	Number of Copies	2-25
ESC&l#Z	Short-Edge Offset Registration	2-25
ESC&n#W[data]	Alphanumeric ID	2-29
ESC&p#C	Palette Control	2-40
ESC&p#I	Palette Control ID	2-40
ESC&p#S	Select Palette	2-40
ESC&p#X[data]	Transparent Print Data	2-33
ESC&r#F	Flush All Pages	2-42
ESC&s#C	End-Of-Line Text Wrap	2-43
ESC&t#P	Text Parsing Method	2-33
ESC&u#D	Unit-of-Measure	2-25
ESC(#	Primary Font Symbol Set	2-31
ESC(#X	Select Primary Download Font by Font ID	2-32
ESC(3@	Select Default Primary Font	2-33
ESC(f#W[data]	Define Symbol Set	2-33
ESC(s#B	Primary Font Stroke Weight	2-32
ESC(s#H	Primary Font Pitch	2-31
ESC(s#P	Primary Font Spacing	2-31
ESC(s#S	Primary Font Style	2-31
ESC(s#T	Primary Font Typeface Selection	2-32
ESC(s#V	Primary Font Height (Point Size)	2-31
ESC(s#W[data]	Load Character	2-34
ESC)#	Secondary Font Symbol Set	2-31
ESC)#X	Select Secondary Download Font by Font ID	2-32

Table 2-9 PCL Emulation Commands (Continued)

Command	Function	Page
ESC)3@	Select Default Secondary Font	2-33
ESC)s#B	Secondary Font Stroke Weight	2-32
ESC)s#H	Secondary Font Pitch	2-31
ESC)s#P	Secondary Font Spacing	2-31
ESC)s#S	Secondary Font Style	2-31
ESC)s#T	Secondary Font Typeface Selection	2-32
ESC)s#V	Secondary Font Height (Point Size)	2-31
ESC)s#W[data]	Load Font Header	2-34
ESC*b#M	Set Raster Compression Mode	2-38
ESC*b#V[data]	Transfer Raster Data by Plane	2-38
ESC*b#W[data]	Transfer Raster Data by Row/Block	2-39
ESC*b#Y	Y Offset	2-38
ESC*c#A	Horizontal Rectangle Size (PCL Units)	2-37
ESC*c#B	Vertical Rectangle Size (PCL Units)	2-37
ESC*c#D	Set Font ID	2-34
ESC*c#E	Set Character Code	2-34
ESC*c#F	Font Control	2-34
ESC*c#G	Area Fill ID	2-35, 2-37
ESC*c#H	Horizontal Rectangle Size (Decipoints)	2-37
ESC*c#K	GL/2 Horizontal Plot Size	2-43
ESC*c#L	GL/2 Vertical Plot Size	2-43
ESC*c#P	Fill Rectangular Area	2-37
ESC*c#Q	Pattern Control	2-36
ESC*c#R	Symbol Set ID Code	2-33
ESC*c#S	Symbol Set Control	2-33
ESC*c0T	Set Picture Frame Anchor Point	2-43
ESC*c#V	Vertical Rectangle Size (Decipoints)	2-37
ESC*c#W[data]	User-Defined Pattern	2-36
ESC*c#X	Picture Frame Horizontal Size (Decipoints)	2-43
ESC*c#Y	Picture Frame Vertical Size (Decipoints)	2-43
ESC*l#O	Logical Operation	2-35
ESC*l#R	Pixel Placement	2-35

Table 2-9 PCL Emulation Commands (Continued)

Command	Function	Page
ESC*l#W[data]	Color Lookup Tables	2-40
ESC*m#W[data]	Download Dither Matrix	2-40
ESC*o#W[data]	Driver Configuration Command	2-40
ESC*p#P	Push/Pop Palette	2-40
ESC*p#R	Set Pattern Reference Point	2-36
ESC*p#X	Horizontal Cursor Positioning in PCL Units	2-30
ESC*p#Y	Vertical Cursor Positioning in PCL Units	2-30
ESC*r#A	Start Raster Graphics	2-38
ESC*r#F	Raster Graphics Presentation Mode	2-38
ESC*r#S	Raster Width (Source)	2-38
ESC*r#T	Raster Height (Source)	2-38
ESC*r#U	Simple Color	2-40
ESC*rB	End Raster Graphics (Version B)	2-39
ESC*rC	End Raster Graphics (Version C)	2-39
ESC*s#I	Inquire Status Readback Entity	2-42
ESC*s1M	Free Space	2-42
ESC*s#T	Set Status Readback Location Type	2-42
ESC*s#U	Set Status Readback Location Unit	2-42
ESC*s#X	Echo	2-42
ESC*t#H	Raster Width Destination	2-39
ESC*t#I	Gamma Correction	2-40
ESC*t#J	Render Algorithm	2-41
ESC*t#R	Set Resolution	2-38
ESC*t#V	Raster Height Destination	2-39
ESC*v#A	Color Component One	2-41
ESC*v#B	Color Component Two	2-41
ESC*v#C	Color Component Three	2-41
ESC*v#I	Assign Color Index	2-41
ESC*v#N	Source Transparency Mode	2-35
ESC*v#O	Pattern Transparency Mode	2-35
ESC*v#S	Foreground Color	2-41
ESC*v#T	Select Current Pattern	2-35

Table 2-9 PCL Emulation Commands (Continued)

Command	Function	Page
ESC*v#W[data]	Configure Image Data	2-41
ESC9	Clear Horizontal Margins	2-27
ESC=	Half Line-Feed	2-30
ESC%#A	Enter PCL 5 Emulation	2-43
ESC%#B	Enter GL/2 Language	2-43
ESC%-12345X	Universal Exit Language (UEL)/Start of PJL	3-2

PCL Emulation Commands by Function

Table 2-10 Job Control

Command / Parameters	Function / Result
ESC E	**Printer Reset** • Prints any partial pages. • Resets printer environment to defaults. • Deletes all temporary downloaded resources.
ESC &l#X # = number of Copies (1 to 32767) Default = 1	**Number of Copies** Affects the page currently in process and subsequent pages.
ESC &l#S 0 Single-Sided (Default) 1 Duplex Long-Edge Binding 2 Duplex Short-Edge Binding	**Simplex/Duplex Print** Long-edge or short-edge binding refers to the side of the physical page where binding occurs. Most manuals, including this one, use long-edge binding.
ESC &l#U # = number of Decipoints Range = -32767 to 32767 (1 Decipoint = 1/720 inch) Default = 0	**Long-Edge Offset Registration** Also known as Left Offset. Adjusts placement of logical page along the width of the physical page.
ESC &l#Z # = number of Decipoints Range = -32767 to 32767 (1 Decipoint = 1/720 inch) Default = 0	**Short-Edge Offset Registration** Also known as Top Offset. Adjusts placement of logical page along the length of the physical page.
ESC &u#D Range = (96, 100, 120, 144, 150, 160, 180, 200, 225, 240, 288, 300, 360, 400, 450, 480, 600, 720, 800, 900, 1200, 1440, 1800, 2400, 3600, 7200) Default = 300 units per inch	**Unit-of-Measure** Sets the size for the PCL Unit (units per inch). The Unit-of-Measure defines the unit used in the following commands: • Horizontal Cursor Position by PCL Unit (ESC*p#X) • Vertical Cursor Position by PCL Unit (ESC*p#Y) • Horizontal Rectangle Size by PCL Unit (ESC*c#A) • Vertical Rectangle Size by PCL Unit (ESC*c#B) The Unit-of-Measure also affects the rounding of character escapements and the Horizontal Motion Index. **Note:** This command does not affect the interpretation of binary raster data for bitmapped fonts, raster graphics, or user defined fill patterns.
ESC &l1T	**Job Separation** This command is parsed and ignored.
ESC %-12345X	**Universal Exit Language (UEL)/Start of PJL** This command terminates the current printer language and allows switching into PJL. For more information, see “UNIVERSAL EXIT LANGUAGE Command” on page 3-2.

Table 2-11 Page Control

Command / Parameters	Function / Result
ESC&l#A Paper 1 Executive 2 Letter 3 Legal 6 Ledger (11 x 17 in.) 13, 25 A5 Paper 26 A4 Paper 27 A3 Paper 45 B5 Paper 46 B4 Paper 101 Custom Paper/Universal Envelopes 80 Monarch 7 3/4 81 Commercial 10 89 Commercial 9 90 DL 91 C5 100 B5 Envelope 600 Other Envelope	**Set Page Size** Selects the physical size of the paper, which also determines the logical page dimensions. See Table 2-1 on page 2-3 for paper and envelope dimensions. If the requested paper size is not in the requested source or if no source is requested, sources are checked for the requested size in the following order: multipurpose feeder, tray 1, tray 2, tray 3, tray 4, tray 5, and envelope feeder. If the requested size is not found, a **Change <tray>** message, where <tray> is the name of a paper or envelope source, is displayed on the operator panel. **Notes**: • Some Lexmark printers may not support Ledger, A3, or B4 size papers. For more information, refer to your *User's Guide*. • When the printer receives the page size command any partially formatted pages are printed, and the cursor position and margins are reset. • Duplex printing is not supported on any envelope. • The size loaded in the active source is checked to see if it matches the requested size. If the multipurpose feeder is configured as Cassette or Manual, the same applies; however, if the multipurpose feeder is configured as First and media is loaded in the multipurpose feeder, then, regardless of media size, it is the source used until it is empty.
ESC&l#H 0 Active source 1 Tray 1 (Default) 2 Manual Paper Feed 3 Manual Envelope Feed 4 Tray 2 5 Tray 3 6 Optional Envelope Feeder 7 Auto Select 8 Multipurpose Feeder 20 Tray 4 21 Tray 5	**Paper Source** Selects the paper feed source. **Note:** If the paper source is changed for the back of a duplexed page, a blank back page prints, the paper source changes, and the information for the back side of the page is printed on the front side of a page sent from the new paper source.
ESC&l#O 0 Portrait (Default) 1 Landscape 2 Reverse Portrait 3 Reverse Landscape	**Select Orientation** Specifies the position of the logical page with respect to the physical page. **Note:** Resets margins, number of printable lines per page, and cursor position.
ESC&a#P # = Degrees (0, 90, 180, 270) Default = 0	**Print Direction** Rotates coordinate system counter-clockwise in 90° increments with respect to current orientation. **Note:** Margins are not rotated or cleared.

Table 2-11 Page Control (Continued)

Command / Parameters	Function / Result
ESC&c#T 0 Horizontal Printing -1 Vertical Rotated Printing	**Character Text Path Direction** Sets Character Text Path Direction.
ESC&a#L # = Column Default = 0	**Set Left Margin** Sets left margin to left edge of the designated column. **Note:** The column width is defined by the space character of the active font and the Horizontal Motion Index (HMI).
ESC&a#M # = Column Default = Logical Page Width	**Set Right Margin** Sets right margin to right edge of the designated column. **Note:** The column width is defined by the space character of the active font and the HMI.
ESC9	**Clear Horizontal Margins** Clears left and right margins.
ESC&l#E # = number of Lines Default = 3 (1/2 inch)	**Set Top Margin** Sets the number of lines between the top of the physical page and first line of print. Line height is determined by the current Vertical Motion Index (VMI) and/or line spacing value. **Note:** Setting a top margin of 0 results in the first line of text falling outside of the printable area.
ESC&l#F # = number of Lines Default = 60 (U.S.), 64 in other countries	**Set Text Length** Sets the bottom margin length in lines, measured from the first line of the page. Text Length equals Logical Page Length -1 inch (-1/2 inch for top and -1/2 inch for bottom)
ESC&l#G 0 Auto Select (uses the active bin) 1 Standard bin 2 Bin 1 3 Bin 1 4 Bin 2 5 Bin 3	**Set Output Bin** Sets the exit path to direct paper to one of the output bins.
ESC&l#L 0 Off 1 On (Default)	**Skip Perforation** Perforation area includes the area from the bottom margin of the current page to the top margin of the next page. When skipping perforations, a line feed past the bottom margin ejects a page and places the cursor at the top margin of the next page.
ESC&k#H # = number of 1/120 inch increments (Valid to 4 decimal places)	**Set Horizontal Motion Index (HMI)** Sets the width of all characters for fixed-space fonts. Sets only the width of the space for proportional spaced fonts.

Table 2-11 Page Control (Continued)

Command / Parameters	Function / Result
ESC&l#C # = number of 1/48 inch increments (Valid to 4 decimal places) Default = 8	**Set Vertical Motion Index (VMI)** Sets Vertical Motion Index in 1/48 inch increments. The VMI determines the vertical distance between lines. **Notes:** • You can change the default VMI from the operator panel by using the Lines Per Page menu item. Select **MENUS**, **PCL EMUL MENU**, **Lines per Page**. • Use of this command alters any previous **Set Line Spacing** command settings.
ESC&l#D 1 1 line/inch 2 2 lines/inch 3 3 lines/inch 4 4 lines/inch 6 6 lines/inch (Default) 8 8 lines/inch 12 12 lines/inch 16 16 lines/inch 24 24 lines/inch 48 48 lines/inch	**Set Line Spacing (Alternative Method)** Specifies VMI in lines per inch. **Notes:** • You can change the default VMI from the operator panel by using the Lines Per Page menu item. • Unsupported values are ignored. • Use of this command alters any earlier VMI setting.
ESC&a#G 0 Next Side 1 Front Side 2 Back Side	**Duplex Page Side Selection** Specifies which physical page side to print next when duplex printing.
ESC&l#P	**Page Length** This command is obsolete. Use the Page Size command to select paper size. Unexpected results may occur when this command is used.

Table 2-12 Alphanumeric ID

Command / Parameters	Function / Result
ESC&n#W [operation] [string] # = number of data bytes that make up the operation and string Operation operation = 100 or 1 byte = 0x64 or 'd' ascii For example: 100 Media Select String string = See **Alphanumeric String** table to the right of this column.	**Alphanumeric ID** Selects the media type using a character string. The string ID is case sensitive. The string ID specifies the media type requested. **Media Type** — **Alphanumeric String** Plain Paper — Plain Bond — Bond Transparency — Transparency Card Stock — Card Stock Labels — Labels Letterhead — Letterhead Pre-printed — Preprinted Colored Paper — Color Envelope — Envelope Custom Type 1 — Custom Type 1 Custom Type 2 — Custom Type 2 Custom Type 3 — Custom Type 3 Custom Type 4 — Custom Type 4 Custom Type 5 — Custom Type 5 Custom Type 6 — Custom Type 6 For example, the following shows the command and parameters to select bond paper: ESC&n5WdBond To select letterhead paper: ESC&n11WdLetterhead

Table 2-13 Cursor Positioning

Command / Parameters	Function / Result
ESC&a#C # = number of Columns[1]	**Horizontal Cursor Positioning (in Columns)** **Note:** The column width is determined by the space character width of the active font or the Horizontal Motion Index (HMI), if set.
ESC&a#H # = number of Decipoints[1] (1 Decipoint = 1/720 inch)	**Horizontal Cursor Positioning (in Decipoints)**
ESC*p#X # = number of PCL Units[1]	**Horizontal Cursor Positioning (in PCL Units)** PCL units are set by the Unit-of-Measure Command.
ESC&a#R # = number of Rows[1]	**Vertical Cursor Positioning (in Rows)** **Note:** Row height is determined by either the Vertical Motion Index (VMI) or the Set Line Spacing Command.
ESC&a#V # = number of Decipoints[1] (1 Decipoint = 1/720 inch)	**Vertical Cursor Positioning (in Decipoints)**
ESC*p#Y # = number of PCL Units[1]	**Vertical Cursor Positioning (in PCL Units)** PCL units are set by the Unit-of-Measure Command.
ESC=	**Half Line-Feed** Moves the cursor down 1/2 line (1/2 of the current VMI).
ESC&k#G 0 CR=CR, LF=LF, FF=FF (Default) 1 CR=CR+LF, LF=LF, FF=FF 2 CR=CR, LF=CR+LF, FF=CR+FF 3 CR=CR+LF, LF=CR+LF, FF=CR+FF	**Set Line Termination** Controls how the printer responds to the Carriage Return (CR), Line Feed (LF), and Form Feed (FF) control codes.
ESC&f#S 0 Push 1 Pop	**Push / Pop Cursor Position** Sets up a cursor position stack for storing and recalling various cursor positions. The stack can store up to 20 cursor positions.
[1] Parameter preceded by + or - sign denotes a relative cursor move from the current cursor position. Parameter without a sign denotes an absolute cursor move from the top left margin.	

Note: For the commands listed in Table 2-14, font selection is made based on all parameters set and according to the best fit selection rules.

Table 2-14 Font Selection

Command / Parameters	Function / Result
ESC(# (primary) ESC)# (secondary) # = symbol set ID Default = 10U (PC-8) or 12U (PC-850), [Country specific]	**Select Symbol Set** See Table 2-2 on page 2-7. **Note:** The line-draw characters are contained in the symbol set ID 10U, PC-8. The non-U.S. characters are contained in symbol set ID 12U, PC-850.
ESC(s#P (primary) ESC)s#P (secondary) 0 Fixed (Default) 1 Proportional	**Select Spacing** Selects a font with proportional or fixed spacing.
ESC(s#H (primary) ESC)s#H (secondary) # = characters per inch Default = 10	**Select Pitch** Selects the number of characters per inch (cpi) for a fixed-space bitmapped or monospaced scalable font. Valid to 2 decimal places. **Note:** Pitch is not needed for proportional spaced fonts.
ESC(s#V (primary) ESC)s#V (secondary) # = height in points (.25 to 999.75) Default = 12	**Height (Select Point Size)** Sets the font height in points. Valid to 2 decimal places. **Note:** Point size is not needed for monospaced fonts. For fonts larger than 12 points, it may be necessary to change the line spacing.
ESC(s#S (primary) ESC)s#S (secondary) 0 Upright (Default) 1 Italic 4 Condensed 5 Condensed Italic 8 Compressed 24 Expanded 32 Outline 64 Inline 128 Shadowed 160 Outline Shadowed	**Select Style** Identifies the physical traits of a character and the composition of the font symbols. **Note:** This command can only be used to select from fonts presently available in the machine. It cannot alter the appearance of the available fonts.

Table 2-14 Font Selection (Continued)

Command / Parameters	Function / Result
ESC(s#B (primary) ESC)s#B (secondary) -7 Ultra Thin -6 Extra Thin -5 Thin -4 Extra Light -3 Light -2 Demi Light -1 Semi Light 0 Medium (Default) 1 Semi Bold 2 Demi Bold 3 Bold 4 Extra Bold 5 Black 6 Extra Black 7 Ultra Black	**Select Stroke Weight** Selects a font with a particular thickness. **Note:** This command will not alter the stroke weight of an available font.

ESC(s#T (primary)
ESC)s#T (secondary)
# Typeface identifier (0 - 65535) 	
0 Line Printer
4099 Courier (Default)
4101 CG Times
4102 Letter Gothic
4113 CG Omega
4116 Coronet
4140 Clarendon Condensed
4148 Univers
4148 Univers Condensed
4168 Antique Olive
4197 Garamond
4297 Marigold
4362 Albertus
16602 Arial
16901 Times New Roman
16686 Symbol
31402 Wingdings
61444 Helvetica
61455 Palatino
61463 Centuryschlbk
61471 AvanteGarde
61483 ZapfChancery
61485 ZapfDingbats
61487 Bookman
	Select Typeface
	Selects the best fit font design.
	To obtain the typeface values for downloaded fonts, print the font list from the printer operator panel: select **MENUS, TESTS MENU, Print Fonts, PCL Fonts.**
	On the printout, the typeface number is the last number on the font selection command example line. The line is below the name of the font. In the following example, the typeface number is underlined:
	`R0 Courier`
	`<<ESC>>(<<symset>><<ESC>>(s0p<<pitch>>h0s0b4099T`

ESC(#X (primary) ESC)#X (secondary) # = Font ID (0 - 32767)	**Select Font by Font ID** Selects the font by the identification number.

Table 2-14 Font Selection (Continued)

Command / Parameters	Function / Result
ESC(3@ (primary) ESC)3@ (secondary)	**Select Default Font** Sets all font selection characteristics to the Default Font.
ESC&p#X[data] # = number of data of bytes to print as text	**Transparent Print Data** Prints the next number of bytes as text.
ESC&t#P 0, 1 1 byte characters 21 1 or 2 byte characters 31 1 or 2 byte characters 38 1 or 2 byte characters	**Text Parsing Method** Selects the text parsing method.
ESC&d#D 0 Fixed 3 Floating	**Select Underline Type (Enable)** **Notes:** • Fixed underline is drawn 5 pels below cursor position. • Floating underline position is determined by all the positions of the characters with descenders in the fonts that are to be underlined. • Underline thickness is 3/300 inch.
ESC&d@	**Underline - Disable**
ESC&k#S 0 10.00 cpi 2 16.66 cpi 4 12.00 cpi	**Select Primary and Secondary Pitch** Selects the pitch for the primary and secondary font.

Table 2-15 User-Defined Symbol Set

Command / Parameters	Function / Result
ESC*c#R # = Symbol Set ID (0 - 32767) Default = 0	**Symbol Set ID Code** Sets the symbol set identification for the symbol set downloaded.
ESC(f#W[data] # = number of data bytes	**Define Symbol Set** Contains the data for the user-defined symbol sets.
ESC*c#S 0 Delete all (temporary and permanent) 1 Delete all temporary 2 Delete current (ID) 4 Make current temporary 5 Make current permanent	**Symbol Set Control** Manages user-defined symbol sets.

Table 2-16 Font Creation

Command / Parameters	Function / Result
ESC*c#D # = Font ID # (0 - 32767) Default = 0	**Set Font ID** Sets the identification number for the font being downloaded.
ESC)s#W[data] # = number of data bytes	**Load Font Header** Downloads soft font header information. **Note:** Set Font ID before using this command.
ESC*c#F 0 Delete all (temporary and permanent) 1 Delete all temporary 2 Delete previous font ID 3 Delete previous specified character 4 Make previous font ID temporary 5 Make previous font ID permanent 6 Copy the current font	**Font Control** Manages soft fonts.
ESC*c#E # = Code Point (0 - 65536) Default = 0	**Set Character Code** Sets the decimal code point associated with the next character downloaded or deleted.
ESC(s#W[data] # = number of data bytes	**Load Character** Downloads character descriptor and data to the current character code.

Table 2-17 Macros

Command / Parameters	Function / Result
ESC&f#Y # = Macro ID (0 - 32767) Default = 0	**Set Macro ID**
ESC&f#X 0 Start definition 1 End definition 2 Execute macro (previous macro ID) 3 Call macro (previous macro ID) 4 Enable overlay (previous macro ID) 5 Disable overlay 6 Delete all macros 7 Delete all temporary macros 8 Delete current macro ID 9 Make last ID temporary 10 Make last ID permanent	**Macro Control** Manages use of macros. **Notes:** • GL/2 commands are supported inside macros. • Only call and execute macro commands are allowed within a macro. • A macro may call or execute another macro. This is called nesting. A maximum of two nesting levels are allowed, for a total of three levels. See “Macros” on page 2-52 for additional information.

Table 2-18 Print Model

Command / Parameters	Function / Result
ESC*c#G Gray Scale Fills 0 White (default) 1-2 2% gray 3-10 10% gray 11-20 15% gray 21-35 30% gray 36-55 45% gray 56-80 70% gray 81-99 90% gray 100 100% gray (Black) Cross-Hatch Fills 1 Horizontal line 2 Vertical line 3 Diagonal line 4 Diagonal line 5 Square grid 6 Diagonal grid User-Defined Patterns # = User-Defined Pattern ID	**Area Fill ID** Selects pattern used to fill rectangle area. **Note:** This command is also used to set the user-defined pattern ID.
ESC*v#N 0 Transparent (Default) 1 Opaque	**Source Transparency Mode** Affects copying of white pixels from source onto the destination image.
ESC*v#O 0 Transparent (Default) 1 Opaque	**Pattern Transparency Mode** Affects copying of white pixels from pattern onto the destination image.
ESC*]#O # = logical operation, value (0 to 255) Default = 252	**Logical Operation** Defines boolean operations to be performed on data already printed and data about to be printed.
ESC*]#R 0 Grid Intersection (Default) 1 Grid Centered	**Pixel Placement** Determines how pixels are placed for rectangle fills and GL/2 objects. **Note:** Pixel Placement does not affect text or raster images.
ESC*v#T 0 Solid Black (Default) 1 Solid White 2 Gray Shading Pattern 3 Cross-Hatch Pattern 4 User Defined Pattern	**Select Current Pattern** Selects pattern used when printing text and raster images.

Table 2-19 User-Defined Pattern

Command / Parameters	Function / Result
ESC*c#W[data] # = number of data bytes	**User-Defined Pattern** Downloads binary pattern data.
ESC*p#R 0 Rotate with print (Default) 1 Fixed	**Set Pattern Reference Point** Sets pattern reference point to the current cursor position for user-defined patterns. **Note:** Default pattern reference point is the upper left corner of logical page.
ESC*c#Q 0 Delete all patterns (temporary and permanent) 1 Delete all temporary patterns 2 Delete pattern (last ID specified) 4 Make pattern of last ID # temporary 5 Make pattern of last ID # permanent	**Pattern Control** Manages use of user-defined patterns. **Note:** Use Area Fill ID command (ESC*c#G) to set ID.

Table 2-20 Rectangular Area Fill Graphics

Command / Parameters	Function / Result
ESC*c#H # = number of Decipoints (0 - 32767) (1 Decipoint = 1/720 inch) Default = 0, valid to 4 decimal places	**Horizontal Rectangle Size (in Decipoints)**
ESC*c#A # = number of PCL Units (0 - 32767) Default = 0	**Horizontal Rectangle Size (in PCL Units)** **Note:** Size of PCL Units is set by Unit-of-Measure command.
ESC*c#V # = number of Decipoints (0 - 32767) (1 Decipoint = 1/720 inch) Default = 0, valid to 4 decimal places	**Vertical Rectangle Size (in Decipoints)**
ESC*c#B # = number of PCL Units (0 - 32767) Default = 0	**Vertical Rectangle Size (in PCL Units)** **Note:** Size of PCL Units is set by Unit-of-Measure command.
ESC*c#G Gray Scale Fills 0 White (default) 1-2 2% gray 3-10 10% gray 11-20 15% gray 21-35 30% gray 36-55 45% gray 56-80 70% gray 81-99 90% gray 100 100% gray (Black) Cross-Hatch Fills 1 Horizontal line 2 Vertical line 3 Diagonal line 4 Diagonal line 5 Square grid 6 Diagonal grid User-Defined Patterns # = User-Defined Pattern ID	**Area Fill ID** Selects pattern used to fill rectangle area. **Note:** This command is also used to set the user-defined pattern ID.
ESC*c#P 0 Black Fill (Default) 1 White Fill 2 Gray Fill 3 Pre-Defined Cross-Hatch Pattern Fill 4 User-Defined Pattern 5 Current Pattern Fill	**Fill Rectangular Area** Fills rectangular area defined by Horizontal and Vertical Rectangle sizes with selected pattern.

Table 2-21 Raster Graphics

Command / Parameters	Function / Result
ESC*t#R 75 75 dpi (Default) 100 100 dpi 150 150 dpi 200 200 dpi 300 300 dpi 600 600 dpi 1200 1200 dpi	**Set Resolution** **Note:** 200 dpi raster graphics are only supported when the printer resolution is set to 600 or 1200 dpi.
ESC*r#F 0 Rotate with print 3 Fixed (Default)	**Raster Graphics Presentation** Sets the Raster Image Orientation in relation to the logical page.
ESC*r#S # = number of Input Pixels	**Raster Width (Source)** Sets width of clip window for raster graphics.
ESC*r#T # = number of Raster Lines	**Raster Height (Source)** Sets height of clip window for raster graphics.
ESC*r#A 0 Left Graphics Margin at 0 (Default) 1 Current Cursor Position 2 At logical left page limit with scaling On 3 At current cursor position with scaling On	**Start Raster Graphics** Sets the left margin for raster graphics.
ESC*b#V[data] # = number of data bytes	**Transfer Raster Data by Plane** This command is used when the raster data is encoded by plane as specified by the Simple Color command or the Configure Image Data command. The command sends each plane in the row except the last.
ESC*b#Y # = number of Raster Lines	**Y Offset** Moves cursor position down by the specified number of raster lines.
ESC*b#M 0 Uncoded (Default) 1 Run-Length Encoded 2 Tagged Image File Format (TIFF) byte 3 Delta Row 5 Adaptive Compression 1002 Group 4 1003 Group 3 one dimensional 1004 Group 3 two dimensional K=2 1005 Group 3 two dimensional K=4 1006 TIFF word (16 bit) 1007 TIFF double-word (32 bit) 1008 Adaptive compression (includes TIFF word and TIFF double-word)	**Set Raster Compression Mode** **Note:** For further information see “Group 3 and Group 4 Raster Compression” on page 2-51.

Table 2-21 Raster Graphics (Continued)

Command / Parameters	Function / Result
ESC*b#W[data] # = number of data bytes	**Transfer Raster Data by Row/Block** **Note:** After each command, the cursor position is moved to the beginning of the next raster row.
ESC*rB	**End Raster Graphics (Version B)** Signals end of raster graphics transfer. If a Raster Height is specified, the cursor is moved to the first raster row past the Raster Height.
ESC*rC	**End Raster Graphics (Version C)** Same as Version B but also: • Resets compression mode to uncoded. • Sets left graphics margin to 0.
ESC*t#H	**Raster Width (Destination)** Sets the width of the destination raster.
ESC*t#V	**Raster Height (Destination)** Sets the height of the destination raster.

Table 2-22 Color Extensions

Command / Parameters	Function / Result
ESC&b#M 0 Print in mixed render algorithm mode 1 Print using gray scale equivalent	**Monochrome Print Mode** Changes each color value to its gray scale equivalent.
ESC&p#C 0 Deletes all palettes except those in stack (active palette is deleted) 1 Delete all palettes in stack (active palette not affected) 2 Delete palette specified by Palette Control ID 6 Copy active palette to ID specified by Palette Control ID	**Palette Control** Provides palette management.
ESC&p#I 0 to 32767 Palette ID number	**Palette Control ID** Indicates the ID number used by the Palette Control command.
ESC&p#S 0 to 32767 Palette ID number	**Select Palette** Selects a new active palette by indicating the ID number.
ESC*]#W[data] 0 Resets or initializes the color lookup tables for each primary color to the unity curve 770, Data Data for color lookup table	**Color Lookup Tables** Enables and indicates the color lookup tables.
ESC*m#W[data] 7 to 32767, Data Data size and data of byte aligned binary data that specifies a matrix or matrices for the primary colors	**Download Dither Matrix** Downloads a device dependent user-defined dither matrix.
ESC*o#W[data]	**Driver Configuration Command** Indicates the lightness, saturation, and scaling algorithm to be applied to a job.
ESC*p#P 0 Push (save) palette 1 Pop (restore) palette	**Push/Pop Palette** Saves (push) the current palette and then restores (pop) it from the palette stack.
ESC*r#U -3 3 planes, device CMY palette 1 Single plane, K (black) palette 3 3 planes, device RGB palette	**Simple Color** Creates a fixed-size palette. The color specification of the palette cannot be modified.
ESC*t#I 0 Gamma correction Off 0.0 - 4.0 Gamma number	**Gamma Correction** Improves the perceptual correctness of color data sent from the monitor to any other non-linear device by adjusting the brightness and darkness.

Table 2-22 Color Extensions (Continued)

Command / Parameters	Function / Result
ESC*t#J	**Render Algorithm** Selects the algorithm used for dithering images and fills.
ESC*v#A -32767.0 to 32767.0	**Color Component One** Indicates the first primary color specified by the Assign Color Index command.
ESC*v#B -32767.0 to 32767.0	**Color Component Two** Indicates the second primary color specified by the Assign Color Index command.
ESC*v#C -32767.0 to 32767.0	**Color Component Three** Indicates the third primary color specified by the Assign Color Index command.
ESC*v#I #=palette index	**Assign Color Index** Designates the three current color components to the specified palette index number. n represents the number of bits per index.
ESC*v#S #=palette index	**Foreground Color** Sets the foreground color to the specified index in the current palette.
ESC*v#W[data]	**Configure Image Data** Creates programmable palettes.

Table 2-23 Status Readback

Command / Parameters	Function / Result
ESC*s#T 0 Invalid location (Default) 1 Use currently selected location 2 All locations 3 Internal (resident) 4 Downloaded entity 5 Cartridge 7 User-installable flash 200 Disk	**Set Status Readback Location Type** The 5 value for Cartridge may be specified, but since your printer does not support font cards or cartridges, the command is ignored. The 7 value for User-installable flash is only valid when flash memory is installed. **Note:** 200 is only valid when an optional disk is installed.
ESC*s#U 0 All 1 If download, temporary else, highest priority 2 If download, permanent else, next higher priority	**Set Status Readback Location Unit**
ESC*s#I 0 Font 1 Macro 2 User-defined pattern 3 Symbol set (for unbound scalable fonts) 4 Font extended	**Inquire Status Readback Entity** Returns the requested information set by Set Status Readback Location Type and Set Status Readback Location Unit.
ESC*s1M	**Free Space** Returns the total available memory and the largest available block of memory.
ESC&r#F 0 Flush all complete pages 1 Flush all pages	**Flush All Pages** Pauses the printer link until the pages are finished printing.
ESC*s#X -32767 to 32767 Default = 0	**Echo** Returns # back to host computer.

Table 2-24 Picture Frame

Command / Parameters	Function / Result
ESC*c#X # of Decipoints: 0 to 32767 (1 Decipoint = 1/720 inch)	**Picture Frame Horizontal Size (in Decipoints)**
ESC*c#Y # of Decipoints: 0 to 32767 (1 Decipoint = 1/720 inch)	**Picture Frame Vertical Size (in Decipoints)**
ESC*c0T 0 Set Anchor Point to Cursor Position	**Set Picture Frame Anchor Point**
ESC*c#K Size in inches: 0 to 32767	**GL/2 Horizontal Plot Size**
ESC*c#L Size in inches: 0 to 32767	**GL/2 Vertical Plot Size**
ESC%#B 0 Use Previous GL/2 Pen Position 1 Use Current PCL Cursor Position	**Enter GL/2 Language** GL/2 must be exited and a PCL emulation command used to print.
ESC%#A 0 Use Previous PCL Cursor Position 1 Use Current GL Pen Position	**Enter PCL 5 Emulation**

Table 2-25 Miscellaneous Commands

Command / Parameters	Function / Result
ESC&s#C 0 Enable 1 Disable (Default)	**End-Of-Line Text Wrap** Enabling End-Of-Line Text Wrap moves portions of lines that extend into the unprintable area to the next line. Disabling drops the portion extending into the unprintable area.
ESCY	**Display Functions On** Prints all control codes and escape sequences rather than executing them. **Notes:** • To prevent characters from falling outside the right margin (and not printing), turn End-Of-Line Text Wrap on (ESC&s0C). • To see the control characters and other blank codepoints in symbol set Roman8 (8U), set the symbol set to PC-8 (10U).
ESCZ	**Display Functions Off** Turns off Display Functions; resumes normal command processing.

Note: GL/2 is not a stand-alone plotter emulation. It can only be entered from within PCL emulation and cannot be used with software without a unique printer driver written explicitly for GL/2.

The following tables list the GL/2 commands by group.

Table 2-26 Configuration Group

Command / Parameter	Command Name
CO "text"	Comment
DF;	Default Values
IN;	Initialize
IP (X_{P1}, Y_{P1}(, X_{P2}, Y_{P2}));	Input P1 and P2
IR (X_{P1}, Y_{P1}(, X_{P2}, Y_{P2}));	Input Relative P1 and P2
IW (X_1, Y_1, X_2, Y_2);	Input Window
MC (mode(, opcode));	Logical Operation
PP (mode);	Pixel Placement
RO (angle);	Rotate Coordinate System
SC (X_{min}, X_{max}, Y_{min}, Y_{max}(, type(, left, bottom)));	Scale

Table 2-27 Vector Group

Command / Parameter	Command Name
AA X_{center}, Y_{center}, sweep_angle(, chord_angle);	Arc Absolute
AR X_{center}, Y_{center}, sweep_angle(, chord_angle);	Arc Relative
AT X_{inter}, Y_{inter}, X_{end}, Y_{end}(, chord_angle);	Absolute Arc Three Point
BR X_1, Y_1, X_2, Y_2, X_3 , Y_3(,...);	Bezier Relative
BZ X_1, Y_1, X_2, Y_2, X_3 , Y_3(,...);	Bezier Absolute
CI radius(, chord_angle);	Circle
PA (X, Y(,...));	Plot Absolute
PD (X, Y(,...));	Pen Down
PE (flag(value) | coordinates (...));	Polyline Encoded

Table 2-27 Vector Group (Continued)

Command / Parameter	Command Name
PR (X, Y(,...));	Plot Relative
PU (X, Y(,...));	Pen Up
RT $X_{incr\ inter}$, $Y_{incr\ inter}$, $X_{incr\ end}$, $Y_{incr\ end}$(, chord_angle);	Arc Relative Three Point

Table 2-28 Polygon Group

Command / Parameter	Command Name
EA X, Y;	Edge Rectangle Absolute
EP;	Edge Polygon
ER X, Y;	Edge Rectangle Relative
EW radius, start_angle, sweep_angle(, chord_angle);	Edge Wedge
FP (fill_method);	Fill Polygon
PM (mode);	Polygon Mode
RA X, Y;	Fill Rectangle Absolute
RR X, Y;	Fill Rectangle Relative
WG radius, start_angle, sweep_angle(, chord_angle);	Fill Wedge

Table 2-29 Character Group

Command / Parameter	Command Name
AD (kind, value(,...));	Define Alternate Font
CF (mode(, pen));	Character Fill
CP (spaces, lines);	Character Plot
DI (run, rise);	Absolute Direction
DR (run, rise);	Relative Direction
DT (label_terminator(, mode));	Define Label Terminator
DV (path(, line));	Define Variable Text Path
ES (width(, height));	Extra Space
FI font_ID;	Primary Font
FN font_ID;	Secondary Font
LB char...char label_terminator;	Label
LO (position);	Label Origin

Table 2-29 Character Group (Continued)

Command / Parameter	Command Name
SA;	Select Alternate Font
SB (mode);	Scalable or Bitmapped Fonts
SD (kind, value(,...));	Define Standard Font
SI (width, height);	Absolute Character Size
SL (tangent);	Character Slant
SR (width, height);	Relative Character Size
SS;	Select Standard Font
TD (mode);	Transparent Data

Table 2-30 Line and Fill Attributes Group

Command / Parameter	Command Name
AC (X, Y);	Anchor Corner
CR (red $_{\text{black ref}}$, red $_{\text{white ref}}$, green $_{\text{black ref}}$, green $_{\text{white ref}}$, blue $_{\text{black ref}}$, blue $_{\text{white ref}}$);	Color Range
FT (fill_type(, option1(, option2));	Fill Type
LA (kind, value(,...));	Line Attributes
LT (pattern_number(, pattern_length(, mode)));	Line Type
NP (number);	Number of Pens
PC (pen (, red, green, blue));	Pen Color
PW (width(, pen));	Pen Width
RF (index(, width, height(, pen, ...)));	Define Raster Fill
SM (character);	Symbol Mode
SP (pen);	Select Pen
SV (screen_type(, option1(, option2)));	Screened Vectors
TM (width, height(, number...)));	Threshold Matrix
TR (mode);	Transparency Mode
UL (index(, gap,...gap));	User Defined Line
WU (type);	Pen Width Units

Raster Image Graphics

These commands utilize the raster area. Before sending data, set the presentation mode, resolution, the compression mode, the raster height and width, and start raster graphics. These parameters are in effect until you overwrite them with a different command or there is a printer reset.

To ensure that the printed image appears in the expected area, set width and height parameters.

Raster Compression Mode

The Raster Compression Mode command determines how raster data is coded. It affects the amount of code required to create an image, and the efficiency of image printing.

Syntax:

ESC * b # M

Parameters:

0	Uncoded (default)
1	Run-Length Encoded
2	Tagged Image File Format (TIFF) Byte
3	Delta Row
5	Adaptive Compression
1002	Group 4
1003	Group 3 one dimensional
1004	Group 3 two dimensional K=2
1005	Group 3 two dimensional K=4
1006	TIFF word (16 bit)
1007	TIFF double-word (32 bit)
1008	Adaptive Compression (includes TIFF word and TIFF double-word)

Descriptions and examples of the different parameters are listed below. Each example draws the same square outline 64 bits (8 Bytes) wide by 64 scan lines long.

Uncoded Data

Uncoded Data is not compressed. Only those bytes needed to form the image are sent. Each bit represents a single dot. In the first byte, bit 7 corresponds to the first dot in the raster row, bit 5 to the third dot, and so forth.

Example:

```
ESC*p300x300Y                          |Move the cursor to 1" x 1" (1 in. from top
                                        margin and 1 in. from left edge of logical
                                        page)
ESC*t100R                              |Set resolution to 100 dots per inch
ESC*r0F                                |Rotate image to match current orientation
ESC*b0M                                |Set compression mode to Uncoded
ESC*r1A                                |Start raster graphics at current position
ESC*b8W 'FF FF FF FF FF FF FF FF'x     |Raster data uncompressed
ESC*b8W '80 00 00 00 00 00 00 01'x
ESC*b8W '80 00 00 00 00 00 00 01'x
...                                    |Repeat to provide 64 total scan lines
ESC*b8W '80 00 00 00 00 00 00 01'x
ESC*b8W 'FF FF FF FF FF FF FF FF'x
ESC*rB                                 |End graphics
```

Run-Length Encoded Data

Run-Length Encoded Data is interpreted in pairs of bytes. The first byte:

- Acts as a counter, or control byte
- Indicates how many times to repeat the data in the second byte
- Can be from 0 (no repetition) to 255
- The second byte is the data byte

Example:

```
ESC*p300x600Y                          |Move cursor to 1" x 2"
ESC*b1M                                |Set compression to Run-Length
ESC*r1A                                |Start raster graphics at current position
ESC*b2W '07FF'x                        |Run-Length: 8x'FF'x
ESC*b6W '0080 0500 0001'x              |1x'80'x, 6x'00'x, 1x'01'x
ESC*b6W '0080 0500 0001'x              |1x'80'x, 6x'00'x, 1x'01'x
...                                    |. . .
ESC*b6W '0080 0500 0001'x              |1x'80'x, 6x'00'x, 1x'01'x
ESC*b2W '07FF'x                        |8x'FF'x
ESC*rB                                 |End graphics
```

Tagged Image File Format

TIFF “Packbits” contain a control byte (a signed number) that indicates whether the raster data bytes are to be repeated (up to 127 times) or printed as encoded data.

- For control values of 0 through 127, the next (Control+1) byte(s) are uncoded.
- For control values of -1 through -127 ('FF'x - '81'x), the next byte is repeated (Abs(Control)+1) times.

Example:

```
ESC*p300x900Y                          |Move cursor to 1" x 3"
ESC*b2M                                |Set compression to TIFF
ESC*r1A                                |Start Raster Graphics at current position
ESC*b2W 'F9FF'x                        | TIFF: 8x'FF'x
ESC*b6W '0080 FB00 0001'x              |1:'80'x, 6x'00'x, 1: '01'x or
ESC*b9W '078000000000000001'x          |8: '8000000000000001'x
...                                    |. . .
ESC*b6W '0080 FB00 0001'x              |1:'80'x, 6x'00'x, 1: '01'x
ESC*b2W 'F9FF'x                        |8x'FF'x
ESC*rB                                 |End graphics
```

Delta Row

Delta Row is a compression mode that identifies and transmits only those bytes different from the ones in a preceding row. The control byte consists of two parts:

- High 3 bits: Number of bytes to replace +1 (1 to 8).
- Low 5 bits: Offset from last unmodified byte (0-30); if the offset is 31, the next byte(s) are added to the offset until the next byte is not 255.

Example:

```
ESC*p300x1200Y                         |Move cursor to 1" x 4"
ESC*b3M                                |Set compression to Delta Row
ESC*r1A                                |Start raster graphics at current position
                                       |Num Offset
ESC*b9W 'E0FFFFFFFFFFFFFFFF'x          |'111 00000'b=8 at 0:
                                        'FFFFFFFFFFFFFFFF'x
ESC*b9W 'E08000000000000001'x          |8 at 0: '8000000000000001'x
ESC*b0W                                |No bytes change
...
ESC*b0W                                |No bytes change
ESC*b9W 'E0FFFFFFFFFFFFFFFF'x          |8 at 0: '8FFFFFFFFFFFFF'x
ESC*rB                                 |End graphics
```

Adaptive Compression

Adaptive compression allows the combined use of compression methods 0 through 3 (Uncoded, Run-Length Encoded, TIFF, and Delta Row). It also allows the printing of empty rows (all zeros) or duplicate rows.

- The Transfer Raster Data command size includes all rows (scan lines).
- Scan Mode and SizeH,L are three byte primary control strings: CountH and CountL.

Table 2-31 Adaptive Compression Control Strings

Scan Mode	CountH,CountL	Data
0	Data sizeH,L	Unencoded raster scan data
1	Data sizeH,L	Size of Run-length encoded data (high,low)
2	Data sizeH,L	Size of Tagged Image File Format (TIFF) data (high,low)
3	Data SizeH,L	Size of Delta Row data (high,low)
4	NumberH,L of empty rows	None
5	NumberH,L of duplicate rows	None
254	Data SizeH, L	TIFF word
255	Data SizeH, L	TIFF double-word

Example:

```
ESC*p300x1500Y'                                  |Move cursor to 1" x 5"
ESC*b5M                                          |Set the compression to Adaptive
                                                  Compression
ESC*b29W                                         |Raster Data: 29 bytes follow
  '03 0009'x 'E0FFFFFFFFFFFFFFFF'x               |   Delta Row: 8 at 0:
                                                     'FFFFFFFFFFFFFFFFh'x
  '01 0006'x '0080 FB00 0001'x                   |   Run Length: 1:'80'x, 6x'00'x, 1:'01'x
  '05 0035'x                                     |   Duplicate rows: 61 times
  '02 0002'x 'F9FF 'x                            |   TIFF: 8x'FF'x
ESC*rB                                           |End graphics
```

Group 3 and Group 4 Raster Compression

Since Group 4 images do not use line endings, the width of the image must be specified using the Raster Width command (ESC*r#S).

The compressed image data is sent to the printer using the Transfer Raster Data command (ESC*b#W). The maximum number of bytes that can be sent using the Transfer Raster Data command is 32K bytes. Images larger than 32K bytes must be broken up and sent using multiple commands. It does not matter where the image is broken, or how many Transfer Raster Data commands are used. Once the image is started (with a Transfer Raster Data command), no other commands are allowed until the entire image has been sent.

The following example prints a Group 4 image file that is 256 bits wide and 9,645 bytes long:

ESC*b1002M	|Set Raster Compression to Group 4
ESC*r256S	|Define width of image in input bits
ESC*r1A	|Start Raster Graphics at current position
ESC*b9645W	|9,645 bytes of a Group 4 image
...[*Group 4 image data*]...	
ESC*rB	|End Raster Graphics

All lines of data must be the same length. If they are not, zeroes (0) must be added to attain the same length.

Note: If the uncompressed image extends beyond the logical page dimensions or beyond the raster width specified in the Raster Width command (ESC*r#S), the image is clipped at print time.

Additional Compression Modes

When the compression mode is 1008 (Lexmark Adaptive), TIFF word and double-word can be printed using compression scan modes 254 and 255 respectively. This compression method sends a raster image as a block of raster data.

When creating a macro, first assign it an ID number. If this number is identical to an existing macro ID in RAM, the old macro is deleted when you specify the Macro Control Start Definition. Next, start the macro definition, send the contents of the macro, and stop the macro definition.

Note: Although a macro may be called or executed from within another macro (nesting), a macro cannot be defined within another macro definition. Each macro must be defined separately.

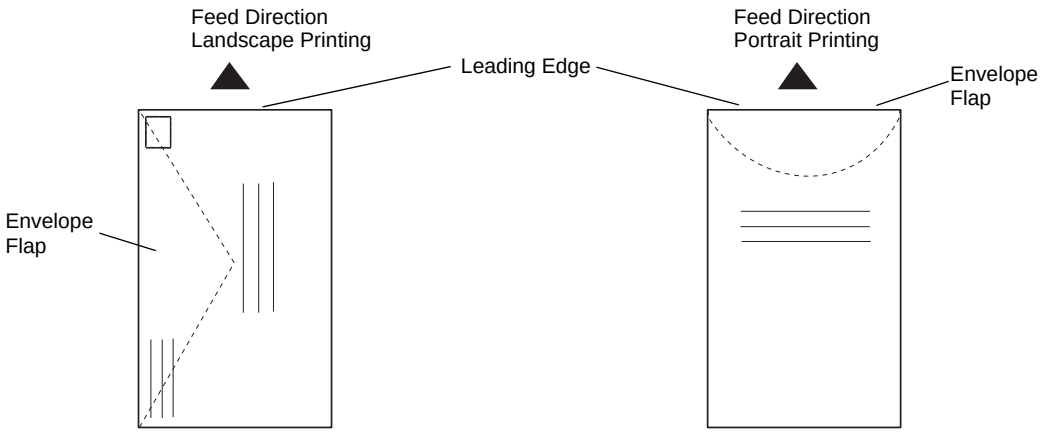
Example:

This example creates a macro to print the Wigit Corp. logo, then calls the logo macro in the body of a letter.

ESC&f1Y	|Set the macro ID to 1
ESC&f0X	|Start the macro definition
ESC&a+72H	|Relative move right 1/10 inch (+72/720th)
ESC(8U	|Select Roman-8 symbol set
ESC(s1p18v0s3b4101T	|Select CG Times 18 point bold
W	|Print W
ESC&a-21.6H	|Relative move left 0.03 inch
ESC(s12v1S	|Select (CG Times) 12 point (bold) italic
igit	|Print igit
ESC&a+72H	|Relative move right 1/10 inch
ESC(s18v0S	|Select 18 point and turn off italic
C	|Print C
ESC(s12v1S	|Select 12 point italic
orp.	|Print orp.
ESC&a+72H	|Relative move right 1/10 inch
ESC&f1X	|End of macro definition
ESC&f10X	|Make Macro ID 1 permanent
...	
...	
From:	|Print the header From:
ESC&f1y3X	|Set the macro ID to 1 and call the macro
...	|Print the letter
Thank you for ...	|Print the closing
ESC&f1y3X	|Set the macro ID to 1 and call the macro
...	

PCL 5 Emulation Envelope Orientation

Envelopes are positioned in the multipurpose feeder or the envelope feeder with the flap facing down and the short edge feeding into the printer. See the following illustration. The stamp is shown for placement only. Do not feed stamped envelopes.



Chapter 3 Printer Job Language

The printer supports complete Printer Job Language (PJL) commands, including certain commands that force the printer to enter PCL 5 emulation, PostScript Level 2 emulation, and Personal Printer Data Stream (PPDS).

PJL Command Notation

The syntax for each supported PJL command is listed in this chapter. The following character codes are used throughout the chapter to illustrate the syntax of each PJL command.

Table 3-1 PJL Command Notation

Character Code	Description	Hex Code	Decimal Code
<ESC>	Escape Character	0x1B	27
<LF>	Line Feed Character	0x0A	10
<CR>	Carriage Return Character	0x0D	13
<FF>	Form Feed Character	0x0C	12
<HT>	Horizontal Tab	0x09	9
<UEL>	Universal Exit Language	0x1B 25 2D 31 32 33 34 35 58	

Notes:

- Parameters enclosed in square brackets ([ ]) are optional and not required for command execution.
- The PJL interpreter requires uppercase for the `@PJL` prefix for all PJL commands except the Universal Exit Language (UEL) command. The rest of the PJL command is not case sensitive. The UEL command is case sensitive.
- All PJL commands except UEL must be terminated with a line feed character (<LF>).

UNIVERSAL EXIT LANGUAGE Command

The Universal Exit Language (UEL) command terminates the current printer language and allows dynamic switching into PJL.

Syntax:

```
<ESC>%-12345X
```

Notes:

- If the printer receives this command while in PCL 5 emulation, it performs a Printer Language Reset (^{ESC}E) before exiting PCL 5 emulation.
- If the printer receives this command while in PostScript Level 2 emulation, it performs an End-of-Job (EOJ) command before exiting PostScript Level 2 emulation (Ctrl-D).

The PJL commands must immediately follow the UEL command (that is, the `X` in the UEL syntax must be immediately followed by the `@PJL` of the next PJL command).

ENTER LANGUAGE Command

This command causes the printer to enter the specified language, such as PCL 5 emulation, PostScript Level 2 emulation, or PPDS.

Syntax:

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

Notes:

- *language* is *PCL*, *PostScript*, or *PPDS*.
- You can use uppercase, lowercase, or mixed case. (`@PJL` must be uppercase; all others can be mixed or lowercase.)

Example:

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

enters PostScript Level 2 emulation.

COMMENT Command

This command lets you add descriptive comments to your PJL job.

Syntax:

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

Notes:

- When the printer receives this command, it is ignored.
- The words parameter can be any combination of printable characters, spaces, and horizontal tabs.
- The COMMENT command is terminated by the line feed character (<LF>).

Job Separation Commands

Support for the PJL JOB and EOJ commands is identical to the Hewlett-Packard Company's LaserJet 5Si/5SiMx printer, with the following exceptions. When the printer receives a JOB command, the print timeout is multiplied by 10. When the printer receives a PJL EOJ command, the print timeout is reset to the user default. The printer continues to display the **Waiting** message on the operator panel until an EOJ command is received or until the print timeout expires.

The printer also supports the PASSWORD parameter for the PJL JOB command.

JOB Command

The JOB command may be used by the host computer to separate print data into various parts or jobs. Specifically, the JOB command signifies to the printer the start of a print job. The EOJ command is used to signify the end of a job. In addition, the JOB/EOJ pair can be used to accomplish the following:

- Provide a job name (the name is displayed on the operator panel).
- Indicate which pages of the job should be printed.
- Monitor the job status as it is printing.

Syntax:

```
@PJL JOB [NAME = "job name"] [START = first page]
[END = last page] [PASSWORD = number][<CR>]<LF>
```

Notes:

- The JOB command should only be used in conjunction with the EOJ command.
- After receiving a JOB command, the printer does not process a UEL command as a PJL job boundary until it receives the corresponding EOJ. Instead, UELs occurring within a JOB/EOJ pair are processed as printer language resets, (for example, PCL ^{ESC}E).

Parameters:

`NAME = "job name"`

The NAME parameter is used to assign a character string name to a particular job. The name may be any combination of printable characters, spaces or horizontal tabs up to a maximum of 80 characters, spaces or tabs. The *job name* must be enclosed in double quotes, as indicated by the command syntax.

`START = first page`

The START parameter is used in conjunction with the END parameter to skip the printing of a particular portion of the job. The emulator discards pages of a job until the page specified by this parameter is reached. The *first page* range is from 1 to 2,147,483,647. Omission of the START parameter causes the printer to start printing with page 1 of the job.

`END = last page`

The END parameter is used in conjunction with the START parameter to skip the printing of a particular portion of the job. The emulator discards all pages of a job after the *last page* has been printed. The specification of *last page* is relative to page 1 of the print job and its range is from 1 to 2,147,483,647. Omission of the END parameter causes the printer to print all pages to the end of the job.

`PASSWORD = number`

A system administrator can control which jobs, and therefore which users, are allowed to modify the printer default or NVRAM variables by declaring a PJL password. With a PJL password declared, the PASSWORD parameter with the correct PASSWORD number must be specified in order to modify the default printer environment.

A PJL JOB command with the correct PASSWORD must be issued before any PJL command can modify a NVRAM setting. The PJL EOJ command terminates the job and disables any further modification of NVRAM. If a PJL password is declared and the wrong PASSWORD number is specified on the PJL JOB command, the printer will delay one half of a second before processing the next command.

Note: Setting a default PJL password disables the use of PJL DEFAULT and INTIALIZE commands. (See “DEFAULT Command” on page 3-8 and “INITIALIZE Command” on page 3-10.)

EOJ Command

The EOJ command is used to signify the end of a print job.

Syntax:

```
@PJL EOJ [NAME = "job name"][<CR>]<LF>
```

Note:

The EOJ command should only be used in conjunction with the JOB command.

Parameter:

`NAME = "job name"`

The NAME parameter is used to assign a character string name to a particular job. The name may be any combination of printable characters, spaces or horizontal tabs up to a maximum of 80 characters, spaces or tabs. The NAME string may be different from the NAME string specified in the JOB command. The *job name*must be enclosed in double quotes.

Environment Commands and Variables

This section describes the variables that comprise the printer environment and the PJL commands used to modify or query the variables.

Note: The word *common* applies to those variables common to both this printer and the Hewlett-Packard Company's LaserJet 5Si/5SiMx printer.

Table 3-2 Environment Variable Categories

Categories	Beginning on Page ...
Common Variables for Both Printer Languages	3-12
Printer Unique Variables for Both Printer Languages	3-17
Common Variables for PCL 5 emulation	3-28
Printer Unique Variables for PCL 5 emulation	3-29
Common Variables for PostScript Level 2 emulation	3-32
Printer Unique Variables for PostScript Level 2 emulation	3-32
Printer Unique LRESOURCE Variables	3-34

The following commands modify the environment variables, and are described in this section:

- DEFAULT
- SET
- INITIALIZE
- RESET

The following commands query the environment variables, and are described in "Status Readback Commands" beginning on page 3-35.

- INQUIRE
- DINQUIRE
- INFO

DEFAULT Command

This command modifies the default setting for the specified environment variable, and stores the setting in the printer NVRAM. The new setting is activated with the occurrence of the next PJL reset condition.

Syntax:

`@PJL DEFAULT [command modifier=value] variable=value[<CR>]<LF>`

`[command modifier=value]`

The `[command modifier=value]` parameter specifies the type of PJL variables to be modified. The variables supported are listed in the tables beginning on page 3-12.

- A `[command modifier=value]` parameter is not required for variables listed in the tables "Common Variables for Both Printer Languages," beginning on page 3-12, and "Printer Unique Variables for Both Printer Languages," beginning on page 3-17.
- `LPARM:PCL` is used with variables specific to PCL 5 emulation. (See the tables "Common Variables for PCL 5 Emulation," beginning on page 3-28, and "Printer Unique Variables for PCL 5 Emulation," beginning on page 3-29.)
- `LPARM:POSTSCRIPT` is used for variables specific to PostScript Level 2 emulation. (See the tables "Common Variables for PostScript Level 2 Emulation," beginning on page 3-32, and "Printer Unique Variables for PostScript Level 2 Emulation," beginning on page 3-32.)
- `LRESOURCE:"device:filename.filetype"` is required for LRESOURCE variables. (See the table "Printer Unique LRESOURCE Variables" beginning on page 3-34.)

  Values for "`device:filename.filetype`" are:

`device`	`flash`, `flash1`, `disk`, or `disk1` (case insensitive)
`filename`	a unique identifier for a file, such as the macro ID for a PCL macro, the symbol set ID for a PCL symbol set, the font ID for a PCL font, and so on. The `filename` is case sensitive.
`filetype`	an identifier that categorizes the file, such as `p5macro` for PCL macros or `p5symset` for PCL symbol sets. See Table 3-20, "Variables for Flash and Disk File and Password Commands" on page 3-55 for a complete list of the supported file types. The `filetype` is case sensitive.

`variable=value`

The supported variables and values are listed in the tables beginning on page 3-12.

Note: Variables may be modified by the DEFAULT command except those marked Read Only. Some variables may only be modified using the PJL SET command and these cannot be modified using the DEFAULT command. These are marked Set Only.

SET Command

This command modifies the current setting for the specified environment variable. The new setting is active immediately, and remains active until the next occurrence of a PJL reset condition.

The SET command is used to modify any currently defined environment variable that cannot be set using the desired printer language. For example, use the PJL SET command to set Print Quality Enhancement Technology (PQET) or Page Protect, which cannot be set within a printer language such as PCL 5 emulation.

Syntax:

`@PJL SET [command modifier=value] variable=value[<CR>]<LF>`

where

`[command modifier=value]`

The `[command modifier=value]` parameter specifies the type of PJL variables to be modified. The variables supported are listed in the tables beginning on page 3-12.

- A `[command modifier=value]` is not required for variables listed in the tables "Common Variables for Both Printer Languages," beginning on page 3-12, and "Printer Unique Variables for Both Printer Languages," beginning on page 3-17.
- `LPARM:PCL` is used with variables specific to PCL 5 emulation. (See the tables "Common Variables for PCL 5 Emulation," beginning on page 3-28, and "Printer Unique Variables for PCL 5 Emulation," beginning on page 3-29.)
- `LPARM:POSTSCRIPT` is used for variables specific for PostScript Level 2 emulation. (See the tables "Common Variables for PostScript Level 2 Emulation," beginning on page 3-32, and "Printer Unique Variables for PostScript Level 2 Emulation," beginning on page 3-32.)
- `LRESOURCE:"device:filename.filetype"` is required for LRESOURCE variables. (See Table 3-9, "Printer Unique LRESOURCE Variables" on page 3-34.)

Values for "*device:filename.filetype*" are:

device	*flash*, *flash1*, *disk*, or *disk1* (case insensitive)
filename	a unique identifier for a file, such as the macro ID for a PCL macro, the symbol set ID for a PCL symbol set, the font ID for a PCL font, and so on. The *filename* is case sensitive.
filetype	an identifier that categorizes the file, such as *p5macro* for PCL macros or *p5symset* for PCL symbol sets. See the table beginning on page 3-55 for a complete list of the supported file types. The *filetype* is case sensitive.

`variable=`*value*

The supported variables and values are listed in the tables beginning on page 3-12.

Note: All variables may be modified by the SET command except those marked Read Only. Some variables may only be modified using the PJL DEFAULT command. These cannot be modified using the SET command. These are marked Default Only.

INITIALIZE Command

This command restores both the current and default environment variables to their factory default values and updates the printer NVRAM. This command affects all of the variables listed in Table 3-3, “Common Variables for Both Printer Languages” on page 3-12 through Table 3-8, “Printer Unique Variables for PostScript Level 2 Emulation” on page 3-32, except the following:

- All read only variables
- PASSWORD
- LANG
- LRESOURCESAVE
- LDOWNLOADTARGET
- LPPDS
- LHONORINIT
- LUSDEFAULTS
- PARALLEL
- RESOURCESAVE

Note: This command does not affect LRESOURCE variables in Table 3-9, “Printer Unique LRESOURCE Variables” on page 3-34.

Syntax:

```
@PJL INITIALIZE[<CR>]<LF>
```

RESET Command

This command resets the current environment variables to the settings stored in the printer NVRAM. Therefore, any variables modified by the PJL SET command are returned to their default value after execution of the PJL RESET command.

Syntax:

```
@PJL RESET[<CR>]<LF>
```

Common Variables for Both Printer Languages

Note: The word *common* applies to those variables common to both this printer and the Hewlett-Packard Company's LaserJet 5Si/5SiMx printer.

The following common variables are supported for both PCL 5 emulation and PostScript Level 2 emulation, unless otherwise noted. Therefore, the [`command modifier`*`value`*] parameter should not be specified.

Table 3-3 Common Variables for Both Printer Languages

Variable	Function	Selections	Factory Default
AUTOCONT (DEFAULT only)	Auto Continue	0, 5 to 255, OFF, ON A value 0 or Off indicates Auto Continue is disabled. A value of On indicates Auto Continue is set to 30. INQUIRE or DINQUIRE on the Auto Continue variable returns a numeric value.	OFF
BINDING	Duplex Bind	LONGEDGE, SHORTEDGE	LONGEDGE
BITSPERPIXEL	Image Enhancement Technology	1, 2 INQUIRE or DINQUIRE for BITSPERPIXEL returns a value of 1 when IET is set to OFF and a value of 2 when IET is set to ON. For SET/DEFAULT, a BITSPERPIXEL value of 1 sets IET to OFF and a BITSPERPIXEL value of 2 sets IET to ON.	1
CLEARABLEWARNINGS (READ only)	Auto Continue from Operator Panel Non-Fatal Warning Messages	JOB, ON If Auto Continue menu item is set to On, JOB is returned. If Auto Continue is set to Off, ON is returned.	ON
COPIES	Number of copies of each page	Range is 1 to 999 If a value larger than 999 is specified by a SET or DEFAULT command, the value is changed to 999.	1
CPLOCK (DEFAULT only)	Disables menus	ON, OFF ON disables the operator panel menus OFF enables menus	OFF
DENSITY	Print Darkness	If changed through PJL, an inquiry returns the following values: 3 Normal 2,1 Light to Lightest 4,5 Dark to Darkest	3
DUPLEX	Duplex	ON, OFF	OFF
ECONOMODE	Toner Saver	ON, OFF	OFF

Table 3-3 Common Variables for Both Printer Languages (Continued)

Variable	Function	Selections	Factory Default
FORMATTERNUMBER (Read only)	Unique printer identifier	The value of the NVRAM serial number field is returned. The NVRAM serial number field is set to the printer serial number. In order to guarantee that a unique identifier exists in this field, the printer writes a random alphanumeric string into this field whenever the critical byte area in NVRAM is re-initialized.	Set by printer manufacturer
FORMLINES	Lines per page	1 to 255	60, 64 (Country specific)
IMAGEADAPT (DEFAULT only)	Resolution Reduction	ON, OFF	ON
INTRAY1SIZE (SET only)	Tray 1 installed size	LETTER, LEGAL, A4, EXECUTIVE, A5, JISB5, CUSTOM	LETTER, A4 (Country specific)
INTRAY2SIZE (SET only)	Tray 2 installed size	LETTER, LEGAL, A4, EXECUTIVE, A5, JISB5, CUSTOM	LETTER, A4 (Country specific)
INTRAY3SIZE (SET only)	Tray 3 installed size	LETTER, LEGAL, A4, EXECUTIVE, A5, JISB5, CUSTOM	LETTER, A4 (Country specific)
INTRAY4SIZE (SET only)	Tray 4 installed size	LETTER, LEGAL, A4, EXECUTIVE, A5, JISB5, CUSTOM	LETTER, A4 (Country specific)
INTRAY5SIZE (SET only)	Tray 5 installed size	LETTER, LEGAL, A4, EXECUTIVE, A5, JISB5, CUSTOM	LETTER, A4 (Country specific)
LANG (DEFAULT only)	Default display language	DANISH, GERMAN, ENGLISH, SPANISH, FRENCH, ITALIAN, DUTCH, NORWEGIAN, SWEDISH, PORTUGUESE, FINNISH, JAPANESE	Varies by country

Table 3-3 Common Variables for Both Printer Languages (Continued)

Variable	Function	Selections	Factory Default
LOWTONER (DEFAULT only)	Toner Alarm	ON, OFF, CONTINUE, STOP A value of ON or CONTINUE indicates the Toner Alarm setting is set Off. The value of OFF or STOP indicates the Toner Alarm setting is Single. INQUIRE or DINQUIRE returns the value of the Toner Alarm as follows: If Toner Alarm is set to Off, CONTINUE is returned. If Toner Alarm is set to Single, STOP is returned. If Toner Alarm is set to Continuous, STOP is returned.	ON
MANUALFEED (READ only)	Manual Feed Selection	OFF Printer always returns OFF	OFF
MEDIATYPE	Default formatting or installed paper type for the default paper source	PLAIN, BOND, TRANSPARENCY, CARDSTOCK, LABELS, LETTERHEAD, PREPRINTED, COLORED, ENVELOPE, CUSTOMTYPE1, CUSTOMTYPE2, CUSTOMTYPE3, CUSTOMTYPE4, CUSTOMTYPE5, CUSTOMTYPE6	PLAIN
MPTRAY (DEFAULT only)	Multipurpose feeder configuration	CASSETTE, MANUAL, FIRST Sets the configuration of the Multipurpose Feeder.	CASSETTE
ORIENTATION	Print orientation	PORTRAIT, LANDSCAPE This variable does not affect PostScript Level 2 emulation on this printer.	PORTRAIT
OUTBIN	Output Bin Selection	UPPER, LOWER, OPTIONALOUTBIN1, OPTIONALOUTBIN2, OPTIONALOUTBIN3 UPPER refers to the printer standard bin. LOWER and OPTIONALOUTBIN1 refer to Bin 1 which is the first optional output expander installed. OPTIONALOUTBIN1 to OPTIONALOUTBIN3 is used for optional output expanders.	UPPER

Table 3-3 Common Variables for Both Printer Languages (Continued)

Variable	Function	Selections	Factory Default
PAGEPROTECT	Page Protect	AUTO, ON A value of ON indicates the Page Protect setting is set On. The value of AUTO indicates the Page Protect setting is set Off. INQUIRE or DINQUIRE returns the value of the Page Protect as follows: If Page Protect is set Off, AUTO is returned. If Page Protect is set On, ON is returned.	AUTO
PAPER	Default formatting or installed paper size for the default paper source	Paper: LETTER, LEGAL, A4, EXECUTIVE, A5, JISB5, CUSTOM Envelopes: COM10, COM9, MONARCH, DL, C5, B5, OTHERENVELOPE	LETTER, A4 (Country specific)
PARALLEL (DEFAULT only)	Parallel Protocol	SLOW, FAST A value of SLOW indicates the Parallel Protocol setting is Standard. The value of FAST indicates the Parallel Protocol setting is FASTBYTES. INQUIRE or DINQUIRE returns the value of the Parallel Protocol as follows: If Parallel Protocol is set as Standard, SLOW is returned. If Parallel Protocol is set as Fastbytes, FAST is returned.	FAST
PASSWORD (DEFAULT only)	Default Password for PJL NVRAM security	0 to 65535 The Default PJL password is 0. If the PJL password is not equal to 0, a DINQUIRE or INQUIRE on the PASSWORD variable returns ENABLED. If the PJL password is equal to 0, a DINQUIRE or INQUIRE on the PASSWORD variable returns DISABLED. See the PASSWORD parameter of the JOB command on page 3-5 for more information.	0

Table 3-3 Common Variables for Both Printer Languages (Continued)

Variable	Function	Selections	Factory Default
PERSONALITY	SmartSwitch settings	PCL, POSTSCRIPT, AUTO PERSONALITY controls the SmartSwitch settings for the interface link on which the PJL command is received. If AUTO is sent, both PS SmartSwitch and PCL Smartswitch menu settings are set to ON. If PCL is sent, PS SmartSwitch is set to OFF and PCL SmartSwitch is set to ON. If POSTSCRIPT is sent, PCL SmartSwitch is set to OFF and PS SmartSwitch is set to ON. When queried, AUTO is returned if both SmartSwitch settings are ON. If one SmartSwitch setting is OFF, the printer language whose SmartSwitch setting of ON is returned. If both SmartSwitch settings are OFF, the default printer language is returned.	AUTO
POWERSAVE (DEFAULT only)	Power Save feature	ON, OFF ON enables the power-saving feature. OFF disables the power-saving feature.	ON
POWERSAVETIME (DEFAULT only)	Power Save time in minutes	0 to 120 The time the printer remains idle before it enters Power Save mode when POWERSAVE is On.	20
REPRINT	Jam Recovery	ON, OFF, AUTO	AUTO
RESOLUTION	Print Resolution	300, 600, 1200	600
RESOURCESAVE (DEFAULT only)	Resource Save	ON, OFF, AUTO ON indicates Resource Save is set On. OFF and AUTO indicate Resource Save is set Off.	OFF
RET	Print Quality Enhancement Technology (PQET)	OFF, DARK, MEDIUM, LIGHT, ON If this value is set through PJL, the same value is returned on a PJL inquiry. DARK, MEDIUM, LIGHT, and ON values indicate that PQET is On. OFF indicates PQET is Off.	ON
TIMEOUT	Print Timeout in seconds	0 to 255 The time the printer remains idle before the job is forced to print. If a larger value than 255 is specified by a SET or DEFAULT, the value is changed to 255.	90
WIDEA4	A4 Width	NO, YES	NO

Printer Unique Variables for Both Printer Languages

The following variables are unique to this printer and are supported for both PCL 5 emulation and PostScript Level 2 emulation.Therefore, the [`command modifier`*`value`*] parameter should not be specified.

Table 3-4 Printer Unique Variables for Both Printer Languages

Variable	Function	Selections	Factory Default
LACTIVEBINRESET (DEFAULT only)	Active Bin Reset	MANUAL, AUTOMATIC Configures the printer to automatically perform the Reset Active Bin operation when the printer exits the Ready or Powersaver state to print an incoming job.	MANUAL
LADVANCEDSTATUS (DEFAULT only)	Advanced Status	ON, OFF ON enables parallel bidirectional support. OFF disables parallel bidirectional support.	ON
LALARMCONTROL (DEFAULT only)	Alarm Control	OFF, SINGLE, CONTINUOUS	SINGLE
LAUTOCRLF	Auto CR after LF	ON, OFF	OFF
LAUTOLFCR	Auto LF after CR	ON, OFF	OFF
LBLANKPAGES	Blank Pages	DONOTPRINT, PRINT	DONOT PRINT
LBONDTEXTURE (DEFAULT only)	Bond Texture	SMOOTH, NORMAL, ROUGH	ROUGH
LBONDWEIGHT (DEFAULT only)	Bond Weight	LIGHT, NORMAL, HEAVY	NORMAL
LCARDSTOCKTEXTURE (DEFAULT only)	Card Stock Texture	SMOOTH, NORMAL, ROUGH	NORMAL
LCARDSTOCKWEIGHT (DEFAULT only)	Card Stock Weight	LIGHT, NORMAL, HEAVY	NORMAL
LCOLLATION	Collation Mode	ON, OFF If Collation is ON, the print job pages are collated. For example, if the job contains three pages and two copies are requested, collated output prints as 1, 2, 3, 1, 2, 3. Collation set to OFF causes output to print 1, 1, 2, 2, 3, 3.	OFF
LCOLOREDTEXTURE (DEFAULT only)	Colored Paper Texture	SMOOTH, NORMAL, ROUGH	NORMAL
LCOLOREDWEIGHT (DEFAULT only)	Colored Paper Weight	LIGHT, NORMAL, HEAVY	NORMAL

Table 3-4 Printer Unique Variables for Both Printer Languages (Continued)

Variable	Function	Selections	Factory Default
LCUSTOMTYPE1MEDIA (DEFAULT only)	Custom Type 1 Media	PAPER, TRANSPARENCY, LABELS, CARDSTOCK, ENVELOPE	PAPER
LCUSTOMTYPE1NAME (DEFAULT only)	Custom Type 1 Name	"name" *name* is a text string that is truncated to 24 characters. This variable allows for custom naming of print material types. When queried, the quotes are not returned around the string name. The default name is returned unless you have specified a custom name.	CUSTOM TYPE1
LCUSTOMTYPE1TEXTURE (DEFAULT only)	Custom Type 1 Texture	SMOOTH, NORMAL, ROUGH	NORMAL
LCUSTOMTYPE1WEIGHT (DEFAULT only)	Custom Type 1 Weight	LIGHT, NORMAL, HEAVY	NORMAL
LCUSTOMTYPE2MEDIA (DEFAULT only)	Custom Type 2 Media	PAPER, TRANSPARENCY, LABELS, CARDSTOCK, ENVELOPE	PAPER
LCUSTOMTYPE2NAME (DEFAULT only)	Custom Type 2 Name	"name" *name* is a text string that is truncated to 24 characters. This variable allows for custom naming of print material types. When queried, the quotes are not returned around the string name. The default name is returned unless you have specified a custom name.	CUSTOM TYPE2
LCUSTOMTYPE2TEXTURE (DEFAULT only)	Custom Type 2 Texture	SMOOTH, NORMAL, ROUGH	NORMAL
LCUSTOMTYPE2WEIGHT (DEFAULT only)	Custom Type 2 Weight	LIGHT, NORMAL, HEAVY	NORMAL
LCUSTOMTYPE3MEDIA (DEFAULT only)	Custom Type 3 Media	PAPER, TRANSPARENCY, LABELS, CARDSTOCK, ENVELOPE	PAPER
LCUSTOMTYPE3NAME (DEFAULT only)	Custom Type 3 Name	"name" *name* is a text string that is truncated to 24 characters. This variable allows for custom naming of print material types. When queried, the quotes are not returned around the string name. The default name is returned unless you have specified a custom name.	CUSTOM TYPE3

Table 3-4 Printer Unique Variables for Both Printer Languages (Continued)

Variable	Function	Selections	Factory Default
LCUSTOMTYPE3TEXTURE (DEFAULT only)	Custom Type 3 Texture	SMOOTH, NORMAL, ROUGH	NORMAL
LCUSTOMTYPE3WEIGHT (DEFAULT only)	Custom Type 3 Weight	LIGHT, NORMAL, HEAVY	NORMAL
LCUSTOMTYPE4MEDIA (DEFAULT only)	Custom Type 4 Media	PAPER, TRANSPARENCY, LABELS, CARDSTOCK, ENVELOPE	PAPER
LCUSTOMTYPE4NAME (DEFAULT only)	Custom Type 4 Name	"name" *name* is a text string that is truncated to 24 characters. This variable allows for custom naming of print material types. When queried, the quotes are not returned around the string name. The default name is returned unless you have specified a custom name.	CUSTOM TYPE4
LCUSTOMTYPE4TEXTURE (DEFAULT only)	Custom Type 4 Texture	SMOOTH, NORMAL, ROUGH	NORMAL
LCUSTOMTYPE4WEIGHT (DEFAULT only)	Custom Type 4 Weight	LIGHT, NORMAL, HEAVY	NORMAL
LCUSTOMTYPE5MEDIA (DEFAULT only)	Custom Type 5 Media	PAPER, TRANSPARENCY, LABELS, CARDSTOCK, ENVELOPE	PAPER
LCUSTOMTYPE5NAME (DEFAULT only)	Custom Type 5 Name	"name" *name* is a text string that is truncated to 24 characters. This variable allows for custom naming of print material types. When queried, the quotes are not returned around the string name. The default name is returned unless you have specified a custom name.	CUSTOM TYPE5
LCUSTOMTYPE5TEXTURE (DEFAULT only)	Custom Type 5 Texture	SMOOTH, NORMAL, ROUGH	NORMAL
LCUSTOMTYPE5WEIGHT (DEFAULT only)	Custom Type 5 Weight	LIGHT, NORMAL, HEAVY	NORMAL
LCUSTOMTYPE6MEDIA (DEFAULT only)	Custom Type 6 Media	PAPER, TRANSPARENCY, LABELS, CARDSTOCK, ENVELOPE	PAPER

Table 3-4 Printer Unique Variables for Both Printer Languages (Continued)

Variable	Function	Selections	Factory Default
LCUSTOMTYPE6NAME (DEFAULT only)	Custom Type 6 Name	"name" *name* is a text string that is truncated to 24 characters. This variable allows for custom naming of print material types. When queried, the quotes are not returned around the string name. The default name is returned unless you have specified a custom name.	CUSTOM TYPE6
LCUSTOMTYPE6TEXTURE (DEFAULT only)	Custom Type 6 Texture	SMOOTH, NORMAL, ROUGH	NORMAL
LCUSTOMTYPE6WEIGHT (DEFAULT only)	Custom Type 6 Weight	LIGHT, NORMAL, HEAVY	NORMAL
LDOWNLOADTARGET (SET only)	Download Target	RAM, FLASH, FLASH1,DISK, DISK1 If the device specified as the download target is write or read/write password protected, the download target will not be changed.	RAM
LENVELOPEENHANCE (DEFAULT only)	Envelope Enhance	ON, OFF	ON
LENVELOPETEXTURE (DEFAULT only)	Envelope Texture	SMOOTH, NORMAL, ROUGH	NORMAL
LENVELOPEWEIGHT (DEFAULT only)	Envelope Weight	LIGHT, NORMAL, HEAVY	NORMAL
LFEEDERPAPERTYPE	Envelope Feeder Paper Type	ENVELOPE, CUSTOMTYPE1, CUSTOMTYPE2, CUSTOMTYPE3, CUSTOMTYPE4, CUSTOMTYPE5, CUSTOMTYPE6, "name" *name* is a text string that is truncated to 24 characters. This variable allows for custom naming of print material types. When queried, the quotes are not returned around the string name. The default name is returned unless you have specified a custom name.	ENVELOPE
LHONORINIT (DEFAULT only)	Honor INIT Signal	HONORSIGNAL, DONOTHONORSIGNAL	DONOT HONOR SIGNAL
LIMAGEENHANCE (DEFAULT only)	Image Enhancement Technology	ON, OFF	OFF

Table 3-4 Printer Unique Variables for Both Printer Languages (Continued)

Variable	Function	Selections	Factory Default
LIMAGEORIENTATION	Page Image Orientation	DONOTROTATE, ROTATEPAPER, ROTATEENVELOPES, ROTATESTAPLED, ROTATESTAPLEDANDENVELOPES, ROTATEALL Specifies whether the page images for the standard paper sizes and/or envelope sizes are rotated 180 degrees. The physical characteristics of a paper handling device may require page image rotation.	ROTATESTAPLED
LINFEEDERSIZE	Envelope Feeder installed size, Default formatting size	COM10, COM9, MONARCH, DL, C5, B5, OTHERENVELOPE	COM10, DL (Country specific)
LINMPFEEDERSIZE	Multipurpose Feeder installed size, Default formatting size	Paper: LETTER, LEGAL, A4, EXECUTIVE, A5, JISB5, CUSTOM Envelopes: COM10, COM9, MONARCH, DL, C5, B5, OTHERENVELOPE	LETTER, A4 (Country specific)
LJAMRECOVERY	Jam Recovery	ON, OFF, AUTO	AUTO
LLABELSTEXTURE (DEFAULT only)	Labels Texture	SMOOTH, NORMAL, ROUGH	NORMAL
LLABELSWEIGHT (DEFAULT only)	Labels Weight	LIGHT, NORMAL, HEAVY	NORMAL
LLETTERHEADTEXTURE (DEFAULT only)	Letterhead Texture	SMOOTH, NORMAL, ROUGH	NORMAL
LLETTERHEADWEIGHT (DEFAULT only)	Letterhead Weight	LIGHT, NORMAL, HEAVY	NORMAL
LMANUALENVELOPESIZE	Manual Envelope default formatting size	COM10, COM9, MONARCH, DL, C5, B5, OTHERENVELOPE	COM10, DL (Country specific)
LMANUALENVELOPETYPE	Manual Envelope Type	ENVELOPE, CUSTOMTYPE1, CUSTOMTYPE2, CUSTOMTYPE3, CUSTOMTYPE4, CUSTOMTYPE5, CUSTOMTYPE6	ENVELOPE
LMANUALPAPERSIZE	Manual Paper default formatting size	LETTER, LEGAL, A4, EXECUTIVE, A5, JISB5, CUSTOM	LETTER, A4 (Country specific)

Table 3-4 Printer Unique Variables for Both Printer Languages (Continued)

Variable	Function	Selections	Factory Default
LMANUALPAPERTYPE	Manual Paper Type	PLAIN, BOND, TRANSPARENCY, CARDSTOCK, LABELS, LETTERHEAD, PREPRINTED, COLORED, CUSTOMTYPE1, CUSTOMTYPE2, CUSTOMTYPE3, CUSTOMTYPE4, CUSTOMTYPE5, CUSTOMTYPE6,"name" *name* is a text string that is truncated to 24 characters. This variable lets you custom name print material types. When queried, the quotes are not returned around the string name. The default name is returned unless you have specified a custom name.	PLAIN
LMPFEEDERPAPERTYPE	Multipurpose Feeder Paper Type	PLAIN, BOND, TRANSPARENCY, CARDSTOCK, LABELS, LETTERHEAD, PREPRINTED, COLORED, ENVELOPE, CUSTOMTYPE1, CUSTOMTYPE2, CUSTOMTYPE3, CUSTOMTYPE4, CUSTOMTYPE5, CUSTOMTYPE6,"name" *name* is a text string that is truncated to 24 characters. This variable lets you custom name print material types. When queried, the quotes are not returned around the string name. The default name is returned unless you have specified a custom name.	CUSTOM TYPE6
LMULTIPAGEBORDER	Multipage Border	NONE, SOLID	NONE
LMULTIPAGEORDER	Multipage Order	HORIZONTAL, VERTICAL, REVHORIZONTAL, REVVERTICAL	HORIZONTAL
LMULTIPAGEPRINT	Multipage Printing	OFF, 2UP, 3UP, 4UP, 6UP, 9UP, 12UP, 16UP	OFF
LMULTIPAGEVIEW	Multipage View	AUTO, SHORTEDGE, LONGEDGE	AUTO
LNPAP (READ only; port specific)	NPA Protocol Setting	ON, OFF, AUTO This value is reported for the interface link that the command is received.	AUTO
LOPTIONALOUTBIN1NAME (DEFAULT only)	Optional Output Bin 1 Name	"name" *name* is a text string that is truncated to 24 characters. This variable lets you custom name optional output expander #1. When queried, the quotes are not returned around the string name. The default name is returned unless you have specified a custom name.	OPTIONAL OUTBIN1

Table 3-4 Printer Unique Variables for Both Printer Languages (Continued)

Variable	Function	Selections	Factory Default
LOPTIONALOUTBIN2NAME (DEFAULT only)	Optional Output Bin 2 Name	"name" *name* is a text string that is truncated to 24 characters. This variable lets you custom name optional output expander #2. When queried, the quotes are not returned around the string name. The default name is returned unless you have specified a custom name.	OPTIONAL OUTBIN2
LOPTIONALOUTBIN3NAME (DEFAULT only)	Optional Output Bin 3 Name	"name" *name* is a text string that is truncated to 24 characters. This variable lets you custom name optional output expander #3. When queried, the quotes are not returned around the string name. The default name is returned unless you have specified a custom name.	OPTIONAL OUTBIN3
LOUTBINCONFIG (DEFAULT only)	Output Bin Configuration	MAILBOX, LINK, LINKOPTIONAL	MAILBOX
LPAGEMODE	Print Area	NORMAL, FULLPAGE, WHOLEPAGE The FULLPAGE value for the LPAGEMODE variable means Print Area is set to Fit to Page.	NORMAL
LPAPERSOURCE	Default Paper Source	TRAY1, TRAY2, TRAY3, TRAY4, TRAY5, FEEDER, MPFEEDER, MANUALPAPER, MANUALENVELOPE **Note:** If any optional source is specified, but it is not installed, the default paper source is not changed.	TRAY1
LPLAINTEXTURE (DEFAULT only)	Plain Paper Texture	SMOOTH, NORMAL, ROUGH	NORMAL
LPLAINWEIGHT (DEFAULT only)	Plain Paper Weight	LIGHT, NORMAL, HEAVY	NORMAL
LPOWERSAVER (DEFAULT only)	Power Saver time in minutes	0 to 120 0 indicates the Power Saver function is disabled.	20

Table 3-4 Printer Unique Variables for Both Printer Languages (Continued)

Variable	Function	Selections	Factory Default
LPPDS (DEFAULT only)	Activate Personal Printer Data Stream (PPDS) printer language	OFF, ON Use ON to enable PPDS printer language and OFF to disable PPDS printer language. After this command is processed, the printer performs a Power On Reset (POR) to activate the changes. **Note:** The following printer settings in NVRAM are changed when PPDS is activated: • PCL and PS SmartSwitch settings for each port are turned off • Printer Language is set to PPDS	OFF
LPPDSFORMLINES (DEFAULT only)	Lines Per Page (PPDS)	1 to 255	64, 68 (Country specific)
LPPDSLINESPERINCH (DEFAULT only)	Lines Per Inch	0.25 to 30.00 in increments of 0.25. If a Lines Per Inch outside this range is specified, the printer defaults to the closest number in the range.	6.0
LPREPRINTEDTEXTURE (DEFAULT only)	Pre-printed Texture	SMOOTH, NORMAL, ROUGH	NORMAL
LPREPRINTEDWEIGHT (DEFAULT only)	Pre-printed Weight	LIGHT, NORMAL, HEAVY	NORMAL
LPRINTBUFFER	Print Buffer control	ON, OFF If ON is selected, **Print Buffer** is displayed with the **Waiting** message. If OFF is selected, **Print Buffer** is not displayed with the **Waiting** message.	ON
LPRINTSCREENS (port specific)	Print Screen Detection	DETECT, DONOTDETECT LPRINTSCREENS controls the Print Screens setting on the interface port (link) where the PJL command is received. The DETECT setting indicates the printer should search the input data stream for print screen requests and force a page after each block of print screen data that it detects. The data prints on a single page. **Warning:** After the print screen page is ejected, any temporary fonts and macros downloaded to RAM are discarded. The DONOTDETECT setting can be used to disable the print screen detection function.	DONOT DETECT

Table 3-4 Printer Unique Variables for Both Printer Languages (Continued)

Variable	Function	Selections	Factory Default
LRESET	Reset Control	ON, OFF If this variable is set to ON, **RESET** will be displayed with the **Busy**, **Waiting**, and error messages. If this variable is set to OFF, **RESET** will not be displayed with the **Busy**, **Waiting**, and error messages. Resetting Printer is still selectable in MENUS, and **RESET** will still be displayed with the **Ready** message when Hex Trace is active.	ON
LRESOURCESAVE (DEFAULT only)	Resource Save	ON, OFF	OFF
LSEPARATORSHEETS	Indicates where separator sheets are placed within the print job	NONE, BETWEENCOPIES, BETWEENJOBS, BETWEENPAGES	NONE
LSEPARATORSOURCE	Indicates which source contains the separator sheets	TRAY1, TRAY2, TRAY3, TRAY4, TRAY5, FEEDER, MPFEEDER	TRAY1
LSTANDARDOUTBINNAME (DEFAULT only)	Standard Output Bin Name	"name" *name* is a text string that is truncated to 24 characters. This variable lets you custom name optional output bins. When queried, the quotes are not returned around the string name. The default name, UPPER, is returned unless you have specified a custom name.	UPPER
LSUBSTITUTESIZE (Default Only)	Substitute Size	OFF, LETTERA4	OFF
LTOPBINROTATE (Default Only)	Top Bin Timeout in minutes	0 to 255 Value 0 indicates Top Bin Timeout is disabled	0
LTRANSPARENCYTEXTURE (Default Only)	Transparency Texture	SMOOTH, NORMAL, ROUGH	NORMAL
LTRANSPARENCYWEIGHT (DEFAULT only)	Transparency Weight	LIGHT, NORMAL, HEAVY	NORMAL
LTRAY1AUTOSIZE (DEFAULT only)	Auto Size Sensing for Tray 1	ON, OFF	ON
LTRAY2AUTOSIZE (DEFAULT only)	Auto Size Sensing for Tray 2	ON, OFF	ON

Table 3-4 Printer Unique Variables for Both Printer Languages (Continued)

Variable	Function	Selections	Factory Default
LTRAY3AUTOSIZE (DEFAULT only)	Auto Size Sensing for Tray 3	ON, OFF	ON
LTRAY4AUTOSIZE (DEFAULT only)	Auto Size Sensing for Tray 4	ON, OFF	ON
LTRAY5AUTOSIZE (DEFAULT only)	Auto Size Sensing for Tray 5	ON, OFF	ON
LTRAY1PAPERTYPE	Tray 1 Paper Type	PLAIN, BOND,TRANSPARENCY, CARDSTOCK, LABELS, LETTERHEAD, PREPRINTED, COLORED, CUSTOMTYPE1, CUSTOMTYPE2, CUSTOMTYPE3, CUSTOMTYPE4, CUSTOMTYPE5, CUSTOMTYPE6, "name" *name* is a text string that is truncated to 24 characters.	PLAIN
LTRAY2PAPERTYPE	Tray 2 Paper Type	PLAIN, BOND,TRANSPARENCY, CARDSTOCK, LABELS, LETTERHEAD, PREPRINTED, COLORED, CUSTOMTYPE1, CUSTOMTYPE2, CUSTOMTYPE3, CUSTOMTYPE4, CUSTOMTYPE5, CUSTOMTYPE6, "name" *name* is a text string that is truncated to 24 characters.	PLAIN
LTRAY3PAPERTYPE	Tray 3 Paper Type	PLAIN, BOND,TRANSPARENCY, CARDSTOCK, LABELS, LETTERHEAD, PREPRINTED, COLORED, CUSTOMTYPE1, CUSTOMTYPE2, CUSTOMTYPE3, CUSTOMTYPE4, CUSTOMTYPE5, CUSTOMTYPE6, "name" *name* is a text string that is truncated to 24 characters.	PLAIN
LTRAY4PAPERTYPE	Tray 4 Paper Type	PLAIN, BOND,TRANSPARENCY, CARDSTOCK, LABELS, LETTERHEAD, PREPRINTED, COLORED, CUSTOMTYPE1, CUSTOMTYPE2, CUSTOMTYPE3, CUSTOMTYPE4, CUSTOMTYPE5, CUSTOMTYPE6, "name" *name* is a text string that is truncated to 24 characters.	PLAIN

Table 3-4 Printer Unique Variables for Both Printer Languages (Continued)

Variable	Function	Selections	Factory Default
LTRAY5PAPERTYPE	Tray 5 Paper Type	PLAIN, BOND,TRANSPARENCY, CARDSTOCK, LABELS, LETTERHEAD, PREPRINTED, COLORED, CUSTOMTYPE1, CUSTOMTYPE2, CUSTOMTYPE3, CUSTOMTYPE4, CUSTOMTYPE5, CUSTOMTYPE6, "name" *name* is a text string that is truncated to 24 characters.	PLAIN
LTRAY1RENUMBER	Tray 1 Renumber	OFF, TRAY2, TRAY3, TRAY4, TRAY5, MPFEEDER	OFF
LTYPE1FONTS	Enables Type 1 fonts for PCL 5 emulation	OFF, ON	ON
LUSDEFAULTS *(DEFAULT only)*	US/non-US Defaults	US, NONUS	US, NONUS (Country specific)

Common Variables for PCL 5 Emulation

Note: The word *common* applies to those variables common to both this printer and the Hewlett-Packard Company's LaserJet 5Si/5SiMx printer.

These variables are used only for PCL 5 emulation. The [command modifier=*value*] parameter should be specified as LPARM:*PCL*. For example:

@PJL SET LPARM:*PCL* FONTSOURCE=*I*<CR><LF>

Table 3-5 Common Variables for PCL 5 Emulation

Variable	Function	Selections	Factory Default
FONTNUMBER	Font Number	0, 1, ... n	0
FONTSOURCE	Font Source	I, S, M1, M2, M3, M4, D1 I Internal font source S Permanent download fonts M1, M2, M3, M4 Flash font source D1 Disk font source All other values default to internal font source.	I
PITCH	Default pitch (fixed-pitch fonts)	0.08 to 100 (in increments of 0.01) If an invalid pitch is requested, the printer selects the closest pitch.	10
PTSIZE	Default point size (proportional spaced fonts)	1 to 1008 (in increments of 0.25) If an invalid point size is requested, the printer selects the closest point size.	12
SYMSET	Symbol set for the default font	For a list of the values, see Table 2-2, "Key 24 PCL Emulation Symbol Sets" on page 2-7 and Table 2-3, "Additional PCL Emulation Symbol Sets" on page 2-10. If a symbol set is requested that is not resident in the printer, the symbol set ID is not changed.	PC-8 (US), PC850 (Country specific)

Printer Unique Variables for PCL 5 Emulation

The following variables are unique to this printer and are supported in PCL 5 emulation only.

The [command modifier *value*] parameter should be specified as LPARM:*PCL*. For example:

@PJL SET LPARM:*PCL* LBITMAPROUNDING=*OFF*[<CR>]<LF>

Table 3-6 Printer Unique Variables for PCL 5 Emulation

Variable	Function	Selections	Factory Default
LA4WIDTH	A4 Width in millimeters	198, 203	198
LASSIGNTRAY1	Tray Renumber-Assign Tray 1	OFF, 0 to 199 When this variable is used with the PJL SET or DEFAULT command.	OFF
		OFF, 0 to 199, NONE When this variable is used with the PJL INQUIRE or DINQUIRE command.	OFF
LASSIGNTRAY2	Tray Renumber-Assign Tray 2	OFF, 0 to 199 When this variable is used with the PJL SET or DEFAULT command.	OFF
		OFF, 0 to 199, NONE When this variable is used with the PJL INQUIRE or DINQUIRE command.	OFF
LASSIGNTRAY3	Tray Renumber-Assign Tray 3	OFF, 0 to 199 When this variable is used with the PJL SET or DEFAULT command.	OFF
		OFF, 0 to 199, NONE When this variable is used with the PJL INQUIRE or DINQUIRE command.	OFF
LASSIGNTRAY4	Tray Renumber-Assign Tray 4	OFF, 0 to 199 When this variable is used with the PJL SET or DEFAULT command.	OFF
		OFF, 0 to 199, NONE When this variable is used with the PJL INQUIRE or DINQUIRE command.	OFF

Table 3-6 Printer Unique Variables for PCL 5 Emulation (Continued)

Variable	Function	Selections	Factory Default
LASSIGNTRAY5	Tray Renumber-Assign Tray 5	OFF, 0 to 199 When this variable is used with the PJL SET or DEFAULT command.	OFF
		OFF, 0 to 199, NONE When this variable is used with the PJL INQUIRE or DINQUIRE command.	OFF
LASSIGNMPFEEDER	Tray Renumber-Assign MP Feeder	OFF, 0 to 199 When this variable is used with the PJL SET or DEFAULT command.	OFF
		OFF, 0 to 199, NONE When this variable is used with the PJL INQUIRE or DINQUIRE command.	OFF
LASSIGNFEEDER	Tray Renumber-Assign Envelope Feeder	OFF, 0 to 199 When this variable is used with the PJL SET or DEFAULT command.	OFF
		OFF, 0 to 199, NONE When this variable is used with the PJL INQUIRE or DINQUIRE command.	OFF
LASSIGNMANUALPAPER	Tray Renumber-Assign Manual Paper	OFF, 0 to 199 When this variable is used with the PJL SET or DEFAULT command.	OFF
		OFF, 0 to 199, NONE When this variable is used with the PJL INQUIRE or DINQUIRE command.	OFF

Table 3-6 Printer Unique Variables for PCL 5 Emulation (Continued)

Variable	Function	Selections	Factory Default
LASSIGNMANUALENVELOPE	Tray Renumber-Assign Man Envelope	OFF, 0 to 199 When this variable is used with the PJL SET or DEFAULT command.	OFF
		OFF, 0 to 199, NONE When this variable is used with the PJL INQUIRE or DINQUIRE command.	OFF
LBITMAPROUNDING	Bitmap Font Partial Pel Rounding	ON, OFF Some printers handle partial pel character escapement rounding of bitmap fonts differently. LBITMAPROUNDING offers a way of instructing the printer how to handle partial pel rounding of bitmap fonts. When ON is specified, Bitmap rounding is compatible with the Hewlett-Packard LaserJet 5Si/5SiMx printer. When OFF is specified, Bitmap rounding is compatible with the Hewlett-Packard LaserJet III printer.	ON
LFONTPRIORITY (SET only)	Font Priority Search	RESOLUTION, NORESOLUTION When RESOLUTION is specified, this printer is compatible with the Hewlett-Packard Company LaserJet 5Si/5SiMx printer. When NORESOLUTION is specified, font resolution is removed from the font selection priority criteria.	RESOLUTION

Common Variables for PostScript Level 2 Emulation

Note: The word *common* applies to those variables common to both this printer and the Hewlett-Packard Company's LaserJet 5Si/5SiMx printer.

These variables are used only for PostScript Level 2 emulation. The [command modifier:*value*] parameter should be specified as LPARM:*POSTSCRIPT*. For example:

```
@PJL SET LPARM:POSTSCRIPT JAMRECOVERY=OFF[<CR>]<LF>
```

Table 3-7 Common Variables for PostScript Level 2 Emulation

Variable	Function	Selections	Factory Default
JAMRECOVERY	Jam Recovery	ON, OFF Changing this variable also affects PCL 5 emulation on this printer.	OFF
PRTPSERRS	Print PS Error	ON, OFF	OFF

Printer Unique Variables for PostScript Level 2 Emulation

The following variable is unique to this printer and is supported in PostScript Level 2 emulation only.

The [command modifier*value*] parameter should be specified as LPARM:*POSTSCRIPT*. For example:

```
@PJL SET LPARM:POSTSCRIPT LPICTUREGRADE=ON[<CR>]<LF>
```

Table 3-8 Printer Unique Variables for PostScript Level 2 Emulation

Variable	Function	Selections	Factory Default
LPSFONTPRIORITY	Font Priority	RESIDENT, FLASHDISK	RESIDENT
LPICTUREGRADE	PictureGrade™	ON, OFF	ON

Printer Unique LRESOURCE Variables

The following variables are used when additional storage devices are installed, such as Disk Option and Flash Memory.

The [command modifier *value*] parameter of the DEFAULT, INQUIRE, DINQUIRE, and SET commands must be specified as LRESOURCE:"*device:filename.filetype*". For example:

```
@PJL DEFAULT LRESOURCE : "device:filename.filetype"LDESCRIPTION="my
description"[<CR>]<LF>
```

Values for "*device:filename.filetype*" are:

device	*flash*, *flash1*, *disk*, or *disk1* (case insensitive)
filename	a unique identifier for a file, such as the macro ID for a PCL macro, the symbol set ID for a PCL symbol set, the font ID for a PCL font, or the actual file name for data, Type 1 fonts, and demo files as shown on the Directory. The *filename* is case sensitive.
filetype	the identifier that categorizes the file, such as *p5macro* for PCL macros or *p5symset* for PCL symbol sets

Using the DEFAULT command to modify any of these variables forces a write to flash or disk if resource collection mode is On before the command is executed. The DEFAULT command causes a PJL Reset.

Table 3-9 Printer Unique LRESOURCE Variables

Variable	Function	Selections	Factory Default
LDESCRIPTION (DEFAULT only)	Macro or Symbol Set Description[1]	"alphanumeric string" The description is limited to 16 characters and must be enclosed in double quotes. If more than 16 characters are specified by the DEFAULT command, the first 16 characters are used and a PJL parser warning is issued. The DINQUIRE command can be used to query the file description. The description is returned in the response.	NULL (no description)
LRWLOCK (DEFAULT only)	Read/Write Lock (password) for an entire device or a particular file on the device[2]	"alphanumeric string" This variable can be used with other PJL commands: • DEFAULT command The Read/Write password is limited to eight characters. If more than eight characters are specified by the PJL DEFAULT command, the password is truncated and a PJL warning is issued. If a null (" ") password is given, password protection is removed from the specified device or file. • DINQUIRE or INQUIRE commands These commands can be used to determine if a password has been specified for a device or specific file. The response is one of the following: NOTSET The password has not been set or has been reset to zero. SET The password is defined and active. EXPIRED The password is reset to zero (Flash Option only). The LDECLARE command can be used to temporarily unlock access to a device or particular file. See “File and Device Protection Commands” on page 3-60 for additional information about using passwords on these devices.	NULL (no password) NOTSET
LWLOCK (DEFAULT only)	Write Lock (password) for an entire device or particular file on the device[2]	"alphanumeric string" Same as LRWLOCK, except the password limits write-only access instead of read-write access.	NULL (no password)

[1]The macro or symbol set description is printed in the Description field of the Print Directory listing.
[2]To password protect a device, the `command modifier:value` should be `LRESOURCE :"device:"`. The colon (:) and double quotes (" ") must be specified.

Status Readback Commands

Applications can request configuration and status information from the printer using the Status Readback commands. In addition, the printer can also be instructed to send unsolicited status information back to the host computer when asynchronous events occur, such as a memory error or a paper jam.

DINQUIRE Command

This command is used to query the default setting (NVRAM) of the specified environment variable.

Syntax:

```
@PJL DINQUIRE [command modifier value] variable[<CR>]<LF>
```

Response Syntax:

```
@PJL DINQUIRE [command modifier value] variable<CR><LF>
value<CR><LF>
<FF>
```

where:

`[command modifier value]`

The `[command modifier value]` parameter specifies the type of PJL variable to be queried. The variables supported are listed in the tables beginning on page 3-12.

- A `[command modifier value]` parameter is not required for variables listed in the tables "Common Variables for Both Printer Languages," beginning on page 3-12, and "Printer Unique Variables for Both Printer Languages," beginning on page 3-17.
- `LPARM:PCL` is used with variables specific to PCL 5 emulation. (See the tables "Common Variables for PCL 5 Emulation," beginning on page 3-28, and "Printer Unique Variables for PCL 5 Emulation," beginning on page 3-29.)
- `LPARM:POSTSCRIPT` is used for variables specific for PostScript Level 2 emulation. (See the tables "Common Variables for PostScript Level 2 Emulation," beginning on page 3-32, and "Printer Unique Variables for PostScript Level 2 Emulation," beginning on page 3-32.)
- `LRESOURCE:"device:filename.filetype"` is required for LRESOURCE variables. (See the table "Printer Unique LRESOURCE Variables" beginning on page 3-34.)

Values for "*device:filename.filetype*" are:

device	*flash*, *flash1*, *disk*, or *disk1* (case insensitive)
filename	a unique identifier for a file, such as the macro ID for a PCL macro, the symbol set ID for a PCL symbol set, the font ID for a PCL font, and so on. The *filename* is case sensitive.
filetype	an identifier that categorizes the file, such as *p5macro* for PCL macros or *p5symset* for PCL symbol sets. See the table beginning on page 3-55 for a complete list of the supported file types. The *filetype* is case sensitive.

`variable=`*value*

The supported variables are listed in the tables beginning on page 3-12.

This printer returns a ? for inquiries of an unsupported variable, or inquiries of a variable associated with an option that is not installed.

ECHO Command

The ECHO command instructs the printer to return the specified words after the command is parsed. This command provides a method of capturing the status information returned by a specific print job.

Syntax:

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

Response Syntax:

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

`words` parameter

The `words` parameter must start with a printable character and can consist of a combination of printable characters, spaces, and horizontal tabs.

Note: The ECHO command is terminated by the line feed character.

INFO Command

The INFO command is used to query status information from the printer. Table 3-10, “INFO Category Parameter Values” lists the categories of information that can be queried.

See “Status Message Format” on page 3-42 for additional information about the messages returned by the INFO STATUS, USTATUS DEVICE, and USTATUS TIMED commands.

Syntax:

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

Response Syntax:

```
@PJL INFO category<CR><LF>
[one or more lines of printable characters, spaces, or tabs]<CR><LF>
<FF>
```

`category`

Table 3-10 lists the supported categories.

Table 3-10 INFO Category Parameter Values

Category Values	Description
ID	Returns the model name or the model number stored in the printer NVRAM.
CONFIG	Returns the printer configuration, including paper sources, paper sizes, and installed options.
MEMORY	Returns the printer available memory.
PAGECOUNT	Returns the printer page count.
STATUS	Returns the printer current status.
VARIABLES	Returns the printer environment variables and values.
USTATUS	Returns the printer unsolicited status variables and values.

INFO CONFIG Response Syntax (An Example):

```
@PJL INFO CONFIG<CR><LF>
    IN TRAYS [7 ENUMERATED]<CR><LF>
       INTRAY1 TRAY1<CR><LF>
       INTRAY2 TRAY2<CR><LF>
       INTRAY3 TRAY3<CR><LF>
       INTRAY4 TRAY4<CR><LF>
       MANUAL PAPER<CR><LF>
       ENVELOPE FEEDER
       MULTI-PURPOSE FEEDER<CR><LF>
    ENVELOPE TRAY<CR><LF>
    OUT TRAYS [3 ENUMERATED]<CR><LF>
       UPPER FACEDOWN<CR><LF>
       EXTNL OUTTRAY1
       EXTNL OUTTRAY2
    PAPERS [15 ENUMERATED]<CR><LF>
       LETTER<CR><LF>
       LEGAL<CR><LF>
       A4<CR><LF>
       A5<CR><LF>
       JISB5<CR><LF>
       B5PAPER<CR><LF>
       CUSTOM<CR><LF>
       EXECUTIVE<CR><LF>
       COM10<CR><LF>
       COM9<CR><LF>
       MONARCH<CR><LF>
       DL<CR><LF>
       C5<CR><LF>
       B5<CR><LF>
       OTHERENVELOPE<CR><LF>
    LANGUAGES [2 ENUMERATED]<CR><LF>
       PCL<CR><LF>
       POSTSCRIPT<CR><LF>
    USTATUS [4 ENUMERATED]<CR><LF>
       DEVICE<CR><LF>
       JOB<CR><LF>
       PAGE<CR><LF>
       TIMED<CR><LF>
    FLASH=4194304<CR><LF>
    DISK=1441972224
    MEMORY=4194304<CR><LF>
    DISPLAY LINES=2<CR><LF>
    DISPLAY CHARACTER SIZE=16<CR><LF>
    SYSTEM FIRMWARE VERSION=500.46<CR><LF>
    ENGINE FIRMWARE VERSION=60.50<CR><LF>
    BOOT FIRMWARE VERSION=10.12<CR><LF>
    PANEL FIRMWARE VERSION=07.00<CR><LF>
    ENGINE CARD=18<CR><LF>
    SERIAL NUMBER=ND752A00<CR><LF>
    DUPLEX FIRMWARE VERSION=21.02
    <FF>
```

INQUIRE Command

This command is used to query the current setting of the specified environment variable.

Syntax:

```
@PJL INQUIRE [command modifier=value] variable[<CR>]<LF>
```

Response Syntax:

```
@PJL INQUIRE [command modifier=value] variable<CR><LF>
value<CR><LF>
<FF>

[command modifier=value]
```

The [command modifier=*value*] parameter specifies the type of PJL variables to be queried. The variables supported are listed in the tables beginning on page 3-12.

- A [command modifier=*value*] parameter is not required for variables listed in the tables "Common Variables for Both Printer Languages," beginning on page 3-12, and "Printer Unique Variables for Both Printer Languages," beginning on page 3-17.
- LPARM:*PCL* is used with variables specific to PCL 5 emulation. (See the tables "Common Variables for PCL 5 Emulation," beginning on page 3-28, and "Printer Unique Variables for PCL 5 Emulation," beginning on page 3-29.)
- LPARM:*POSTSCRIPT* is used for variables specific for PostScript Level 2 emulation. (See the tables "Common Variables for PostScript Level 2 Emulation," beginning on page 3-32, and "Printer Unique Variables for PostScript Level 2 Emulation," beginning on page 3-32.)
- LRESOURCE:"*device:filename.filetype*" is required for LRESOURCE variables. (See the table "Printer Unique LRESOURCE Variables" beginning on page 3-34.)

Values for "*device:filename.filetype*" are:

device	*flash*, *flash1*, *disk*, or *disk1* (case insensitive)
filename	a unique identifier for a file, such as the macro ID for a PCL macro, the symbol set ID for a PCL symbol set, the font ID for a PCL font, and so on. The *filename* is case sensitive.
filetype	an identifier that categorizes the file, such as *p5macro* for PCL macros or *p5symset* for PCL symbol sets. See the table beginning on page 3-55 for a complete list of the supported file types. The *filetype* is case sensitive.

`variable=`*value*

The supported variables are listed in the tables beginning on page 3-12.

This printer returns a ? for inquiries of an unsupported variable, or inquiries of a variable associated with an option that is not installed.

USTATUS Command

This command is used to enable and disable unsolicited status from the printer. Unsolicited status information is sent automatically when an asynchronous event occurs. Table 3-11, "USTATUS Unsolicited Status Variable Values" on page 3-41 lists the asynchronous information that can be enabled and disabled.

Syntax:

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

Response Syntax:

```
@PJL USTATUS ustatus variable=value<CR><LF>
[one or more lines of printable characters, spaces, or tabs]<CR><LF>
<FF>
```

See "Status Message Format" on page 3-42 for additional information about the messages returned by the INFO STATUS, USTATUS DEVICE, and USTATUS TIMED commands.

`ustatus variable=`*value*

The following values are supported for the `ustatusvariable=`*`value`* parameter.

Table 3-11 USTATUS Unsolicited Status Variable Values

Ustatus Variable	Value	Description
DEVICE	ON	Enables unsolicited status for device changes.
	VERBOSE	Enables unsolicited status for all device changes. Also enables warnings from the PJL parser.
	OFF	Disables unsolicited status for device changes.
JOB	ON	Enables unsolicited status for job changes. Printer sends a status message when a job begins and ends.
	OFF	Disables unsolicited status for job changes.
PAGE	ON	Enables unsolicited status for page changes. Printer sends a status message when a printed sheet reaches the standard output bin.
	OFF	Disables unsolicited status for page changes.
TIMED	5 to 300 in seconds	Enables timed unsolicited status. The printer automatically sends status at a specified time interval.
	0	Disables timed unsolicited status.

USTATUSOFF Command

This command turns off unsolicited status. Unsolicited status may also be turned off by using the USTATUS command on each variable.

Syntax:

```
@PJL USTATUSOFF[<CR>]<LF>
```

Status Message Format

The format of the returned information from the INFO STATUS, USTATUS DEVICE, and USTATUS TIMED commands is described in this section.

Information Messages

Information messages are returned in this form:

CODE=status code
DISPLAY=display string (in double quotes)
ONLINE=online status

Table 3-12 PJL Information Messages

Printer State	Status Code	Display String	Online Status
Ready	10001	**Ready**	TRUE
Powersaver	35078	**Powersaver**	TRUE
Ready with Toner Low	10006	**88 Toner Low**	TRUE
Powersaver with Toner Low	10006	**88 Toner Low**	TRUE
While in Ready Menu Group	10002	**Not Ready**	FALSE
Not Ready	10002	**Not Ready**	FALSE
Performing Front Panel Reset	10005	**Resetting the Printer**	FALSE
Cancelling Job	10007	**Cancelling Job**	FALSE
Waiting	10024	**Waiting**	TRUE
Busy	10023	**Busy**	TRUE
Resolution Reduced	35029	**Res Reduced**	TRUE

Note: The Display String is returned in the current language. A display message longer than one line shows only the first line of the message.

Auto-Continuable Conditions

These status messages are returned independent of the state of the Auto Continue menu item. Auto-Continue messages are returned in this form:

CODE=status code
DISPLAY=display string (in double quotes)
ONLINE=online status

Table 3-13 PJL Messages for Auto-Continuable Conditions

Printer State	Status Code	Display String	Online Status
Intervention required: memory full	30016	**38 Memory Full**	FALSE
Intervention required: complex page	30017	**39 Complex Page**	FALSE
Intervention required: standard serial error	30018	**54 Standard Serial Error**	FALSE
Intervention required: serial option x error	30112	**54 Serial Option x Error**	FALSE
Intervention required: standard parallel ENA connection lost	30027	**54 Std Par ENA Connection Lost**	FALSE
Intervention required: parallel x ENA connection lost	30113	**54 Par x ENA Connection Lost**	FALSE
Intervention required: standard serial fax connection lost	30018	**54 Std Ser Fax Connection Lost**	FALSE
Intervention required: serial x fax connection lost	30112	**54 Ser x Fax Connection Lost**	FALSE
Intervention required: standard serial disabled	30018	**56 Standard Serial Disabled**	FALSE
Intervention required: serial option x disabled	30112	**56 Serial Port x Disabled**	FALSE
Intervention required: standard parallel port disabled	30027	**56 Std Parallel Port Disabled**	FALSE
Intervention required: parallel port x disabled	30113	**56 Parallel Port x Disabled**	FALSE
Intervention required: resource save off deficient memory	30076	**35 Res Save Off Deficient Memory**	FALSE
Intervention required: print jobs on disk request	30031	**Print Jobs on Disk?**	FALSE
Intervention required: short paper	30034	**34 Short Paper**	FALSE
Intervention required: flash full	32002	**52 Flash Full**	FALSE
Intervention required: disk full	32002	**62 Disk Full**	FALSE
Intervention required: defective flash	32056	**51 Defective Flash**	FALSE
Intervention required: unformatted flash	32052	**53 Unformatted Flash**	FALSE

Table 3-13 PJL Messages for Auto-Continuable Conditions (Continued)

Printer State	Status Code	Display String	Online Status
Intervention required: defective disk	32056	**61 Defective Disk**	FALSE
Intervention required: defective disk	32052	**63 Unformatted Disk**	FALSE
Intervention required: scheduled maintenance	30075	**80 Scheduled Maintenance**	FALSE
Intervention required: insufficient collation area	30016	**37 Insufficient Collation Area**	FALSE
Intervention required: insufficient defrag memory	30016	**37 Insufficient Defrag Memory**	FALSE
Note: The Display String is returned in the current language. A display string longer than one line shows only the first line of the message.			

Attendance Conditions

Attendance conditions require operator intervention. Attendance messages are returned in this form:

CODE=status code
DISPLAY=display string (in double quotes)
ONLINE=online status

Table 3-14 PJL Messages for Attendance Conditions

Printer State	Status Code	Display String	Online Status
Intervention required: printer cover open or cartridge not installed	40021	**Close Door or Insert Cartridge**	FALSE
Intervention required: defective print cartridge	40021	**31 Defective Print Cartridge**	FALSE
Intervention required: unsupported print cartridge	40021	**32 Unsupported Print Cartridge**	FALSE
Intervention required: change cartridge no license	40021	**Change Cartridge No License**	FALSE
Intervention required: check tray connection	40027	**Check Tray <source #> Connection**	FALSE
Intervention required: reattach envelope feeder	40028	**Reattach Envelope Feeder**	FALSE
Intervention required: reattach output bin	40029	**Reattach Output Bin <bin#>**	FALSE
Intervention required: install tray x or cancel job	40027	**Install Tray x or Cancel Job**	FALSE
Intervention required: install bin x or cancel job	40029	**Install Bin x or Cancel Job**	FALSE
Intervention required: install duplex or cancel job	40095	**Install Duplex or Cancel Job**	FALSE
Intervention required: install envelope feeder or cancel job	40028	**Install Env Feed or Cancel Job**	FALSE
Intervention required: too many trays attached	40030	**58 Too Many Trays Attached**	FALSE
Intervention required: too many bins attached	40030	**58 Too Many Bins Attached**	FALSE
Intervention required: too many disks installed	40030	**58 Too Many Disks Installed**	FALSE
Intervention required: incompatible bin x	40087	**59 Incompatible Bin x**	FALSE

Table 3-14 PJL Messages for Attendance Conditions (Continued)

Printer State	Status Code	Display String	Online Status
Intervention required: incompatible envelope feeder	40090	**59 Incompatible Envelope Feeder**	FALSE
Intervention required: incompatible tray x	40089	**59 Incompatible Tray x**	FALSE
Intervention required: incompatible duplex	40088	**59 Incompatible Duplex**	FALSE
Intervention required: toner low	40038	**88 Toner Low**	FALSE
Intervention required: OPMSG	40048	Message specified by OPMSG	FALSE
Intervention required: STMSG	40049	Message specified by STMSG	FALSE
Intervention required: duplex front cover open	40096	**Insert Duplex Front Cover**	FALSE
Intervention required: duplex rear cover open	40096	**Close Duplex Rear Door**	FALSE
Intervention required: check duplex connection	40095	**Check Duplex Connection**	FALSE
Intervention required: check output bin connection	40029	**Check Output Bin Connection**	FALSE
Note: The Display String is returned in the current language. A display string that is returned is truncated to the DISPLAY CHARACTER SIZE returned in INFO CONFIG.			

Operator Intervention - Paper Handling

When a **Load <tray>, Load Manual,** or **Change <tray>** message is displayed, a message is returned to the host computer indicating the paper source and size for the prompt.

Attendance (operator intervention) messages are returned in this form:

CODE=status code
DISPLAY=display string (in double quotes)
ONLINE=online status

The display string is the first line of the message displayed.

Table 3-15 PJL Messages for Paper Handling

Printer State	Status Code	Display String	Online Status
Intervention required: load request	41*xyy*	**Load <source> <Custom Type Name>**	FALSE
Intervention required: load request	41*xyy*	**Load <source> <Custom String>**	FALSE
Intervention required: load request	41*xyy*	**Load <source> <size>**	FALSE
Intervention required: load request	41*xyy*	**Load <source> <type><size>**	FALSE
Intervention required: change request	41*xyy*	**Change <source> <Custom Type Name>**	FALSE
Intervention required: change request	41*xyy*	**Change <source> <Custom String>**	FALSE
Intervention required: change request	41*xyy*	**Change <source> <size>**	FALSE
Intervention required: change request	41*xyy*	**Change <source> <type><size>**	FALSE
Intervention required: insert tray request	4300*x*	**Insert Tray <source #>**	FALSE
Intervention required: remove paper standard bin	40019	**Remove Paper Standard Bin**	FALSE
Intervention required: remove paper output bin	40019	**Remove Paper Output Bin <bin #>**	FALSE
Intervention required: remove paper all output bins	40019	**Remove Paper All Output Bins**	FALSE
Intervention required: remove paper <linked set bin name>	40019	**Remove Paper <linked set bin name>**	FALSE
x represents an input source code. *yy* represents a media size code.			

Table 3-16 Tray Values

X Value	Tray
0	Multipurpose feeder
1	Manual Feed
2	Tray 1
3	Tray 2
4	Envelope feeder
5	Tray 3
6	Tray 4
7	Tray 5

Table 3-17 Media Size Values

YY Value	Media Size
00	Universal
01	Other Envelope
02	Letter Paper
03	Legal Paper
04	A4 Paper
05	Executive Paper
08	10 Envelope
09	7 3/4 Envelope
10	C5 Envelope
11	DL Envelope
13	JISB5
14	B5 Envelope
20	A5

Operator Intervention - Paper Jams

When a **<#> Paper Jam** message is displayed, a message is returned to the host computer indicating the type and location for the prompt.

Attendance (operator intervention) messages are returned in this form:

CODE=status code
DISPLAY=display string (in double quotes)
ONLINE=online status

Table 3-18 PJL Messages for Paper Jams

Printer State	**Status Code**	Display String	**Online Status**
Intervention required: paper jam - printer input sensor	4200*x*	**200 Paper Jam** **Remove Cartridge**	FALSE
Intervention required: paper jam - between sensors	4201*x*	**201 Paper Jam** **Remove Cartridge**	FALSE
Intervention required: paper jam - printer exit sensor	4202*x*	**202 Paper Jam** **Open Rear Door**	FALSE
Intervention required: paper jam - duplex	4230*x*	**230 Paper Jam** **Check Duplex**	FALSE
Intervention required: paper jam - tray	424*yx*	**24y Paper Jam** **Check Tray y**	FALSE
Intervention required: paper jam - multipurpose feeder	4250*x*	**250 Paper Jam** **Check MP Feeder**	FALSE
Intervention required: paper jam - envelope feeder	4260*x*	**260 Paper Jam** **Check Env Feeder**	FALSE
Intervention required: paper jam - bin	427*zx*	**27z Paper Jam** **Check Bin z**	FALSE
x represents the number of jammed pages in the printer. *y* represents the tray #. *z* represents the bin #.			

Service Errors

Error Code 50000 is returned for all 9xx Service Errors when the printer can return a status code.

RDYMSG Command

The RDYMSG command is used to specify a message to display on the first line of the operator panel display whenever the printer is ONLINE (Ready or Busy state). This message is displayed instead of the **Ready** or **Busy** message.

Syntax:

```
@PJL RDYMSG DISPLAY = "message"[<CR>]<LF>
```

OPMSG Command

When an OPMSG command is received, the message is displayed and is allotted both lines of the operator panel display. The printer is taken OFFLINE. This message, along with the STMSG command, is the lowest priority, so if another intervention occurs, it displays instead.

Note: Press **SELECT** or **GO** to clear the message and return the printer to the ONLINE state. Other button actions are ignored. Once in the ONLINE state, the printer displays **Ready**, **Busy**, or **Waiting**.

A printer operator panel reset is not available when **OPMSG** is displayed.

Syntax:

```
@PJL OPMSG DISPLAY = "message"[<CR>]<LF>
```

STMSG Command

When a STMSG command is received, the message is displayed and is allotted both lines of the operator panel display. The printer is taken OFFLINE. This message, along with the OPMSG command, is the lowest priority, so if another intervention occurs, it displays instead.

Note: Press **SELECT** or **GO** to clear the message and return the printer to the ONLINE state. Other button actions are ignored. If **SELECT** is pressed, the printer returns a **Select** message that is sent from the host computer. If **GO** is pressed, the printer returns a **Continue** message from the host computer. Once in the ONLINE state, the printer displays **Ready**, **Busy**, or **Waiting**.

A printer operator panel reset is not available when **STMSG** is displayed.

Syntax:

```
@PJL RDYMSG DISPLAY = "message"[<CR>]<LF>
```

LBEEP Command

This command causes the printer to beep three times.

Syntax:

```
@PJL LBEEP[<CR>]<LF>
```

LPORTROTATE Command

This command causes the printer to rotate ports at the next job boundary. The information to rotate ports is specified in the job header. For example, the printer could switch from parallel interface to serial interface between jobs.

Syntax:

```
@PJL LPORTROTATE[<CR>]<LF>
```

Print Test Page Commands

This command can be used to print each of the internal information pages.

```
@PJL testpage[<CR>]<LF>
```

The supported `testpage`values are listed in the following table.

Table 3-19 Test Page Command Values

testpage Value	Description
LPRINTDIRECTORY	Prints both the flash and disk directory listings. If Flash Memory and Disk Option are not installed, the command is ignored.
LPRINTTESTPAGE	Prints the test page.
LPRINTMENUS	Prints the menu settings page.
LPRINTPCLFONTS	Prints the PCL font listing.
LPRINTPSFONTS	Prints the PostScript font listing.

LESCAPECHAR Command

This command is used to modify the code point of the escape character for the host computer specified by the PORT parameter. The escape character is mapped to code point 0x1B for each host interface port.

Syntax:

```
@PJL LESCAPECHAR CHAR=byte PORT=port [<CR>]<LF>
```

`CHAR` parameter

The `byte` value for the CHAR parameter is the code point of the ASCII character that is used for the escape character.

For example, at the factory, the printer uses 0x1B (character <Esc>) for the escape character. If CHAR = 65 is specified with this command, the printer uses 0x41 (character ‘A’) as the escape character for the host interface port specified via the PORT parameter.

`PORT` parameter

The following ports are valid parameters for LESCAPECHAR:

- INA1
- INA2
- INA3
- LOCALTALK1
- LOCALTALK2
- LOCALTALK3
- PARALLEL
- PARALLEL1
- PARALLEL2
- PARALLEL3
- SERIAL
- SERIAL1
- SERIAL2
- SERIAL3
- IR
- IR1
- IR2
- IR3

LDOWNLOADTARGET Command

This command specifies which device is the target for downloaded files. The target can be RAM, flash, or disk.

Syntax:

```
@PJL SET LDOWNLOADTARGET=variable [<CR>]<LF>
```

File Commands for Flash or Disk

The following commands let you use the optional storage devices, including the Flash Memory Option and Disk Option:

- LOPENFILE
- LCLOSEFILE
- LREADFILE
- LWRITEFILE
- LRUNFILE
- LRENAMEFILE
- LDELETEFILE
- LFORMAT

Syntax:

```
@PJL LOPENFILE DEVICE=filedevice FILENAME=fname ACCESS=accesstype
[<CR>]<LF>
```

See Chapter 6, “Flash Memory and Disk Options” beginning on page 6-1 for additional information about using the Flash Memory Option and Disk Option.

The following parameters are used with most of the commands. Additional parameters are noted in the description of each command.

Table 3-20 Variables for Flash and Disk File and Password Commands

Parameter	Syntax	Description
accesstype	ACCESS = *accesstype*	One of the following access types must be specified when a file is opened: *RO* Open for read only. File must already exist on specified device. *WO* Create a new file. If the file already exists, its contents will be discarded and a new file will be created. *RW* Open for reading and writing. File must already exist. *AP* Open for reading and writing, and positions the file pointer to the end of the file. File must already exist. Access types are case sensitive. The LREADFILE command is ignored if the file was not opened with an *accesstype* of *RO*, *RW*, or *AP*. The LWRITEFILE command is ignored if the file was not opened with an *accesstype* of *WO*, *RW*, or *AP*.
bytecount	LENGTH = *bytecount*	The amount of data in bytes to be read or written. The parameter is optional for both the LREADFILE and LWRITEFILE commands. If the LENGTH parameter is omitted from the LREADFILE command, *bytecount* is assumed to be equal to the entire file beginning at the START location. If the LENGTH parameter is omitted from the LWRITEFILE command, an @PJL END DATA command must be placed at the *end* of the data. All data up to ‘@’ in @PJL END DATA is written to the file. **Note:** The LWRITEFILE command requires that *either* the LENGTH parameter or the @PJL END DATA command be specified, but not both. If the LENGTH is greater than the file size on a LREADFILE command, it is assumed to be the entire file beginning at the START location.
filedevice	DEVICE = *filedevice*	File storage media. Case insensitive. *flash* *flash1* disk disk1 rom The *rom* value is used for the LRUNFILE command only. **Note:** The command is ignored if the device is not installed.

Table 3-20 Variables for Flash and Disk File and Password Commands (Continued)

Parameter	Syntax	Description
filename	FILENAME = "fname" OLDFILENAME = "fname" NEWFILENAME = "fname"	Fname is comprised of a filename, a unique identifier for a file, and a filetype, which specifies the type of file. The format is *filename.filetype* The *filename* must be one of the following: *macro ID* PCL macros *symbol set ID* PCL symbol sets *font ID* PCL fonts *actual filename* data, Type 1 fonts, demo files (case sensitive) The *filetype* must be one of the following: *t1* PostScript font *sFnt5* PCL scalable font *bFnt5* PCL bitmap font *MAC5* PCL macro *data* User Data *type1* PostScript font *demo* Demo *p5scalable* PCL scalable font *p5bitmap* PCL bitmap font *p5macro* PCL macro *p5symset* PCL symbol set All *fname* specifications must be enclosed in quotation marks and may not exceed 127 characters. If the file is password-protected, the password must be provided in order to unlock the file. For additional information about passwords, see “File and Device Protection Commands” on page 3-60.
location	START = *location*	The location in the file to begin writing or reading. An integer that represents an offset in bytes from the beginning of the file. Optional for both LREADFILE and LWRITEFILE commands. If omitted on a LREADFILE command, *location* of *0* (beginning of the file) is assumed. If omitted on a LWRITEFILE command with an *accesstype* of *RW*, *location* of *0* is also assumed. If a START location is provided but it is greater than the file size, the LREADFILE command response will contain no file data. Similarly, a LWRITEFILE command with an *accesstype* of *RW* functions like a LWRITEFILE command with an *accesstype* of *AP*.

Note: If PostScript Level 2 emulation was used to create the file on the device, it may have automatically attached a *.data* extension to the *fname*. See “Filename Extensions” on page 6-9 for a description of enabling and disabling this operation. Attach a *.data* extension to the *fname*. For example, if "*myfile.data*" is downloaded to flash through PostScript Level 2 emulation, the *fname* on the PJL commands is "*myfile.data.data*".

LOPENFILE Command

This command is used to open a file on a file storage device.

Syntax:

```
@PJL LOPENFILE DEVICE = filedevice FILENAME = "fname"
ACCESS = accesstype[<CR>]<LF>
```

LCLOSEFILE Command

This command is used to close a file located on a file storage device. The command is ignored if the file doesn't exist on the device or if the file is not open.

Syntax:

```
@PJL LCLOSEFILE DEVICE =filedevice FILENAME = "fname"[<CR>]<LF>
```

LREADFILE Command

This command is used to read data from a file located on a file storage device.

Syntax:

```
@PJL LREADFILE DEVICE =filedevice FILENAME = "fname"
[START = location] [LENGTH = bytecount][<CR>]<LF>
```

Response Syntax:

```
@PJL LREADFILE DEVICE =filedevice FILENAME = "fname"
START = location LENGTH = bytecount<CR><LF>
<requested data from the file>@PJL END DATA<CR><LF><FF>
```

Notes:

- The file must be closed using the LCLOSEFILE command once all operations are complete.
- The command is ignored if the file doesn't exist on the device or has not already been opened with LOPENFILE with an *accesstype* of *RO*, *RW*, or *AP*.
- If START = location parameter is omitted, location 0 (beginning of the file) is assumed.
- If a START location is provided but it is greater than the file size, the response will contain no file data.

- If the LENGTH parameter is omitted, *bytecount* is assumed to be equal to the entire file beginning at the START location.
- If the LENGTH is greater than the file size on a LREADFILE command, it is assumed to be the entire file beginning at the START location.

LWRITEFILE Command

This command is used to write data to a file located on a file storage device.

Syntax:

```
@PJL LWRITEFILE DEVICE =filedevice FILENAME = "fname"
[START = location] [LENGTH = bytecount][<CR>]<LF>
<data>[@PJL END DATA][<CR>]<LF>
```

Notes:

- The file must be closed using the LCLOSEFILE command once all operations are complete.
- The command is ignored if the file doesn't exist on the device. The command is ignored if the file isn't already open with a write *accesstype*.
- If START = *location* is omitted on a file with an *accesstype* of *RW*, location *0* is assumed.
- If START = *location* is greater than file size and the *accesstype* is *RW*, it positions the file pointer at the end of the file.
- If the LENGTH is omitted from a LWRITEFILE command, an @PJL END DATA must be placed at the *end* of the data. All data up to '@' in @PJL END DATA is written to the file. The command requires *either* the LENGTH parameter or the @PJL END DATA be specified, but not both.

LRUNFILE Command

This command is used to load and execute a file located on a file storage device, such as flash or disk. For example, this command could be used to run the resident demo file or a demo file stored on flash or disk.

Syntax:

```
@PJL LRUNFILE DEVICE = filedevice FILENAME = "fname"[<CR>]<LF>
```

LRENAMEFILE Command

This command is used to rename a file on a file storage device. The command will be ignored if the filename specified as OLDFILENAME doesn't exist on the device, or if the filename specified as NEWFILENAME already exists on the device.

Syntax:

```
@PJL LRENAMEFILE DEVICE =filedevice OLDFILENAME = "fname"
NEWFILENAME = "fname"[<CR>]<LF>
```

LDELETEFILE Command

This command is used to delete a file located on a file storage device. The command is ignored if the file doesn't exist on the device.

Syntax:

```
@PJL LDELETEFILE DEVICE =filedevice FILENAME = "fname"[<CR>]<LF>
```

LFORMAT Command

This command is used to format media for file storage, such as the flash or disk.

Syntax:

```
@PJL LFORMAT DEVICE =filedevice[<CR>]<LF>
```

The following information applies to password protection.

- The read/write and write passwords can both be set for a resource. If both passwords are set, the read/write password has precedence over the write password.
- If you attempt to password protect a non-existing resource, the PJL interpreter will return a warning (CODE = 25001).
- If a resource has already been password protected, the resource must be "unlocked" before a different password can be specified for that resource.
- Several restrictions with passwords apply to flash due to the nature of the technology:
  - Passwords for the whole flash may be created/changed multiple times, but each change uses up free space in the flash that can only be recovered by reformatting the whole flash.
  - Passwords for individual resources on the flash can only be created once. This password may also be deleted once. If this is done, the password feature cannot be used again for this resource unless the resource is recreated.

Protecting a File or Device

The DEFAULT command is used to set a password on the entire flash or disk or on an individual macro or font in flash.

Password Protection for a File

LRWLOCK with DEFAULT specified locks a file or device for reading and writing. LWLOCK with DEFAULT specified locks a file or device for writing only.

Syntax:

```
@PJL DEFAULT LRESOURCE:"device:filename.filetype"
LRWLOCK="password"[<CR>]<LF>

@PJL DEFAULT LRESOURCE:"device:filename.filetype"
LWLOCK="password"[<CR>]<LF>
```

The filename used depends on whether you wish to put a password on a font or a macro.

The filename for a font is a five digit ID from the print directory page (add zeros to the left of the ID to fill the five digits) followed by a three digit instance number. The first time a font is downloaded since flash has been formatted, the instance number is 0. Filetypes are described under *filename* in the table, “Printer Unique LRESOURCE Variables” beginning on page 3-34. For example, to write password protect a PCL 5 emulation bitmapped font (filetype of *p5bitmap*) with an ID of *127*, which has not been downloaded since flash was formatted:

```
@PJL DEFAULT LRESOURCE:"flash:00127000.p5bitmap"
    LWLOCK="password"[<CR>]<LF>
```

To password protect a macro, the filename is the ID taken from the print directory page, followed by the filetype. For example, the command to put a read/write password on a PCL 5 emulation macro (filetype is *p5macro*) that is saved to flash with an ID of 1023 would be:

```
@PJL DEFAULT LRESOURCE:"flash:1023.p5macro" LRWLOCK="password"[<CR>]<LF>
```

Note: If the filename is incorrect, the printer applies the password to the entire device.

Password for an Entire Device

If you want to set a password on a device, not just a single file, omit the filename. LRWLOCK with DEFAULT specified locks a device for reading and writing. LWLOCK with DEFAULT specified locks a device for writing only.

Syntax:

```
@PJL DEFAULT LRESOURCE:"device:" LRWLOCK="password"[<CR>]<LF>

@PJL DEFAULT LRESOURCE:"device:" LWLOCK="password"[<CR>]<LF>
```

Unlocking a Protected File or Device

The LDECLARE command is used to specify a password so a protected file or device may be accessed or "unlocked." The LDECLARE command is only allowed within a JOB/EOJ combination.

LRWLOCK with LDECLARE specified unlocks a file or device for reading and writing. LWLOCK with LDECLARE specified unlocks a file or device for writing only. The file or device *must* be re-locked using the LDELETEPASSWORD command after the job is completed. The file or device is not automatically re-locked with the EOJ command.

Syntax:

```
@PJL LDECLARE LRESOURCE : "device:filename.filetype"
LRWLOCK = "password"[<CR>]<LF>

@PJL LDECLARE LRESOURCE : "device:filename.filetype"
LWLOCK = "password"[<CR>]<LF>

LRESOURCE : "device:filename.filetype"
```

Values for "*device:filename.filetype*" are:

device	*flash*, *flash1*, *disk*, or *disk1* (case insensitive).
filename	a unique identifier for a file, such as the macro ID for a PCL macro, the symbol set ID for a PCL symbol set, the font ID for a PCL font, or the actual file name for data, Type 1 fonts, and demo files as shown on the Directory. The *filename* is case sensitive.
filetype	an identifier that categorizes the file, such as *p5macro* for PCL macros or *p5symset* for PCL symbol sets. See the table beginning on page 3-55 for a complete list of the supported file types. The *filetype* is case sensitive.

`LRWLOCK = "password"` or `LWLOCK = "password"`

See "Printer Unique LRESOURCE Variables" beginning on page 3-34 for information about values for `LRWLOCK = "password"` and `LWLOCK = "password"` parameters.

Notes:

- This should be the same password that was defined in the DEFAULT command. See "Password Protection for a File" on page 3-60 and "Password for an Entire Device" on page 3-61 for examples.
- The filetype is case sensitive.

Re-Locking a Protected File or Device

The LDELETEPASSWORD command is used to re-lock a password-protected file or device that has been unlocked using the LDECLARE command.

If an LRESOURCE is not specified, all unlocked files or devices are re-locked.

Syntax:

```
@PJL LDELETEPASSWORD LRESOURCE = "device:filename.filetype"[<CR>]<LF>

LRESOURCE = "device:filename.filetype"
```

Values for "*device:filename.filetype*" are:

device	*flash*, *flash1*, *disk*, or *disk1* (case insensitive).
filename	a unique identifier for a file, such as the macro ID for a PCL macro, the symbol set ID for a PCL symbol set, the font ID for a PCL font, or the actual file name for data, Type 1 fonts, and demo files as shown on the Directory. The *filename* is case sensitive.
filetype	an identifier that categorizes the file, such as *p5macro* for PCL macros or *p5symset* for PCL symbol sets. See the table beginning on page 3-55 for a complete list of the supported filetypes. The *filetype* is case sensitive.

Unlocking a Protected File or Device for the Current Job

The file or device unlocked by the execution of this command is automatically re-locked upon execution of the EOJ command or by an emulation change.

Syntax:

```
@PJL LDECLARE LRESOURCE : "device:filename.filetype"
LRWLOCKJ = "password"[<CR>]<LF>

@PJL LDECLARE LRESOURCE : "device:filename.filetype"
LWLOCKJ = "password"[<CR>]<LF>

LRESOURCE : "device:filename.filetype"
```

Values for "*device:filename.filetype*"are:

device — *flash*, *flash1*, *disk*, or *disk1* (case insensitive).

filename — a unique identifier for a file, such as the macro ID for a PCL macro, the symbol set ID for a PCL symbol set, the font ID for a PCL font, or the actual file name for data, Type 1 fonts, and demo files as shown on the Directory. The *filename* is case sensitive.

filetype — an identifier that categorizes the file, such as *p5macro* for PCL macros or *p5symset* for PCL symbol sets. See the table beginning on page 3-55 for a complete list of the supported file types. The *filetype* is case sensitive.

`LRWLOCK = "password"` or `LWLOCK = "password"` Parameters

See “Printer Unique LRESOURCE Variables” beginning on page 3-34 for information about values for `LRWLOCK = "password"` and `LWLOCK = "password"` parameters.

Recovering Lost Passwords

The LQUERYSEED and LBYPASSPASSWORD commands are used to recover lost passwords.

Syntax:

```
@PJL LQUERYSEED[<CR>]<LF>

@PJL LBYPASSPASSWORD KEY = key"[<CR>]<LF>
```

Use the following steps to retrieve lost passwords:

1. **Send the LQUERYSEED command to the printer by one of the host computer interfaces.**

   This command causes a value, the "seed," to be displayed on the operator panel. The value of the "seed" determines the *key*.

2. **Obtain the *key* from the Lexmark Technical Support Center.**

   You must have the "seed" value.

3. **Send the @PJL LBYPASSPASSWORD command to the printer by any port.**

   If the correct *key* is specified, a modified version of the directory is produced. The directory indicates the appropriate passwords for the flash or disk.

Chapter 4 PostScript Level 2 Emulation

This section explains PostScript Level 2 emulation supplemental operators in detail. For more information, refer to the *PostScript Language Reference Manual (Second Edition)* by Adobe Systems, Inc.

Selecting PostScript Level 2 Emulation

Using SmartSwitch

When SmartSwitch is enabled for both printer languages on an interface, the printer automatically switches to the printer language being sent by your software application. The printer is shipped with SmartSwitch enabled for both printer languages and all interfaces. The printer examines all print jobs and switches dynamically between PostScript Level 2 emulation and PCL 5 emulation.

Using the Operator Panel

You may select PostScript Level 2 emulation from the operator panel. To disable the automatic switching and have all input interpreted as PostScript language, first turn PCL SmartSwitch Off by pressing **MENU>**, then selecting **PARALLEL MENU** (or **SERIAL MENU**, and so on), **PCL SmartSwitch**, **Off**. Then set the printer language default to PostScript Level 2 emulation by pressing **MENU>**, then selecting **SETUP MENU**, **Printer Language**, **PS 2 Emulation**.

Using Application Software

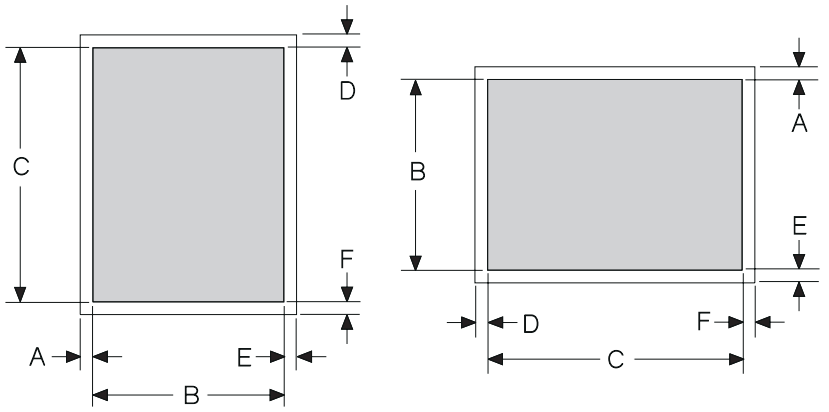
To select PostScript Level 2 emulation from your application software, use the Universal Exit Language (UEL) command which is a Printer Job Language (PJL) command. See “UNIVERSAL EXIT LANGUAGE Command” on page 3-2.

Warning: When you change printer languages, you may lose all previously downloaded fonts and macros, unless they are stored in flash memory or disk, or unless Resource Save is On.

Page Formatting

The printable areas and logical pages for PostScript Level 2 emulation, both portrait and landscape orientation, are illustrated below. A legend and a table of dimensions follow the illustration.

Printable Areas



Legend:

A Distance between the edge of the physical page and the printable area for the left side of a portrait page; distance between the edge of the physical page and the printable area for the top of a landscape page

B Portrait printable area width; landscape printable area length

C Portrait printable area length; landscape printable area width

D Distance between the edge of the physical page and the printable area for the top of a portrait page; distance between the edge of the physical page and the printable area for the left side of a landscape page

E Distance between the edge of the physical page and the printable area for the right side of a portrait page; distance between the edge of the physical page and the printable area for the bottom of a landscape page

F Distance between the edge of the physical page and the printable area for the bottom of a portrait page; distance between the edge of the physical page and the printable area for the right side of a landscape page

Note: If the paper size you specify is larger than the installed paper, the print can run off the physical page.

Logical Page Size

Table 4-1 lists the exact width and length of the printable areas (the logical page size) for the paper and envelope sizes this printer supports. For 600 dpi, multiply the pels by 2; for 1200 quality, multiply the pels by 4. Areas **A** through **F** in this table are described in the Legend under "Printable Areas" on page 4-2.

Table 4-1 PostScript Level 2 Emulation Printable Area

Selection	Paper/Envelope Dimensions		Dimensions by Area (pels) in 300th of an Inch					
Name	**Millimeters**	**Inches**	**A**	**B**	**C**	**D**	**E**	**F**
Paper								
Letter	215.9 x 279.4	8.5 x 11	50	2450	3200	50	50	50
Legal	215.9 x 355.6	8.5 x 14	50	2450	4100	50	50	50
B5 (JIS)	182 x 257	7.17 x 10.1	50	2057	2935	45	44	50
A4	210 x 297	8.27 x 11.7	40	2414	3407	53	26	50
Executive	184.2 x 266.7	7.25 x 10.5	50	2075	3050	50	50	50
A5	148 x 210	5.83 x 8.27	50	1648	2380	51	51	50
Universal	215.9 x 355.6	8.5 x 14	50	2450	4100	50	50	50
Envelope								
7-3/4 Monarch	98.4 x 190.5	3.875 x 7.5	50	1112	2150	50	0.5	50
9 Commercial	98.4 x 225.4	3.875 x 8.875	50	1112	2562	50.5	0.5	50
10 Commercial	104.8 x 241.3	4.125 x 9.5	50	1176	2750	50	11.5	50
DL	110 x 220	4.33 x 8.66	50	1241	2498	50	8	50
C5	162 x 229	6.38 x 9.02	50	1849	2604	52	15	50
B5 Envelope	176 x 250	6.93 x 9.84	50	2024	2852	50	5	50
Other Envelope	229 x 355.6	9.01 x 14	50	2450	4100	50	50	50

PostScript Level 2 Emulation Fonts

Following are the PostScript emulation scalable fonts resident in the printer. To select these fonts, use your application software.

- Times New Roman
- Times New Roman Italic
- Time New Roman Bold
- Times New Roman Bold Italic
- Helvetica
- Helvetica Italic
- Helvetica Bold
- Helvetica Bold Italic
- Helvetica Narrow
- Helvetica Narrow Italic
- Helvetica Narrow Bold
- Helvetica Narrow Bold Italic
- Helvetica Light
- Helvetica Light Oblique
- Helvetica Black
- Helvetica Black Oblique
- Courier
- Courier Oblique
- Courier Bold
- Courier Bold Oblique
- ITC Avant Garde Book
- ITC Avant Garde Book Oblique
- ITC Avant Garde Demi
- ITC Avant Garde Demi Oblique
- ITC Bookman Light
- ITC Bookman Light Italic
- ITC Bookman Demi
- ITC Bookman Demi Italic
- Century Schoolbook Roman
- Century Schoolbook Italic
- Century Schoolbook Bold
- Century Schoolbook Bold Italic
- Palatino Roman
- Palatino Italic
- Palatino Bold
- Palatino Bold Italic
- ITC Zapf Chancery Medium Italic
- ITC Zapf Dingbats
- SymbolSet

The following fonts are shared with PCL 5 emulation.

Albertus Medium	Coronet
Albertus Extrabold	Garamond Antiqua
Antique Olive	Garamond Kursiv
Antique Olive Italic	Garamond Halbfett
Antique Olive Bold	Garamond Kursiv Halbfett
Arial	Letter Gothic
Arial Italic	Letter Gothic Italic
Arial Bold	Letter Gothic Bold
Arial Bold Italic	Marigold
CG Omega	Univers Medium
CG Omega Italic	Univers Medium Italic
CG Omega Bold	Univers Bold
CG Omega Bold Italic	Univers Bold Italic
CG Times	Univers Condensed Medium
CG Times Italic	Univers Condensed Medium Italic
CG Times Bold	Univers Condensed Bold
CG Times Bold Italic	Univers Condensed Bold Italic
Clarendon Condensed Bold	Wingdings

PostScript Level 2 Emulation Supplemental Operators

This section explains PostScript Level 2 emulation supplemental operators in detail. These supplemental operators are extensions to the standard PostScript Level 2 language. For each supplemental operator, the exact syntax is listed, as well as the values returned on the stack and possible error messages.

Tips for PostScript Level 2 emulation command extensions:

- **Set** operators are effective until the end of a job. At the end of a job, these values return to their default values.
- **Setdefault** operators do not become effective until the end of a job. However, the value may be queried immediately.
- Unless otherwise noted, all of these operators are located in the **statusdict** dictionary.
- In **userdict**, **#copies** is initialized at the beginning of each job to the number of copies selected either by PJL or from the operator panel.

Command Format

The PostScript Level 2 emulation supplemental operators are described in this chapter in the following format:

nameofoperator

– nameofoperator *variable*

Brief description of the command function.

Description of variables.

Error: **bold font**

Paper Size Support

The operators in this section relate to the paper used in the printer.

The literal names described in the following table are also supported as operators in **userdict**. When the literal names are used as operators:

- They execute **setpagedevice** to request a specific paper size.
- They use the specified size as a page device **PageSize** parameter.
- They set **PageSize Policy** to 7.

Therefore, the requested **PageSize** is used on the previously selected medium without adjusting it in any way by disabling media selection. Because of this action, the image may be clipped. For example, if you execute the legal operator when letter size paper is installed, part of the image is clipped from the page.

When the literal names are used as operators, the action is equivalent to executing the following PostScript Level 2 emulation sequence. This example uses letter paper size.

Note: In the following command, "<<" and ">>" are dictionary mark objects.

```
<< /Policies << /PageSize 7 >> /PageSize [612 792] >> setpagedevice
```

All of the paper sizes listed in Table 4-2 can be fed automatically from the multipurpose feeder.

Table 4-2 Paper Sizes Supported

Literal Name	Size (mm)	Size (inches)	Size (points)
letter	215.9 x 279.4	8.5 x 11.0	612 x 792
legal	215.9 x 355.6	8.5 x 14.0	612 x 1008
B5[1]	182.0 x 257.0	7.17 x 10.1	516 x 729
A4	210.0 x 297.0	8.27 x 11.7	595 x 842
executivepage	184.2 x 266.7	7.25 x 10.5	522 x 756
A5	148.0 x 210.0	5.83 x 8.27	419 x 595

[1] B5 is a Japanese Industry Standard (JIS) paper size. The same B5 designation is used by JIS and International Standards Organization (ISO) for different paper sizes.

ignoresize

— ignoresize *integer*

queries whether or not text is being oriented based on page size.

An *integer* value is returned on the stack:

0 perform automatic orientation of text based on page size.
1 treat the page size as an envelope.
2 treat the page size as paper.

Error: **stackoverflow**

setignoresize

integer setignoresize —

overrides the automatic page orientation selected by the printer to support custom media sizes. This operator determines whether or not to adjust the text based on the page size.

integer value may be:

0 perform automatic orientation of text based on page size (default).
1 treat the page size as an envelope.
2 treat the page size as paper.

A value set by this operator takes effect on a subsequent **setpagedevice** only if **PageSize Policy** is set to 7.

Errors: **rangecheck, stackunderflow, typecheck**

Paper Tray Support

When the printer receives one of the operators listed in Table 4-3 on page 4-10, it performs the actions listed as follows. This paper tray selection process ends as soon as a suitable paper source is chosen and paper is fed from this tray.

- The printer checks the value of **manualfeed** in **statusdict** and the **ManualFeed** page device parameter. If either one is true, the printer sends a message to load the requested size in the manual feed tray (multipurpose feeder).
- The **PageSize Policy** is set to 0 by means of **setpagedevice**.
- The paper size loaded in the current active source is checked to determine if it matches the requested size. If the sizes match, the paper is fed from the active source.

  Note: The current active tray is the last source that was selected from the operator panel or by the printer language.

- If the requested size and the size loaded in the active source do not match, the sources are searched in the order defined by the Priority array in the InputAttributes dictionary in the pagedevice dictionary.
- If the requested media size is not found by the previous search, the following search order is used:
  - Tray 1
  - Tray 2
  - Tray 3
  - Multipurpose Feeder
  - Tray 4
  - Tray 5
- If the requested size cannot be located in any automatic source, a **configurationerror** is issued and the job is flushed.

Notes:

- Automatic duplexing is not supported for custom-size paper or for envelopes in the multipurpose feeder. Automatic duplexing is supported from the multipurpose feeder for all other papers.
- If the paper source is changed before the back side of a duplexed page prints, a blank back page prints, the paper source changes, and the information for the back side of the page is printed on the front side of a page sent from the new paper source.

When these operators are used, it is equivalent to executing the following PostScript Level 2 emulation sequence:

```
<< /PageSize [x y] /ImagingBBox null /Policies << /PageSize 0>> >>
    setpagedevice
```

where *x y* are the PageSize in points.

Table 4-3 Tray Selected with Tray Operators

Operator	Tray Selected (Corresponding Image Size is Set)
lettertray	tray with letter-size paper
legaltray	tray with legal-size paper
b5tray	tray with B5-size paper
a4tray	tray with A4-size paper
executivetray	tray with executive-size paper
a5tray	tray with A5-size paper

manualfeed

`/manualfeed` *boolean def*

This boolean value in **statusdict** indicates if a manual feed source has been selected:

true print from a manual feed source
false print from an automatic feed source

This boolean key can be redefined to affect manual feed for the current job.

If the **manualfeed** operator or the **ManualFeed** page device parameter is *true* when showpage or copypage is executed, the page is fed manually. If both have a value of *false* when showpage or copypage is executed, the page is fed from an automatic source. These two values are independent of each other.

The default value for **manualfeed** is *false*.

Note: If manualfeed is redefined between printing the front and back page of a duplexed sheet, the information for the front and back pages is printed on the same sheet.

Error: **stackoverflow**

papertray

– papertray *integer*

queries the paper tray that is currently selected. An *integer* is returned on the stack, indicating which paper tray is currently in use. Valid *integers* are:

0	Tray 1
1	Tray 2
2	Envelope Feeder
3	Manual
4	Manual Envelope
5	Tray 3
7	Multipurpose Feeder
8	Tray 4
9	Tray 5

Error: **stackoverflow**

setpapertray

integer setpapertray –

changes the active paper source for the next page through the end of job by setting the PageSize entry in the page device to the size loaded in the selected source and by setting MediaPosition to the selected source. This operator executes a **setpagedevice**.

The **Policy** page device parameter is not altered by this operator.

Use the following *integers* to set the paper tray:

0	Tray 1
1	Tray 2
2	Envelope Feeder
3	Manual
4	Manual Envelope
5	Tray 3
7	Multipurpose Feeder
8	Tray 4
9	Tray 5

Notes:

- If Manual or Manual Envelope source is selected, the **ManualFeed** page device parameter is set to *true*.
- A **rangecheck** error is returned if a paper source that is not installed is selected.
- If a **setpapertray** operator is issued for the back of a duplexed sheet, a blank back page is printed, the paper source is changed, and the information for the back side of the page is printed on the front side of a page from the new paper source.

The setting returns to the menu item setting at end of job.

Errors: **rangecheck, stackunderflow, typecheck**

Envelope Size Support

The literal names in Table 4-4 are also supported as operators in **userdict**. These operators, when used as such, change the image size, but do not change the active paper source. Therefore, part of the image may be clipped when these operators are used.

When these literal names are used as operators, it is equivalent to executing the following PostScript Level 2 emulation sequence. The following example uses a 3.875 x 7.5 envelope.

```
<</Policies <</PageSize 7>> /PageSize [279 540]>> >>setpagedevice
```

Table 4-4 Envelope Sizes Supported

Literal Name	Size (mm)	Size (inches)	Size (points)
3.875x7.5envelope	98.4 x 190.5	3.875 x 7.5	[279 540]
3.875x8.875envelope	98.4 x 225.4	3.875. x 8.875	[279 639]
4.125x9.5envelope	104.8 x 241.3	4.125 x 9.5	[297 684]
110x220envelope	110 x 220	4.33 x 8.66	[312 624]
162x229envelope	162 x 229	6.38 x 9.01	[459 649]
176x250envelope	176 x 250	6.93 x 9.84	[499 708]
otherenvelope	Other (see **Note**)		[612 996]
Note: For other envelopes, the page is formatted to 216 x 356 mm (8.5 x 14 in.) unless a size is specified by your software application. The otherenvelope size is not supported for the envelope feeder. It is supported for the multipurpose feeder.			

The literal names in Table 4-5 are supported as PostScript Level 2 emulation compatible operators.

Table 4-5 Literal Names Supported

Literal Name	Compatible Literal Name
monarcenvelope	3.875x7.5envelope
com10envelope	4.125x9.5envelope
dlenvelope	110x220envelope
c5envelope	162x229envelope

Note: Duplexing is not supported on any envelope size. If duplex printing is requested and one of the envelope size operators is sent to the printer, duplexing is suspended until a paper size is requested that is supported for duplex printing.

Envelope Tray Support

If **manualfeed** in **statusdict** and the **ManualFeed** page device parameter are *false* when the printer receives one of the **envelopetray** operators in Table 4-6, “Envelopetray Operator Selections” on page 4-15, the printer:

- Sets the PageSize Policy to 0.
- Checks the active source to see if it matches the requested envelope size. If the sizes match, the envelope is fed from the active source.

  Note: The active source is the last source selected from the operator panel or data stream.

- If the requested size and the size loaded in the active source do not match, the sources are searched in the order defined by the Priority array in the InputAttributes dictionary in the pagedevice dictionary.
- If the requested media size is not found by the previous search, the following search order is used:
  - Envelope Feeder
  - Multipurpose Feeder
- If the size cannot be selected from any automatic source, a **configurationerror** is issued and the job is flushed.

If **manualfeed** or **ManualFeed** is *true*, the printer prompts you to load the requested size in the multipurpose feeder.

The envelope tray the printer selects when it receives an **envelopetray** operator is listed in Table 4-6, “Envelopetray Operator Selections” on page 4-15. These operators are equivalent to executing the following PostScript Level 2 emulation sequence:

```
<</PageSize [x y] /ImagingBBox null /Policies<</PageSize 0 >> >>
    setpagedevice
```

where *x y* are the PageSize in points.

Table 4-6 Envelopetray Operator Selections

Operator	Tray Selected (Corresponding Image Size is Set)
110x220envelopetray	tray with 110 x 220-size envelopes
dlenvelopetray	tray with 110 x 220-size envelopes
162x229envelopetray	tray with 162 x 229-size envelopes
c5envelopetray	tray with 162 x 229-size envelopes
176x250envelopetray	tray with 176 x 250-size envelopes
b5envelopetray	tray with 176 x 250-size envelopes
3.875x7.5envelopetray	tray with 3.875 x 7.5-size envelopes
monarcenvelopetray	tray with 3.875 x 7.5-size envelopes
3.875x8.875envelopetray	tray with 3.875 x 8.875-size envelopes
4.125x9.5envelopetray	tray with 4.125 x 9.5-size envelopes
com10envelopetray	tray with 4.125 x 9.5-size envelopes
otherenvelopetray	tray with other size envelopes

Supplemental Operator Summary

appletalktype

– appletalktype *(string)*

in **statusdict,** this string reflects the current value of the LocalTalkType device parameter from the %LocalTalk% device. The default *string* is *LaserWriter*. To change the *type* portion (appletalk*type*) of the AppleTalk network name and redefine the string:

```
/appletalktype (string) def
```

When you redefine a string inside the normal server loop, it is reset to the default value at the end of the job. When you define it outside the normal server loop, it is reset to the default value when the printer is switched to a printer language other than PostScript Level 2 emulation or when a power-on reset occurs.

Errors: **rangecheck, stackoverflow, typecheck**

buildtime

– buildtime *integer*

returns the BuildTime system parameter, which is a timestamp that identifies the specific build of the PostScript Level 2 emulation interpreter.

Error: **stackoverflow**

checkpassword

integer checkpassword or
(string) checkpassword

checks the passwords of both the **SystemParamsPassword** system parameter and the **StartJobPassword** system parameter stored in the printer.

If the *integer* form is used, the integer is converted into a string before the password check occurs. A *boolean* is returned on the stack to indicate if the specified password matches either password.

true	correct password
false	incorrect password

After the *boolean* is returned, the printer waits 1 second before it continues processing.

Errors: **stackunderflow, typecheck**

Note: The password is defined as a 4-byte number.

currentfilenameextend

`currentfilenameextend` *`boolean`*

returns a boolean on the stack to indicate whether the extension should be automatically added to any filename. The boolean value is either:

`true` adds the extension
`false` does not add the extension

See “Filename Extensions” on page 6-9.

Error: **stackoverflow**

defaulttimeouts

– `defaulttimeouts` *`job manualfeed wait`*

queries the values of all timeouts. Three integers are returned on the stack:

- **JobTimeout** system parameter
  `0` disabled (default)
  *`15...65535`*seconds
- **ManualFeedTimeout** page device parameter
  `0` disabled
  *`1...65535`*seconds (default is 60 seconds)
- **WaitTimeout** system parameter
  `0` disabled
  *`15...65535`*seconds (default is 40 seconds)

Error: **stackoverflow**

deletefile

`filename` `deletefile`

deletes the specified file from the disk.

Error: **invalidfileaccess, ioerror, stackunderflow, typecheck, undefinedfilename**

devcontrol

string integer argument argument devcontrol *boolean*

allows a host computer utility to manage resources on the flash or disk. It requires a string device name parameter, an integer command name parameter, and two command argument parameters. The device control operator performs a specified command on the specified device. The return values on the stack indicate:

true the command is successful
false the command is unsuccessful and returns an error code

Table 4-7 devcontrol Operator Parameters

Integer Command Name Parameter	Argument Parameter	Description
1	null null	Park disk heads
5	file null	Make contiguous flash file
8	filename description	Set description of file
9	password null	Set device read/write password
10	password null	Set device write password
11	filename password	Set file read/write password
12	filename password	Set file write password
13	password null	Declare device read/write password
14	password null	Declare device write password
15	filename password	Declare file read/write password
16	filename password	Declare file write password
17	null null	Reset device password list
18	null null	Reset file password list
19	devicename password	Get device password
19	filename password	Get file password
20	devicename null	Check if device password is properly declared
20	filename null	Check if file password is properly declared
21	null null	Scan for bad block
22	null null	Abort bad block scan
23	null null	Quick bad block scan
24	null null	Flush the disk cache
27	null null	Be quiet when writing to disk

Table 4-8 Unsuccessful devcontrol Parameter Error Codes

Code	Meaning
1	File system access has not been initialized
2	Could not allocate file descriptor
3	Some invalid argument was passed
4	No such device
5	Invalid access to file requested
6	Argument too large (filename, buffer)
7	Invalid file descriptor or filename
8	Catch all error or device error
9	Unable to allocate memory for buffer, data structure
10	Device busy
11	Device not currently mounted
12	Attempt to perform illegal IO operation
13	No space to update or create file
14	Major change in file system for findnext() to function properly
15	Corrupted file system on device
16	Device already mounted
17	Could not initialize file system
18	Device not mounted
19	No file entry located
20	Bad file system on device
21	Password required
22	Aborted by callback

Errors: **invalidaccess, rangecheck, typecheck**

devdismount

device devdismount –

dismounts the specified device by setting the **Mounted** device parameter for the specified device to *false*. This operator is in **systemdict**.

Errors: **invalidaccess, stackunderflow, undefinedfilename**

Note: An **undefinedfilename** is an invalid device name.

devforall

proc scratchstring devforall –

executes the specified *proc* procedure for each storage device after pushing a substring on the stack that is the portion of the scratch string containing the device name. This operator is in **systemdict**.

Errors: **invalidaccess, rangecheck, stackoverflow, stackunderflow, typecheck, undefined**

devformat

device pages action devformat –

formats (erases all data from) the specified device. This operator is in **systemdict.**

pages Sets the **LogicalSize** device parameter for the specified device:
0 entire device is formatted
1,2,3 an ioerror occurs

action *1* is added to the action argument. The result is used for the **InitializeAction** device parameter for the same device.

If **devformat** specifies a flash device, the entire device is formatted, regardless of the **LogicalSize** specified.

Errors: **invalidaccess, ioerror, limitcheck, rangecheck, stackunderflow, typecheck, undefined, undefinedfilename**

devmount

device devmount *boolean*

sets the **Mounted** device parameter for the specified device to *true*. It also returns the value of the **Mounted** device parameter for the specified device. This operator is in **systemdict**.

The boolean values indicate:

true	device successfully mounted, or was already mounted
false	device not mounted

If a device with the specified device name is not installed, an **undefinedfilename** error occurs.

This operator may change the search order. See "Device Search Order" on page 6-11.

Errors: **invalidaccess, stackunderflow, undefinedfilename**

devstatus

device devstatus *false* or
device devstatus *searchable writeable hasnames mounted removable searchorder free size true*

returns on the stack the status of a specified device. This operator is in **systemdict**. A value of *false* is returned if the device is not present. If the device is present, five boolean values and three integers (see the following description) followed by a value of *true* are returned.

The five boolean values are:

searchable

true, if the device is included in the search order and is to be searched for the file operators that do not specify a device name. Same as the value of the **Searchable** device parameter from the specified IODevice.

writeable

true, if the device can be written on. This value is the same as the **Writeable** device parameter from the specified IODevice.

hasnames

true, if the device supports named files. This value is the same as the **HasNames** device parameter from the specified IODevice.

mounted

true, if the device is mounted. This value is the same as the **Mounted** device parameter from the specified IODevice.

removable

true, if the device is removable and must be mounted before it is referenced. The **Removable** device parameter from the specified IODevice.

The three integers are:

searchorder

The position in the search order. The **SearchOrder** device parameter from the specified IODevice.

free

The number of free bytes on the device. The **Free** device parameter from the specified IODevice.

size

The total number of bytes on the device. The **LogicalSize** device parameter from the specified IODevice.

Error: **typecheck**

diskonline

– `diskonline` *`boolean`*

returns the value of the **Writeable** device parameter (which is a boolean) for the %disk1% IODevice.

This operator is equivalent to executing the following PostScript Level 2 emulation sequence:

```
(%disk1%) currentdevparams /Writeable get
```

Error: **stackoverflow**

diskstatus

– `diskstatus` *`free logicalsize`*

returns on the stack the following two integers:

- Number of pages that are free on the optional disk. The value of the **Free** device parameter from the %disk1% IODevice.
- Total number of pages (1024 bytes) that are on the optional disk. The value of the **LogicalSize** device parameter from the %disk1% IODevice.

This operator is equivalent to executing the following PostScript Level 2 emulation sequence:

```
(%disk1%) currentdevparams dup /Free get exch /LogicalSize get
```

Error: **stackoverflow**

displayoperatormsg

(string) displayoperatormsg

sets a custom paper message. The string parameter is used as a prompt string when a page prints. The `string` value can be any string up to 16 characters. The string is cleared at the end of a job.

Errors: **stackunderflow, typecheck**

doidlefonts

– doidlefonts *false*

returns a constant boolean value of false.

Errors: **stackoverflow**

dojamrecovery

– dojamrecovery *boolean*

queries the setting of the Jam Recovery menu item. A boolean value is returned on the stack:

true	reprint jammed page (default) (Jam Recovery is set On)
false	do not reprint jammed page (Jam Recovery is set Off)

This operator is equivalent to executing the following PostScript Level 2 emulation sequence:

```
currentpagedevice /ExitJamRecovery get
```

Error: **stackoverflow**

doprinterrors

– doprinterrors *boolean*

returns a boolean with the same value as the system parameter **DoPrintErrors**. It also indicates the current value of the Print PS Error printer setting. The **DoPrintErrors** system parameter must be present for the doprinterrors operator to be present.

Error: **stackoverflow**

doret

– doret *integer*

returns the PQET setting for the current job. An integer value is returned on the stack:

0 Off
1 On

This operator is equivalent to executing the following PostScript Level 2 emulation sequence:

```
currentpagedevice /PostRenderingEnhanceDetails get /REValue get
```

Error: **stackoverflow**

dostartpage

– dostartpage *boolean*

returns a boolean with the same value as the system parameter **DoStartPage**. The DoStartPage system parameter must be present for the compatibility operator dostartpage to be present.

Error: **stackoverflow**

dosysstart

– dosysstart *boolean*

returns the current value of the StartupMode system parameter. A boolean value is returned:

true StartupMode set to 1.
false StartupMode other than 1.

This operator is equivalent to executing the following PostScript Level 2 emulation sequence:

```
currentsystemsparams /StartupMode get
```

Error: **stackoverflow**

duplexer

– `duplexer` *`boolean`*

queries if the duplex option is attached. A boolean value is returned on the stack:

`true`	duplex option is attached
`false`	duplex option is not attached

Error: **stackoverflow**

duplexmode

– `duplexmode` *`boolean`*

queries the current value for the **Duplex** page device parameter.

`true`	printing mode is duplex
`false`	printing mode is simplex

This operator is equivalent to executing the following PostScript Level 2 emulation sequence:

```
currentpagedevice /Duplex get
```

Error: **stackoverflow**

enginesync

– `enginesync` *`boolean`*

indicates if the printer waits for the last page of a job to print before returning a Ctrl+d to the host computer.

Error: **stackoverflow**

file

filename access `file` *file*

creates a file object with specified filename and access. The access values are:

r	open the file for reading only
w	create a file if one does not already exist, or truncate and overwrite it if it does exist. File is opened for writing only.
a	create a file if one does not already exist or append it if it does exist. File is opened for writing only.
r+	open the file for reading and writing. An **undefinedfilename** error occurs if the file does not exist.
w+	create a file if it does not already exist, or truncate and overwrite if it does exist. File is opened for reading and writing.
a+	create a file if it does not exist or append it if it does exist. File is opened for reading and writing.

Error: **invalidfileaccess, ioerror, limitcheck, stackunderflow, typecheck, undefinedfilename**

filenameforall

pattern proc scratchstring `filenameforall`

lists all the files with names that match a specified pattern string, copies the filename for each of these files into a specified scratch string, and calls a specified procedure.

Error: **ioerror, stackoverflow, stackunderflow, typecheck**

fileposition

file `fileposition` *position*

indicates the current position on an open file.

Error: **ioerror, stackunderflow, typecheck, undefinedfilename**

firstside

– `firstside` *boolean*

indicates whether the current imaging area is on the front side of the page.

true	front side is currently being imaged
false	back side is currently being imaged

Error: **stackoverflow**

fontnonzerowinding

– *boolean* fontnonzerowinding

sets the winding rule for fonts. A query is not performed since the winding rule is reset at the beginning of each job as true. The boolean value can be:

true	non-zero winding used by the interpreter
false	even or odd winding rule used by interpreter

Error: **stackoverflow**

hardwareiomode

– hardwareiomode *boolean*

queries the value of the Parallel Protocol menu item. Hardware IO mode refers to the Parallel Protocol (Standard or Fastbytes). An integer is returned to the stack:

1	Parallel Fastbytes Off (Standard)
2	Parallel Fastbytes On (Fastbytes)

Error: **stackoverflow**

idlefonts

– idlefonts *mark*

supports compatibility with the IBM LaserPrinters 4019, 4029, and 4039. It is parsed and returns a mark on the stack.

Error: **stackoverflow**

ignoresize

See page 4-8.

initializedisk

pages action `initializedisk` –

initializes the optional disk with the page count and action as integer arguments. The arguments set the (%disk1%) IO device parameters as follows:

- **LogicalSize** parameter is set to *pages*.
- If a value of 0 is set as *pages*, the entire disk is formatted.
- If a value of 1, 2, or 3 is set as *pages*, an **ioerror** is generated.
- **InitializeAction** parameter is set to *action* plus 1.

Errors: **invalidaccess, ioerror, rangecheck, stackunderflow, typecheck**

jobname

– `jobname` *(string)*

identifies each print job selection. This string in **statusdict** queries and changes the current setting of the **JobName** user parameter. Originally, **jobname** is set to null.

- To query **jobname**: `jobname` or
  `currentuserparams /JobName get`
  A string indicating the job name is returned on the stack.
- To change **jobname**: `/jobname (string) def` or
  `<< /JobName (string) >> setuserparams`
  where *string* is the new job name.

Error: **stackoverflow**

jobsource

– jobsource *(string)*

indicates the current setting of the **CurInputDevice** system parameter. A string is returned on the stack indicating the job source. Valid values are:

%LocalTalk%
%SerialA%
%SerialB%
%SerialC%
%SerialD%
%ParallelA%
%ParallelB%
%ParallelC%
%ParallelD%
%IR_A%
%IR_B%
%IR_C%
%IR_D%
%EtherTalkB%
%EtherTalkC%
%EtherTalkD%
%TokenTalkB%
%TokenTalkC%
%TokenTalkD%
%LexLinkB%
%LexLinkC%
%LexLinkD%
%PrintServerB%
%PrintServerC%
%PrintServerD%
%RemotePrinterB%
%RemotePrinterC%
%RemotePrinterD%
%AppSocketB%
%AppSocketC%
%AppSocketD%
%LPR_B%
%LPR_C%
%LPR_D%
%UnknownDevice%

This operator is equivalent to executing the following PostScript Level 2 emulation sequence:

```
currentsystemparams /CurInputDevice get
```

Error: **stackoverflow**

jobtimeout

– jobtimeout *integer*

queries the current setting for the **JobTimeout** user parameter. An integer is returned on the stack:

0 disabled
15...65355 seconds

This operator is equivalent to the following PostScript Level 2 emulation sequence:

```
currentuserparams /JobTimeout get
```

Error: **stackoverflow**

manualfeed

See page 4-10.

manualfeedtimeout

/manualfeedtimeout *integer* def

is an integer key in **statusdict** that works with the **ManualFeedTimeout** page device parameter to determine the manualfeed timeout for a given page.

If during a job, **manualfeedtimeout** is defined as an integer value in **statusdict**, that value is used instead of the **ManualFeedTimeout** page device parameter.

The value of the **ManualFeedTimeout** page device parameter and **manualfeedtimeout** key in **statusdict** are independent of each other; the value of one does not affect the value of the other.

0 disabled
1...65355 seconds

An **undefined** error results if **manualfeedtimeout** is queried before it is set.

Errors: **stackoverflow, undefined**

newsheet

– newsheet –

causes the current page to start on the front side of a new sheet.

Error: **none**

pagecount

– pagecount *integer*

queries the value of the **PageCount** system parameter. An integer is returned on the stack indicating the current page count.

This operator is equivalent to executing the following PostScript Level 2 emulation sequence:

```
currentsystemparams /PageCount get
```

Error: **stackoverflow**

papertray

See page 4-11.

printername

(string) printername *(substring)*

returns the value found in the **PrinterName** system parameter into a string that you have already defined and placed on the operand stack immediately before you issue **printername**. The string is filled with the printer name. As many as 32 characters are returned on the stack.

This operator is equivalent to the following PostScript Level 2 emulation sequence:

```
currentsystemparams /PrinterName get
```

Errors: **rangecheck, stackunderflow, typecheck**

product

– product *(string)*

is a string in **statusdict** that refers to the name of the product. A string is returned on the stack indicating the name of the product. The product string in **systemdict** cannot be changed.

To change this product string in **statusdict**:

```
/product (string) def
```

Error: **stackoverflow**

quiet

– quiet *integer*

queries the **PowerSave** page device parameter. An integer is returned on the stack.

0	Power Saver Off
1 to *120*	Number of minutes elapsed after last page before Power Saver is invoked.

reduces power consumption when the printer is idle and prevents room lights from dimming or flickering. When Quiet is set to On, the first page to print takes longer.

This operator is equivalent to the following PostScript Level 2 emulation sequence:

```
currentpagedevice /PowerSave get
```

Error: **stackoverflow**

ramsize

– ramsize *integer*

queries the current setting of the **RamSize** system parameter. An integer is returned on the stack showing total RAM in bytes.

This operator is equivalent to the following PostScript Level 2 emulation sequence:

```
currentsystemparams /RamSize get
```

Error: **stackoverflow**

realformat

– realformat *boolean*

returns a boolean with the same value as the **RealFormat** system parameter. It indicates the printer microprocessor native real number representation. Queries determine if the printer real number representation matches the application real number representation and compensates if necessary.

Error: **stackoverflow**

renamefile

oldfilename newfilename renamefile

renames the oldfilename to the newfilename.

Error: **invalidfileaccess, ioerror, stackunderflow, typecheck, undefinedfilename**

resolution

– resolution *integer*

queries the resolution for the current job. An integer is returned on the stack:

300 300 dpi is set On
600 600 dpi is set On
1200 1200 dpi is set On

This operator is equivalent to executing the following PostScript Level 2 emulation sequence:

```
currentpagedevice /HWResolution get 0 get
```

Error: **stackoverflow**

revision

– revision *integer*

queries the **Revision** system parameter. An integer is returned on the stack to indicate the revision level.

Error: **stackoverflow**

sccbatch

channel sccbatch *baud option*

returns the settings for serial communication parameters.

channel has the following valid integer values:

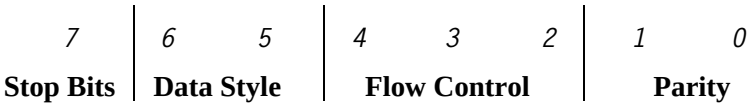
9

25

Because there is only one serial interface on the printer, both *9* and *25* return the same values.

baud returns the value of the Baud menu item.

option returns a value as defined in the following illustration:



Stop Bits

This bit is always set to zero.

Data Style

01 7 data bits
11 8 data bits

Flow Control

000 XON/XOFF
001 DTR/DSR
101 DTR
110 XON/XOFF/DTR
111 XON/XOFF/DTR/DSR

Parity

00 ignore
01 odd
10 even
11 none

Errors: **rangecheck, stackoverflow, stackunderflow, typecheck**

setdefaulttimeouts

*job manualfeed wait*setdefaulttimeouts –

changes the values for all timeouts. Valid values are:

JobTimeout system parameter

0 disabled
15...65355 seconds

ManualFeedTimeout page device parameter

0 disabled
1...65355 seconds

WaitTimeout system parameter

0 disabled
15...65355 seconds

Errors: **invalidaccess, rangecheck, stackunderflow, typecheck**

setdoidlefonts

boolean setdoidlefonts –

This operator is parsed and discarded. A boolean value is required.

Errors: **stackunderflow, typecheck**

setdojamrecovery

boolean setdojamrecovery –

changes the setting of the Jam Recovery menu item. The changes are not effective until end of job.

The *boolean* value sets Jam Recovery:

true reprint jammed page (Jam Recovery is set On)
false do not reprint jammed page (Jam Recovery is set Auto)

This operator is equivalent to executing the following PostScript Level 2 emulation sequence:

```
%Go into exitserver or startjob context
<< /ExitJamRecovery boolean >> setpagedevice
```

Errors: **invalidaccess, stackunderflow, typecheck**

setdoret

integer setdoret –

changes the PQET setting for the next page through the end of job.

The integer values allowed are:

0	turn PQET Off
1	turn PQET On
2	turn PQET On
3	turn PQET On
4	turn PQET On

The setting you selected from the operator panel for PQET returns when the job is finished.

This operator is equivalent to executing the following PostScript Level 2 emulation sequence:

```
<<//PostRenderingEnhanceDetails << /REValue integer >> >>
setpagedevice
```

Errors: **rangecheck, stackunderflow, typecheck**

setdosysstart

boolean setdosysstart –

modifies the value of the **StartupMode** system parameter.

true	StartupMode set to 1
false	StartupMode set to 0

- If *true*, the printer executes a Sys/Start file from the optional flash or disk when the PostScript Level 2 emulation interpreter is initialized. If no flash or disk is installed, no action occurs.
- If a Sys/Start file is on both flash and disk, the search order for the devices determines which one is executed.
- If *false*, the printer does not execute a Sys/Start file.

The default value is *true*.

Errors: **invalidaccess, stackunderflow, typecheck**

setduplexmode

boolean setduplexmode –

sets the value of the Duplex page device parameter for the current job.

true	sets printing mode to duplex
false	sets printing mode to simplex

At the start of the next job, the value is reset.

This operator is equivalent to the following PostScript Level 2 emulation sequence:

```
<< /Duplex boolean >> setpagedevice
```

Errors: **configurationerror, stackunderflow, typecheck**

Note: If simplex printing is requested between the front side and back side of a sheet, a blank back side is printed, and information for the back side is printed on the front side of the next sheet.

setenginesync

boolean setenginesync –

changes the setting used to indicate if the printer waits for the last page of a job to print before returning a Ctrl+d to the host computer.

The boolean values indicate:

true	printer waits for the last page of the job to print
false	printer does not wait for the last page of the job to print

Errors: **invalidaccess, stackunderflow, typecheck**

setethernetaddress

string setethernetaddress

sets the EthernetAddress parameter in the EtherTalk communication parameter set. The EthernetAddress parameter is the Ethernet address of the Ethernet internal network adapter (INA). The string value can be any string up to 17 characters.

Errors: **stackunderflow, typecheck**

setfilenameextend

boolean setfilenameextend

sets whether the extension should be automatically added to any filename.

true adds the extension
false does not add the extension

The default setting is *true*.

See “Filename Extensions” on page 6-9.

Errors: **stackunderflow, typecheck**

setfileposition

file position setfileposition

moves the read pointer in an open file to the specified, new file position. This is specified as the number of bytes from the start of the file. The next read operation starts at the new file position.

Errors: **ioerror, stackunderflow, typecheck, undefinedfilename**

sethardwareiomode

integer sethardwareiomode –

supports compatibility with the IBM LaserPrinters 4019, 4029, and 4039. It is parsed, and one integer is removed from the stack and is discarded.

Errors: **invalidaccess, stackunderflow, typecheck**

setidlefonts

mark... setidlefonts –

supports compatibility with the IBM LaserPrinters 4019, 4029, and 4039. It is parsed and pulls items from the stack until a mark is reached.

Error: **unmatchedmark**

setignoresize

See page 4-8.

setjobtimeout

integer setjobtimeout –

changes the setting of the **JobTimeout** user parameter for the next page through the end of job. Valid integers are:

0 disabled
15...65355 seconds

The setting returns to the **JobTimeout** system parameter value at end of job.

This operator is equivalent to the following PostScript Level 2 emulation sequence:

```
<</JobTimeout integer >> setuserparams
```

Errors: **rangecheck, stackunderflow, typecheck**

setpapertray

See page 4-12.

setprintername

string setprintername –

changes the **PrinterName** system parameter. As many as 32 characters can be used to identify the printer.

This operator is equivalent to the following PostScript Level 2 emulation sequence:

```
<< /PrinterName (string) >> setsystemparams
```

Errors: **invalidaccess, limitcheck, stackunderflow, typecheck**

setquiet

integer `setquiet` –

changes the **PowerSave** page device parameter.

The following are valid integers.

0	Power Saver Off
1 to *120*	number of minutes elapsed after last page before Power Saver is invoked.

Any changes made by this operator are not active until the end of the job.

This operator is equivalent to the following PostScript Level 2 emulation sequence:

```
%Go into exitserver or startjob context
<< /PowerSave integer >> setpagedevice
```

Errors: **rangecheck, stackunderflow, typecheck**

setresolution

integer `setresolution` –

changes the resolution for the current job and discards unprinted data. The following integers are valid:

300	300 dpi is set On
600	600 dpi is set On
1200	1200 dpi is set On

Note: The printer waits for any paper to clear the paper path before changing the resolution. If the resolution is changed for the back side of a duplexed sheet, a blank back side is printed, the resolution is changed, and the front side of the next sheet contains the information for the page where the resolution was changed.

This operator is equivalent to the following PostScript Level 2 emulation sequence:

```
<< /HWResolution [xres yres] >> setpagedevice
```

where *xres* = *yres*.

Errors: **rangecheck, stackunderflow, typecheck**

setsccbatch

integer integer integer`setsccbatch` –

supports compatibility with the IBM LaserPrinters 4019, 4029 and 4039. It is parsed, and three integers are removed from the stack and discarded.

Error: **stackunderflow**

setsoftwareiomode

integer `setsoftwareiomode` –

supports compatibility with the IBM LaserPrinters 4019, 4029, and 4039. It is parsed, and an integer is removed from the stack and discarded.

Errors: **stackunderflow, typecheck**

settumble

boolean `settumble` –

sets the value of the **Tumble** page device parameter for the current job.

true	sets the tumble setting to short-edge binding (back side of the duplex page prints upside down compared to the front)
false	sets the tumble setting to long-edge binding, which is the default (back side of the duplex page prints in the same orientation as the front)

No error is generated if a duplex option is not installed.

Notes:

- At the start of the next job, the setting for tumble is reset to the value for the Duplex Bind menu item.
- If tumble is changed between the printing of a front and back side of a duplexed sheet, a blank back side is not ejected.

This operator is equivalent to the following PostScript Level 2 emulation sequence:

```
<< /Tumble boolean >> setpagedevice
```

Errors: **stackunderflow, typecheck**

setuserdiskpercent

integer `setuserdiskpercent` –

removes an integer from the stack and discards it.

Errors: **stackunderflow**

softwareiomode

– `softwareiomode` *`0`*

supports compatibility with the IBM LaserPrinters 4019, 4029, and 4039. It is parsed and returns a *`0`* (zero, Binary Mode Off) on the stack.

Software IO mode defines the data stream you are using.

Error: **stackoverflow**

tumble

– `tumble` *`boolean`*

returns the current value of the **Tumble** page device parameter.

`true`	the back side of the duplexed page is upside down in relation to the front side (short-edge binding)
`false`	the back side of the duplexed page has the same orientation as the front side (long-edge binding) (default)

This operator is equivalent to the following PostScript Level 2 emulation sequence:

```
currentpagedevice /Tumble get
```

Error: **stackoverflow**

userdiskpercent

– `userdiskpercent` *`0`*

returns a *`0`* (zero) on the stack.

Errors: **stackoverflow, invalidaccess**

waittimeout

– `waittimeout` *`integer`*

queries the current setting for the **WaitTimeout** user parameter. An integer is returned on the stack:

`0`	disabled
`15...65355`	seconds

This operator is equivalent to the following PostScript Level 2 emulation sequence:

```
currentuserparams /WaitTimeout get
```

Error: **stackoverflow**

Page Device Parameters

In addition to the page device parameters described in Section 4.11 of the *PostScript Language Reference Manual (Second Edition)* by Adobe Systems, Inc., these page device parameters are used by **setpagedevice** and **currentpagedevice.** Certain parameters, such as Policies, Priority, and ManualFeed are listed here since more information about the parameters is given in Table 4-9 than in the *PostScript Language Reference Manual (Second Edition)* by Adobe Systems, Inc.

Table 4-9 Page Device Parameters

Key	Type	Default	Definition
DeviceRenderingInfo	dictionary		Specifies the following four unique printer rendering parameters: Screening, TonerSaver, AutoMediaType, and Type. *Screening* controls which halftone dictionary is installed at the beginning of each print job. The value is set at the start of a print job according to the user default settings for PictureGrade, IET, and Resolution settings. These names are valid: PictureGrade — Corresponds to PictureGrade On at 300, 600, or 1200 dpi IET — Corresponds to IET On and PictureGrade Off IETPictureGrade — Corresponds to IET On and PictureGrade On None — Corresponds to IET Off and PictureGrade Off **Notes:** • A PostScript job can override the effect of Screening by using sethalftone, setscreen, or setcolorscreen operators unless Screening is set to IET or IETPictureGrade. • A PostScript job can enter or exit IET mode or PictureGrade using the Screening parameter in a setpagedevice call. This does not change the user default printer settings for PictureGrade or Resolution which are read and used by the interpreter for the next print job unless the setpagedevice is issued in a startjob context. • If Screening is set to IET or IETPictureGrade, this causes **TonerSaver** to be set to False. *TonerSaver* is a boolean type that controls the Toner Saver feature. true — Starts the printer toner saver mechanism. If Toner Saver is specified as true in the same setpagedevice call as Screening IET or IETPictureGrade, a **configurationerror** results. See the preceding parameter, Screening, for more information on how Screening affects TonerSaver. false — Stops the printer toner saver mechanism. *AutoMediaType* is a boolean that controls the MediaType entries in the InputAttributes dictionary in the pagedevice dictionary. true — MediaType entries in the InputAttributes dictionaries may not be modified by the user. The values are confined to values known by the printer operating system. false — MediaType entries in the InputAttributes dictionaries may be modified by the user. *Type* is a constant value of 98.

Table 4-9 Page Device Parameters (Continued)

Key	Type	Default	Definition
ManualFeed	boolean	false	Indicates whether the current (or active) source is a manual source. The following values are supported: true manual feed false automatic feed If ManualFeed is set to True, and a change is made to PageSize, MediaWeight, MediaColor, or MediaType parameters, no matching occurs. It is assumed that the correct page is fed. **Note:** ManualFeed is initialized at the start of each job according to the default paper source set by the operator panel menus or through PJL. If the default paper source is a manual source, ManualFeed is set to True. If the default paper source is not a manual paper source, ManualFeed is set to False.
ManualFeedTimeout	integer	60	Indicates the amount of time that the printer waits for you to manually load a sheet of paper. 0 infinite wait or no timeout If the timeout expires, a **timeout** error is generated. This is initialized at the start of each PostScript Level 2 emulation job to the value of the Feed Timeout menu item value.
MediaPosition	integer	null	Specifies the tray to select if possible whether it is the best match or not. **Policies** may be consulted to determine the selection. For example, there is legal-size paper in Tray 1 and letter-size paper in all other trays, and the Policy for the PageSize page device parameter is 1. The command `<< /PageSize [612 1008]/MediaPosition 3 >> setpagedevice` causes Tray 3 to be selected even though Tray 1 is a perfect match because the PageSize Policy of 1 allows the PageSize to be ignored so Tray 3 is chosen.
Nup	boolean	false	Determines if the Nup (Multipage Printing) function is used. The Nup function allows users to print images of multiple pages on one physical page. False Nup is not active True Nup is active

Table 4-9 Page Device Parameters (Continued)

<table>
<tr><th>Key</th><th>Type</th><th>Default</th><th>Definition</th></tr>
<tr><td>NupDetails</td><td>dictionary</td><td></td><td>Contains the parameters which describe the specific actions performed when the Nup (Multipage Printing) function is active. These parameters specify the orientation, order and number of the images on the physical page.

Rows is an integer specifying the number of rows which the portrait oriented page is divided.

Note: PostScript does not support any combination of rows/columns. The PostScript interpreter performs a check on the row/column combination when either the row or column parameter is modified. If the user specifies a row/column combination which is not supported by the printer, a CONFIGURATIONERROR is generated. The supported row/column combinations are:

<table>
<tr><th>Rows</th><th>Columns</th></tr>
<tr><td>2</td><td>1</td></tr>
<tr><td>3</td><td>1</td></tr>
<tr><td>2</td><td>2</td></tr>
<tr><td>3</td><td>2</td></tr>
<tr><td>3</td><td>3</td></tr>
<tr><td>4</td><td>3</td></tr>
<tr><td>4</td><td>4</td></tr>
</table>

Columns is an integer specifying the number of columns which the portrait oriented page is divided.

Note: PostScript does not support any combination of rows/columns. See note above.

Orientation is an integer specifying the orientation (Multipage View) of the host page:

0 Portrait (Short Edge)
1 Landscape (Long Edge)

Border is an integer specifying the description of a border which is drawn around the individual Nup pages:

0 No border
1 A solid black line is drawn around the border</td></tr>
</table>

Table 4-9 Page Device Parameters (Continued)

Key	Type	Default	Definition
NupDetails (continued)	dictionary		*Order* is an integer specifying how the Nup pages are placed on the host page: 0 The first page is placed at the upper left corner of the host page and subsequent pages are placed across and then down the host page (Horizontal) 1 The first page is placed at the upper left corner of the host page and subsequent pages are placed down and then across the host page (Vertical) 2 The first page is placed at the upper right corner of the host page and subsequent pages are placed across and the down the host page (Reverse Horizontal) 3 The first page is placed at the upper right corner of the host page and subsequent pages are placed down and then across the host page (Reverse Vertical) **Note:** If Orientation is set to Portrait, then the Order is determined by looking at the *host* page in portrait orientation. If Orientation is set to Landscape, then the Order is determined by looking at the *host* page in landscape orientation. *LandscapeOverride* is a boolean used to specify the orientation of the Nup pages. False The orientation of the Nup pages is specified by the PageSize parameter. True The PostScript algorithms which place the Nup pages on the hostpage assume the orientation of the Nup pages is Landscape regardless of the orientation specified by the PageSize parameter. **Note:** The PostScript interpreter requires knowledge of the orientation of the Nup pages to position the Nup pages correctly on the hostpage. Unfortunately, given PostScript's ability to perform origin translations, many landscape pages are created in portrait using the PageSize parameter and then rotated to form a landscape appearance. When this occurs, the PostScript interpreter cannot position the Nup pages correctly on the hostpage unless this parameter is set correctly. *Type* is a constant value of 96.

Table 4-9 Page Device Parameters (Continued)

Key	Type	Default	Definition

OutputAttributes	dictionary		Contains information about the output bin targets. There is a numeric key, which is a dictionary, for each installed output bin. OutputType and OutputLocation are the allowable keys in each output dictionary. OutputType is used in the search algorithm to determine which output bin is used as the exit path.
			
			The numeric keys are:
			
			0 Standard Bin
			1 Optional Output Bin 1
			2 Optional Output Bin 2
			3 Optional Output Bin 3
			
			OutputType fields are null when first initialized, but the fields can be assigned strings to specify the output destination, for example:
			
			`<< /OutputAttributes << 0 << /OutputType (Standard Bin) >> >> >> setpagedevice`
			
			`<< /OutputAttributes << 1<< /OutputType (Optional Output Bin 1 Exit) >> >> >> setpagedevice`
			
			For more information, see the Page Device parameter, OutputType on page 4-49.
			
			OutputLocation key is a read only string that represents the name of the associated destination:
			
			Destination: String Name:
			Standard Bin Standard Bin
			Bin 1 Optional Output Bin 1
			Bin 2 Optional Output Bin 2
			Bin 3 Optional Output Bin 3
			
			The OutputAttributes dictionary contains a Priority Array. If an OutputType string does not match, the priority array is searched in order for a valid output bin.
			
			The initial value of the priority array is set at the beginning of a job and is equal to the value of the menu item for OutputBin. The array can be changed using this setpagedevice operator:
			
			`<< /OutputAttributes << /Priority [ 1 0 ] >> >> setpagedevice`
			
			This command gives the Optional Output Bin 1 (1) a higher priority than the Standard Bin (0). Once the command is issued, if no match is found for the OutputType string, the paper exits into the standard output bin.

OutputPage	boolean	true	true job is processed as usual (default) false no page is printed, but all other processing of a job occurs.

Table 4-9 Page Device Parameters (Continued)

Key	Type	Default	Definition
OutputType	string		Specifies the output bin destination for the current page. If the destination is not null, setpagedevice compares it with the OutputType values in the OutputAttributes dictionary during the search algorithm. If a match is found, this output bin is the target output for the current page.
PageDeviceName	string name or null		Assigns or names a page device by using a string parameter. This is used by the **findcolorrendering** operator.

Table 4-9 Page Device Parameters (Continued)

Key	Type	Default	Definition
Policies	dictionary		Uses entries to describe the actions that should be performed when a particular function cannot be completed. The entries are: *PageSize* An integer that specifies what recovery action to use when PageSize cannot be matched with any available media (paper, envelope, or other print materials). The actions are: 0 Generate a **configurationerror.** This is the default. 1 Ignore the requested PageSize. 2 Interact with a human operator or print manager. 3 Select the next larger or smaller available media and adjust the page to fit. 4 Select the next larger available media and adjust the page to fit. 5 Select the next larger or smaller available media, but do not adjust the page. 6 Select the next larger available media, but do not adjust the page. 7 Disable media selection. Implement the requested PageSize on the previously selected media without making adjustments. The way the image is positioned on the media is printer dependent and may result in part of the image being clipped. To adjust the page means to scale the image to fit the selected media and then center the image on the media. *PolicyNotFound* or any feature name An integer that specifies what recovery action to use when a requested feature other than PageSize cannot be matched with any key in the Policies dictionary. The actions are: 0 Generate a **configurationerror**. 1 Ignore the requested feature. This is the default. 2 Interact with a human operator or print manager. *PolicyReport* A procedure that is called when a successful setpagedevice is finished. The procedure consults policies to process unsatisfied feature requests if needed.
PostRenderingEnhance	boolean	true	Always true to indicate that **PostRenderingEnhanceDetails** is enabled.

Table 4-9 Page Device Parameters (Continued)

Key	Type	Default	Definition
PostRenderingEnhance Details	dictionary		Describes enhancements that are made to the output after the page has been rasterized in memory. The contents of the dictionary are: REValue An integer that specifies the current value of the PQET menu item. The values are: 0 PQET Off 1 to 4 PQET On (default is 1) Type A constant value of 8
PowerSave	integer	20	Number of minutes elapsed after the last page before Power Saver is invoked. The allowable range of minutes is 0 - 120. This value is initialized at the start of each PostScript Level 2 emulation job to the value of the Power Saver menu item.

Table 4-9 Page Device Parameters (Continued)

Key	Type	Default	Definition
SlipSheet	integer	0	Specifies where blank Separator Sheets should be inserted in the output. Supported values are: 0 Do not insert Separator Sheets 1 Insert separator sheet at device deactivation 2 Insert separator sheet at end of the job 3 Insert separator sheet at the end of each set in multicopy job. If Collate is *true*, a set consists of one copy of each page of the document. For example, if a job is five pages long, a set is one copy of pages one to five. If Collate is *false*, a set is all the copies of a single page of the job. For example, if a job is three copies of a five page job, a set is three copies of the first page. 4 Insert separator sheet after each showpage or copypage.
SlipSheetDetails	dictionary		Specifies the following two unique separator sheet parameters: SlipSheetSource and Type. *SlipSheetSource* is an integer type parameter with the default as null. It identifies the source used for separator sheets. Supported values are: Null Use current source 0 Tray 1 1 Tray 2 2 Envelope Feeder 3 Tray 3 4 Multipurpose Feeder 5 Tray 4 6 Tray 5 The key is found in the **DeviceRenderingInfo** dictionary within pagedevice. It can be altered using a setpagedevice operator. `/SlipSheetDetails << /Type 98 /SlipSheetSource n>> >> setpagedevice` *Type* is a constant value of 98.
TraySwitch	boolean	true	Indicates tray linking is always active. When one input source supply of media is depleted, other input sources are searched to determine if the same media can be found in another source. If another source is found, the alternative source is selected. Same media means that both input sources originally had the same size and type of print material loaded.

Interpreter Parameters

This section describes the PostScript Level 2 emulation interpreter parameters supported by this printer. There are three types of interpreter parameters:

- User parameters
- System parameters
- Device parameters

User Parameters

The following user parameters are used by **setuserparams** and **currentuserparams**.

If a value is requested that is not within the range for the requested parameter, the minimum (or maximum) value is used.

If a **setuserparams** value does not match the type of the specified parameter, a **typecheck** error occurs. If a parameter is not supported by this printer, it is ignored. An attempt to change the value of a read-only parameter has no effect on the parameter.

Table 4-10 PostScript Level 2 Emulation User Parameters

Key	Type	Default	Definition
JobName	string	( )	Name of the current job for status responses. Legal values: Any alphanumeric characters in the ASCII printable range (X'20' through X'FE') excluding; and] characters. Maximum length is 80 characters (characters beyond 80 characters are truncated).
JobTimeout	integer	JobTimeout system parameter	Number of seconds a job executes before it is terminated and a PostScript Level 2 emulation **timeout** error is generated. Set to 0 to disable job timeout. JobTimeout is initialized to the value of the **JobTimeout** system parameter at the beginning of each job. Legal value: Any non-negative integer.
MaxDictStack	integer	255	Maximum elements in a dictionary stack. Legal value: Any integer between 40 and 255.
MaxExecStack	integer	10015	Maximum elements in the execution stack. Legal value: Any integer greater than or equal to 75.

Table 4-10 PostScript Level 2 Emulation User Parameters (Continued)

Key	Type	Default	Definition
MaxFontItem	integer	12500	Maximum number of bytes occupied by the pixel array of a single character in the font cache. There is an upper limit dependent on the **MaxFontCache** system parameter and the amount of printer memory. An attempt to set **MaxFontItem** to a value beyond the limit generates a **limitcheck** error. Legal values: Any non-negative integer.
MaxFormItem	integer	100000	Maximum number of bytes occupied by a single cached form. Legal value: Any non-negative integer.
MaxLocalVM	integer	2147483647	Maximum bytes occupied by values in local VM. Legal value: Any integer greater than or equal to 76800.
MaxOpStack	integer	100000	Maximum elements in the operand stack. Legal value: Any integer greater than or equal to 75.
MaxPatternItem	integer	20000	Maximum bytes occupied by a single cached pattern. Legal value: Any non-negative integer.
MaxScreenItem	integer	48000	Maximum bytes occupied by a single halftone screen. Legal value: Any non-negative integer.
MaxUPathItem	integer	5000	Maximum bytes occupied by a single user path. Legal value: Any non-negative integer.
MinFontCompress	integer	2147483647	(Read-only) This value is always the value of **MAXINTEGER**.
VMReclaim	integer	0	0 enables automatic garbage collection -1 disables it for local Virtual Memory (VM) -2 disables it for both local and global VM
VMThreshold	integer	25000 per MB of RAM	Frequency of automatic garbage collection, which occurs when this many bytes have been allocated since the previous collection. Legal value: Any integer from 8192 to 500000, inclusive.
WaitTimeout	integer	WaitTimeout system parameter	Number of seconds the interpreter waits to receive additional characters from the host before it terminates the current job by executing a PostScript Level 2 emulation **timeout** error. A value of 0 indicates an infinite timeout. **WaitTimeout** is initialized to the value of the **WaitTimeout** system parameter at the beginning of each job. Legal value: Any non-negative integer.

System Parameters

The **setsystemparams** operator sets the values of the specified system parameters. This operator requires a password if one is set. The **currentsystemparams** operator returns a dictionary of the current values of the system parameters.

Values supplied to **setsystemparams** that are outside the range or limits for the specified integer parameter do not cause **rangecheck** or **limitcheck** errors. An appropriate value is used. For example, if you set **JobTimeout** to 14, it is actually set to 15, and no error is generated. The exceptions are noted in Table 4-11.

Values supplied to **setsystemparams** that do not match the type of the specified parameter cause **typecheck** errors. Parameters that are not supported by this printer are ignored. An attempt to change the value of a read-only parameter has no effect on the parameter. Write-only parameters are not returned by **currentsystemparams**.

Table 4-11 PostScript Level 2 Emulation System Parameters

Key	Type	Default	Definition
BuildTime	integer		(Read-only) Timestamp identifying the specific build of the PostScript Level 2 emulation interpreter.
ByteOrder	boolean	false	(Read-only) Native order of multiple-byte numbers in binary encoded tokens (preferred). false high-order first true low-order first
CurDisplayList	integer	0	(Read-only) This value is always zero.
CurFontCache	integer	0	(Read-only) Bytes currently occupied by the font cache.
CurFormCache	integer	0	(Read-only) Bytes currently occupied by the form cache.

Table 4-11 PostScript Level 2 Emulation System Parameters (Continued)

Key	Type	Default	Definition
CurInputDevice	string		(Read-only) The name of the communications device that corresponds to the current input file for the PostScript Level 2 emulation program that is executing. Possible values are: %LocalTalk% %SerialA% %SerialB% %SerialC% %SerialD% %ParallelA% %ParallelB% %ParallelC% %ParallelD% %IR_A% %IR_B% %IR_C% %IR_D% %EtherTalkB% %EtherTalkC% %EtherTalkD% %TokenTalkB% %TokenTalkC% %TokenTalkD% %LexLinkB% %LexLinkC% %LexLinkD% %PrintServerB% %PrintServerC% %PrintServerD% %RemotePrinterB% %RemotePrinterC% %RemotePrinterD% %AppSocketB% %AppSocketC% %AppSocketD% %LPR_B% %LPR_C% %LPR_D% %UnknownDevice%
CurOutline Cache	integer	0	(Read-only) This value is always zero.
CurOutputDevice	string		(Read-only) The name of the communications device that corresponds to the current output file for the PostScript Level 2 emulation program that is executing. Possible values are the same as the ones listed for CurInputDevice on page 4-56.
CurPattternCache	integer	0	(Read-only) Bytes currently occupied by the pattern cache.
CurScreenStorage	integer	0	(Read-only) This value is always zero.
CurSourceList	integer	0	(Read-only) This value is always zero.
CurUPathCache	integer	0	(Read-only) Bytes currently occupied by the user path cache.
DoPrintErrors	boolean	Initialized from the Print PS Error menu item	Specifies whether to print an error page using a built-in error handler when a PostScript Level 2 emulation error occurs.
DoStartPage	boolean (Read only)	false	Always returns false.
EnableExtraFonts	boolean	true	true All 75 resident fonts are enabled false Original 39 PostScript fonts are available only **Note:** Changes to this parameter take effect when PostScript is restarted.

Table 4-11 PostScript Level 2 Emulation System Parameters (Continued)

Key	Type	Default	Definition
EngineBoot	string		(Read-only) Version of the boot code.
EngineCode	string		(Read-only) Version of the engine code.
EngineSpeed	integer		(Read-only) Maximum speed of the print engine in pages per minute.
FactoryDefaults	boolean	false	All non-volatile parameters revert to factory default values at the next power-on if set to true and the printer is immediately turned off. The job that sets **FactoryDefaults** to true must be the last job executed before power-off; otherwise, the request is ignored.
FatalErrorAddress	integer	0	The address at which a fatal system software error occurred. It is stored in this parameter before execution is stopped. It is also transmitted to the host over the communications channel.
FontResourceDir	string	(fonts/)	Specifies the location in the file system for font resource files.
FontVersion	string		(Read-only) The version of the font read-only memory (ROM).
GenericResourceDir	string	(Resource/)	Specifies the location in the file system for resource files.
GenericResourcePathSep	string	(/)	Concatenated to the GenericResourceDir and the category name. It is followed by the resource name to get the external location of the resource. Example: If GenericResourceDir and GenericResourcePathSep were (Resource/) and (/), respectively, the LexmarkLogo resource of the Pattern category would be in Resource/Pattern/LexmarkLogo.
JobTimeout	integer	Initialized from Job Timeout menu item	The value in seconds to which the user parameter **JobTimeout** is initialized at the beginning of each job. If you set the system parameter **JobTimeout** to a negative value, it is ignored and the previous setting of **JobTimeout** is used. A value of 0 (zero) indicates that the timeout is infinite. If you set a number between 1 and 14, the result is that 15 is set. Legal values: x = 0, 15 <= x <= 65355
MaxDisplayList	integer	RamSize	(Read-only) This value is always the same value as **RamSize**.
MaxFontCache	integer	RamSize	(Read-only) This value is always the same value as **RamSize**.
MaxFormCache	integer	101000	Maximum bytes occupied by the form cache. Legal value: Any non-negative integer.

Table 4-11 PostScript Level 2 Emulation System Parameters (Continued)

Key	Type	Default	Definition
MaxImageBuffer	integer	RamSize	(Read-only) This value is always the same value as **RamSize**.
MaxOutlineCache	integer	RamSize	(Read-only) This value is always the same value as **RamSize**.
MaxPatternCache	integer	101000	Maximum bytes occupied by the pattern cache. Legal value: Any non-negative integer.
MaxRasterMemory	integer	RamSize	(Read-only) This value is always the same value as **RamSize**.
MaxScreenStorage	integer	RamSize	(Read-only) This value is always the same value as **RamSize**.
MaxSourceList	integer	RamSize	(Read-only) This value is always the same value as **RamSize**.
MaxUPathCache	integer	301000	Maximum bytes occupied by the user path cache. Legal value: Any non-negative integer.
PageCount	integer		(Read-only) Total number of pages that have been printed.
PanelCode	string		(Read-only) Version of the operator panel code.
PrinterCode	string		(Read-only) Firmware version of the printer controller card.
PrinterName	string		Initialized from the printer name stored in NVRAM (the default name of the printer). If this parameter is set to a zero length string, the **PrinterName** is set to the value of the product string in **statusdict**. Legal value: Any string of 32 or fewer non-null characters.
RamSize	integer		(Read-only) Total amount of memory in bytes installed in the printer.
RealFormat	string	(IEEE)	(Read-only) Preferred representation for real numbers in binary encoded tokens.
Revision	integer		(Read-only) Indicates the current revision level of the machine-dependent portion of the PostScript Level 2 emulation.
SerialNumber	string		(Read-only) Serial number of this printer
StartJobPassword	string	( )	(Write-only) Controls the ability of the startjob operator to alter initial Virtual Memory (VM). Legal value: Any integer or string of 32 or fewer non-null characters. An integer is converted to a string.
StaticRamSize	integer		(Read-only) Amount in bytes of static memory on the controller board.

Table 4-11 PostScript Level 2 Emulation System Parameters (Continued)

Key	Type	Default	Definition
StartupMode	integer	1	Controls system start file (Sys/Start) during PostScript Level 2 emulation initialization. Also, controls job start file (Job/Start) before each job. 0 Disable use of Sys/Start file and Job/Start file 1 Sys/Start file executes (if present on disk or flash) 10 Job/Start file executes before each user job 11 Both files run (a combination of 1 and 10) Legal Values: 0 <= x <= 255. Values other than the four listed are equivalent to 0. **Note:** If both flash and disk have a Sys/Start file and Job/Start file, the value of the SearchOrder for the two devices determines which file is executed.
SystemParamsPassword	string	( )	(Write-only) Controls the ability of **setsystemparams** to change the values of system parameters and **setdevparams** to change the values of device parameters. Legal value: Any integer or string of 32 or fewer non-null characters. An integer is converted to a string.
ValidNV	boolean	true	(Read-only) Indicates if non-volatile memory is currently used to store persistent parameters. If this memory is found defective during system initialization, factory defaults are used. If further testing reveals this memory is defective, it is not used. ValidNV is false. Otherwise, ValidNV is true.
WaitTimeout	integer	Initialized from Wait Timeout menu item	The value in seconds to which the user parameter **WaitTimeout** is initialized at the beginning of each job. Negative values are ignored and the previous setting is used. A value of zero indicates an infinite timeout. If you select a number between 1 and 14, 15 is set. Legal values: x = 0, 15 <= x <= 65355

Device Parameters

The **currentdevparams** operator returns a dictionary of the current values of the system parameters.

The **setdevparams** operator sets the values of the specified device parameters.

- This operator requires a password if one is set.
- Values supplied to **setdevparams** that are outside the range or limits for the specified integer parameter do not cause **rangecheck** or **limitcheck** errors. The appropriate value is used.
- Values supplied to **setdevparams** that do not match the type of the specified parameter cause **typecheck** errors.
- If a parameter name is not known, an **undefined** error occurs.
- An attempt to change the value of a read-only parameter has no effect on the parameter.
- To specify the parameters for a specific communications channel use the appropriate suffix. For example, the serial channels are:

  %SerialA%
  %SerialB%
  %SerialC%
  %SerialD%

  For some, no "A" channel exists. If %Serial% is specified, it refers to the channel where the print job is sent.

For additional information on the Flash Memory Option and the Disk Option, see Chapter 6.

Table 4-12 PostScript Level 2 Emulation Device Parameters

Key	Type	Definition
Device Parameters for the Communication Device %Parallel%, %ParallelA%, %ParallelB%, %ParallelC%, %ParallelD% (%Parallel_NV% and %Parallel_Pending% contain the same parameters)		
DelayedOutputClose	boolean	True False
Enabled	boolean	(Read-only) True False
Handshake	integer	(Read-only) Always returns 2.
HasNames	boolean	(Read-only) Always returns false.
Interpreter	name	(Read-only) PostScript AutoSelect PCL PPDS
On	boolean	True False
OutputDevice	string	(Read-only)
PortLocation	string	(Read-only) Designates the physical location of the port related to the parameter set. Values are: Standard Port Option Slot 1 Option Slot 2 Option Slot 3
Type	name	(Read-only) Always returns /Communications.
Device Parameters for the Communication Device %Serial%, %SerialA%, %SerialB%, %SerialC%, %SerialD% (%Serial_NV% and %Serial_Pending% contain the same parameters)		
Baud	integer	(Read-only) Returns the value of the Baud menu item.
CheckParity	boolean	(Read-only) Designates whether parity checking is done on the incoming data. True Parity menu item set to Even or Odd. False Parity menu item set to None or Ignore.
DataBits	integer	(Read-only) Returns the value of the Data Bits menu item.
DelayedOutputClose	boolean	True False
Enabled	boolean	(Read-only) True False

Table 4-12 PostScript Level 2 Emulation Device Parameters (Continued)

Key	Type	Definition
FlowControl	name	(Read-only) Designates the serial flow control method between the host computer and the device. Returns a value corresponding to the Serial Protocol menu item: Dtr DtrDsr XonXoff XonXoffDtr XonXoffDtrDsr.
HasNames	boolean	(Read-only) Always returns false.
HonorDSR	boolean	Serial - Honor DSR true Honor DSR is set On false Honor DSR is set Off
Interpreter	name	(Read-only) PostScript AutoSelect PCL PPDS
On	boolean	True False
Parity	name	(Read-only) Designates the parity to be used between the host computer and the device: Even, Odd, None, or Ignore. Returns the value of the Parity menu item.
PortLocation	string	(Read-only) Designates the physical location of the port related to the parameter set. Values are: Standard Port Option Slot 1 Option Slot 2 Option Slot 3
RobustXon	boolean	true RobustXon is set On false RobustXon is set Off
SerialMode	name	(Read-only) Designates the serial communication configuration: RS232C or RS422. Returns the value of the Serial RS-232/RS-422 menu item. Returns RS232 on a printer that is attached with a cable that does not support RS-422.
StopBits	integer	(Read-only) 1, 2
Type	name	(Read-only) Always returns /Communications.

Table 4-12 PostScript Level 2 Emulation Device Parameters (Continued)

Key	Type	Definition
Device Parameters for the Communication Device %LocalTalk% (%LocalTalk_NV% and %LocalTalk_Pending% contain the same parameters)		
DelayedOutputClose	boolean	True False
Enabled	boolean	(Read-only) True False
Filtering	name	InterpreterBased None
HasNames	boolean	(Read-only) Always returns false.
Interpreter	name	(Read-only) PostScript AutoSelect PCL PPDS
LocalTalkType	string	The type piece of the AppleTalk network entity name. This parameter also sets the Type parameter to the same value. The new value is returned by the **appletalktype** compatibility operator. Legal value: Any string of 32 or fewer non-null characters. Default value is LaserWriter. **Note:** Setting this variable does not affect the value for other physical INA cards. The **statusdict** string **appletalktype** is correct for the current job port.
NodeID	integer	(Read-only)
On	boolean	(Read-only) True False
PortLocation	string	(Read-only) Designates the physical location of the port related to the parameter set. Values are: Standard Port Option Slot 1 Option Slot 2 Option Slot 3
Type	name	(Read-only) Always returns /Communications.

Table 4-12 PostScript Level 2 Emulation Device Parameters (Continued)

Key	Type	Definition
Device Parameters for the Communication Device %EtherTalk%, %EtherTalkB%, %EtherTalkC%, %EtherTalkD% (%EtherTalk_NV% and %EtherTalk_Pending% contain the same parameters)		
DelayedOutputClose	boolean	True False
Enabled	boolean	(Read-only) True False
EthernetAddress	string	(Read only) The Ethernet address of the Ethernet internal network adapter (INA). Ethernet address is read only from RAM. There is no NVRAM variable for the Ethernet address. Legal value: Any string of 17 or fewer non-null characters. Default value is 00:00:00:00:00:00.
EtherTalkType	string	The type piece of the EtherTalk interface entity name. This parameter also sets the LocalTalkType parameter to the same value. The new value is returned by the **appletalktype** compatibility operator. Legal value: Any string of 32 or fewer non-null characters. Default value is LaserWriter. **Note:** Setting this variable does not affect the value for other physical INA cards. The **statusdict** string **appletalktype** is correct for the current job port.
EtherTalkZone	string	The zone piece of the EtherTalk interface entity name. EtherTalkZone is read/write only to RAM. There is no NVRAM variable for EtherTalkZone. Legal value: Any string of 32 or fewer non-null characters.
Filtering	name	InterpreterBased None
HasNames	boolean	(Read-only) Always returns false.
Interpreter	name	(Read-only) PostScript AutoSelect PCL PPDS
NodeID	integer	(Read-only)
On	boolean	(Read-only) True False

Table 4-12 PostScript Level 2 Emulation Device Parameters (Continued)

Key	Type	Definition
PortLocation	string	(Read-only) Designates the physical location of the port related to the parameter set. Values are: Standard Port Option Slot 1 Option Slot 2 Option Slot 3
Type	name	(Read-only) Always returns /Communications.
Device Parameters for the Communication Device %IR%, %IR_A%, %IR_B%, %IR_C%, %IR_D%		
DelayedOutputClose	boolean	True False
Enabled	boolean	(Read-only) True False
HasNames	boolean	(Read-only) Always returns false.
Interpreter	name	(Read-only) PostScript AutoSelect PCL PPDS
On	boolean	True False
PortLocation	string	(Read-only) Designates the physical location of the port related to the parameter set. Values are: Standard Port Option Slot 1 Option Slot 2 Option Slot 3
Type	name	(Read-only) Always returns /Communications.
Device Parameters for the Communication Device %TokenTalk%, %TokenTalkB%, %TokenTalkC%, %TokenTalkD%		
Address	string	(Read-only)
Bridging	name	(Read-only) Adaptive
DelayedOutputClose	boolean	True False
Enabled	boolean	(Read-only) True False
Filtering	name	InterpreterBased None
HasNames	boolean	(Read-only) Always returns false.

Table 4-12 PostScript Level 2 Emulation Device Parameters (Continued)

Key	Type	Definition
Interpreter	name	(Read-only) PostScript AutoSelect PCL PPDS
NodeID	integer	(Read-only)
On	boolean	(Read-only) True False
PortLocation	string	(Read-only) Designates the physical location of the port related to the parameter set. Values are: Standard Port Option Slot 1 Option Slot 2 Option Slot 3
TokenTalkType	string	Setting this variable does not affect the value of other physical INA cards. **Note:** The **statusdict** string **appletalktype** is correct for the current job port.
Type	name	(Read-only) Always returns /Communications.
Zone	string	(Read-only) Determined when printer powers up.
Device Parameters for the Communication Device %AppSocket%, %AppSocketB%, %AppSocketC%, %AppSocketD%		
DelayedOutputClose	boolean	True False
Enabled	boolean	(Read-only) True False
Filtering	name	InterpreterBased None
HasNames	boolean	(Read-only) Always returns false.
Interpreter	name	(Read-only) PostScript AutoSelect PCL PPDS
On	boolean	True False

Table 4-12 PostScript Level 2 Emulation Device Parameters (Continued)

Key	Type	Definition
PortLocation	string	(Read-only) Designates the physical location of the port related to the parameter set. Values are: Standard Port Option Slot 1 Option Slot 2 Option Slot 3
Type	name	(Read-only) Always returns /Communications.
Device Parameters for the Communication Device %RemotePrinter%, %RemotePrinterB%, %RemotePrinterC%, %RemotePrinterD%		
DelayedOutputClose	boolean	True False
Enabled	boolean	(Read-only) True False
Filtering	name	InterpreterBased None **Note:** Setting this variable changes the value of the corresponding %PrintServer% device.
HasNames	boolean	(Read-only) Always returns false.
Interpreter	name	(Read-only) PostScript AutoSelect PCL PPDS
On	boolean	True False
PortLocation	string	(Read-only) Designates the physical location of the port related to the parameter set. Values are: Standard Port Option Slot 1 Option Slot 2 Option Slot 3
Type	name	(Read-only) Always returns /Communications.
Device Parameters for the Communication Device %PrintServer%, %PrintServerB%, %PrintServerC%, %PrintServerD%		
DelayedOutputClose	boolean	True False
Enabled	boolean	(Read-only) True False

Table 4-12 PostScript Level 2 Emulation Device Parameters (Continued)

Key	Type	Definition
Filtering	name	InterpreterBased None **Note:** Setting this variable changes the value of the corresponding %RemotePrinter% device.
HasNames	boolean	(Read-only) Always returns false.
Interpreter	name	(Read-only) PostScript AutoSelect PCL PPDS
On	boolean	True False
PortLocation	string	(Read-only) Designates the physical location of the port related to the parameter set. Values are: Standard Port Option Slot 1 Option Slot 2 Option Slot 3
Type	name	(Read-only) Always returns /Communications.
Device Parameters for the Communications Device %LPR%, %LPR_B%, %LPR_C%, %LPR_D%		
Enabled	boolean	(Read-only) True False
Filtering	name	InterpreterBased None
HasNames	boolean	(Read-only) Always returns false.
Interpreter	name	(Read-only) PostScript AutoSelect PCL PPDS
On	boolean	True False
PortLocation	string	(Read-only) Designates the physical location of the port related to the parameter set. Values are: Standard Port Option Slot 1 Option Slot 2 Option Slot 3
Type	name	(Read-only) Always returns /Communications.

Table 4-12 PostScript Level 2 Emulation Device Parameters (Continued)

Key	Type	Definition
Device Parameters for the Communications Device %LexLink%, %LexLinkB%, %LexLinkC%, %LexLinkD%		
DelayedOutputClose	boolean	True False
Enabled	boolean	(Read-only) True False
HasNames	boolean	(Read-only) Always returns false.
Interpreter	name	(Read-only) PostScript AutoSelect PCL PPDS
On	boolean	True False
PortLocation	string	(Read-only) Designates the physical location of the port related to the parameter set. Values are: Standard Port Option Slot 1 Option Slot 2 Option Slot 3
Type	name	(Read-only) Always returns /Communications.
Device Parameters for the Parameters Device %IP%, %IP_B%, %IP_C%, %IP_D%		
Gateway Address	string	(Read-only)
IPAddress	string	(Read-only)
IPAddressDynamic	boolean	(Read-only) True False
NetworkMask	string	(Read-only)
On	boolean	True False
Physical	string	(Read-only)
PortLocation	string	(Read-only) Designates the physical location of the port related to the parameter set. Values are: Standard Port Option Slot 1 Option Slot 2 Option Slot 3
Type	name	(Read-only) Always returns /Parameters.

Table 4-12 PostScript Level 2 Emulation Device Parameters (Continued)

Key	Type	Definition
Device Parameters for the Parameters Device %EthernetPhysical%, %EthernetPhysicalB%, %EthernetPhysicalC%, %EthernetPhysicalD%		
EthernetAddress	string	(Read-only)
On	boolean	(Read-only) True False
PortLocation	string	(Read-only) Designates the physical location of the port related to the parameter set. Values are: Standard Port Option Slot 1 Option Slot 2 Option Slot 3
Type	name	(Read-only) Always returns /Parameters.
Device Parameters for the Parameters Device %TokenRingPhysical%, %TokenRingPhysicalA%, %TokenRingPhysicalB%, %TokenRingPhysicalC%, %TokenRingPhysicalD%		
Address	string	(Read-only)
On	boolean	(Read-only) True False
PortLocation	string	(Read-only) Designates the physical location of the port related to the parameter set. Values are: Standard Port Option Slot 1 Option Slot 2 Option Slot 3
Speed	integer	4 6
Type	name	(Read-only) Always returns /Parameters.

Table 4-12 PostScript Level 2 Emulation Device Parameters (Continued)

Key	Type	Definition
Device Parameters for the Parameters Device %Engine%		
BSizeStandard	name	(Read-only) Value of JIS
Darkness	real	Print Darkness Real numbers in the 0.0 to 1.0 range. Queries return the Print Darkness setting as a real value: **Setting** **Darkness Value** Lightest 0.1 Lighter 0.3 Normal 0.5 Darker 0.7 Darkest 0.9 When the Darkness value is modified, the following ranges determine the Print Darkness setting: **Value Range** **Setting** 0.0 - 0.2 Lightest 0.2 - 0.4 Lighter 0.4 - 0.6 Normal 0.6 - 0.8 Darker 0.8 - 1.0 Darkest
PageCount	integer	(Read-only) Page Count
TimeToStandby	integer	Power Saver 0 - 120
Type	name	(Read-only) Always returns /Parameters.
Device Parameters for the Parameters Device %Console%		
Language	name	Display Language
Type	name	(Read-only) Always returns /Parameters.
Device Parameters for the IODevice Device %disk1%		
BlockSize	integer	(Read-only)
Free	integer	(Read-only) Indicates the amount of free space available in pages on the optional disk. Valid only if the disk is mounted (mounted is set to true). A value of 0 (zero) indicates that either the disk is not mounted or is full.
HasNames	boolean	(Read-only) Indicates whether the disk supports named files. Valid only if the disk is mounted (mounted is set to true). If the disk is not mounted, the parameter value is false.

Table 4-12 PostScript Level 2 Emulation Device Parameters (Continued)

Key	Type	Definition
InitializeAction	integer	Specifies an action for initializing the disk: 0 indicates no action; the value returned when the parameter is read. 1 indicates that the current file system (if any) should be deleted and a new one of **LogicalSize** created (the disk is assumed to have been formatted already). The disk must first be mounted; otherwise, an **ioerror** results. 2 reformats the entire disk before creating a new file system of size **LogicalSize**. 3 (or greater) has the same effect as the value 2 and also tests the disk x-2 times.
LogicalSize	integer	Specifies the size of the file system to be created; also used as an argument by InitializeAction. • If 0, InitializeAction uses the size of the entire disk. When queried, indicates the current size of the file system on the device (in pages). A value of 0 indicates that the device is not mounted. • If set with a certain value and the device is reformatted, a query should return the value that was set. If queried before the disk is reformatted, a different value from the one set may be returned because it may return the current size. • If set to 1, 2, or 3, an **ioerror** occurs. Legal value: Any non-negative integer, including 0. The value must be less than or equal to the value of PhysicalSize. If set to a value greater than PhysicalSize, or less than zero, a **rangecheck** error occurs.
Mounted	boolean	true System attempts to mount the disk. false System attempts to dismount the disk. A device must contain a valid file system to mount successfully. When a device is mounted, it is known to the system and is readable. To verify if the device is currently mounted, query this parameter immediately after setting it.
PhysicalSize	integer	(Read-only) Indicates the size of the disk (in pages). Valid only when the disk is mounted. A value of 0 indicates that the device is not mounted.
Removable	boolean	(Read-only) Indicates whether the drive supports removable disks. Always returns false.
Searchable	boolean	(Read-only) Indicates whether the disk participates in searches in the file system operations that have specified a filename without specifying a device.
SearchOrder	integer	(Read only) If the Searchable parameter is true, indicates the priority at which the disk is searched for a file in operations where no device has been specified. A lower integer indicates a higher priority. If the Searchable parameter is false, the value of this integer does not have any meaning.
Type	name	(Read-only) Always returns /FileSystem.

Table 4-12 PostScript Level 2 Emulation Device Parameters (Continued)

Key	Type	Definition
Writeable	boolean	(Read only) Indicates whether the files on the disk can be open for write access. If the disk is write protected, this parameter is a constant equal to false. When the disk is not mounted, this parameter indicates whether or not the drive supports writeable media.
Device Parameters for the IODevice %flash1%		
BlockSize	integer	(Read-only)
Free	integer	(Read-only) Indicates the amount of free space available in pages on the flash. Valid if the flash is mounted (mounted is set to true). A value of 0 (zero) indicates that either the flash is not mounted or is full.
HasNames	boolean	(Read-only) Indicates whether the flash parameter is only valid if flash is mounted (mounted is set to true). If flash is not mounted, the parameter has a value of false.
InitializeAction	integer	Specifies an action for initializing flash: 0 indicates no action; the value returned when the parameter is read. 1 indicates that the current file system should be deleted and a new one of PhysicalSize created (the flash must be formatted already). Mount the flash first or an **ioerror** results. 2 reformats the entire flash before creating a new file system of PhysicalSize. 3 (or greater) has the same effect as the value 2 and also tests the flash x-2 times. Legal value: Any non-negative integer.
LogicalSize	integer	This parameter is not used for InitializeAction. InitializeAction always formats to PhysicalSize, regardless of what is specified in LogicalSize. A query returns the current size of the file system on the device in pages. 0 device is not mounted. Legal value: Any non-negative integer, including 0. The value of LogicalSize must be less than or equal to the value of PhysicalSize. A **rangecheck** error occurs if you try to set a larger value or set the value to zero.
Mounted	boolean	true system attempts to mount the flash. false system attempts to dismount the flash. When a device is mounted, it becomes known to the system and is readable, depending on the nature of the device. A device must contain a valid file system or it will not mount successfully. To verify if the device is currently mounted, query this parameter immediately after setting it.
PhysicalSize	integer	(Read-only) Indicates the size of the flash (in pages) for a flash that is mounted. A value of 0 indicates that the device is not mounted.
Removable	boolean	(Read-only) Indicates whether the drive supports removable flash.

Table 4-12 PostScript Level 2 Emulation Device Parameters (Continued)

Key	Type	Definition
Searchable	boolean	(Read-only) Indicates whether the flash participates in searches in file system operations that have specified a filename without specifying a device.
SearchOrder	integer	(Read-only) If the Searchable parameter is true, indicates the priority at which the flash is searched for a file in operations where no device has been specified. A lower integer indicates a high priority. If the Searchable parameter is false, the value of this integer has no meaning.
Type	name	(Read-only) This constant always returns /FileSystem.
Writeable	boolean	(Read-only) Indicates whether the files on the flash can be opened for write access. A write-protected flash returns false. When the flash is not mounted, this parameter indicates whether or not the device supports writeable media.
Device Parameters for the IODevice %rom%		
BlockSize	integer	(Read-only)
Free	integer	(Read-only) Indicates the amount of free space available in pages in ROM. Valid only if the ROM is mounted (mounted is set to true). A value of 0 (zero) indicates that either the ROM is not mounted or is full.
HasNames	boolean	(Read-only) Indicates whether ROM supports named files. Valid only if ROM is mounted (mounted is set to true). If ROM is not mounted, this parameter has a value of false.
InitializeAction	integer	(Read-only) Always returns zero which indicates no action.
LogicalSize	integer	(Read-only)
Mounted	boolean	true System attempts to mount the ROM. false System attempts to dismount the ROM. When a device is mounted, it becomes known to the system and is readable, depending on the nature of the device. A device must contain a valid file system or it will not mount successfully. To verify if the device is currently mounted, query this parameter immediately after setting it. If the ROM device is dismounted, unpredictable results occur.
PhysicalSize	integer	(Read-only) Indicates the size of the ROM that is mounted in pages. A value of 0 indicates that the device is not mounted. This parameter is only valid when ROM is mounted.
Removable	boolean	(Read-only) Always false.
Searchable	boolean	(Read-only) Indicates whether ROM participates in searches in file system operations that have specified a filename without specifying a device.

Table 4-12 PostScript Level 2 Emulation Device Parameters (Continued)

Key	Type	Definition
SearchOrder	integer	(Read-only) If the Searchable parameter is true, indicates the priority at which the ROM is searched for a file in operations where no device has been specified. A lower integer indicates a higher priority. If the Searchable parameter is false, the value of this integer has no meaning.
Type	name	(Read-only) Always returns /FileSystem.
Writeable	boolean	(Read-only) Indicates whether the files on the ROM can be opened for write access. Always false.

Status and Error Messages

The printer can return PostScript Level 2 emulation error messages and status information to the computer through any active interface. To send information to the computer through the parallel interface, configure the interface as bidirectional.

Status Messages

The printer responds to a status query (usually Ctrl+T) on an interface by sending a one-line status message back to the host computer over the same interface. If the status query is received between jobs and the printer is idle with no error conditions, an idle response is returned to the host computer.

Status messages are bracketed by the characters `%%[` and `]%%`, so the computer software can extract them from other data generated by the current job. They follow a standard syntax, consisting of one or more key-value pairs, separated by semicolons. For example:

```
%%[ job: Project Report; status: busy; source: Parallel ]%%
```

Table 4-13 Status Message Keys and Value Descriptions

Key	Value Description
job	The name of the job, as stored in the **JobName** entry in **statusdict**. This field is omitted when the current job does not have a defined **JobName**.
status	Printer activity at the time the message is sent: Idle — No job in progress. Busy — Executing a PostScript Level 2 emulation program, printing pages or both. Waiting — I/O wait in mid-job. PrinterError — For example, Paper Jam or Wrong Paper Length. Initializing — During startup. Not ready — Printer menus are displayed or **Not Ready** is displayed.
source	Source of job the server is executing; this field is omitted if the server is idle. Parallel Serial Network1 Network2 Network3

Unsolicited Messages

Unsolicited messages are only returned through an AppleTalk internal network adapter (INA). Unsolicited messages use the same syntax as status messages. These messages are transmitted sequentially as ordinary data through the communication channel, with other characters written to a standard output file. These messages are bracketed with `%%[` and `]%%`.

`%%[ Error: error type; Offending Command: operator ]%%`

The interpreter has detected an *error* while executing *operator* and invoked **handleerror**.

`%%[ Flushing: rest of job (to EOF) is ignored ]%%`

The rest of the current job is being discarded because of a previous error or other ending, such as a **stop** or Ctrl+C. The printer ignores further input until it determines end of job.

`%%[ exitserver: permanent state may be changed ]%%`

The PostScript Level 2 emulation program has exited successfully from the server normal save or restore context; it can therefore make permanent changes to system parameters or to virtual memory.

Chapter 5 Switching Printer Languages

The printer supports enhanced PCL 5 emulation and PostScript Level 2 emulation. This chapter describes ways to switch printer languages and explains when you may want to choose one method over another. SmartSwitch is provided with the printer to switch languages. Other methods of switching languages are:

- PJL ENTER LANGUAGE command
- Set Initial Conditions (SIC) command
- Sniffing

SmartSwitch

The SmartSwitch feature lets the printer switch to either PCL 5 emulation or PostScript Level 2 emulation for each interface (parallel, serial, or network). The printer is shipped from the factory with SmartSwitch set On for all languages and all interfaces. Consequently, the printer examines all print jobs coming into all its interfaces and switches between PostScript Level 2 emulation and PCL 5 emulation dynamically.

If a software application explicitly tells the printer which language to use by a PJL command, the printer always accepts and uses that explicit command, regardless of how SmartSwitch has been set from the operator panel.

If a software application does not explicitly tell the printer which language to use, the printer examines the incoming data stream and selects the language.

Setting SmartSwitch for Different Interfaces

You can customize the printer so that particular print jobs are sent to particular interfaces. For example, you may want to send all PostScript Level 2 emulation jobs to the network interface and all PCL 5 emulation jobs to the parallel interface. You can do so by choosing different languages for each interface from the operator panel, setting the selected language On for the interface you want. Refer to the *User's Guide* that came with your printer for further information.

If you have turned off a particular language for an interface, but then decide to send a job to that interface using that language, you *must* begin the job with a PJL command to override the operator panel setting. For example, if you set PCL 5 emulation off for the serial interface and later decide to send a job in that language through that interface, you must preface the job with a PJL command to override the Off setting. Be sure to end the job with a Universal Exit Language (UEL) command, which is described on page 3-2.

Printer Job Language

For details on Printer Job Language (PJL) and the PJL ENTER LANGUAGE command, see "ENTER LANGUAGE Command" on page 3-2.

Sniffing

Sniffing is:

- enabled when any End-of-Job point occurs
- disabled when a SIC or PJL command within a valid printer language is received.

The printer examines the received data stream, attempts to determine the type of data stream, and automatically switches to the proper language.

The printer examines the active printer language and decides when an End-of-Job point occurs. End-of-Job points are:

- SIC command
- UEL command
- Print timeout
- Wait timeout
- PostScript timeout due to erasing the contents of an internal link
- Ctrl+d in PostScript or tagged binary
- INIT*
- Network Protocol Alliance Protocol job boundary

Chapter 6 Flash Memory and Disk Options

The Flash Memory Option and Disk Option are used to store permanent fonts, macros, and symbol sets. The Disk Option is also used to buffer print jobs waiting to print. Unlike RAM memory, these options retain the following information when the printer is turned off, or when the printer switches languages:

- PCL emulation permanent bitmapped and scalable fonts
- PCL emulation permanent macros
- PCL emulation symbol sets
- PostScript Type 1 fonts
- Files created using the PostScript Level 2 emulation file operators
- Demonstration files (select **TESTS MENU**, **Print Demo** from the operator panel)

A printer may contain both a Flash Memory Option and a Disk Option.

When first installed in the printer, the flash or disk may be unformatted. It must be formatted before it can be used. A message is displayed on the operator panel if the option is unformatted. When a flash or disk is formatted, all information stored on the device is lost.

If a flash or disk becomes full when downloading resources, a message is displayed on the operator panel. The file being downloaded is not saved unless room is available to hold the entire file.

Resource Data Collection

The Resource Data Collection mode is used to save the following information to flash or disk:

- Permanent bitmapped and scalable fonts for PCL emulation
- Permanent macros for PCL emulation macros
- Permanent symbol sets for PCL emulation
- Type 1 fonts for PostScript Level 2 emulation

Resource Data Collection can be turned on and off by using:

- The operator panel (press **MENUS>**, then select **SETUP MENU**, **Download Target**)
- The DOS Toolkit utility, OS/2 Toolkit, or MarkVision. You can also download resources to flash and disk or format the flash or disk using these printer utilities.
- A PJL command (see "LDOWNLOADTARGET" on page 3-20 and "LDOWNLOADTARGET Command" on page 3-54.)

The download target (the destination for the resource data collection) may be RAM (the default), flash, or disk.

If you store resources (fonts, macros, or symbol sets) in RAM, the resources will be lost if the printer is reset or if the printer language changes while Resource Save is Off. In each case, the resources must be downloaded again. By storing resources on flash or disk, the resources become resident to the printer.

Storing Resources on Flash or Disk

Complete the following steps to download resources to flash or disk from the operator panel, the Toolkit utility associated with your operating system, a SIC command, or a PJL command.

1. **Set the download target to flash or disk. Resource Data Collection mode is enabled to the device selected.**
2. **Download the resources to flash or disk using PCL emulation or PostScript Level 2 emulation.**
   - PCL emulation collects and stores the currently defined font, macro, or symbol set information in printer RAM memory. These resources are written to flash or disk when Resource Data Collection is changed (see step 3). Stored resources are also copied to flash or disk when a printer language switch occurs.
   - PostScript Level 2 emulation writes Type 1 fonts to flash or disk after successfully parsing a **definefont** operator.
3. **Set Download Target to RAM. Resource Data Collection mode is disabled.**

Viewing the Contents of Flash and Disk

There are three ways to view the contents of flash and disk:

- The PJL LPRINTDIRECTORY command (see “Print Test Page Commands” on page 3-52)
- The printer operator panel (press **MENUS>**, then select **TESTS MENU**, **Print Directory**)
- The MarkVision utility

The directory lists the storage device (flash or disk), the names of the files, and the file size. See page 6-4 for a sample directory.

Example of Directory

The Directory that prints appears similar to the one below. An explanation of the parts of the Directory follows the example.

```
                                                                    Page 1
Optional Font Memory          Size 1048576 bytes
Part Name:  FLASH
Part Number: (none)
Write password protected

ID           Type                 Size       Prot.      Description
===========  ===================  =========  =========  ========================
1000         PCL bitmap font      32140      W          ITClublnGrphBkOb
1002         PCL bitmap font      52550                 Courier
1003         PCL scalable font    254491                CG Times
             PostScript font      134572                Courier
             User data            1000                  My Program
             Demo                 1000                  My Demo
             Unknown file type    1000                  My Unknown
248          PCL macro            10         R/W
249          PCL macro            10                    mydescription


             9 files              476773 bytes used
                                      0 bytes unavailable
                                  571803 bytes free
```

Optional Font Memory

Expression used to indicate flash or disk is installed.

Part Name

Name as it is stored in the flash card header. If flash is formatted by the printer, the Part Name field is FLASH. No part name field is printed for a disk.

Part Number

Part number that is in the flash card header. If the flash is formatted by the printer, the part number field is shown as (none). The part number field for the disk is not printed.

Write Password Protected

Indicates the flash or disk is write-protected.

If the device is read/write protected, "`Read/Write password protected`" is printed. If the device is not protected, this line is blank.

For more information, see “File and Device Protection Commands” on page 3-60 and “Password Protection” on page 6-7.

ID

Valid for PCL emulation macros, fonts, and symbol sets only. The ID must be used when adding a description to a macro or a symbol set. If two files with the same file type have duplicate IDs, the following occurs:

- If multiple fonts with the same file type have been created with duplicate download IDs, all fonts are listed but only the last font has an ID printed by it.
- If multiple macros or symbol sets have been created with duplicate download IDs, only the last macro or symbol set is listed. It is the only one that can be selected. On the flash device, the number listed for `bytes unavailable` does include the unlisted macros and symbol sets. The `bytes unavailable` is not applicable for the disk device.
- PostScript Level 2 emulation fonts, and files created by PostScript Level 2 emulation file operators, do not have IDs.

Type

File types that can be stored on flash or disk have unique extensions. The following file types are recognized by the flash format used on earlier printer models; the name of the file type printed in the directory appears in parenthesis.

.t1 (PostScript font)
.sFnt5 (PCL scalable font)
.bFnt5 (PCL bitmap font)
.Mac5 (PCL macro)

Except as noted below, file types listed above are recognized by the flash format used in your printer. In addition, the flash format in your printer also recognizes the following formats:

.data (user data) - any file written with PostScript operators
.type1 (PostScript font) - replaces the earlier .t1 extension
.demo (demo) - used for demonstration printouts or forms
.p5scalable (PCL scalable font)
.p5bitmap (PCL bitmapped font)
.p5macro (PCL macro) - replaces the earlier .Mac5 extension
.p5symset (PCL symbol set)

Usually the PostScript file operators can only read/write files with the extension *.data*. Use the **setfilenameextend** operator to read/write other file types, including *.demo*. Any other file type appears in the list as Unknown File Type. The description column then contains the full filename with the file type (extension).

Size

The size for each resource includes the size of the file header.

Prot.

Indicates whether the file is password protected.

`R/W` - read/write protection
`W` - write protection

If this field is blank, the flash or disk is not protected.

For more information on file protection, see “File and Device Protection Commands” on page 3-60 and “Password Protection” on page 6-7.

Description

The description field for fonts comes from the font header. The description field for macros or symbol sets is blank unless the description field in the file header is set by the PJL LRESOURCE command. See “Printer Unique LRESOURCE Variables” on page 3-33.

The description for macros or symbol sets can be set only once for these files on flash devices. They can be set any number of times on a disk. The limitation for flash files is due to flash technology. See the “LDESCRIPTION” variable in Table 3-9, “Printer Unique LRESOURCE Variables” on page 3-34 for more information.

Password Protection

You can password protect the entire flash or disk device, or files stored on the flash or disk device.

There are two levels of password protection:

Read/Write

Ensures that the file or device is protected against reading and writing unless the password has been appropriately specified (applies only to actual file data).

Write

Ensures that data cannot be changed on a file or device unless the password has been appropriately specified. A Read/Write password takes precedence over a Write password.

Each file or device can have a separate password. Write passwords ensure that files cannot be deleted, renamed, or updated and a device cannot be formatted or specified as a download target. Read/Write password protection provides the same protection as Write, but additionally ensures that data cannot be read from the file or device.

By using passwords, administrators can ensure data integrity and proper authorization. If a flash device is write password protected, for example, users cannot delete existing files, format the device, or download new files to the device (without first specifying the password). A specific example might be a macro file of an authorizing signature that is stored on flash with a Read/Write password. This password ensures that only those authorized can use the signature. All other files (fonts, letterhead, macros) can be unprotected for general use.

Passwords are set, declared, retracted, and deleted using the PJL commands or the MarkVision utility. See “Protecting a File or Device” on page 3-60.

General Information about Flash

Rewriting the Flash Content

Be aware that once a bit on the flash is turned from 1 (binary 1) to 0 (binary 0), it cannot be changed back to binary 1 without a complete flash format. As PostScript Level 2 emulation file operators write data to flash, the printer microcode software verifies that none of the bits being set to binary 1 is binary 0. If any attempt is made to change a 0 bit back to 1, a PostScript Level 2 emulation **ioerror** occurs.

When a device is formatted, all locations are set to binary 1. This is also the reason descriptions and passwords can be set only once for files on flash.

Accessing Files with PostScript Level 2 Emulation

File Naming Conventions

For any PostScript Level 2 emulation operator that requires a filename parameter, the filename can be either:

%device%filename

Specifically references a file on a particular device. If the filename does not exist on %device%, no other %device% is accessed for a duplicate filename.

filename

Does not specifically reference a device. The following action occurs:

- For the PostScript Level 2 emulation operator **deletefile,** only the first device in the search order is checked for filename.
- For all other PostScript Level 2 emulation operators, and all other combinations of search order and available devices, each installed %device% is checked in the search order for the existence of filename. The operator acts upon the first filename that it finds.

Device Names

The term *device* refers to flash, disk, or ROM. For PostScript Level 2 emulation, some of the operators require or return device names. These operators are: **deletefile, filenameforall, devforall, devdismount, devmount, devformat, devstatus**. The device always begins and optionally ends with a % character. The following are the valid device names:

%rom%
%rom1%
%flash%
%flash1%
%disk%
%disk1%
%disk1_0%

The same filename can exist on more than one device. The device prefix determines the actual file to use. For example, *%rom%myfile* and *%flash%myfile* designate, respectively, a file called *myfile* both on the ROM and on the flash device. The device name distinguishes which file to use.

Device names are case sensitive. They must appear exactly as shown.

Each device (except the disk) has one synonym. For example, the flash can be referred to as *%flash%* or *%flash1%*. The name with the *1* is a unique identifier. This system allows for future expansion of multiple flash or disk devices. The disk provides for multiple physical units and multiple logical units. Thus, *%disk1_0%* indicates the first physical unit and the first (*0*) logical partition on the device. Currently, one physical device (for ROM, flash, and disk) is supported. The disk supports only the first (*0*) logical partition.

Filenames

Each file on a device has a unique name to identify the information contained within the file. The name may be up to 127 characters in length. All character codes from X'01' to X'FF' are valid (X'00' is not valid). Filenames are case sensitive: for example, *%flash%myfile* and *%flash%MYFILE* indicate different files on the flash.

Filename Extensions

By default, all files referenced when using the PostScript Level 2 emulation file operators are given a *.data* extension. For example, if the following PostScript Level 2 emulation command occurs,

```
(%flash%myfile) (w) file
```

the file *myfile.data* is opened on flash. The *.data* extension is added to:

- Enable the Print Directory feature to identify files as PostScript Level 2 emulation data files.
- Ensure the integrity of files, such as resource collection files and demonstration files.

However, it is sometimes necessary to access files by their *real* name through PostScript Level 2 emulation. For example, you may want to remove old versions of PCL 5 language resource collection fonts (without formatting the entire device).

To do this, use the PostScript Level 2 emulation **setfilenameextend** operator. This operator is in the **statusdict** dictionary.

The value of this operator adds the extension *.data* to all filenames referenced when using PostScript Level 2 emulation file operators. To prevent the *.data* extension from being added, issue the following PostScript Level 2 emulation command:

```
statusdict begin
    false setfilenameextend
    end
```

To add the *.data* extension automatically again, issue:

```
statusdict begin
    true setfilenameextend
    end
```

The following example shows how to remove a file for the font *myfont* from the disk. The PostScript Level 2 emulation resource collection filename is *myfont.type1*.The PostScript Level 2 emulation command to remove the file is:

```
statusdict begin
    false setfilenameextend
    (%disk%myfont.type1 deletefile
    true setfilenameextend
    end
```

For other file types, see page 6-5.

Note: It is recommended that **setfilenameextend** be enabled as soon as possible after being disabled. For example, the following PostScript Level 2 emulation commands generate an **undefinedfilename** error:

```
(%disk%iconimage) (w) file dup
(0f0606060686c6ff) writestring closefile
statusdict begin
false setfilenameextend
end
(%disk%iconimage) (r) file
%%[ Error: undefinedfilename; OffendingCommand: file ]%%
```

This occurs because the filename actually written to disk is *iconimage.data*. When **setfilenameextend** is enabled (the default), all PostScript Level 2 emulation file operators treat filename operands as *filename.data*; when disabled, they treat filename operands literally.

If you receive unexpected **undefinedfilename** or similar errors, try toggling **setfilenameextend** and sending your print job again.

Device Search Order

For the PostScript Level 2 emulation operators **run, file, renamefile, status** and **eexec**, the device need not be specified. If it is omitted, devices are searched in the default order: disk and then flash. If the following PostScript Level 2 emulation code is encountered,

```
(myfile) (w) file
```

the file on disk is used (since disk occurs before flash in the default search order), and files cannot be created in ROM.

The operator **deletefile** searches only the first device in the default search order if a device is not specified.

Use the PostScript Level 2 emulation operators **devmount, devdismount** to change the order. The default search order is determined by the order the devices are mounted. For example, if you want to place the disk device after the flash in the default search order, use the following command sequence:

```
(%disk%) devdismount
    (%disk%) devmount
```

To change the order so the devices are searched as disk, flash, and then ROM, use the following PostScript Level 2 emulation command sequence:

```
(%rom%) devdismount
    (%flash%) devdismount
    (%disk%) devdismount
    (%disk%) devmount
    (%flash%) devmount
    (%rom%) devmount
```

If the device is already mounted, the following operators may change the search order:

- **initializedisk**
- **devformat**
- `<</InitializeAction>>setdevparams`

Sending these operators has the following effect on the devices in the search order:

1. **If mounted, (*%device%*) devdismount**
2. **Formats the device**
3. **If dismounted in step 1, (*%device%*) devmount**

If you do not want a device searched, dismount it and leave it dismounted.

Note: *Do not* leave the ROM device unmounted. All internal fonts are contained on the ROM device.

In the previous examples, the **devmount, devdismount** operators must be used outside the server loop. It is recommended that you place the requests in a **stop** context so that if the devices do not exist, error recovery can take place.

Previous search orders are not retained. Once a change is made, it remains in effect.

Performance

Some performance degradation may occur during initial access to font or macro information from the disk (as opposed to flash or RAM). However, font information is put in cache, and further references to a font character occur at RAM speed.

Table 6-1 Device Performance Retrieval Speeds

Device	Retrieval Speed	Write
Disk	70KB/second	70KB/second
Flash	1MB/second	200KB/second

Job Buffering

Job buffering to the disk lets you store incoming print jobs on an optional disk installed on your printer. Although job buffering is designed for individual workstations and networks using MarkVision as the primary tool to control printer operations, you can handle some job buffering functions from the printer operator panel. Refer to the *User's Guide* for more details.

Job buffering requires at least 10MB of disk storage space, although a minimum of 20MB is recommended. You must define the size of the job buffer area before you enable buffering for any link ports.

Some advantages of job buffering include:

- The printer accepts print jobs more quickly.
- The printer accepts print jobs from all ports as long as the disk is not filled.
- The printer continues to print even after the host computer, network connection, or printer server goes down.
- Buffered jobs print when power is restored after a printer power loss.
- The printer manages print jobs from multiple sources.

Keep in mind that job buffering may also:

- Slow system performance.
- Restrict the amount of memory available on the disk for other uses.
- Increase the time required for a printer reset or recovery after a power loss.

Creating a Partition

Before job buffering is enabled for a port, you must allocate a portion of the disk for job buffering functions. When a new partition is created, the entire disk is formatted and all fonts and macros previously downloaded to the disk are lost.

Once a partition is defined, this disk space is reserved for job buffering.

Enabling Job Buffering

Once a partition is allocated, job buffering to disk may be enabled for each active link port through a Network Printing Alliance Protocol (NPAP) command. If you try to enable a port before the partition is allocated, the NPAP command is rejected. When buffering is enabled, the printer must go through a power-on reset (POR) or you must perform a full NPAP reset before job buffering can occur.

Disabling Job Buffering

When you disable job buffering, it takes effect immediately on the port you disabled. A POR is not required, but it is recommended so the unused memory resources can be reallocated. When buffering is disabled on a port, any jobs on the disk are printed before normal processing of incoming jobs continues.

To delete or resize a job buffer partition, first, delete or print all jobs. Then, disable job buffering on all ports. Finally, delete or resize the job buffer partition.

Recovering from a Power Loss

If the printer loses power, the job being spooled may be lost. Jobs already stored on the disk remain intact. When power is restored, you are asked if you want to print the jobs held in the buffer. Press **Stop** to cancel the job or erase the jobs from the disk. Press **Go** to print all jobs from the last NPAP command or from the last time the printer was in the Not Ready state.

Jobs that were partially printed during the loss of power are printed again in their entirety when power is restored.

Chapter 7 Hardware and Printer Interface

This chapter presents hardware information, such as physical specifications and interface information.

Printer Specifications

Print Method

Laser electrophotography (non-impact)

Table 7-1 Pels Per Square Inch

Resolution (Dots per inch)	Pels per square inch
300 dpi	90,000
600 dpi	360,000
1200 dpi	1,440,000
1200 Image Quality	360,000[1]

[1]1200 Image Quality mode has 360,000 pels per square inch. Each of these 600 x 600 dpi pels can be turned on in one of 4 increments. This provides 1,440,000 combinations of laser control per square inch; (600 x 600 x 4 = 1.44 million).

In 1200 Image Quality mode, the printer runs at full speed yet produces a comparable number of gray levels to 1200 dpi mode. 1200 Image Quality cannot, however, resolve fine details as precisely as true 1200 dpi.

See “1200 Image Quality” on page 1-5 for more information.

Display

Two-line liquid crystal display that shows text in 12 languages (English, French, German, Italian, Spanish, Danish, Norwegian, Dutch, Swedish, Portuguese, Finnish, and Japanese).

Standard Memory

4MB for Optra S 1255, S 1625 and S 1855, and 8MB for Optra S 2455.

Optional Memory

- 4MB, 8MB, 16MB, 32MB and 64MB printer memory options
- 1MB, 2MB, and 4MB flash memory options

Printer Languages

- PCL emulation
- PostScript Level 2 emulation
- Personal Printer Data Stream (PPDS)

Print Speed

For A4 and letter size paper:

Table 7-2 Print Speed

	300 and 600dpi		1200 Image Quality		1200 x 1200 dpi	
	letter	A4	letter	A4	letter	A4
Optra S1255	12 ppm	11.4 ppm	12 ppm	11.4 ppm	8 ppm	7.6 ppm
Optra S1625	16 ppm	15.2 ppm	16 ppm	15.2 ppm	8 ppm	7.6 ppm
Optra S1855	18 ppm	17.1 ppm	18 ppm	17.1 ppm	9 ppm	8.5 ppm
Optra S2455	24 ppm	22.8 ppm	24 ppm	22.8 ppm	12 ppm	11.4 ppm

Print Addressability

- 300, 600, and 1200 dpi
- 1200 Image Quality (See Table 7-1, “Pels Per Square Inch,” on page 7-1 for more information.)

Airflow Requirement

Room should meet ASHRAE 62-1989 standards.

Noise Emission Levels

The following measurements were made in accordance with ISO 7779 and reported in conformance with ISO 9296.

Table 7-3 Noise Emission Levels

	1-Meter Average Sound Pressure, dBa				Declared Sound Power Level, Bels			
Status	**Optra S 1255**	**Optra S 1625**	**Optra S 1855**	**Optra S 2455**	**Optra S 1255**	**Optra S 1625**	**Optra S 1855**	**Optra S 2455**
Printing	46	48	48	51	6.1	6.3	6.3	6.6
Standby	26	26	26	29	4.1	4.1	4.1	4.4

Electrical Specifications

- 100 to 120 volts (V) at 50 to 60 hertz (Hz)
- 200 to 240 V at 50 to 60 Hz (not available in all countries)

Note: We do not recommend using a 220 to 110 power converter with the 110 V printer.

Power Requirements

The following table lists the nominal average power requirements (including fuser power).

Table 7-4 Power Requirements

Printer Model	**Optra S 1255**		**Optra S 1625**		**Optra S 1855**		**Optra S 2455**	
State	**110 V**	**220 V**	**110 V**	**220 V**	**110 V**	**220 V**	**110 V**	**220 V**
Average Continuous Printing	275 W	275 W	315 W	315 W	410 W	410 W	490 W	490 W
Idle with Power Saver Off	80 W	80 W	95 W	95 W	95 W	95 W	110 W	110 W
Idle with Power Saver On	13 W	13 W	16 W	16 W	20 W	20 W	19 W	19 W
Peak Short Term Current	6.7 A	3.2 A	7.3 A	3.6 A	7.3 A	3.6 A	10 A	5.2 A

Physical Specifications

Table 7-5 Printer Physical Specifications

Dimensions	Optra S 1255 Optra S 1625	Optra S 1855	Optra S 2455
Height	13.2 in. (335 mm)	13.2 in. (335 mm)	25.6 in. (650 mm)
Width	15.9 in. (405 mm)	16.7 in. (425 mm)	17.5 in (445 mm)
Depth	19.5 in. (495 mm)	19.5 in. (495 mm)	20.5 in. (520 mm)
Weight	41 lb (18.6 kg)	42 lb (19.1 kg)	58 lb (26.4 kg)

Clearance Required

- 304.8 mm (12 in.) at the rear, on the left side, and on the right side of the printer
- 508 mm (20 in.) at the front of the printer
- 137.16 cm (4 ½ ft.) above the printer

Environmental Conditions - Printer and Print Cartridge

Table 7-6 Environmental Conditions

Condition	Operating Value	Power-Off Value	Shipping/Storage Value
Temperature Range	15.6° to 32.5°C (60° to 90.5°F)	10° to 43°C (50° to 110°F)	*Printer (with cartridge packed separately):* -40° to 60°C (-40° to 140°F) *Print Cartridge:* -40° to 43°C (-40° to 110°F)
Humidity Range	8% to 80%	8% to 80%	*Printer and Print Cartridge:* 5% to 95%
Maximum Wet Bulb Temperature	22.8°C (73°F) maximum	26.7°C (80°F) maximum	29°C (84.2°F) maximum

Temperature and Humidity

The printer is designed to operate from 15.6° to 32.5°C (60° to 90.5°F) with a humidity range of 8 to 80%. Certain media use such as envelopes or labels may limit the environment more. The preferred operating range for labels and card stock is 18.3° to 23.8°C (65° to 75°F).

Altitude

0 to 3048 m (10,000 ft) above sea level

Atmospheric Pressure

74.6 to 101.3 kPa (560 to 760 mmHg)

Warmup Period

After you turn the printer on, it takes about 60 seconds to perform internal diagnostics and to prepare for printing (**Ready** state).

Time to Print the First Page

The following information specifies the time to print the first page in seconds for 215.9 x 279.4 mm (8.5 x 11 in.) size pages. The media source is Tray 1:

Table 7-7 Print Times

Output[1]	Optra S 1255	Optra S 1625	Optra S 1855	Optra S 2455
First page	15	14	10	14
Subsequent pages	5	3.75	3.33	2.5
[1] Print wait time may also vary as a result of page complexity or size.				

Print Cartridge Supply

Your printer uses a recyclable print cartridge. (Lexmark does not recommend refilling your used print cartridges.) We recommend that you order a new print cartridge when the printer first displays the **88 Toner Low** message.There are three recommended print cartridges specifically designed for your printer.

Prebate™ Print Cartridge Part Numbers*	**Yield (Average)**	**Coverage (Approximate)**
1382920	7,500 pages	5%
1382925	17,600 pages	5%
1382929 (cartridge for special label machine use**)	17,600 pages	5%
* To order regular priced cartridges without Prebate discount and terms, order part numbers 1382620 (7,500 pages) or 1382625 (17,600 pages). ** Label fuser cleaners are not recommended in your duplex (two-sided) printing applications.		

Interfaces and Connectors

Interfaces connect the printer to other devices, such as a computer. Your printer has one parallel connector (also referred to as a *Centronics*-type interface).

Optra S 1855 has one serial connector for RS-232C serial interface. It is a standard feature on this printer model. This interface can be added to Optra S 1255, S 1625 and S 2455 only if the Tri-Port interface option card is installed. RS-422 serial interface can be added to all printer models if the Tri-Port interface option card is installed. For more information, refer to the *User's Guide*.

You can also buy optional network adapters that connect the printer to Token-Ring, Ethernet, or LocalTalk networks.

Note: All network adapters are capable of supporting AppleTalk.

Deciding Which Interface to Use

You can attach multiple interface cables to the printer at the same time.

The printer automatically switches to the interface receiving a job. Then it prints the job and begins searching the interfaces for the next job.

The parallel connector for all printer models and the serial connector for RS-232C for Optra S 1855 only are built into the printer. To use them, connect a cable from the printer to the computer, then set the appropriate values on the printer operator panel.

Use the parallel interface if you are attaching the printer to an IBM Personal Computer, IBM AT, or IBM PS/2-compatible parallel port or to a host system with a Centronics-compatible parallel port. Use the parallel interface also when attaching a Lexmark MarkNet XLe external network adapter.

Use the serial interface when you:

- Need to use a parallel interface cable more than 10 feet in length

  Note: If you use Lexmark cable part number 1427498, which is a 6.1 m (20 ft) cable, you may still use parallel interface.

- Share the printer using a printer-sharing device
- Need to connect the printer to a computer that does not have an available parallel port.

Attach the network cables to the optional network adapters installed in your printer for Token-Ring, Ethernet, or LocalTalk networks. Refer to the *User's Guide* for detailed information on installing the network adapters.

Parallel Interface

Use the Lexmark 3.04 m (10 ft) parallel cable part number 1329605, Lexmark 6.1 m (20 ft) parallel cable part number 1427498, or a cable that is IEEE 1284 compliant, to connect the printer to an IBM Personal Computer, IBM AT, or IBM PS/2-compatible parallel port or to a host system with a Centronics-compatible parallel port. The *User's Guide* that came with your printer shows the location of the parallel connector at the rear of the printer. Your printer can communicate with a computer across the parallel interface in three ways:

Computer to printer

This is typically how a computer and printer communicate. When the printer is receiving data from the computer, it can use either *Standard* or *Fastbytes* protocol.The burst transfer rate in Fastbytes is faster than in Standard protocol. For best throughput, use Fastbytes protocol.

Printer to computer (Advanced Status)

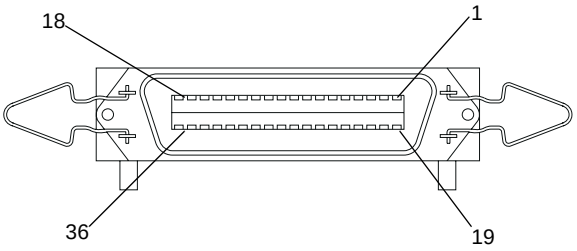
Your printer can send data to the computer. This new capability lets the printer send status messages to the computer on the parallel interface.

Parallel Modes 1 and 2

These are printer features that enhance reliability of data transfer from the host computer to the printer. See "Parallel Mode 1" and "Parallel Mode 2" on page 7-17 for more information.

Parallel Connector

The parallel connector on the printer is a 36-pin D-shell female receptacle, as shown.



Parallel Connector Pin Assignments

Table 7-8 lists interface and signal information for connector pin assignments. In this table, “Direction” refers to the direction of signal flow from the printer’s point of view. “Return” denotes twisted pair return.

Notes:

- Be sure to use a twisted pair cable for each signal in the interface wiring, and always complete the connection on the return side.
- To prevent line noise, the cables should be shielded and connected to the chassis of both the computer and the printer. The parallel cable length should not exceed 3.04 m (10 ft), unless a Lexmark 6.1 m (20 ft) parallel cable is used.

Table 7-8 Parallel Connector Pin Assignments

Pin	Signal	Direction	Description
1	STROBE* Inverted logic: signal is active when low	In	The computer generates this signal to allow the printer to read in data. The signal level is normally high: data is sampled at the falling edge of this pulse.
2–9	DATA0 through DATA7	In/Out	These signals represent data bits 0 to 7, respectively. Each signal is at a high level when data is logical 1, and low when data is logical 0. Pin 2 is the least significant bit. **Note:** Data is driven out only when the printer is in IEEE 1284 Byte or ECP modes.
10	ACKNLG* Inverted logic: signal is active when low	Out	This negative pulse indicates the printer can again accept data.
11	BUSY	Out	A high signal indicates the printer cannot receive data. The signal is high: • During initialization • During data sampling • When the buffer is full • In the not ready state • During a printer error A low signal indicates the printer is not busy and the computer can again send data.
12	PE	Out	Paper Exception signal indicates no paper is loaded, a paper jam exists, or a paper feed error occurred.
13	SLCT	Out	Select signal indicates the printer is selected and is online. This signal is normally active. It becomes inactive when the printer is offline.
14	AUTO FEED XT* Inverted logic: signal is active when low.	In	Host Busy when Advanced Status is On.

Table 7-8 Parallel Connector Pin Assignments (Continued)

Pin	Signal	Direction	Description
15	LOGIC CHASSIS GROUND		
16	LOGIC CHASSIS GROUND		
17	LOGIC CHASSIS GROUND		Not used.
18	VCC		300 mA of 5 V +/- 5%
19–30	GND	Return	These pins are grounded signals 1 through 12 when a twisted (parallel) cable is used. GND is often called a logic ground, and a fusible link isolates it from chassis ground to offset any large ground shifts when the printer and computer are on different circuits.
31	INIT* signal is active when low	In	The rising edge of a negative pulse on this line causes the printer to initialize. The printer synchronizes this function with the received data. On the falling edge of INIT*, the printer drives the BUSY interface signal active. On the rising edge of INIT*, the printer: • Prints all received data • Displays RESET • Initializes • Deactivates the BUSY signal To disable INIT* processing, set HONOR INIT to Off from the operator panel Setup Menu (Parallel Setup).
32	ERROR* Inverted logic: signal is active when low	Out	This signal indicates a printer error condition. The signal level becomes low when the printer is: • In paper exception status • Not ready because of an operator panel command to stop • Not ready because of a software command to stop • Not ready because of a software command for manual feed This signal is activated approximately 5 seconds after one of the above conditions sets BUSY.
33–35	LOGIC CHASSIS GROUND		
36	SLCTIN* signal is active when low	In	Set low by host computer to select printer.

Using the INIT* Signal to Initialize

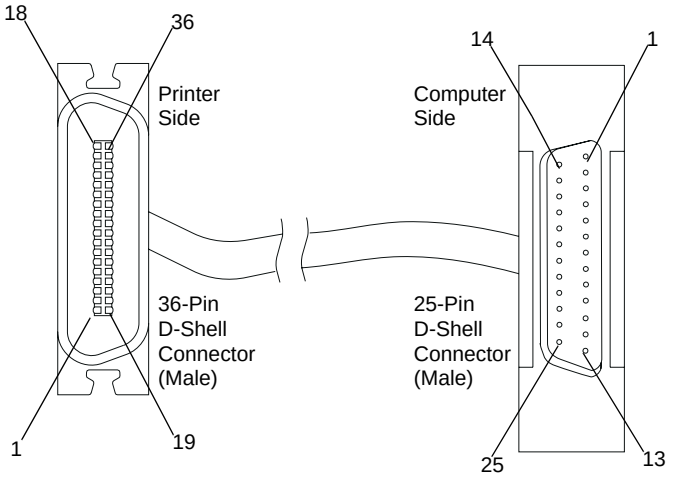
When the printer is using the parallel interface and it receives an INIT* signal, it initializes as follows (unless INIT* is disabled by a variable default setting):

- It prints data received before INIT*, then initializes.
- It returns variable defaults to the values stored in the user default settings.
- It returns fixed default settings to the factory values.
- It retains permanent downloaded fonts and macros, but deletes temporary downloaded fonts and macros.
- The link buffer remains intact.
- Variable default paper size settings become the active paper formatting size.
- If paper is loaded in a tray with auto size sensing, the printer resets the active default paper formatting size to the size of the paper in the tray.
- INIT* is not honored when Hex Print is active.
- INIT* causes the parallel interface to go busy. The printer processes INIT* when the parallel interface becomes active and all preceding characters have been processed.

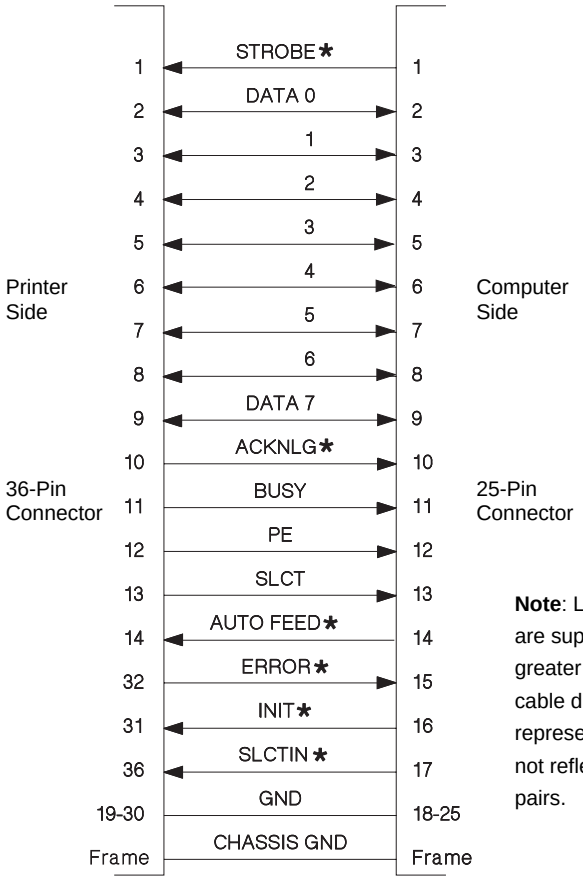
Computer-to-Printer Communications

This section describes how the parallel interface receives data from the computer.

The cabling in the following illustration supports Standard and Fastbytes protocols and IEEE 1284 Nibble, Byte, and ECP protocols.



The following illustration shows the pin assignments for connecting the 25-pin connector to the 36-pin connector. The symbol * indicates an active low signal.



Note: Lexmark IEEE 1284 compliant cables are supported up to 20 feet. Cable lengths greater than 20 feet are not supported. The cable drawing to the left is a functional representation of the Lexmark cables; it does not reflect correct pairing of leads or unused pairs.

The parallel interface consists of an 8-bit parallel data bus with the following characteristics:

- Uses 17 of the 36 positions on the printer connector, as follows:
  - The host system controls 12 lines, which it uses to send data and commands to the printer.
  - The printer controls five lines. The printer uses two lines to notify the computer when data is transferred successfully and three lines to report printer status.
- Controls synchronization with an externally supplied STROBE* pulse.
- Controls data flow control with BUSY and ACKNLG* signals. Does not carry out data transfer by ignoring the BUSY or ACKNLG* signal. (The system can carry out data transfer to the printer only when the level of the BUSY signal is low and after confirming the ACKNLG* signal is high.)
- Uses standard transistor-transistor logic (TTL) levels for all interface control signals and input data. Interface conditions are based on TTL levels. All printer outputs are totem-pole TTL devices. All printer input/output (I/O) are devices with an internal pull-up resistor to 5 V. Rise and fall times of each signal must be less than 1,500 nanoseconds (ns) without slope reversal.

Standard Protocol Data Transfer Sequence

The following illustration shows the typical data transfer sequence on the parallel interface. See Table 7-9 for typical parallel interface timings on the parallel interface.

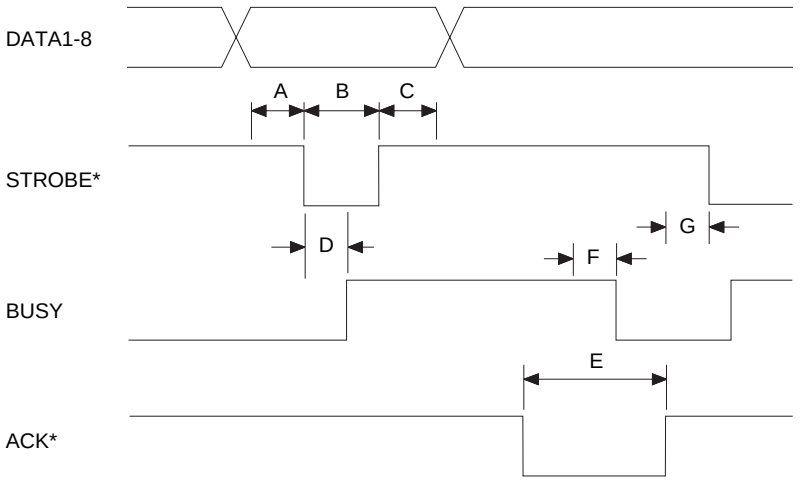


Table 7-9 shows all protocol timings in nanoseconds.

Table 7-9 Typical Parallel Interface Timings

Time	Name	Minimum/Maximum
A	Data setup to STROBE* low	500 min.
B	STROBE* width	500 min.
C	Data hold after STROBE*	500 min.
D	STROBE* low to BUSY high	500 max.
E	ACKNLG* low until ACKNLG* high	500 min.
F	ACKNLG* high to BUSY low[1]	-
G	BUSY low and ACKNLG* high to STROBE* low	500 min.
[1]Relationship of ACKNLG* and BUSY is not consistent		

Fastbytes Protocol Data Transfer Sequence

This printer is equipped with *Fastbytes* protocol, which is an enhanced parallel interface protocol. Fastbytes protocol may give you a faster data transfer time on some personal computers and operating systems. Fastbytes protocol is the printer default.

If you have data transmission problems between your personal computer and the printer, change the parallel protocol to *standard*. This causes the printer to operate in IEEE compliant compatibility mode.

The following illustration shows the typical timing sequence.

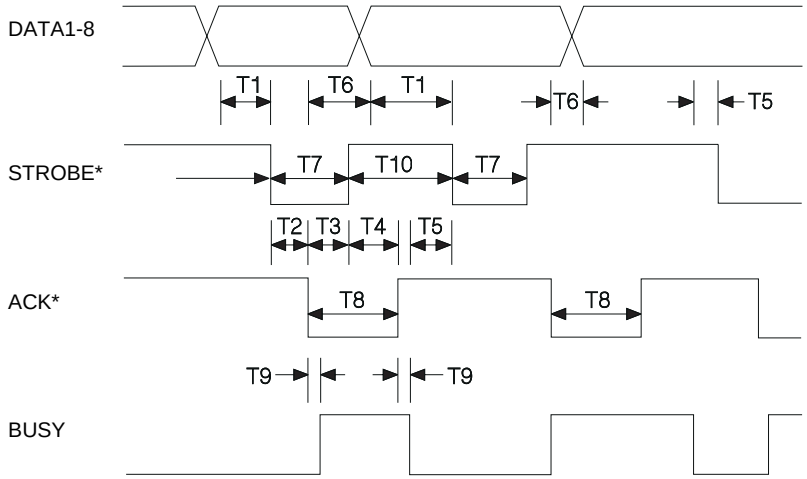


Table 7-10 shows all protocol timings in nanoseconds

Table 7-10 Fastbytes Timing Sequence

Time	Name	Minimum/Maximum
T1	Data setup to STROBE* low	400 min.
T2	STROBE* low to ACKNLG* low	0
T3	ACKNLG* low to STROBE* high	0
T4	STROBE* high to ACKNLG* high	0
T5	ACKNLG* high and BUSY low to STROBE* low	0
T6	ACKNLG* low to change data	50 min.
T7	STROBE* Timeout Max based on Auto Strobe Timer in PS/2	500 min.
T8	ACKNLG* width Equal to Data Setup Time	400 min.
T9	ACKNLG* to BUSY Skew	+/- 20 max.
T10	STROBE* high time Equal to Data Setup Time	400 min.

Printer-to-Computer Communication (Advanced Status)

The printer has an IEEE 1284-B compliant connector and is an IEEE 1284-I compliant device.

This printer could be considered an IEEE 1284-II compliant device if the “C” to “B” style connector converter were used. The printer exceeds the maximum allowable circuit capacitance for Level II interfaces. Compliance with IEEE 1284-II may slow data flow control time slightly; however, all minimum and maximum criteria set forth in IEEE 1284 documentation will be met.

The printer supports:

- Compatibility Mode
- Nibble Mode
- Byte Mode
- ECP Mode

The printer also supports a Device ID function. When queried for its ID, the printer returns the following information:

- Manufacturer
- Command set
- Model of printer

More information (such as timing diagrams) about the printer-to-computer communication capabilities of this printer is available at the Lexmark web site in a file called LEXPARAL. To read or download the LEXPARAL file, go to the *Technical Support* area of Lexmark’s web site and select *FTP site*. The file, LEXPARAL.EXE, is located in the \pub\driver\technical_brief\ directory.

When the Advanced Status menu item is On, the printer supports IEEE 1284 communication. If the attached host computer does not support IEEE 1284 communication, Advanced Status can be turned Off from the printer operator panel, and SLCTIN* and AUTO FD XT* will be ignored.

Note: Excessive device queries and status checks (Nibble and Byte modes) will slow printer performance.

IEEE 1284 documentation may be obtained by calling 1-800-678-IEEE (order number DS02709).

Parallel Mode 1

Parallel Mode 1 is a feature for the Lexmark laser printer line. The factory default setting is On.

If the host side of the parallel interface is using open collector drivers to transmit data to the printer, Parallel Mode 1 should be turned Off to increase reliability of data transfer. Turning this mode off equalizes all parallel interface signal impedances. You can turn Parallel Mode 1 off from the operator panel.

Parallel Mode 2

Parallel Mode 2 is a feature for the Lexmark laser printer line. The factory default setting is On.

The timing required by the printer is clearly indicated in the “Standard Protocol Data Transfer Sequence” on page 7-14. This is the classic centronics interface timing.

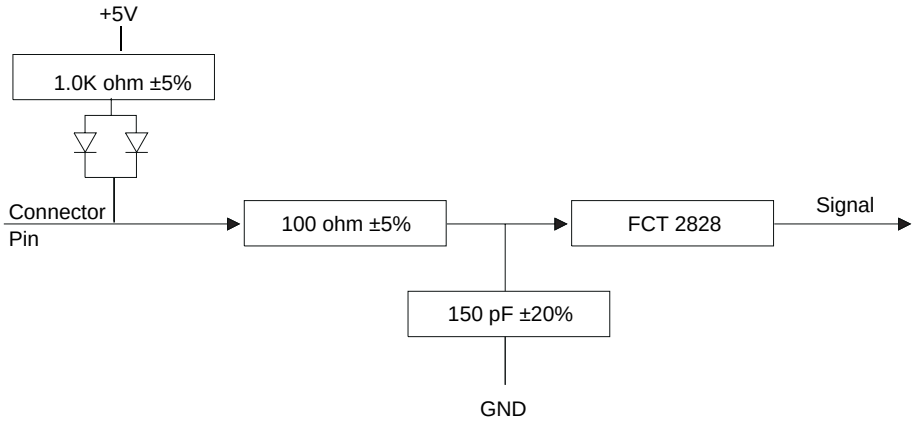
By setting Parallel Mode 2 Off from the printer operator panel, the printer changes when data is valid. Once Mode 2 is Off, the printer takes data from the host computer at the trailing edge of STROBE. This is the last possible host driven transition where data should be valid.

If Parallel Mode 2 is Off, the printer automatically turns Advanced Status Off, eliminating any IEEE 1284 data flow control.

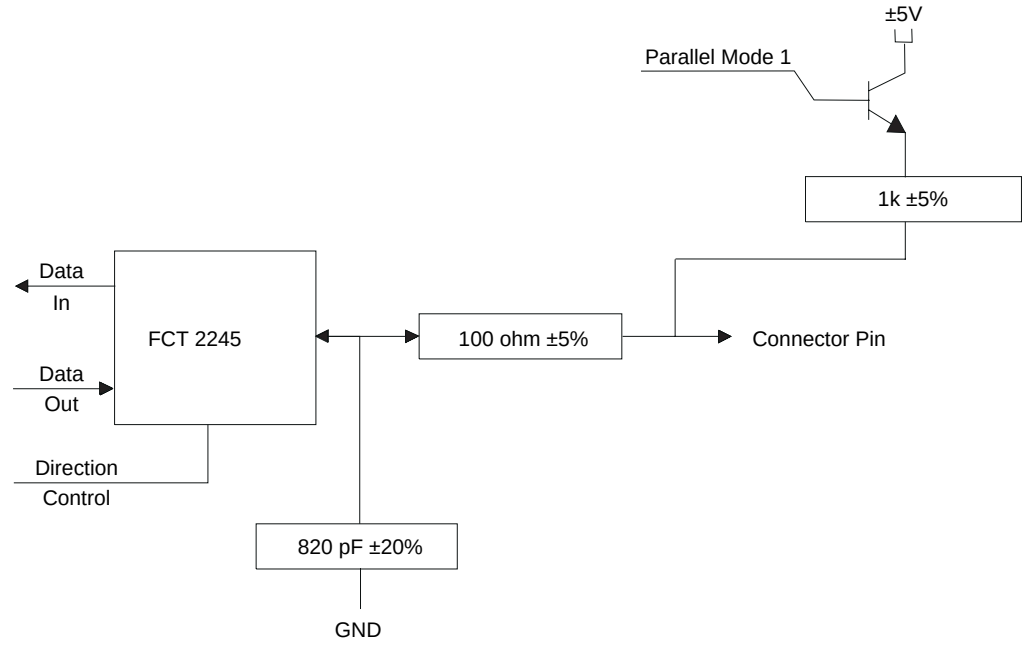
Note: You may find this feature helpful when having data transfer reliability problems.

Signal Descriptions

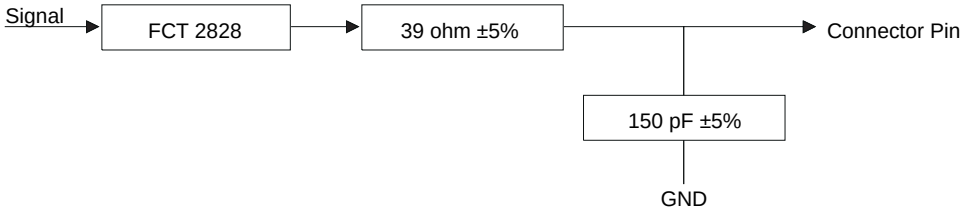
The following diagram illustrates the STROBE, AUTOFD* receivers.



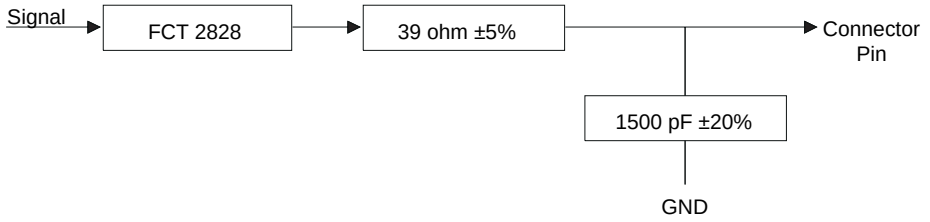
The following diagram illustrates each of the DATA 1-8 signal driver/receivers.



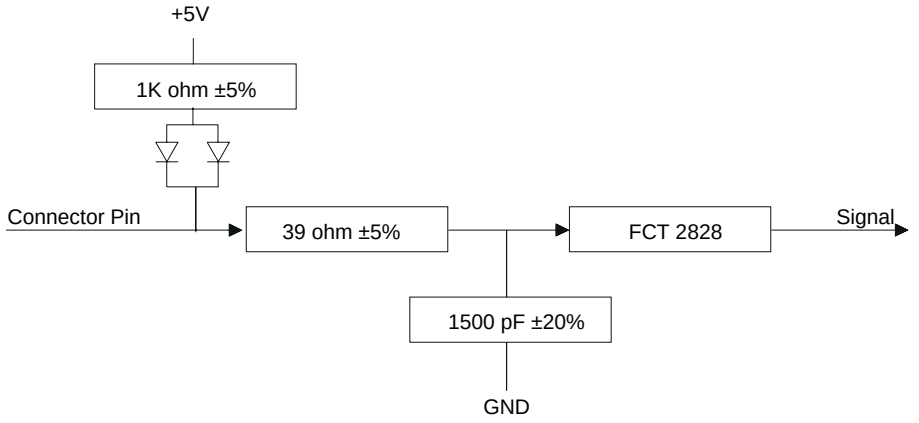
The following diagram illustrates the BUSY / ACKNLG* driver.



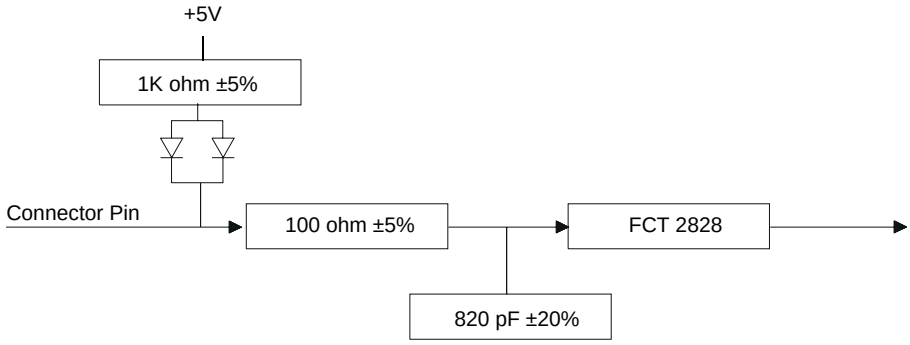
The following diagram illustrates the ERROR*, SLCT, PE drivers.



The following diagram illustrates the INIT* receiver.



The following diagram illustrates the SLCTIN* receiver.



Serial Interface

The printer accepts a serial cable connection to the computer. The serial interface allows data to flow back and forth between the computer and the printer. However, the serial interface transfers data at a slower rate than the parallel interface.

You may want to use the serial interface if the parallel interface is already being used, or if the printer is more than 3.04 m (10 ft) from the computer unless you use a Lexmark 6.1 m (20 ft) parallel cable.

The printer supports two serial interface standards: RS-232C and RS-422.

The RS-232C serial interface is standard on many computers. Use RS-232C if the printer is more than 3.04 m (10 ft) from the computer but less than 15.24 m (50 ft) away unless you use a Lexmark 6.1 m (20 ft) parallel cable.

The RS-422 serial interface provides more protection from electrical noise than RS-232.

You should use RS-422 if your computer is more than 15.24 m (50 ft) away from the printer. You may need to purchase an RS-422 adapter and software for your computer to run RS-422. Refer to your computer documentation for more information. You also need to purchase a custom cable for the serial interface, because serial RS-422 interface pinouts are usually unique to each computer.

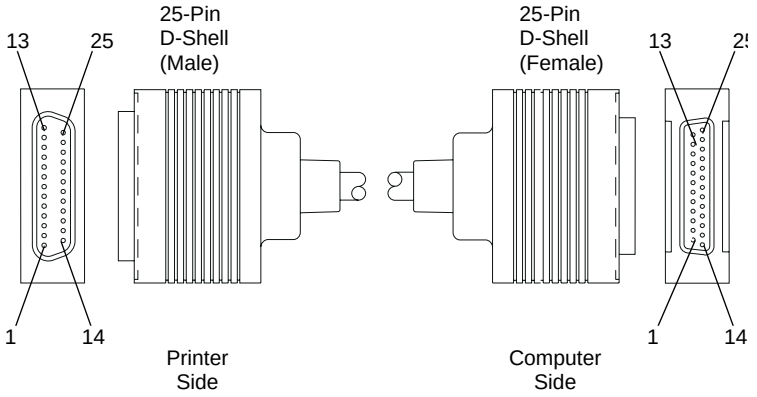
Using the RS-232C Serial Interface

This section describes how to use the RS-232C serial interface. If you are using RS-422, see page 7-30.

How to Connect the RS-232C Serial Interface

Use Lexmark serial cable P/N 1038693 (15.24 m or 50 ft) to connect the serial interface.

If you connect the printer using the serial port, the RS-232C serial cable appears as follows:



RS-232C Serial Cable Pin Assignments

Table 7-11 Dedicated Serial Connector Pin Assignments (RS-232C)

Pin	Signal	Direction	Description
1	GND		Frame Ground
2	TXD	Out	Transmit Data. The pin transmits data to your computer or terminal.
3	RXD	In	Receive Data. The pin receives data from your computer or terminal.
4	RTS	Out	Request to Send. The printer sets this signal high and the signal remains high while the printer is powered On (|).
5	CTS	In	Clear to Send. This pin is optionally used for serial data flow control protocol when in serial mode.
6	DSR	In	Data Set Ready. This pin is optionally used for data validation, depending on the Honor DSR setting, or flow control, depending on the Serial Protocol setting.
7	GND		Logic Ground
20	DTR	Out	Data Terminal Ready. This pin is optionally used for serial data flow control protocol when in serial mode.

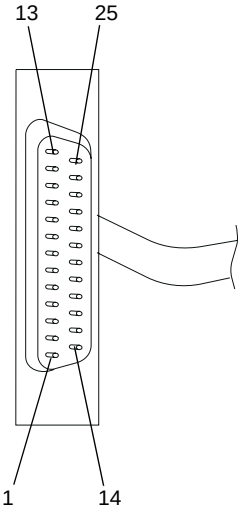
Using an IBM Personal Computer AT (RS-232C)

Note: These instructions are for connecting the printer to an IBM Personal Computer AT, using the IBM PS/2 Dual Asynchronous Adapter or the MarkNet Pro or MarkNet XLe external network adapter.

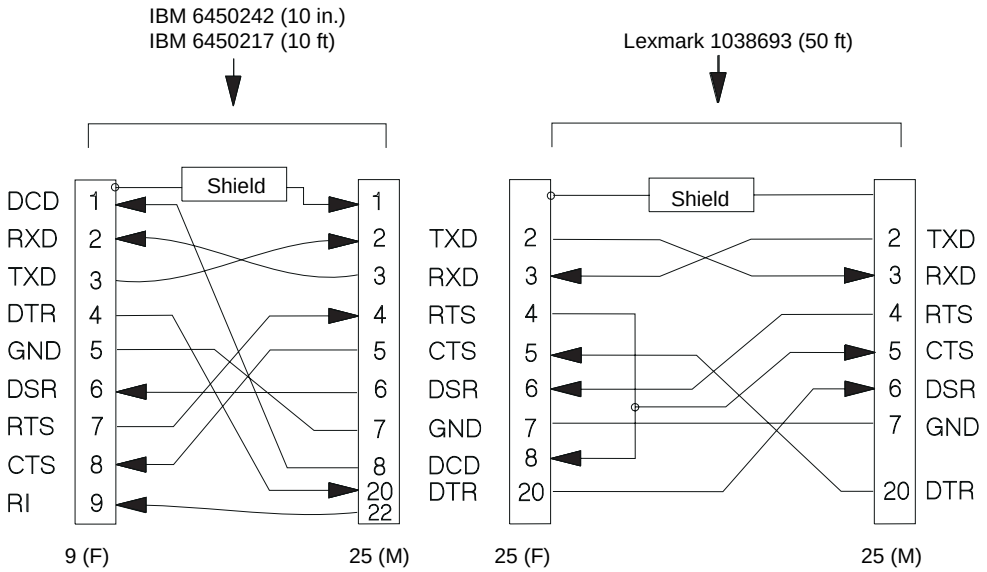
If you are using any of the above products, or if your computer has a 9-pin D shell connector that conforms to the IBM designed 9-pin serial port, we recommend one of the following for a 9-pin to 25-pin cables:

- IBM Part Number 6450242 (254 mm or 10 in.)
- IBM Part Number 6450217 (3.04 m or 10 ft)

Null modem cables, such as Lexmark part number 1038693 [15.24 m (50 ft)], will connect the converter cable to the printer. The illustration below represents the 25-pin connectors for the RS-232C cable (1038693).



The following illustration shows the pin assignments for the 9-pin to 25-pin IBM EIA RS-232C serial cables.



Serial Communication Parameters (RS-232C)

The following paragraphs show acceptable values for serial communications parameters.

Voltage Level Range

The maximum voltage level for control lines or data lines is +/- 25 positive V dc and +/- 25 negative V dc. A timing or control line is active if the voltage is more than +3 V, or inactive if the voltage is less than -3 V. The voltage reference point is the signal ground on pin 7.

A data signal greater than +3 V means that the bit is a logical 0. A signal less than -3 V means that the bit is logical 1.

For additional information, refer to *Interface between Data Terminal Equipment and Data Communications Equipment Employing Serial Binary Data Interchange*, published by the Electronic Industries Association, publications EIA RS-232C and EIA\TIA-232-E.

Serial Data Frame Considerations (RS-232C)

The computer sends serial data in data frames (also known as packets). You can create 10-bit, 11-bit, and 12-bit data frames and set the serial data transfer parameter so that each data frame contains 7 or 8 data bits. However, your printer is an 8-bit printer; characters, controls, and all points addressable (APA) graphics need 8 bits of data. If you select 7-bit data transfer, some unexpected characters might print.

Data Transmission

For the list of acceptable data transfer rates (in bits per second), select **MENUS, SETUP MENU, SERIAL SETUP, Baud** from the printer operator panel.

Data Bits

The printer sends 7 or 8 data bits in each transmission frame, depending on which one is selected.

Start and Stop Bits

The printer receives data with 1 start bit and either 1 or 2 stop bits. The printer always sends 1 start and 2 stop bits.

Parity

There are four possible parity settings: Odd, Even, None, and Ignore.

Odd	The port expects to receive data frames with an odd number of logical 1's per byte. The printer transmits XOFF and XON with odd parity. If the printer detects a parity error, the port sends X'5F' to the printer instead of the character sent by the host system.
Even	The port expects to receive data frames with an even number of logical 1's per byte. The port transmits XOFF and XON with even parity. If the port detects a parity error, the port sends an inverted question mark to the printer instead of the character sent by the host system.
None	The port expects no parity bit when it receives data. The port transmits XON and XOFF without parity bits.
Ignore	The port expects a parity bit when the port receives a data frame. The port ignores the parity bit. The port uses even parity when it transmits XON and XOFF.

The printer posts a **54 Serial Error** on the operator panel the first time it detects a transmission error (parity, overrun, or framing). Select **Go** from the operator panel to reset the **54 Serial Error**.

If repeated serial errors occur, turn the printer off and on to restore proper serial operation.

Data Flow Control

Data flow control is accomplished through the following lines:

- Data Set Ready (DSR)
- Data Terminal Ready (DTR)

Five data flow control protocols are available:

- DTR pacing
- DTR/DSR
- XON/XOFF
- XON/XOFF/DTR
- XON/XOFF/DTR/DSR

Your printer supports two modes in which both hardware and software data flow control protocols are performed. In XON/XOFF/DTR mode, the printer uses both XON/XOFF and DTR pacing. When XON/XOFF/DTR/DSR mode is active, the printer uses both XON/XOFF and DTR/DSR pacing.

Robust XON may be selected when the data flow control protocol for the serial port is set to XON/XOFF pacing. The printer sends a continuous stream of XON signals to the host computer to indicate that the serial port is ready to receive additional data. The signals continue as long as one of the following conditions exist:

- No data has been received across the serial port in the last second
- The last XON was accepted by the host computer
- The printer is ready to receive data

Refer to the *User's Guide* for more information about selecting the protocol from the operator panel.

Protocol (RS-232C)

Table 7-12 shows the state or function of each serial interface signal in the three data flow control protocols when the Honor DSR setting is On.

Table 7-12 Serial Link (All Protocols) with Honor DSR On

Printer	XON/XOFF Protocol (Honor DSR On)	DTR Protocol (Honor DSR On)	DTR/DSR Protocol (Honor DSR On)
DTR	Always active	Flow control to computer	Flow control to computer
DSR	Data validity	Data validity	Flow control (transmit mode) to computer (receive mode)
CTS	Ignored	Flow control from computer	Ignored

Table 7-13 shows the state of each serial interface signal in the three data flow control protocols when the Honor DSR setting is Off.

Table 7-13 Serial Link (All Protocols) with Honor DSR Off

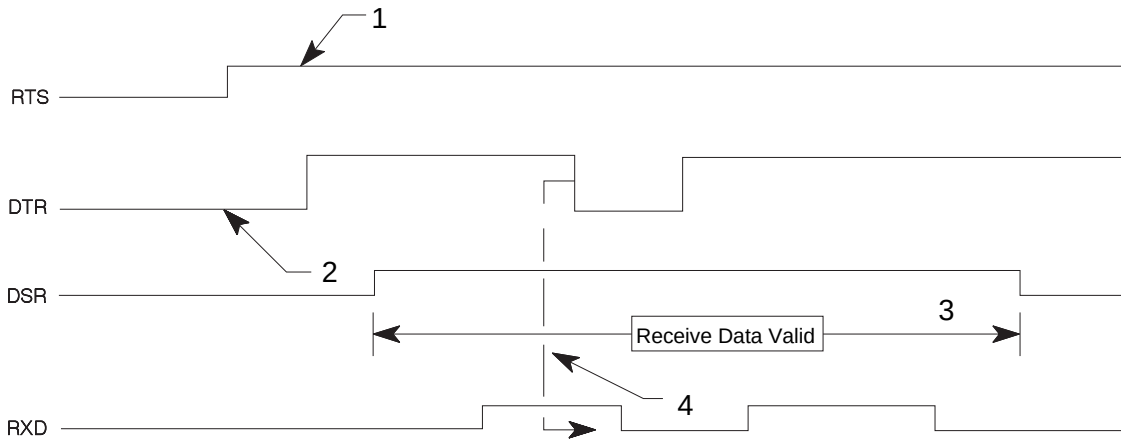
Printer Signal	XON/XOFF Protocol (Honor DSR Off)	DTR Protocol (Honor DSR Off)	DTR/DSR Protocol (Honor DSR Off)
DTR (Output)	Always active	Flow control to computer	Flow control to computer
DSR (Input)	Ignored	Ignored[1]	Flow control to computer
CTS (Input)	Ignored	Flow control from computer[1]	Ignored
[1] These values are compatible with Hewlett-Packard Company LaserJet printers.			

DTR and DTR/DSR Protocol Timing (RS-232C)

Use DTR to pace the data flow from the computer. DTR goes from high to low to indicate to the computer that the printer cannot receive more data when it detects the following BUSY conditions:

- Buffer full
- Attendance error
- Printer not in ready state

The following diagram illustrates DTR Protocol Timing.



Legend:

1 The RTS signal is driven active as long as power is supplied to the printer.

2 The DTR signal becomes active when initialization is complete, telling the computer that the printer is ready to receive data.

3 When Honor DSR is On, the printer considers data received invalid when DSR is low and discards the data. Only DTR/DSR is used for flow control from the printer to the host computer.

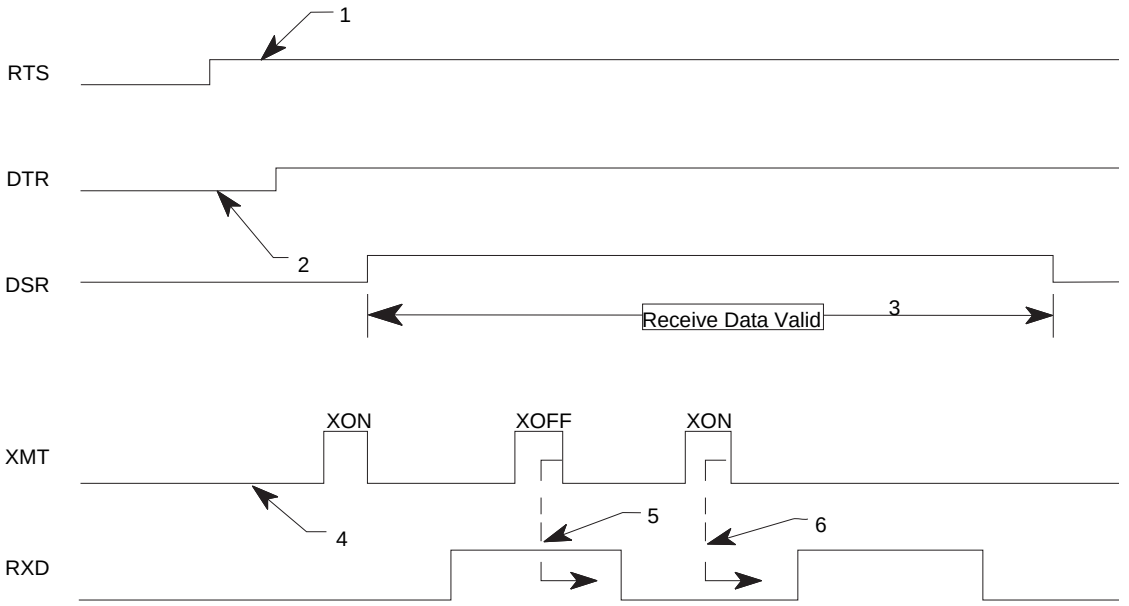
4 DTR drops to tell the computer that the receive buffer is nearly full or that the printer is busy and that data transmission should stop. About 512 free bytes remain in the buffer at this time. If the computer continues to send data after the printer has sent a low DTR signal, data could be lost.

XON/XOFF Protocol Timing (RS-232C)

When you select this data flow control protocol, the printer sends an XOFF signal when it detects the following BUSY conditions:

- Buffer full
- Attendance error
- Printer not in ready state

The following diagram illustrates XON/XOFF Protocol Timing.



Legend:

1 The RTS signal is driven active as long as power is supplied to the printer.

2 The DTR signal becomes active at the completion of initialization.

3 The printer considers data received invalid when DSR is low and discards the data. (This is conditional depending on the setting of Honor DSR.)

4 After you power on the printer and DTR is active, the printer sends an XON signal to the computer (DC1 control or X'11'). However, the computer does not need to detect this initial XON before sending data to the printer, because the printer can be powered on before the computer or terminal.

5 The printer sends an XOFF signal (DC3 control or X'13') to request that data transmission end until the buffer clears. About 512 free bytes remain in the buffer at this time. If the computer continues to send data after the printer sent an XOFF signal, data could be lost.

6 The printer sends an XON signal to the computer when the buffer space is again available. The serial interface is ready to receive more data.

Serial Errors

The printer places an underscore character in the link buffer when it detects an error. Serial errors also appear on the operator panel as **54 Serial Error**. Serial errors that do *not* generate an operator panel error are:

- Serial Break
- Framing error received simultaneously as a Break
- Powering on a PS/2 connected to the printer

Serial Computer Configuration Recommendations (RS-232C)

For correct operation of the serial interface, your printer and computer operating system must be configured identically. The following are examples of how to configure DOS and OS/2 for the printer using serial DTR protocol:

DOS:

From the DOS prompt, enter the following commands:

```
mode comy:9600,n,8,1,p
    mode lptx :=comy
```

where `x` equals 1, 2, or 3, and `y` equals 1 or 2

Include these two command statements in the AUTOEXEC.BAT file on the computer so they run each time your system starts operating.

OS/2 1.2 and 1.3:

1. **From Desktop Manager or Group Utilities, select Utilities.**
2. **Select Control Panel.**
3. **Select Options.**
4. **Select Communications Port.**
5. **For the port you want to set up, set the following parameters to match the printer defaults:**
   - Baud rate = 9600
   - Word length = 8
   - Parity = none
   - Stop bits = 1
   - Data Flow Control = Hardware
6. **Select Set.**

OS/2 2.0 (or later):

OS/2 2.0 defaults already match the defaults on this printer. Consequently, no changes are necessary if you are using the printer defaults.

Make sure the OS/2 serial port settings match the settings on the printer operator panel. To view or change the OS/2 settings, select:

1. **The printer icon.**
2. **Open.**
3. **Settings. The Printer - Settings screen appears.**
4. **The serial port to which you want to attach the printer. The Serial Port Settings screen appears.**
5. **The settings you want to use.**

   Note: Data Flow Control should be set to None.
6. **OK.**

RS-232C Port Compatibility

The RS-232C port is compatible with the Plug and Play External COM Device Draft Specification, Rev. 0.86.

Devices that are compatible with Plug and Play COM can:

- Detect attachment of serial devices
- Identify the device
- Locate a driver for the device
- Detect detachment of serial devices

Using the RS-422 Serial Interface

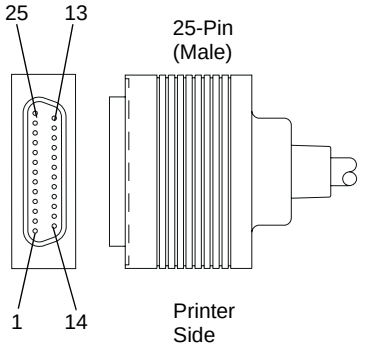
This section describes how to use the RS-422 serial interface. If you are using RS-232, see page 7-20.

How to Connect the RS-422 Serial Interface

You need to purchase a custom cable for RS-422 support. You may also need to purchase an adapter card and software to run RS-422 on your computer. Contact your point of purchase.

Serial Cable Pin Assignments (RS-422)

If you connect the printer using the serial port, the serial cable appears as follows:

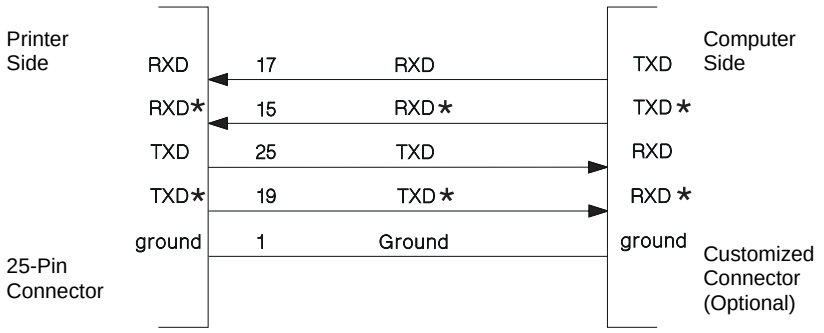


Pin assignments for this 25-pin connector are shown in Table 7-14. You can set the polarity of these signals from the printer operator panel.

Table 7-14 Dedicated Serial Connector Pin Assignments (RS-422)

Pin	Signal	Direction	Description
1	GND		Logic Ground
15	RXD*	In	Receive Data
17	RXD	In	Receive Data
19	TXD*	Out	Send (transmit) Data
25	TXD	Out	Send (transmit) Data

The following illustration shows how the pins are used:



Serial Communication Parameters (RS-422)

The following paragraphs show acceptable values for serial communication parameters.

Voltage Level

RS-422 serial interface uses a differential pair, 5-volt typical delta, 0.5 volt threshold. This printer uses a TI75179 transceiver with transorbs.

Serial Data Frame Considerations

The computer sends serial data in data frames (also known as *packets*). You can create 10-bit, 11-bit, or 12-bit data frames and set the serial data transfer parameter so that each data frame contains 7 or 8 data bits. However, your printer is an 8-bit printer; characters, controls, and APA graphics need 8 bits of data. If you select 7-bit data transfer, some unexpected characters might print.

Data Transmission

For the list of acceptable data transfer rates (in bits per second), select **MENUS, SETUP MENU, SERIAL SETUP, Baud** from the printer operator panel.

Data Bits

The printer sends 7 or 8 data bits in each transmission frame, depending on which one is selected.

Start and Stop Bits

The printer receives data with 1 start bit and either 1 or 2 stop bits. The printer always sends 1 start and 2 stop bits.

Parity

There are four possible parity settings: Odd, Even, None, and Ignore.

Odd — The port expects to receive data frames with an odd number of logical 1's per byte. The printer transmits XOFF and XON with odd parity. If the printer detects a parity error, the port sends X'5F' to the printer instead of the character sent by the host system.

Even — The port expects to receive data frames with an even number of logical 1's per byte. The port transmits XOFF and XON with even parity. If the port detects a parity error, the port sends an inverted question mark to the printer instead of the character sent by the host system.

None — The port expects no parity bit when it receives data. The port transmits XON and XOFF without parity bits.

Ignore — The port expects a parity bit when the port receives a data frame. The port ignores the parity bit. The port uses even parity when it transmits XON and XOFF.

The printer posts a **54 Serial Error** on the operator panel the first time it detects a transmission error (parity, overrun, or framing). Select **Go** on the operator panel to reset the **54 Serial Error**.

If repeated serial errors occur, turn the printer off and on to restore proper serial operation.

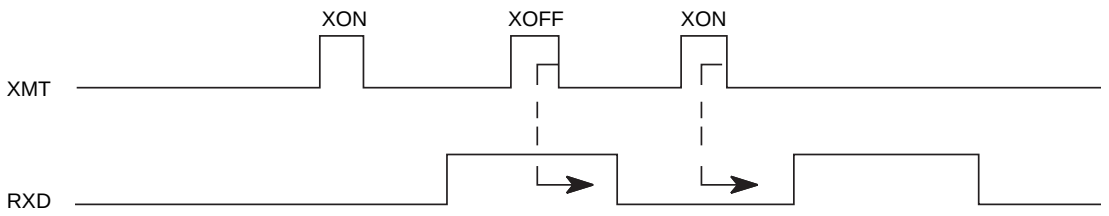
Data Flow Control Protocol

One data flow control protocol is available: XON/XOFF with programmable polarity. Refer to the *User's Guide* for more information about selecting the protocol from the operator panel.

XON/XOFF Protocol Timing (RS-422)

When you select this data flow control protocol, the printer sends an XOFF signal when it detects the following BUSY conditions:

- Buffer full
- Attendance error
- Printer not in ready state



Note: The printer sends an XOFF signal (DC3 control or X'13') to request that data transmission end until the buffer clears. About 512 free bytes remain in the buffer at this time. If the computer continues to send data after the printer sends an XOFF signal, data could be lost.

Serial Errors

The printer places an underscore character in the link buffer when it detects an error. Serial errors also display on the operator panel as **54 Serial Error**. Serial errors that do *not* generate an operator panel error are:

- Serial Break
- Framing error received simultaneously as a Break
- Powering on a PS/2 connected to the printer

Serial Computer Configuration Recommendations (RS-422)

For correct operation of the RS-422 serial interface, make sure you have:

- Installed an RS-422 adapter card in your host computer.
- Set up the IRQ according to the RS-422 documentation that you received with the RS-422 adapter card.
- Installed support software for the RS-422 adapter card if you use DOS.
- Purchased a RS-422 cable meeting the requirements according to the RS-422 documentation that you received with the RS-422 adapter card.

The following are examples of how to configure DOS and OS/2 for the printer using serial XON\XOFF protocol:

DOS:

Run the software you received that supports your RS-422 adapter card.

OS/2 1.2 and 1.3:

1. **From Desktop Manager or Group Utilities, select Utilities.**
2. **Select Control Panel.**
3. **Select Options.**
4. **Select Communications Port.**
5. **For the port you want to set up, set the following parameters to match the printer defaults:**
   - Baud rate = 9600
   - Word length = 8
   - Parity = none
   - Stop bits = 1
   - Data Flow Control = Software (XON/XOFF)
6. **Select Set.**

OS/2 2.0 (or later):

OS/2 2.0 defaults already match the defaults on this printer. Consequently, no changes are necessary if you are using the printer defaults.

Make sure the OS/2 serial port settings match the settings on the printer operator panel. To view or change the OS/2 settings, select:

1. **The printer icon.**
2. **Open.**
3. **Settings. The Printer - Settings screen appears.**
4. **The serial port to which you want to attach the printer. The Serial Port Settings screen appears.**
5. **The settings you want to use.**

Note: Data Flow Control should be set to None.

6. **OK.**

Input Buffer

The printer has an input (link) buffer for each interface. The maximum size of the input buffer depends upon the amount of RAM memory installed. The input buffers serve the same purpose as a print spooler and can be allocated automatically by the printer. The size of the input buffer may be modified or disabled from the menus. (Only the parallel and serial ports may be disabled.)

If NPAP is active on a port, two-thirds of the buffer memory is reserved for NPAP and one-third is set aside for the input buffer. If NPAP is not active, all the memory is available for the input buffer.

The table below shows the sizes automatically selected for the buffers when the buffer size is set to **Auto** in the menus.

Table 7-15 Input Buffer Sizes in Bytes

Memory Size	Parallel Buffer Size	Serial Buffer Size	Network Buffer Size (each port)
4MB	12K	12K	12K
6MB	24K	12K	24K
8, 10, or 12MB	48K	24K	1MB
16, 18, or 20MB	48K (1MB if no network adapter is installed)	24K	1MB
24, 32, or 34MB	192K (1MB if no network adapter is installed)	150K	1MB
38 or 40MB	384K (1MB if no network adapter is installed)	300K	1MB
48 or 64MB	2MB	300K	2MB
Note: MB represents 1,048,576 bytes. K represents 1024 bytes.			

Note: When in serial communication, the printer signals the host computer to stop transmitting bytes when the serial input buffer is within 640 bytes. In addition, when XON/XOFF protocol is used, the printer signals the host computer to stop transmitting when the serial input buffer is 384, 256, and 128 bytes from full.

Network Support

Installing a MarkNet S internal network adapter enables you to connect the printer to a local area network (LAN). The network adapters support these network interfaces:

- The Token-Ring network adapter conforms to IEEE 802.5 using either IBM Cabling System (STP) or unshielded twisted-pair cable, which meets the IBM Cabling System Type 3 Media Specification (UTP).
- The Ethernet Combined 10BaseT and 10Base2 network adapter conforms to IEEE 802.3 with Category 3, 4, or 5 unshielded twisted-pair (UTP) cable for the 10BaseT and conforms to IEEE 802.3 with RG58 coaxial cable for the 10Base2.
- Ethernet 10/100BaseTX network adapter conforms to the IEEE 802.3 standard for 10BaseT networks using Category 3, 4, or 5 unshielded twisted-pair (UTP) cabling, and to the IEEE 802.3u Fast Ethernet standard for 100BaseTX networks using Category 5 UTP cabling.
- The LocalTalk network adapter conforms to AppleTalk.

For information on installing a network adapter in your printer, refer to the printer *User's Guide*.

You may also connect the printer to a LAN by using the external network adapter. Use one of the following:

- Lexmark MarkNet Pro
- Lexmark MarkNet XLe
- IBM LAN Connection for Printer and Plotters (IBM 4033)

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