
Apple Color LaserWriter 12/600 PS Developer Note

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About This Note

The Color LaserWriter 12/600 PS is a new member of the Apple Computer LaserWriter printer family. It is the first full-color, high-performance LaserWriter printer available from Apple Computer, Inc. This developer note describes the features and capabilities of the printer and is intended for use by professional software and hardware developers.

To use this note, you must understand the Adobe™ PostScript™ Level 2 programming language and printer terminology referred to in PostScript programming documentation.

You do not need to use this note if you are simply running packaged programs for your Apple computer. Your owner's guide provides instructions for connecting the printer to your computer, inserting paper, installing various options, and performing other routine operating tasks. This note does not provide that type of information.

This preface describes the contents of the note, explains visual cues and conventions, and lists other books to which you can refer.

What This Note Contains

This note consists of four chapters, a glossary, and an index.

- Chapter 1, "Introduction to the Color LaserWriter 12/600 PS," describes the hardware features of the printer, the built-in communication ports and connectors, the printer's paper-handling capabilities, and the control panel.
- Chapter 2, "PostScript Software," provides general information about the PostScript Level 2 programming language, the Color LaserWriter 12/600 PS driver, the utility program, page types, the details dictionary, color models, product strings, interpreter parameters, and resource categories.
- Chapter 3, "Compatibility Operators," describes the PostScript Level 1 compatibility operators present in the Color LaserWriter 12/600 PS. These operators enable the printer, which uses PostScript Level 2, to maintain compatibility with software that uses PostScript Level 1 operators.
- Chapter 4, "Communication Channels," describes the communication protocols for LocalTalk, the parallel port, and Ethernet.
- Glossary
- Index

Conventions and Abbreviations

This developer note uses the following typographical conventions and abbreviations.

Typographical Conventions

Computer-language text—any text that is literally the same as it appears in computer input or output—appears in `Courier` font.

Certain terms used in this note may appear in different typographical formats—for example, `BuildTime` and `buildtime`. In this developer note, `BuildTime` is the format used for the system parameter, and `buildtime` is the format used for the `buildtime` operator.

Note

A note like this contains information that is interesting but not essential for an understanding of the text. ♦

IMPORTANT

A note like this contains important information that you should read before proceeding. ▲

▲ WARNING

A note like this directs your attention to something that could cause damage or result in a loss of data. ▲

Subjects described in the Glossary are shown in **boldface** in the first reference in the main text.

Standard Abbreviations

When unusual abbreviations appear in this developer note, the corresponding terms are also spelled out. Standard units of measure and other widely used abbreviations are not spelled out. The following abbreviations are used in this note:

ACCT	Apple Contone Compression Technology
ADSP	AppleTalk data stream protocol
AMD	Advanced Micro Devices
ARP	Address Resolution Protocol
ASIC	application-specific integrated circuit
ATP	AppleTalk Transaction Protocol
BOOTP	Bootstrap Protocol

CDC	compression/decompression coprocessor
CRD	color rendering dictionary
DDP	Datagram Delivery Protocol
DIP	dual in-line package
dpi	dots per inch
DRAM	dynamic RAM
ELAP	EtherTalk Link Access Protocol
ICMP	Internet Control Message Protocol
IDP	Imaging Device Protocol
I/O	input/output
IP	Internet Protocol
KB	kilobyte
lpd	line printer daemon
LLAP	LocalTalk Link Access Protocol
MB	megabyte
MHz	megahertz
NBP	Name Binding Protocol
PAP	Printer Access Protocol
PDL	page-description language
ppm	pages per minute
RAM	random-access memory
RARP	Reverse Address Resolution Protocol
ROM	read-only memory
SIMM	single in-line memory module
SRAM	static random access memory
TBCP	tagged binary communication protocol
TCP	Transmission Control Protocol
UDP	User Datagram Protocol
VM	virtual memory

Other Reference Material

This developer note assumes that you are familiar with printer technology and know how to operate and program Apple LaserWriter printers. Additional information is available in the following publications:

- The owner's guide that is shipped with every Apple printer explains how to set up the printer in the standard configuration. The guide gives basic operating information on how to load toner cartridges, load the paper tray,

and set up an external hard disk for fonts. The owner's guide also provides basic troubleshooting information.

- *PostScript Language Reference Manual*, second edition, published by Addison-Wesley, is required if you plan to write programs in the PostScript Level 2 programming language. The supplement to this manual, the *PostScript Language Reference Manual Supplement* for Version 2014, is available from Adobe Systems, Inc.
- *PostScript Language Tutorial and Cookbook*, published by Addison-Wesley, provides a basic introduction to the PostScript programming language. It also includes sample PostScript programs that help you to understand how the PostScript programming language works.
- *PostScript Language Program Design*, published by Addison-Wesley, is written for programmers who want to take advantage of the PostScript programming language to design efficient PostScript programs and printer devices.
- *Inside AppleTalk*, second edition, published by Addison-Wesley, provides a comprehensive description of the protocol architecture of the AppleTalk network system.

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Introduction to the Color LaserWriter 12/600 PS

Introduction to the Color LaserWriter 12/600 PS

The Color LaserWriter 12/600 PS is a full-color mainstream network laser printer designed for midsize to large businesses, higher education institutions, Macintosh and non-Macintosh networks, and graphics and desktop publishing environments. It is the first color LaserWriter printer available from Apple Computer, Inc. The Color LaserWriter 12/600 PS supports Adobe™ PostScript™ Level 2 programming functions and produces printed pages at a rate of up to 12 black-and-white letter-size pages per minute, 3 four-color letter-size pages per minute, and approximately 1.1 letter-size transparencies per minute.

The Color LaserWriter 12/600 PS is both a four-pass full-color laser printer and a single-pass black-and-white laser printer. During the color printing process, a sheet makes four passes through the printer paper path. One pass is made for each color of toner (cyan, magenta, yellow, and black) to produce full-color page images. For single-color or grayscale page images, a sheet makes a single pass through the printer paper path.

The Color LaserWriter 12/600 PS supports 600-dpi resolution. FinePrint technology does not apply to this printer.

The Color LaserWriter 12/600 PS ships with 12 MB of DRAM: 8 MB on the controller board itself, and a 4 MB SIMM in a SIMM slot on the controller board. With this DRAM configuration, the printer supports Color PhotoGrade printing. **Color PhotoGrade Technology** allows the Color LaserWriter 12/600 PS to print photographs with hundreds of shades for each color. These photographs retain a higher level of detail than that produced by other 600-dpi laser printers. Color PhotoGrade can designate more than one level of gray for each pixel by controlling the size of the dots.

The Color LaserWriter 12/600 PS is intended to work simultaneously with several network interfaces. The LocalTalk port may be connected to a network of one or more Macintosh computers, or any other type of computer that supports LocalTalk on a serial port. DOS-based IBM or IBM-compatible personal computers that are not on larger networks typically connect to the Centronics-style (IEEE 1284) parallel port. The Ethernet port can be connected to any network that supports EtherTalk, TCP/IP, and Novell NetWare network protocols.

The Color LaserWriter 12/600 PS is Energy Star compliant and is available in 110-volt and 220-volt versions.

This chapter describes:

- hardware features
- communication ports
- external and internal SCSI drive connectors
- configuration switch settings
- memory capabilities
- page types
- paper handling capabilities

- the control panel
- Apple Color PhotoGrade technology
- **Apple Contone Compression Technology (ACCT)**

Features of the Printer

The Color LaserWriter 12/600 PS supports the entire PostScript Level 2 language as specified in the *PostScript Language Reference Manual*, second edition. In addition, the printer has features, capabilities, and operating modes not present in other PostScript language printers. You may access these additional facilities by executing special PostScript operators that exist only in the printer's PostScript interpreter.

The Color LaserWriter 12/600 PS uses dynamic-interface switching and automatically selects the appropriate communication parameters and port based on the incoming data stream. For this reason, the rotary switch used on previous LaserWriters to select communication protocol setups is not present on the Color LaserWriter 12/600 PS. However, you can modify communication parameters using either the Apple Printer Utility on the Macintosh computer or the Apple Printer Utility for Windows, or through PostScript operators. A two-position configuration switch located on the back panel of the printer allows you to use default communication parameters or to enable communication configurations that you have set through the software.

The printer uses SRAM (static random-access memory) with battery backup to provide nonvolatile storage. Any PostScript interpreter's default parameters that are changed using `statusdict` operators are stored in the SRAM and persist across power cycles. Table 1-1 lists functional features of the Color LaserWriter 12/600 PS.

Table 1-1 Color LaserWriter 12/600 PS features

Features	Specifications
Printing speed	12 pages per minute (ppm) black and white 3 pages per minute full color
Imaging	User-selectable resolution and imaging features: <ul style="list-style-type: none"> ■ 600-dpi text and images ■ Color PhotoGrade
Processor	RISC processor (AMD 29030, running at 30 MHz)
I/O expansion options	Internal SCSI hard disk External SCSI hard disk You can use either or both options.
Interface ports	Ethernet 14-pin Apple AUI connector (IEEE 802.3) 8-pin mini-DIN connector for LocalTalk Centronics 36-pin bidirectional parallel port (IEEE 1284) HDI-30 SCSI connector for external SCSI devices

continued

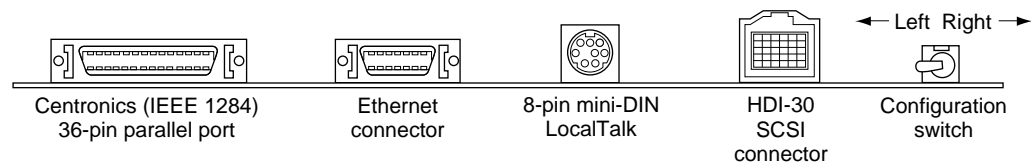
Table 1-1 Color LaserWriter 12/600 PS features (continued)

Features	Specifications
Paper handling	<p>Standard output: 100-sheet face-down tray</p> <p>Standard inputs: multipurpose tray for 100 sheets of paper or 250-sheet cassette feeder for U.S. letter or A4 size paper</p> <p>Optional inputs: 250-sheet universal cassette feeder</p> <p>For more information, see the sections “Page Types” on page 17 and “Paper Handling” on page 17.</p>
ROM	8 MB of masked ROM on the controller board. These devices are DIPs (dual inline packages) mounted in sockets on the controller board.
DRAM standard	8 MB of DRAM soldered on controller board. These are 32-pin, 60 ns DRAMs One 4 MB SIMM
DRAM expansion	Two SIMM slots on controller board accommodate 1 MB through 16 MB SIMMs, expanding DRAM capability up to 40 MB
SRAM	32 KB with battery backup provide nonvolatile storage
Fonts	39 PostScript Type I fonts
PDL (page-description language)	Adobe PostScript Level 2
Support for <i>n</i> -up printing	Allows 1, 2, or 4 pages to be printed on one sheet of paper

Back Panel Connectors

The interface connectors for the Color LaserWriter 12/600 PS, shown in Figure 1-1, are on the back panel of the printer. They are:

- the Centronics, Ethernet, and LocalTalk communication ports
- an external SCSI connector

Figure 1-1 Color LaserWriter 12/600 PS back-panel connectors and switch

Communication Ports

The communication ports on the Color LaserWriter 12/600 PS are:

- 8-pin mini-DIN connector for LocalTalk
- Centronics 36-pin parallel port (IEEE 1284-C Type)
- Ethernet 14-pin AUI connector

LocalTalk Connector

An 8-pin mini-DIN connector supports the LocalTalk protocol. Figure 1-2 shows the connector pin designations for the connector. Table 1-2 lists the pin functions. Refer to Chapter 4 for further information on LocalTalk communication protocols.

Figure 1-2 8-pin mini-DIN connector for LocalTalk

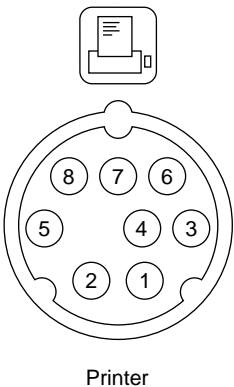


Table 1-2 Signal descriptions for LocalTalk connector

Pin number	Signal name	Description
1, 2, 7	NC	Not connected
3	/TXD	Transmit data (inverted)
4	GND	Signal ground
5	/RXD	Receive data (inverted)
6	TXD	Transmit data
8	RXD	Receive data

Note

In the Color LaserWriter 12/600 PS, the /TXD signal is connected to the /RXD signal, and the TXD signal is connected to the RXD signal. ♦

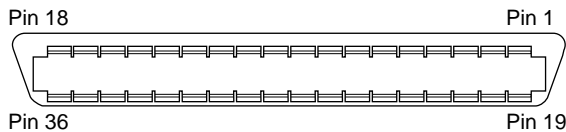
Centronics Parallel Connector (IEEE 1284)

The Color LaserWriter 12/600 PS provides a 36-pin connector for bidirectional communication with a Centronics (IEEE 1284) parallel interface. The connector is fully compatible with the IBM PC Centronics port, and from a software perspective the port operates exactly like the Hewlett-Packard LaserJet 4 Bi-Tronics parallel interface. The Centronics interface also supports the high-speed parallel interface. The high-speed capability of the parallel port can be enabled or disabled with the Macintosh Apple Printer Utility or the Apple Printer Utility for Windows, as well as with PostScript operators.

The parallel channel is basically unidirectional and transfers information from the host computer to the printer. The printer returns minimal status information to the host, such as PAPER ERR and /FAULT, which flag paper errors. It also returns handshaking signals such as BUSY and /ACK.

Figure 1-3 shows the pin designations for the parallel connector, and Table 1-3 lists the signal descriptions. Figure 1-4 shows the timing requirements for the Centronics interface. Table 1-4 lists the timing values. Refer also to Chapter 4 for information on parallel communication protocols.

Figure 1-3 The Centronics (IEEE 1284) parallel connector



Note

In Table 1-3, inputs and outputs are referenced to the printer. This means that an input (I) is a signal sent from the host computer to the printer, and an output (O) is a signal sent by the printer to the host. ♦

Table 1-3 Signal descriptions for the Centronics parallel port

Pin number	Signal name	I/O	Description
1	BUSY	O	Busy output signal; indicates that the printer is busy, and that a /STROBE signal has been received, but that /ACK has not yet been issued.
2	SELECT	O	This is the printer select line. It is driven high to indicate that the printer is on line.
3	/ACK	O	This is a handshaking signal. The printer uses it to acknowledge receipt of data.

continued

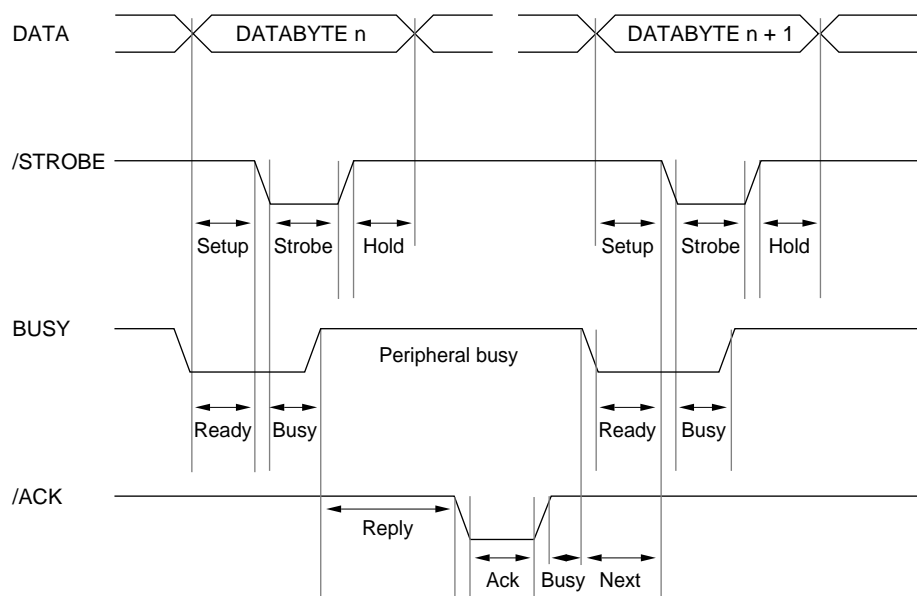
Table 1-3 Signal descriptions for the Centronics parallel port (continued)

Pin number	Signal name	I/O	Description
4	/FAULT	O	Fault signal; asserted if there is a printer problem.
5	PAPER ERR	O	Paper error; indicates that the printer has run out of paper.
6	DATA 1	I/O	Data bit 1 (least significant bit).
7	DATA 2	I/O	Data bit 2.
8	DATA 3	I/O	Data bit 3.
9	DATA 4	I/O	Data bit 4.
10	DATA 5	I/O	Data bit 5.
11	DATA 6	I/O	Data bit 6.
12	DATA 7	I/O	Data bit 7.
13	DATA 8	I/O	Data bit 8 (most significant bit).
14	/INIT	I	Reset signal, asserted by host CPU to cancel the current job on this port.
15	/STROBE	I	Host CPU clock signal; strobes data input to printer.
16	/SELECT IN	I	Used by host CPU to select this printer port.
17	/AUTO FEED	I	Asserted by host CPU to indicate paper auto feed.
18	Tied high	I	Host logic tied high.
19	Signal ground (BUSY)	–	Ground for BUSY signal.
20	Signal ground (SELECT)	–	Ground for SELECT signal.
21	Signal ground (/ACK)	–	Ground for /ACK signal.
22	Signal ground (/FAULT)	–	Ground for /FAULT signal.
23	Signal ground (PAPER ERR)	–	Ground for PAPER ERR signal.
24	Signal ground (DATA1)	–	Ground for DATA1 signal.
25	Signal ground (DATA2)	–	Ground for DATA2 signal.
26	Signal ground (DATA3)	–	Ground for DATA3 signal.
27	Signal ground (DATA4)	–	Ground for DATA4 signal.
28	Signal ground (DATA5)	–	Ground for DATA5 signal.
29	Signal ground (DATA6)	–	Ground for DATA6 signal.
30	Signal ground (DATA7)	–	Ground for DATA7 signal.

continued

Table 1-3 Signal descriptions for the Centronics parallel port (continued)

Pin number	Signal name	I/O	Description
31	Signal ground (DATA8)	–	Ground for DATA8 signal.
32	Signal ground (/INIT)	–	Ground for /INIT.
33	Signal ground (/STROBE)	–	Ground for /STROBE signal.
34	Signal ground (/SELECT IN)	–	Ground for /SELECT IN signal.
35	Signal ground (/AUTO FD)	–	Ground for /AUTO FD signal.
36	Peripheral logic high	O	This line is pulled high.

Figure 1-4 Timing for Centronics interface**Table 1-4** Timing values for Centronics interface

Parameter	Measured at	Value
Ready	Host output	0 ns minimum
Setup (host)	Host output	750 ns minimum
Setup (printer)	Printer input	500 ns maximum
Strobe (host)	Host output	750 ns minimum 500 μ s maximum
Strobe (printer)	Printer input	500 ns maximum

continued

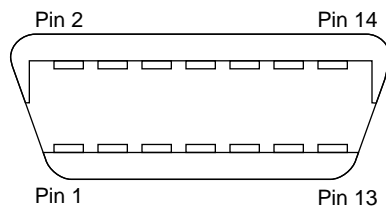
Introduction to the Color LaserWriter 12/600 PS

Table 1-4 Timing values for Centronics interface (continued)

Parameter	Measured at	Value
Hold (host)	Host output	750 ns minimum
Hold (printer)	Printer input	500 ns maximum
Peripheral busy	Printer output	500 ns maximum
Reply	Printer output	0 ns minimum
Ack	Printer output	500 ns minimum 10 μ s maximum
Busy	Printer output	0 ns minimum
Next	Host output	0 ns minimum

Ethernet Connector

The Color LaserWriter 12/600 PS provides built-in support for Macintosh and PC-DOS Ethernet network protocols through a 14-pin AUI connector. Supported Ethernet protocols include EtherTalk, NetWare, and TCP/IP. The printer uses dynamic protocol switching, which allows support for multiple Ethernet protocols running simultaneously on the same network medium. Figure 1-5 shows the Ethernet connector. Table 1-2 lists the pin assignments. Refer to Chapter 4 for information on Ethernet communication protocols.

Figure 1-5 Ethernet connector**Table 1-5** Signal descriptions for Ethernet connector

Pin number	Signal name	Description
1	AAU15V	+5 V power
2	RX+EXT	Receive data positive
3	RXEXT	Receive data negative
4	GND	Ground
5	CD+EXT	Carrier detect positive

continued

Table 1-5 Signal descriptions for Ethernet connector (continued)

Pin number	Signal name	Description
6	CDEXT	Carrier detect negative
7, 8	AAU15V	+5 V power
9	TX+EXT	Transmit data positive
10	TXEXT	Transmit data negative
11	GND	Ground
12, 13	Open	Open line
14	AAU15V	+5 V power

External SCSI Drive Connector

The Color LaserWriter 12/600 PS has an HDI-30 SCSI connector for an external SCSI hard drive. Figure 1-6 shows the pin designations for the external SCSI connector. Table 1-6 lists the pin assignments.

IMPORTANT

Devices connected to the SCSI port must be assigned a SCSI ID. SCSI ID 7 cannot be used for devices on this port, because 7 is reserved for the Color LaserWriter 12/600 PS. ▲

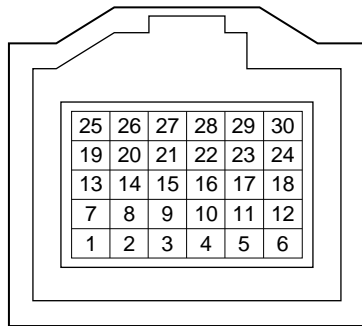
Figure 1-6 30-pin external SCSI connector

Table 1-6 Signal descriptions for the external SCSI connector

Pin number	Signal name	I/O	Description
1	Open	—	Open line
2	/DB0	I/O	Bit 0 of SCSI data bus
3, 8, 10, 12, 13, 15, 17, 20, 22, 24	GND	—	Ground
4	/DB1	I/O	Bit 1 of SCSI data bus
5	Open	—	Open line
6	/DB2	I/O	Bit 2 of SCSI data bus
7	/DB3	I/O	Bit 3 of SCSI data bus
9	/ACK	O	Handshake signal; acknowledges a request for data transfer
11	/DB4	I/O	Bit 4 of SCSI data bus
14	/DB5	I/O	Bit 5 of SCSI data bus
16	/DB6	I/O	Bit 6 of SCSI data bus
18	/DB7	I/O	Bit 7 of SCSI data bus
19	/DBP	I/O	Parity bit of SCSI data bus
21	/REQ	I	Request for a data transfer
23	/BSY	O	When active (low), indicates that the SCSI bus is busy
25	/ATN	O	When active (low), indicates an attention condition, meaning that the printer is ready to accept data
26	/C/D	I	When active (low), indicates that data is on the SCSI bus; when high, indicates that control signals are on the SCSI bus
27	/RST	I	SCSI bus reset
28	/MSG	I	When active (low), indicates the message phase is active
29	/SEL	I	Selects between target and initiator
30	/I/O	I	Controls the direction of data movement on the SCSI bus; when low, data is output from the printer; when high, data is input

Configuration Switch

The Color LaserWriter 12/600 PS has a two-position configuration switch on the back panel. Figure 1-1 on page 4 shows the position of the switch.

- When the switch is set to the left, the printer uses preset communication parameters.
- When the switch is set to the right, the printer uses the parameters set by means of the communication parameters described in Chapter 2.

Table 1-7 shows the default parameter values for the configuration switch.

Table 1-7 Configuration switch default parameter values

Setting	Port name	Type of connection and default parameter values	Interpreter
Preset (Left, logical 0)	8-pin mini-DIN	LocalTalk	PostScript
	36-pin parallel (IEEE 1284)	Centronics (IEEE 1284), fast mode Protocol: Raw	AutoSelect
	Ethernet	EtherTalk NetWare TCP/IP	PostScript AutoSelect AutoSelect
User defined (Right, logical 1)	8-pin mini-DIN	LocalTalk	PostScript
	36-pin parallel	Centronics (IEEE 1284), fast mode Protocol: Normal	PostScript
	Ethernet	EtherTalk NetWare TCP/IP	PostScript PostScript PostScript

The preset communication parameters should work for the majority of Color LaserWriter 12/600 PS users. These parameters can be modified when the switch is in the left position, but they will not persist and cannot be used.

Changes made to the communication parameter set using the Apple Printer Utility, LaserWriter Utility for Windows, or low-level PostScript operators, are saved to nonvolatile RAM regardless of the switch position. However, the changes cannot be used for any print job until the switch is moved to the right, and, in this case, the parameters will be implemented for the next job, not the one in progress. See Chapter 2, "PostScript Software," for further information about the communication parameters.

If the parameter set you have defined causes difficulties in communicating with the printer, you may set the configuration switch to the left position, and return the printer to the preset communication parameters. For instance, if you are using the parallel port

Introduction to the Color LaserWriter 12/600 PS

to communicate with the printer, and the configuration switch is in the right position and the parallel port communication parameters are set to PCL5, the LaserWriter Utility cannot send commands to the printer because the utility uses PostScript commands rather than PCL5 commands to modify printer behavior. Moving the switch to the left position returns the parallel port to the AutoSelect mode. In this mode, the parallel port is automatically configured for the PostScript data stream from the LaserWriter Utility.

You can find out the setting of the switch in one of the following ways:

- by using the PostScript Level 2 system parameter `PrinterMode`
- by choosing Configure Communication from the Utilities menu of the Apple Printer Utility program
- by looking at the setting of the configuration switch on the back panel of the printer

IMPORTANT

Changing the configuration switch to the user-defined position during a printing operation affects the next print job and does not modify parameters for the job in progress. In addition, if you turn off the Ethernet channel, the change will not take effect until the printer has been powered down and then powered up again. ▲

Internal SCSI Drive Connector

The Color LaserWriter 12/600 PS supports an optional internal 2.5-inch SCSI hard drive by means of a SCSI connector on the printer controller board. Figure 1-7 shows the pin designations for this connector, and Table 1-8 lists the signal descriptions.

Figure 1-8 on page 15 shows where the SCSI connector and mounting screws are located on the controller board. The mounting bracket is part of the hard drive assembly. To install the drive, remove the three screws shown in Figure 1-8, position the hard drive and bracket so that the holes in the bracket align with the holes in the board, and then replace the three screws. The hard drive is positioned above the ROM array and covers the upper five ROMs. If you need to remove those devices for any reason, you will first have to remove the hard drive.

Figure 1-7 Internal SCSI connector

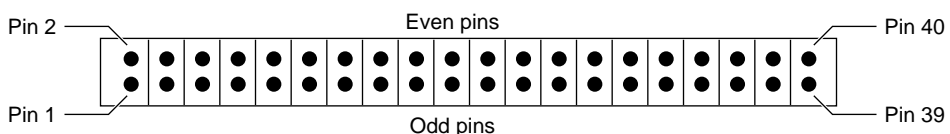


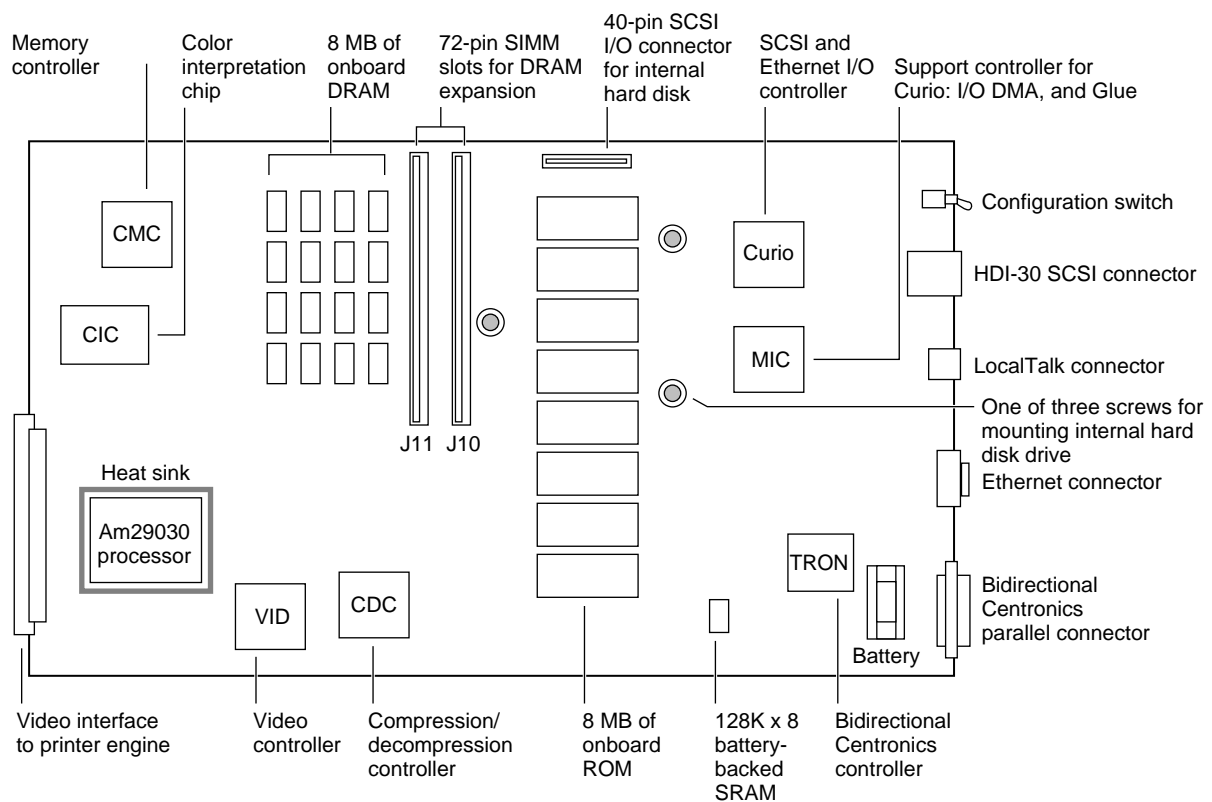
Table 1-8 Signal descriptions for internal SCSI connector

Pin number	Signal name	Description
1, 2, 24	+5 V	+5 V power supply
3, 4, 5, 7, 9, 11, 13, 15, 19, 21, 23, 27, 31, 33, 35	GND	Ground
6	/DB0	Bit 0 of SCSI data bus
8	/DB1	Bit 1 of SCSI data bus
10	/DB2	Bit 2 of SCSI data bus
12	/DB3	Bit 3 of SCSI data bus
14	/DB4	Bit 0 of SCSI data bus
16	/DB5	Bit 0 of SCSI data bus
17	Open	Open line
18	/DB6	Bit 0 of SCSI data bus
20	/DB7	Bit 0 of SCSI data bus
22	/DB8	Parity bit of SCSI data bus
25	/ATN	When active (low) indicates an attention condition
26	/BSY	When active (low) indicates that the SCSI bus is busy
28	/SCSIACK	Handshake signal; acknowledges a request for data transfer
29	/RST	SCSI bus reset
30	/MSG	When active (low) indicates the message phase is active
32	/SEL	Selects between target and initiator
34	/C/D	When active (low) indicates that data is on the SCSI bus; when high indicates that control signals are on the bus
36	/REQ	Request for a data transfer
37, 38	MGND	Memory ground
39, 40	Motor5V	+5 V power supply for motor

Memory Capabilities

The Color LaserWriter 12/600 PS comes with 8 MB of masked ROM (MROM) and 8 MB of DRAM soldered onto the controller board. Two SIMM slots are available for additional DRAM expansion. Figure 1-8 shows the positions of the SIMM slots, DRAM, and ROM in relation to the other components on the controller board.

Figure 1-8 Controller board with component locations



ROM Capability

The Color LaserWriter 12/600 PS has 8 MB of ROM installed on the controller board, which store the diagnostic software, fonts, and the PostScript interpreter required by the printer. The ROMs are DIPs (dual in-line packages) mounted in sockets on the board.

DRAM Expansion

The Color LaserWriter 12/600 PS comes with 8 MB of DRAM soldered on the controller board. There are also two 72-pin DRAM SIMM slots on the board that allow you to expand DRAM capacity. See Figure 1-8 on page 15. The SIMM slots accept 1 MB, 4 MB, and 16 MB 72-pin 60 nanosecond DRAM SIMMs, like those used in the Power Macintosh computer. A total of 40 MB of DRAM can be installed in the printer.

Table 1-9 on page 16 lists the possible DRAM configurations for 1 MB, 4 MB, and 16 MB SIMMs installed in the printer.

Note

You can mix SIMMs of different capacities in the two SIMM slots. ♦

Table 1-9 DRAM configurations for the Color LaserWriter 12/600 PS

SIMM slot J10	SIMM slot J11	Total installed DRAM
4 MB	0 MB	12 MB (shipped configuration)
4 MB	1 MB	13 MB
4 MB	4 MB	16 MB
16 MB	0 MB	24 MB
16 MB	1 MB	25 MB
16 MB	4 MB	28 MB
16 MB	16 MB	40 MB

IMPORTANT

If you install SIMMs of different capacities, it is advisable to install the larger SIMM in slot J10. ▲

Page Types

Page size (the area in which printed output may appear) is constrained by

- the physical size of the paper (paper size)
- the margins required by the printing engine
- the amount of memory available for the full-page frame buffer

Table 1-10 lists the range of page sizes supported by the Color LaserWriter 12/600 PS.

Table 1-10 Available page types

Name	Paper size in inches	Page size in inches	Description
A4	8.26 × 11.69	7.84 × 11.42	Standard page type for European A4-size paper
B5	7.17 × 10.11	6.97 × 9.72	Standard page type for Japanese B5-size paper
Legal	8.5 × 14	8.1 × 13.67	Standard page type for legal-size paper
Letter	8.5 × 11	8.1 × 10.67	Standard page type for letter-size paper
Lettersmall	8.5 × 11	7.68 × 10.16	Smaller version of letter size

Notes

1. The margins required are 0.2 inches (5 mm) left, right, and bottom and 0.32 inches (8 mm) at the top.
2. All images may be centered either horizontally or vertically, with the exception of b5, which must be centered horizontally.
3. See the sections "Page Size Compatibility Operators" and "Paper Tray Compatibility Operators" in Chapter 3 for further information.

Paper Handling

The Color LaserWriter 12/600 PS offers a variety of paper handling features.

- The multipurpose input tray (item C in Figure 1-9) is an integral part of the printer. To use it, you pull down a small flap on the right side of the printer. You may use it to feed up to 100 sheets of paper of various sizes, as well as transparency film. The tray can also be used for manual feed jobs.
- The 250-sheet cassette feeder (item D in Figure 1-9) pulls out like a drawer from the front of the printer. It holds 250 sheets of either U.S. letter-size or A4 paper.
- An optional 250-sheet universal cassette feeder (item E in Figure 1-9) holds four paper sizes: A4, B5, legal, and letter.

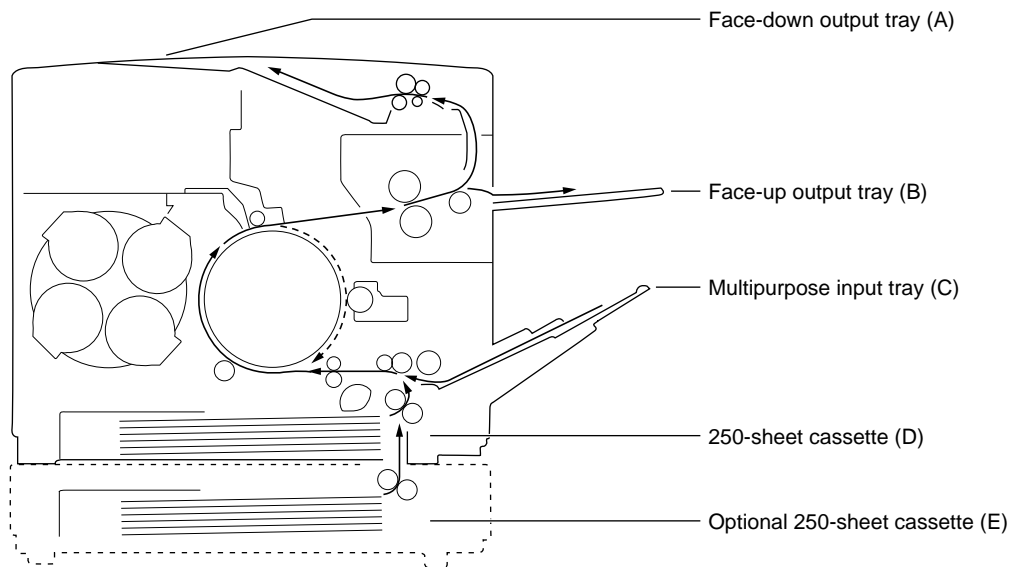
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- A paper tray on the top of the printer (item A in Figure 1-9) allows the printer to output paper face down.
- A paper tray on the front of the printer (item B in Figure 1-9) allows the printer to output paper face up.

The standard configuration of the printer comes with

- the 100-sheet multipurpose tray
- the 250-sheet cassette feeder
- both output trays

Figure 1-9 Paper handling options



Display Panel

The Color LaserWriter 12/600 PS has an LED display that provides graphical information about the status of the printer, engine maintenance requirements, and error conditions. The display panel, shown in Figure 1-10, is located on the top panel of the printer.

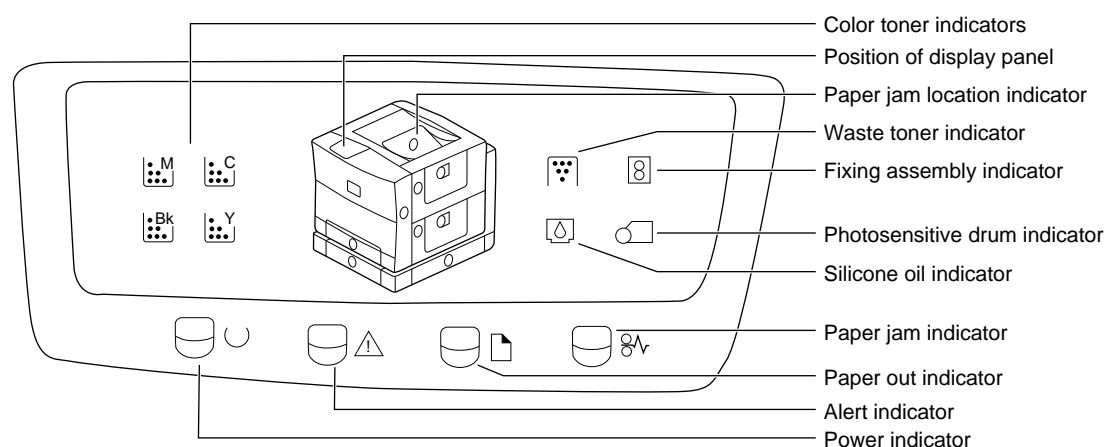
Figure 1-10 Color LaserWriter 12/600 PS display panel

Table 1-11 describes the functions of the display panel.

Table 1-11 Status indicator functions

Indicator	Printer's state
Color toner indicators	The lights come on when the related toner cartridge is running low: C is cyan, M is magenta, Y is yellow, Bk is black.
Paper jam location indicator(s)	The light (or lights) come on to indicate the location(s) of a paper jam. The paper jam indicator also comes on when one of these indicators comes on.
Waste toner indicator	This indicator comes on when the bottle that holds the waste toner is full. You then need to replace the bottle.
Fixing assembly indicator	This indicator comes on when the fixing assembly and related parts are ready to be replaced. You can print 100 more sheets after this light has come on.
Silicone oil indicator	This indicator comes on when the silicone oil level is low and you need to replace the silicone oil bottle.
Photosensitive drum indicator	This indicator comes on when the photosensitive drum needs to be replaced.
Paper jam indicator	This indicator comes on when a paper jam has occurred. Check the paper jam location indicators to find the location of the paper jam.
Paper out indicator	This indicator comes on to indicate that the paper tray is empty or has been removed from the printer.
Alert indicator	This indicator comes on when any of the consumables in the printer (toner, silicone oil, paper) need replenishing or when the waste toner bottle needs replacing.
Power indicator	This indicator blinks when the printer is starting up. It stays on steadily when the printer is ready to print.

IMPORTANT

If there is an external hard disk attached to the printer, make sure the hard disk is turned on. Otherwise, the Paper out and Paper jam indicators will flash alternately. If a hard disk is not attached to the printer, and the Paper out and Paper jam indicators flash alternately, then the printer requires service. ▲

Every time you turn on the printer, it runs self-diagnostic tests. The process takes about 40 seconds. If there are no problems, the printer continues to warm up for about two minutes. If a service problem is detected, the Paper out and Paper jam indicators flash alternately, indicating a hardware failure. Other indicators on the panel come on at this time and provide a more precise definition of the problem areas. As shown in Figure 1-11, these indicators are the ones at the left side of the status panel and the ones at the right side.

Figure 1-11 Indicators used in troubleshooting

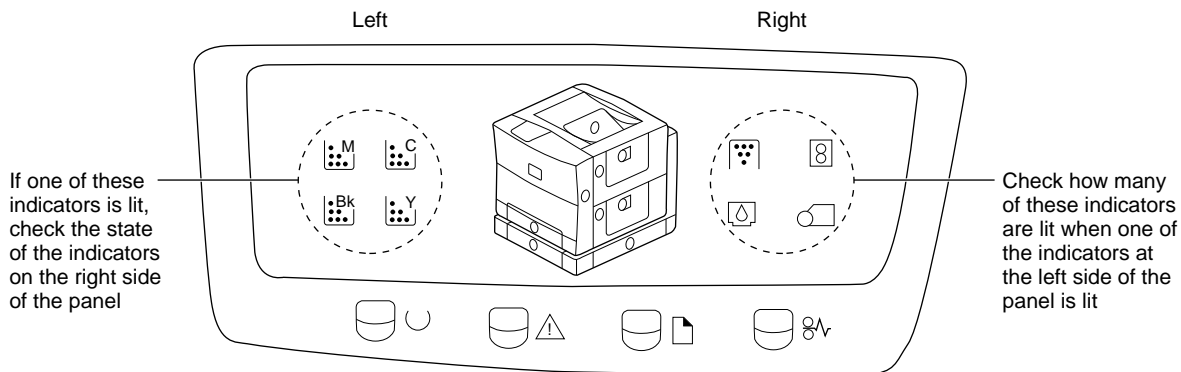


Table 1-12 explains how to read the indicators. For example, if the C (Cyan) indicator is on at the same time as any two of the indicators on the right side of the panel, there is a problem with the SIMM in slot J10.

Table 1-12 Reading the error indicators

Left indicator lit	Number of right indicators lit	Problem area
C (Cyan)	0	Controller board
C (Cyan)	1	SIMM in slot J11
C (Cyan)	2	SIMM in slot J10
M (Magenta)	2	SCSI drive
M (Magenta)	3	ROM checksum

continued

Table 1-12 Reading the error indicators (continued)

Left indicator lit	Number of right indicators lit	Problem area
Y (Yellow)	0	Fuser
Y (Yellow)	1	Fuser oil pump
Y (Yellow)	2	Fuser sensor
Y (Yellow)	3	Paper feed unit
Y (Yellow)	4	Density sensor
Bk (Black)	2	Developer unit
Bk (Black)	3	Laser/scanner
M and Bk (Magenta and Black)	0	Main motor
M and Bk (Magenta and Black)	1	Drum motor
M and Bk (Magenta and Black)	2	Laser scanner
C and Bk (Cyan and Black)	0	Controller fan
C and Bk (Cyan and Black)	1	Fuser fan
C and Bk (Cyan and Black)	2	Electric fan

Color Control Panel

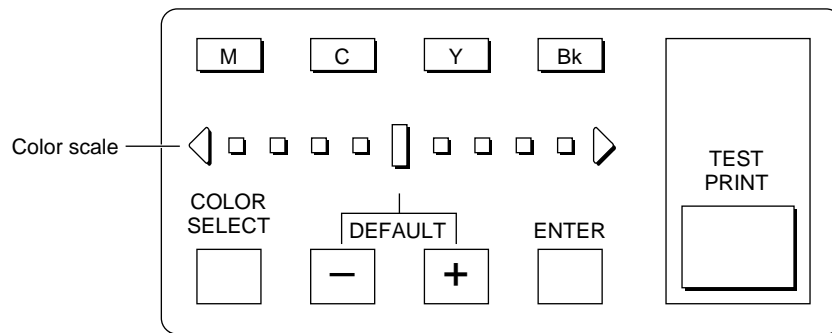
A small panel on the back of the printer (to the left of the connector panel) allows you to change the intensity of each color. You may use this panel if you have more than one Color LaserWriter 12/600 PS, and need to adjust the color between the different printers. The values you set on this panel stick over jobs, but do not persist over power cycles. Figure 1-12 on page 22 shows the color controls, and Table 1-13 on page 22 explains the functions of the different pads.

IMPORTANT

This panel is for engineering or system administrator use only. ▲

IMPORTANT

Modifying the default values can have an adverse effect on image quality and color matching fidelity. ▲

Figure 1-12 Color control panel**Table 1-13** Color control panel functions

Color control pads/indicators	Functions
M, C, Y, Bk	These indicators show you which color intensity you are changing: M indicates magenta, C indicates cyan, Y indicates yellow, Bk indicates black.
Color scale	The color scale indicators show the intensity of color currently in effect. The further to the right you go, the higher the intensity. The center indicator shows the default setting. As you press the + and - pads, this scale indicator reflects the changes.
COLOR SELECT	This pad allows you to select the color you want to change. Each time you press it, it moves from one color to the next. The M, C, Y, and Bk indicators show the color currently selected.
-, +, DEFAULT	When you press the - pad, the intensity of the color selected decreases, when you press the + pad, the intensity increases. If you wish to return to the default setting, press both pads at the same time.
ENTER	When the color settings are as you require them, press this pad to enter them in the printer.
TEST PRINT	If you press this pad, the printer will print a test page.

Color PhotoGrade Technology

PhotoGrade was introduced by Apple Computer in 1991. It used laser modulation and unique halftone design to produce high print quality from black-and-white LaserWriter printers.

Apple's Color PhotoGrade is a new development that, used on the Color LaserWriter 12/600 PS, produces near-photographic color image quality. Color PhotoGrade is implemented in firmware stored on an ASIC (application-specific integrated circuit) on the controller board. Working in conjunction with Apple's Contone Compression Technology, Color PhotoGrade supports a variety of halftoning techniques without sacrificing performance.

Color PhotoGrade introduces the following innovations:

- Color continuity augments the number of distinguishable gray shades that the Color LaserWriter 12/600 PS engine can achieve. It helps to provide uniform and consistent print quality over a full spectrum of colors.
- Line-clustered dot screening takes advantage of the best features of both line screen and traditional clustered-dot halftoning methods and provides the ability to modulate each pixel.
- By scaling and filtering images prior to halftoning, Color PhotoGrade augments PostScript capabilities. It both magnifies and reduces when scaling images, so that low-resolution images, like those from digital cameras, video capture boards, and multimedia applications, produce better image quality than those using other imaging technologies.

Color Gamut

A printer's **color gamut** is the full range of colors that the device can reliably reproduce. The toners in the Color LaserWriter 12/600 PS have been chosen to provide a large standard gamut, well suited to publishing applications. Text, graphics, and line art can use this range of colors. In the special case of scanned images, the printer can reproduce colors from an enhanced gamut that allows for more saturated, vivid images.

The PostScript operators that set colors in the standard gamut are:

```
setcolor          setrgbcolor
setgray           setcmykcolor
sethsbcolor
```

The PostScript operators that set colors in the enhanced gamut are:

```
image             colorimage
```

IMPORTANT

To get the best results from a custom or user-defined PostScript color rendering dictionary (CRD), it is important to measure device colors using the enhanced gamut. This means that color patches to be measured should be rendered using the `image` or `colorimage` operators. ▲

Apple Contone Compression Technology (ACCT)

Compression is a critical element in color printing, since it reduces the amount of memory required to process color images. Compression takes place at both the I/O and printer memory levels.

The frame buffers store an entire page prior to printing it and, therefore, occupy a great deal of memory, particularly in a color printer. Without ACCT, the frame buffer could require about 120 MB of RAM to print a high-quality page. The Color LaserWriter 12/600 PS accomplishes this effect with a basic 12 MB.

In the Color LaserWriter 12/600 PS, the PostScript interpreter renders each page on a band-by-band basis. As each band is rendered, it is compressed by the compression/decompression coprocessor (CDC) and then stored in the compressed frame buffer. Once all the bands have been compressed, the printer mechanism engages, and the video controller decompresses the data, performs the halftoning, and feeds the data to the printer in real time. Using these two proprietary ASIC devices (the CDC and the video controller), the Color LaserWriter 12/600 PS performs the decompression and halftoning processes at a faster rate than it could using software, thus enabling these processes to keep pace with the printer engine.

PostScript Software

PostScript Software

This chapter describes the Color LaserWriter 12/600 PS software. It includes

- an overview of the programming language, interpreter, driver, utility program, and page types
- a detailed description of the software parameters that enable you to set up and configure the printer, including page device parameters, product strings, interpreter parameters, and resource categories

Software Overview

This section provides an overview of the PostScript programming language, the PostScript interpreter, the printer driver, the printer utility program, and the page types supported by the printer.

Adobe PostScript Programming Language

The Color LaserWriter 12/600 PS executes descriptions written in the PostScript language. The version of the PostScript language used has features and capabilities that might not be present in other PostScript output devices. This developer note describes only the supplementary PostScript language features of the Color LaserWriter 12/600 PS, and you should use it in conjunction with the *PostScript Language Reference Manual*, second edition.

PostScript Interpreter

You may access the special features of the Color LaserWriter 12/600 PS by executing PostScript operators that exist only in this printer's interpreter. The PostScript Interpreter version at the time of printing is 2014.108.

The special operators are intended for use by interactive users, by programmers of host software that carries out user requests, or by users who may want to configure the printer in nonstandard ways. Normally, page descriptions should not refer to the special operators, since doing so impairs portability.

Printer Driver

The Color LaserWriter 12/600 PS driver and Print Manager provide a general interface to the printer. The interface should meet the needs of most Macintosh applications.

The printer driver

- provides full support for PostScript Level 2
- supports a universal paper tray
- allows you to configure the driver according to your printer configuration

PostScript Software

- presents error messages if they are reported back by the printer: for example, printer jam status, paper out
- is compatible with version 7 of the Macintosh LaserWriter driver
- provides support for *n*-up printing: this is a feature offered by version 8.3 of the Macintosh LaserWriter driver that allows you to print one, two, or four logical pages on a single sheet of paper
- supports CS.20
- supports JPEG compression

Printer Utility Program

The Color LaserWriter 12/600 PS utility program, which is shipped with each printer, allows you to control and configure the printer. Using the printer utility program, you can perform the following types of functions:

- set printer parameters, such as printer name, start page mode, and so forth
- add or remove fonts and display or print a list of available fonts
- set page parameters and get the count of pages printed by the printer
- send PostScript files to the printer
- restart the printer
- set imaging options
- set the default paper size

Page Types

The page types supported by the Color LaserWriter 12/600 PS are listed in Table 1-10 on page 17. The printer does not sense what the default paper tray is. The user must select the paper currently installed in the paper cassette. If a job requires a particular paper size, it should invoke the following PostScript commands to select the appropriate paper size for the job:

```
<< /PageSize [x y] /InputAttributes << z <</PageSize [x y] >> >>
>> setpagedevice
```

Refer to Table 2-1 for the *x* and *y* values of the paper sizes supported by the Color LaserWriter 12/600 PS. Refer to Table 2-4 for the *z* value. The paper size change is in effect only for the duration of the job. In the instances shown in this table, paper is fed into the printer short edge first. The values apply to both the standard cassette and the multipurpose feeder tray.

PostScript Software

To get the best results when printing transparencies, a job should invoke the following PostScript commands:

```
<</PageSize [x y] /MediaType (Transparency) /InputAttributes <z
<</PageSize[x y] /MediaType (Transparency)>> >> >> setpagedevice
```

IMPORTANT

If the page size currently selected does not match the paper size installed in the cassette, the printer may print on the drum outside the page boundary. In this situation, undesirable imaging artifacts may persist for up to ten pages. ▲

Table 2-1 Paper size and corresponding paper size name

Name	Paper size
A4	[595 842]
A4 small	[595 842]
B5	[516 729]
Legal	[612 1008]
Letter	[612 792]
Letter small	[612 792]

NOTE Page size is indicated by an array of two numbers ([595 842], and so on) that indicate width and height.

Each unit is equivalent to 1/72 of an inch

NOTE The tray orientation in all cases is paper fed short edge first (SEF).

Device Setup

The PostScript language facilities set up the raster output device (printer) to fulfill the processing requirements of the page description. The `setpagedevice` operator performs the following device setup functions:

- specifies processing requirements, such as making multiple copies
- selects optional printer features, such as the proper input tray, paper size, and image area
- establishes device-dependent rendering parameters needed to produce output
- specifies default device setup or configuration parameters that may be used when the page description does not specify the parameters

PostScript Software

The `currentpagedevice` operator is used to get the current accumulated values and the adjusted state of the page device. The parameters for the `setpagedevice` operator are cumulative: that is, each new call to `setpagedevice` does not reset the state in total but modifies it. In addition, on each call to `setpagedevice`, the resulting accumulated page device state is processed so that the printer can produce the required results. This may cause further modification of the page device state.

The Color LaserWriter 12/600 PS uses the Level 2 implementation, which provides device control operators defined in the special dictionary `statusdict`.

For more information about how the `setpagedevice` operator is used to specify the processing requirements of a document, refer to Section 4.11 of the *PostScript Language Reference Manual*, second edition.

Page Device Parameters

This section describes the page device parameters present in the Color LaserWriter 12/600 PS. Refer to Section 4.11.3 of the *PostScript Language Reference Manual*, second edition, for supplemental information on parameter semantics. Table 2-2 lists the page device parameters and their defaults, and it provides additional technical information.

Table 2-2 Page device parameters

Key	Type	Default	Description
<code>BeginPage</code>	<i>procedure</i>	<code>{pop}</code>	This parameter is executed at the beginning of each page: at the end of <code>setpagedevice</code> , at the end of <code>showpage</code> or <code>copypage</code> , and during any operation that reinstates a page device different from the existing one.
<code>Device RenderingInfo</code>	<i>dictionary</i>	<code><< /Type 8 /HWColorInterpolation true >></code>	This dictionary provides further details on the custom operations to be performed during rendering. Table 2-3 on page 35 provides further information on this subject.
<code>EndPage</code>	<i>procedure</i>	<code>{exch pop 2 ne}</code>	This parameter is executed at the end of each page. End of page occurs at the beginning of each <code>showpage</code> or <code>copypage</code> and when the current page device is about to be replaced by a different page device.

continued

Table 2-2 Page device parameters (continued)

Key	Type	Default	Description
ExitJamRecovery	<i>boolean</i>	false	If this parameter is <code>true</code> , pages that jam in the exit path are reprinted. If it is <code>false</code> (jam recovery disabled), pages that jam are not reprinted. In this case, performance may be improved because it is possible to overlap more page processing. The value persists across power cycles and printer restarts.
HWResolution	<i>array</i>	[600 600]	This parameter is a constant that controls the resolution of the output. Used in conjunction with the <code>Policies</code> dictionary (described later in this table), and depending on the amount of available memory in the printer, it determines if compression will be attempted on the frame buffer and at which resolution the frame buffer will print.
ImagingBBox	<i>array or null</i>	null	This parameter is an optional bounding box. If not <code>null</code> , the value is an array of four numbers in the default user coordinate system, stating lower-left <i>x</i> , lower-left <i>y</i> , upper-right <i>x</i> , and upper-right <i>y</i> of the page image bounding box. In some configurations, this may be set to a default to reduce the imaging area allowed to less than a full page.
InputAttributes	<i>dictionary</i>	Depends on configuration	<p>This parameter contains an entry for each source of input media available for use by the Color LaserWriter 12/600 PS. The values <i>x</i> and <i>y</i> depend on which paper tray is installed. The <code>InputAttributes</code> dictionary for the printer always contains entries for slots 0, 1. The entry for slot 2 is present only when the optional cassette is installed. If a physical tray is not installed in the printer, the corresponding entry in the <code>InputAttributes</code> dictionary is set to <code>null</code>. The multipurpose feeder tray always appears to be installed, even if there is no paper in it.</p> <p>If a job is sent to the printer and the tray is removed, the PostScript interpreter assumes a tray of the same size will be installed and sets the attributes accordingly. There are values of matching tolerance for the <code>PageSize</code> parameter, described later in this table. If a tray of a different size is installed in place of the one removed, the <code>PageSize</code> attribute changes to reflect the characteristics of the new tray. <code>MediaColor</code>, <code>MediaWeight</code>, and <code>MediaType</code> remain unchanged.</p>

continued

Table 2-2 Page device parameters (continued)

Key	Type	Default	Description
Input Attributes (continued)			<p>The entries for the slots in the InputAttributes dictionary correspond to the following input sources in the Color LaserWriter 12/600 PS:</p> <ul style="list-style-type: none"> ■ Slot 0 is cassette 0 (250-sheet capacity) ■ Slot 1 is the multipurpose feeder tray (100-sheet capacity) ■ Slot 2 is cassette 2 (optional 250-sheet capacity) <p>The Priority array within the InputAttributes dictionary defaults to the value [0 1 2].</p>
Install	<i>procedure</i>		<p>This procedure installs values in the graphics state during each invocation of setpagedevice, which calls this procedure after setting up the device and installing it as the current device in the graphics state but before executing the implicit erasepage and initgraphics.</p> <p>The default Install procedure is:</p> <pre> { %//installdictCLRbegin %halftone: /DefaultHalftone/Halftone findresource sethalftone %transfer function: 1183615869 internaldict/permanentTransfer get settransfer %stroke adjustment: %For printers, strokeadjust should be initially disabled. false setstrokeadjust %colorrendering: /DefaultColorRendering/ColorRendering findresource setcolorrendering % under color removal 1183615869 internaldict/permanentUCR get setundercolorremoval %black generation 1183615869 internaldict/premanentBG get setblackgeneration %end%isntalldictCLR }</pre>
ManualFeed	<i>boolean</i>	false	<p>This parameter determines whether the input medium (paper) is to be drawn from the manual or the automatic feeder. It is true for manual feeding and false for automatic feeding.</p>

continued

Table 2-2 Page device parameters (continued)

Key	Type	Default	Description
ManualFeedTimeout	<i>integer</i>	60	This parameter specifies the number of seconds the printer will wait for a page to be fed manually before generating a timeout error. The default is 60 seconds. If the value is set to 0, there is no timeout, and the printer waits indefinitely. The value persists across power cycles and printer restart.
Margins	<i>array</i>	[0 0]	This parameter is an array of two numbers that relocates the page image on the media by <i>x</i> units in the direction of the <i>x</i> coordinate and <i>y</i> units in the direction of the <i>y</i> coordinate. The <i>x</i> and <i>y</i> values are expressed as 1/300s of an inch. The value persists across power cycles and printer restarts.
MediaColor	<i>string</i> or <i>null</i>	null	This parameter specifies the color of the input media.
MediaType	<i>string</i> or <i>null</i>	null	This parameter specifies the type of media: paper, transparency, and so on.
MediaWeight	<i>number</i> or <i>null</i>	null	This parameter specifies the weight of the media.
NumCopies	<i>integer</i> or <i>null</i>	null	If this parameter is not null, it specifies the number of copies to produce. The value applies to each individual page or to the entire document, depending on the setting of <i>Collate</i> . If <i>NumCopies</i> is null, <i>showpage</i> and <i>copypage</i> should consult the value of <i>#copies</i> in the current dictionary stack each time they are executed.
OutputDevice	<i>name</i>	/Printer	This parameter specifies which communications device is to be used for <i>stdout</i> and <i>stderr</i> .
OutputFaceUp	<i>boolean</i>	false	This parameter is a constant that determines whether the printed pages are output face up or face down in the output tray. If the value is false, the pages are output face up. If it is true, they are output face down. The value persists across power cycles and printer restarts.

continued

Table 2-2 Page device parameters (continued)

Key	Type	Default	Description
OutputPage	<i>boolean</i>	true	If this parameter is <code>true</code> , pages are printed normally and output into the output tray. If it is <code>false</code> , no pages are actually printed. However, all other processing is done as if the pages were to be printed, including rasterizing to a frame buffer. In this case, the time required to process a page includes everything except the time spent waiting for the marking engine. In addition, rasterization occurs synchronously with the execution of <code>showpage</code> instead of being overlapped with the execution of subsequent pages. This function is used to measure the complete cost of executing a page.
PageSize	<i>array</i>	Depends on configuration	This parameter defines the overall page size that was assumed during generation of the page description. <code>PageSize</code> is an array of two numbers [<code>width height</code>], which specify the overall size of the page, including borders. Matching tolerance is five default user space units in either dimension. Landscape mode ([792 612]) is also valid. Table 2-1 on page 28 summarizes the page sizes permitted with the Color LaserWriter 12/600 PS.
Policies	<i>dictionary</i>	<< /PolicyNotFound 1 /PageSize 0 /ProcessColorModel 2 /OutputDevice 0 /PolicyReport {pop} >>	This dictionary contains feature-policy pairs that specify what <code>setpagedevice</code> should do when a feature request cannot be satisfied.
PostRendering Enhance	<i>boolean</i>	true	If this parameter is <code>true</code> , product-specific image enhancements are enabled. These enhancements are made after the page is rasterized in memory. If the value is <code>false</code> , the settings for <code>Finish</code> and <code>OutputMode</code> will be <code>Normal</code> . The value persists across power cycles and printer restarts.

continued

Table 2-2 Page device parameters (continued)

Key	Type	Default	Description
PostRendering EnhanceDetails	<i>dictionary</i>	Hardware dependent; see description	<p>This dictionary gives further details to the engine that are postrendering parameters to be used while imaging. There are two keys in this dictionary: <code>Type</code> and <code>OutputMode</code>. The defaults are:</p> <ul style="list-style-type: none"> ■ <code>/Type 19</code> ■ <code>/OutputMode /Normal</code> <p>The value persists across power cycles and printer restarts.</p> <p>Table 2-5 on page 36 provides more information on this subject.</p>
PreRendering Enhance	<i>boolean</i>	true	<p>If the value for this parameter is <code>true</code>, product-specific image enhancements are enabled. These enhancements are made before the image is rasterized into memory. The value persists across power cycles and printer restarts.</p>
ProcessColorModel	<i>name or string</i>	<code>/DeviceCMYK</code>	<p>This <i>name</i> or <i>string</i> value specifies the colorant model used for rendering process colors in the printer. It affects rendering for all color spaces except Separation color spaces that actually produce separations. It does not affect the interpretation of color values in any color space. It controls only the rendering method. Legal values in the Color LaserWriter 12/600 PS are <code>DeviceCMYK</code> and <code>DeviceCMY</code>.</p> <p>Normally, this parameter returns <code>DeviceCMYK</code>. However if the policy for <code>ProcessColorModel</code> is set to 2 (which it is by default), the <code>ProcessColorModel</code> may change to <code>DeviceCMY</code> if there is not enough memory to output all four planes (C, M, Y, and K) for the <code>PageSize</code> requested. “Color Models” on page 36 provides further information on this subject.</p> <p>The value persists across power cycles and printer restarts.</p>

continued

Table 2-2 Page device parameters (continued)

Key	Type	Default	Description
TraySwitch	<i>boolean</i>	false	If TraySwitch is true, automatic tray switching is provided. This means that if a tray runs out of media (paper, or other printing medium), another tray will be selected as a paper source, provided that the tray contains paper, and that the InputAttributes dictionaries match exactly, with the exception of the MatchAll key. The default for the Color LaserWriter 12/600 PS is false, which means that tray switching is not provided automatically. The value persists across power cycles and printer restarts.

NOTE All the terms in the first column are one word. They may be split onto multiple lines because of column width restrictions.

Table 2-3 defines the dictionary keys used for the DeviceRenderingInfo dictionary.

Table 2-3 DeviceRenderingInfo dictionary keys

Key	Type	Values and meaning
Type	<i>integer</i>	8
HWColorInterpolation	<i>boolean</i>	This parameter decides whether or not hardware assistance is to be used for color interpolation. A value of true means that hardware assistance will be used. A value of false means it will not be used.

Table 2-1 on page 28 lists the different paper sizes. The Color LaserWriter 12/600 PS has one input paper cassette, a multipurpose feeder tray, and an optional paper cassette. Table 2-4 lists the paper tray slot numbers and corresponding input sources. The entries for the slots in the InputAttributes dictionary correspond to the input sources shown in Table 2-4.

Table 2-4 Paper tray slot number and input source

Slot number	Input source
0	Cassette 0 (250 sheets)
1	Multipurpose feeder tray (100 sheets)
2	Cassette 2 (250 sheets), optional

Details Dictionary

Certain page device features have many variables that decide how the features function. These variables are different on different products. The feature is enabled or disabled by a primary page device entry. However, the exact way the feature functions is decided by secondary entries in a *Details* dictionary page device entry. This means an application that is not knowledgeable about the details of the feature can enable and disable the feature, while more sophisticated utilities configure the details separately. Section 2.1 of the *PostScript Language Reference Manual Supplement* provides more information on this subject.

There are two `PostRenderingEnhance` details keys: `Type` and `OutputMode`. Table 2-5 summarizes the functions of these keys.

Table 2-5 `PostRenderingEnhance` details dictionary keys

Key	Type	Values and Meaning
<code>Type</code>	<i>integer</i>	19
<code>OutputMode</code>	<i>name or string</i>	Controls the engine's color image quality with respect to registration. Possible values are: <code>/Normal</code> , which provides full engine speed, but lower print quality; and <code>/Best</code> , which provides slower engine speed, but higher print quality. The default is <code>/Normal</code> .

Color Models

The page device parameter `ProcessColorModel` specifies the colorant model used for rendering process colors in the Color LaserWriter 12/600 PS. Each legal value of `ProcessColorModel` implies a specific native color space for the printer. The native color space is the PostScript language device color space (`DeviceGray`, `DeviceRGB`, `DeviceRGBK`, `DeviceCMY`, and `DeviceCMYK`) into which user-specified colors are converted by the PostScript interpreter. The process colorant names (`Red`, `Green`, `Blue`, `Cyan`, `Yellow`, `Magenta`) select halftones in a type 5 halftone dictionary and control the production of color separations. CMYK is the color model used most frequently by commercial printers. RGB or RGBK are the models preferred for documents that are to be distributed on line. CMYK is the only color model supported by the Color LaserWriter 12/600 PS.

Table 2-6 explains the functions of the legal `ProcessColorModel` values. Section 6.2 of the *PostScript Language Reference Manual*, second edition, provides detailed background information on this subject.

Table 2-6 `ProcessColorModel` legal value functions

Legal value	Function
<code>DeviceCMYK</code>	Specifies that the process colorants are named Cyan, Yellow, Magenta, and Black.
<code>DeviceCMY</code>	Specifies that the process colorants are named Cyan, Yellow, and Magenta.

Product Strings

The Color LaserWriter 12/600 PS strings contain characters that provide information about the printer and the printer software. Table 2-7 lists values assigned to the Color printer's product strings.

Table 2-7 Product string values

String name	Type	Value	Definition
<code>languagelevel</code>	<i>integer</i>	2	Level of the PostScript language
<code>product</code>	<i>string</i>	Color LaserWriter 12/600 PS	Printer name
<code>revision</code>	<i>integer</i>	1	Current revision level of the printer
<code>serialnumber</code>	<i>integer</i>	Unique to each printer	Serial number of the printer
<code>version</code>	<i>string</i>	2014.108	Version of the PostScript language

Interpreter Parameters

Certain parameters control the operation and behavior of the PostScript interpreter. Many of them are connected with memory allocation and other specific-purpose resources. For instance, interpreter parameters control the maximum amount of memory allocated to virtual memory, font cache, and halftone screens.

The Color LaserWriter 12/600 PS is configured initially with interpreter parameter values appropriate for most applications. However, using a PostScript language

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program, you can alter the interpreter parameters to favor certain applications or to adapt the printer to special requirements. There are three classes of interpreter parameters: user, system, and device. There are three types of device parameters for the printer: communications, engine, and file system.

Each parameter class has a PostScript language operator to read the current parameter values and an operator to set parameter values. There are six resulting operators: `currentuserparams`, `setuserparams`, `currentsystemparams`, `setsystemparams`, `currentdevparams`, and `setdevparams`.

You can find information on parameter semantics in the *PostScript Language Reference Manual*, second edition.

User Parameters

Within reasonable limits, you can change user parameters without a special authorization or password, using any PostScript language program. User parameters establish temporary policies on issues such as size limits and inserting new items into caches.

The `setuserparams` operator sets user parameters, and the `currentuserparams` operator reads their current values. Unless otherwise indicated, all user parameters are subject to save and restore boundaries. Using `restore` resets all user parameters to their values at the time of the matching save. The initial value of the user parameters when the printer is turned on for the first time depends on the product. Table 2-8 lists the user parameters present in the Color LaserWriter 12/600 PS.

Table 2-8 User parameters in the Color LaserWriter 12/600 PS

Key	Type	Default	Description
AccurateScreens	<i>boolean</i>	false	This is an optional parameter. If the value is <code>true</code> , the parameter invokes a special halftone algorithm that is extremely precise but requires a lot of computation. This parameter is ignored on the Color LaserWriter 12/600 PS.
JobName	<i>string</i>	()	This parameter establishes <i>string</i> as the name of the current job. It should contain no more than 32 characters.
JobTimeout	<i>integer</i>	0	When it is set to a positive value, <code>JobTimeout</code> establishes the number of seconds a job is allowed to execute before it is aborted and a PostScript language <code>timeout</code> error is generated. The current value of the parameter is decremented during each job, and reading the parameter returns the number of seconds remaining before job timeout occurs. Time spent waiting for

continued

Table 2-8 User parameters in the Color LaserWriter 12/600 PS (continued)

Key	Type	Default	Description
JobTimeout (continued)			communications and for correcting device error conditions is not considered to be part of the job execution time. If you set the parameter to 0, job timeout is completely disabled. This parameter is not subject to save and restore. It is initialized to the value of the JobTimeout system parameter at the beginning of each job.
MaxDictStack	<i>integer</i>	530	This parameter determines the maximum number of elements in the dictionary stack. It may be set to 0 or any number larger than 0.
MaxExecStack	<i>integer</i>	10015	This parameter determines the maximum number of elements in the execution stack. It may be set to 0 or any number larger than 0.
MaxFontItem	<i>integer</i>	12500	This parameter determines the maximum number of bytes occupied by the pixel array of a single character in the font cache. It may be set to 0 or any number larger than 0.
MaxFormItem	<i>integer</i>	100000	This parameter determines the number of bytes occupied by a single cached character. It may be set to 0 or any number larger than 0.
MaxLocalVM	<i>integer</i>	2147483647	This parameter determines the maximum number of bytes occupied by values in local virtual memory. It may be set to 0 or any number larger than 0.
MaxOpStack	<i>integer</i>	100000	This parameter determines the maximum number of elements in the operand stack. It may be set to 0 or any number larger than 0.
MaxPatternItem	<i>integer</i>	20000	This parameter determines the maximum number of bytes occupied by a single cached pattern. It may be set to 0 or any number larger than 0.
MaxScreenItem	<i>integer</i>	48000	This parameter determines the maximum number of bytes occupied by a single halftone screen. It may be set to 0 or any number larger than 0. The initial value is 3000 bytes per MB of installed RAM. The default Color LaserWriter 12/600 PS setting of 48000 reflects 16 MB of installed RAM.
MaxUPathItem	<i>integer</i>	5000	This parameter determines the maximum number of bytes occupied by a single cached user path. It may be set to 0 or any number larger than 0.

continued

Table 2-8 User parameters in the Color LaserWriter 12/600 PS (continued)

Key	Type	Default	Description
MinFontCompress	<i>integer</i>	1250	This parameter sets the threshold at which a cached character is stored in compressed form instead of as a full-pixel array. It may be set to 0 or any number larger than 0.
VMReclaim	<i>integer</i>	0	This parameter enables or disables local garbage collection: <ul style="list-style-type: none"> ■ 0 enables automatic collection ■ -1 disables it for local VM ■ -2 disables it for both local and global VM
VMThreshold	<i>integer</i>	40000	This parameter indicates the frequency of garbage collection. It is triggered whenever the number of bytes indicated by the setting has been allocated. It may be set to 0 or any number larger than 0.
WaitTimeout	<i>integer</i>	40	This parameter indicates the current wait timeout. This is the number of seconds the interpreter waits to receive additional characters from the host before it aborts the current job by executing a timeout error. It may be set to 0 or any number larger than 0.

System Parameters

System parameters alter the overall configuration of the printer. You can set system parameters using the `setsystemparams` operator and read them using the `currentsystemparams` operator. You must use a password to change system parameters. System parameters are not subject to `save` and `restore`. Their values persist across jobs and may persist across power cycles. Table 2-9 lists the system parameters present in the Color LaserWriter 12/600 PS.

Note

For further information about parameters listed in Table 2-9, refer to the *PostScript Language Reference Manual Supplement*, Section 3.4 and Section 3.9. ♦

Table 2-9 System parameters in the Color LaserWriter 12/600 PS

Key	Type	Default	Details
BuildTime	<i>integer</i>	Actual date the interpreter was built	This read-only constant is a time stamp that identifies the date the PostScript interpreter was built.
ByteOrder	<i>boolean</i>	false	This read-only constant determines the order of multiple-byte numbers in binary-encoded tokens. A setting of false indicates high-order byte first, true indicates low-order byte first.
CurDisplayList	<i>integer</i>	0	This read-only parameter indicates the number of bytes currently occupied by display lists.
CurFontCache	<i>integer</i>	0	This read-only parameter identifies the amount of RAM currently occupied by the font cache.
CurFormCache	<i>integer</i>	0	This read-only parameter identifies amount of RAM currently occupied by the form cache.
CurInputDevice	<i>string</i>	Communication channel name	This read-only parameter indicates the name of the communications device that corresponds to the current input file for the PostScript language program currently being executed.
CurOutlineCache	<i>integer</i>	0	This read-only parameter identifies the amount of RAM currently occupied by the outline cache.
CurOutputDevice	<i>string</i>	Communication channel name	This read-only parameter indicates the name of the communications device that corresponds to the current output file for the PostScript language program currently being executed.
CurPatternCache	<i>integer</i>	0	This read-only parameter identifies the amount of RAM currently occupied by the pattern cache and indicates the name of the communications device that corresponds to the current input file for the PostScript language program currently being executed.

continued

Table 2-9 System parameters in the Color LaserWriter 12/600 PS (continued)

Key	Type	Default	Details
CurScreenStorage	<i>integer</i>	0	This read-only parameter identifies the amount of RAM currently occupied by screen storage and indicates the name of the communications device that corresponds to the current input file for the PostScript language program currently being executed.
CurSourceList	<i>integer</i>	0	This read-only parameter indicates the number of bytes currently occupied by source lists. It may be set to 0 or any number larger than 0.
CurUPathCache	<i>integer</i>	0	This read-only parameter indicates the number of bytes currently occupied by the user path cache. It may be set to 0 or any number larger than 0.
DoStartPage	<i>boolean</i>	true	This parameter indicates whether or not the start page should print during system initialization. The start page prints if the value is true. The value persists across power cycles and printer restarts.
FactoryDefaults	<i>boolean</i>	false	This parameter is generally false. However, if you set it to true and immediately turn off the printer, all nonvolatile parameters will revert to the factory default values the next time the printer is turned on. The value persists across power cycles and printer restarts.
FatalErrorAddress	<i>integer</i>	0	This integer is the hardware address of the last call to the fatal error handler. A nonzero value for this parameter indicates that a fatal system error has occurred earlier. The value persists across power cycles and printer restarts.
FontResourceDir	<i>string</i>	(fonts/)	This parameter controls the location of external fonts, which are resources in PostScript Level 2.
GenericResourceDir	<i>string</i>	(Resource/)	This parameter controls the location of external resources for the Generic category and all other categories based on it.

continued

Table 2-9 System parameters in the Color LaserWriter 12/600 PS (continued)

Key	Type	Default	Details
GenericResourcePathSep	<i>string</i>	(/)	<p>This parameter is used in conjunction with GenericResourceDir to control the location of external resources for the Generic category and all other categories based on it.</p> <p>With GenericResourceDir as (Resource/) and GenericResourcePathSep as (/), the AdobeLogo resource of the Pattern category would be in Resource/Pattern/AdobeLogo.</p>
JobTimeout	<i>integer</i>	0	<p>This parameter indicates the value in seconds to which the user parameter JobTimeout will be initialized at the beginning of each job. It may be set to 0 or any number larger than 0. The value persists across power cycles and printer restarts.</p>
LicenseID	<i>string</i>	(LN-001-015)	<p>This read-only constant contains the Adobe-assigned license identification. The value is unique to each printer. Any string of non-null characters is legal.</p>
MaxDisplayList	<i>integer</i>	21474833647	<p>This parameter indicates the maximum number of bytes occupied by display lists, excluding those held in caches.</p>
MaxFontCache	<i>integer</i>	Function of RAM size— RamSize /10	<p>This parameter indicates the maximum number of bytes occupied by the font cache. Initial value is based on the amount of RAM installed. The value persists across power cycles and printer restarts.</p>
MaxFormCache	<i>integer</i>	100000	<p>This parameter indicates the maximum number of bytes occupied by the form cache. It may be set to 0 or any number larger than 0.</p>
MaxImageBuffer	<i>integer</i>	65536	<p>This parameter indicates the maximum number of bytes that can be used for a single image buffer. The image buffer holds an internal data representation for sampled image source data. The interpreter may round the value down if the value requested is out of range.</p>

continued

Table 2-9 System parameters in the Color LaserWriter 12/600 PS (continued)

Key	Type	Default	Details
MaxOutlineCache	<i>integer</i>	65536	This parameter indicates the maximum number of bytes occupied by cached character outlines (CharStrings) for fonts whose definitions are kept on disk instead of in virtual memory. It may be set to 0 or any number larger than 0.
MaxPatternCache	<i>integer</i>	100000	This parameter indicates the maximum number of bytes occupied by the pattern cache. It may be set to 0 or any number larger than 0.
MaxRasterMemory	<i>integer</i>	0	<p>This parameter indicates the largest amount of memory, in bytes, that may be allocated to the frame buffer. You may use it to limit the amount of raster memory. Any unused raster memory is available for use as VM.</p> <p>Using this parameter, you can trade off raster memory allocation against VM. If you want larger page sizes and higher resolution, you should choose larger raster memory. If you want to download more fonts and print more complex pages, you should choose larger VM.</p> <p>MaxRasterMemory is consulted only during system initialization, and any changes to the parameter will not take affect until then. The value persists across power cycles and printer restarts.</p>
MaxScreenStorage	<i>integer</i>	Function of RAM size— 120000	This parameter indicates the maximum number of bytes occupied by all active halftone screens. Initial value is 30,000 bytes per MB of RAM installed. This number is recomputed when the RAM configuration changes. It may be set to 0 or any number larger than 0. The value persists across power cycles and printer restarts.
MaxSourceList	<i>integer</i>	Function of RAM size — RamSize/100	This parameter indicates the maximum number of bytes that can be used by source lists. It may be set to 0 or any number larger than 0. When it is set to 0, the parameter is not used. The value persists across power cycles and printer restarts.

continued

Table 2-9 System parameters in the Color LaserWriter 12/600 PS (continued)

Key	Type	Default	Details
MaxUPathCache	<i>integer</i>	300000	This parameter indicates the maximum number of bytes occupied by the user path. It may be set to 0 or any number larger than 0.
PageCount	<i>integer</i>	0	This read-only parameter indicates how many pages have been successfully printed since manufacture. The parameter is continually incremented, and its value persists across power cycles and printer restarts.
PrinterMode	<i>integer</i>	0	Indicates the position of the printer's configuration switch. The value is 0 when the switch is set to the left (default) position, and the printer is using preset communication parameters. The value is 1 when the switch is set to the right and the printer is ready to use the parameters set by means of the communication parameters. The value is a read-only value that changes when you change the setting of the configuration switch.
PrinterName	<i>string</i>	(Color LaserWriter 12/600 PS)	This parameter establishes <i>string</i> as the current name of the printer. You may set this parameter to any string of 32 or fewer characters. The colon (:) and the at symbol (@) are not allowed. The value persists across power cycles and printer restarts.
RamSize	<i>integer</i>	Function of RAM size—12582912 (or greater)	This read-only parameter indicates in bytes the amount of installed RAM available to the printer. It may be set to 0 or any number larger than 0. The Color LaserWriter 12/600 PS has 12 MB of RAM installed. The value of this parameter changes when the amount of installed RAM changes. The value persists across power cycles and printer restarts.
RealFormat	<i>string</i>	(IEEE)	This read-only constant provides native representation of real numbers in binary-encoded tokens.
Revision	<i>integer</i>	1	This read-only constant designates the current revision level of the ROM in which the interpreter is running.

continued

Table 2-9 System parameters in the Color LaserWriter 12/600 PS (continued)

Key	Type	Default	Details
StartJobPassword	<i>string</i>	()	This write-only password authorizes the use of the <code>start job</code> operator. Any string of 32 or fewer characters may be used. The value persists across power cycles and printer restarts.
StartupMode	<i>integer</i>	1	This parameter controls whether the system start file or some other startup procedure should be executed during system initialization. If the value is 0, there are no special startup procedures. Other values may be used that are product specific, and they result in product-dependent startup procedures. The value persists across power cycles and printer restarts.
SystemParams Password	<i>string</i>	()	This write-only password authorizes the use of the <code>setsystemparams</code> and <code>setdevparams</code> operators. Any string of 32 or fewer characters may be used. The value persists across power cycles and printer restarts.
ValidNV	<i>boolean</i>	true	This read-only parameter indicates whether or not nonvolatile memory is currently used to store persistent parameters. When it is <code>true</code> , persistent parameters are stored in nonvolatile memory.
WaitTimeout	<i>integer</i>	40	This parameter indicates the value in seconds to which the user parameter <code>WaitTimeout</code> will be initialized at the beginning of each job. It may be set to 0 or any number larger than 0. A value of 0 indicates an indefinite wait period. The value persists across power cycles and printer restarts.

NOTE All the terms in the first column are one word. They may be split onto multiple lines because of column width restrictions.

NOTE All current parameters, `CurDisplayList`, `CurFontCache`, and so on, are read-only parameters that change to reflect the current status.

Device Parameters

Each PostScript interpreter supports a collection of input/output storage devices, such as communication channels, disks, and cartridges. You may set device parameters using the `setdevparams` operator, and you may read them using the `currentdevparams` operator. Like system parameters, device parameters require a password, are global to the PostScript environment, have similar persistence characteristics, and some of them can be stored in nonvolatile storage.

Device parameters are different from both system and user parameters in that device parameters may be interdependent. This means that the legality of a given parameter may depend on the value of another parameter.

Device parameters fall into sets that correspond to a particular communications device, engine device, or storage device. Some device parameters correspond to a software entity such as a language emulator.

This section defines:

- communication device parameters
- engine device parameters
- file system device parameters

Note

Even if two printers are using the same I/O storage device, the parameters in the set may be different, because the hardware support for that device is different. ♦

Communication Device Parameters

The Color LaserWriter 12/600 PS supports the following communications channels:

- The 8-pin mini-DIN 8 port supports `%LocalTalk%`
- The Centronics parallel port supports `%Parallel%`
- The Ethernet connector supports `%EtherTalk%`, `%LPR%`, `%RemotePrinter%`, `%PrintServer%`, `%TCP%`, `%IP%`, and `%SPX%`

For each channel there are three related parameter sets: RAM, nonvolatile (NV), and pending. Section 3.5.2 in the *PostScript Language Reference Manual Supplement* provides further information on these parameter sets.

LocalTalk Support

The Color LaserWriter 12/600 PS can communicate with the host computer using the AppleTalk network system, implemented by the 8-pin mini-DIN port, which is the LocalTalk physical link. “LocalTalk Connector” on page 5 describes the physical connector, and “AppleTalk Protocols” on page 111 provides information about the LocalTalk communication channel. Table 2-10 lists the factory defaults settings for `%LocalTalk%`, `%LocalTalk%_NV`, and `%LocalTalk_Pending%`.

Table 2-10 %LocalTalk%, %LocalTalk_NV%, and %LocalTalk_Pending% parameters

Key	Type	Default	Description
DelayedOutputClose	<i>boolean</i>	false	<p>This parameter selects the way the output channel is managed after each job has finished executing. The printer does not wait for the pages of one job to finish printing before it starts executing the next job.</p> <p>DelayedOutputClose is set independently for each communication channel.</p> <p>When DelayedOutputClose is true:</p> <ul style="list-style-type: none"> ■ An EOF (end of file) is not sent until all pages of a job have been printed. The channel remains open until the job finishes printing. ■ If a job produces output, and there are preceding jobs that have not finished printing, and that are using the same output channel, the output will not be sent until those jobs have finished printing, and the EOFs for them have been sent. ■ Spontaneous messages, such as printer error messages, are sent to the channel if it is either the output channel for the job executing, or the output channel for jobs that have finished executing, but have not finished printing. <p>When DelayedOutputClose is false:</p> <ul style="list-style-type: none"> ■ An EOF (end of file) is sent as soon as the job finishes executing in the interpreter. The connection may be closed as soon as the job finishes executing, even though pages produced by the job have not finished printing. ■ Output generated by a job can be transmitted without delay, even if there are previous jobs that have not finished printing using the same output channel. For these jobs EOFs will already have been sent.

continued

Table 2-10 %LocalTalk%, %LocalTalk_NV%, and %LocalTalk_Pending% parameters (continued)

Key	Type	Default	Description
DelayedOutput Close (continued)			<ul style="list-style-type: none"> ■ Spontaneous messages, such as printer error messages, are sent to the channel only if it is the output channel for the job executing, even if it is the output channel for previous jobs that have not finished printing.
Enabled	<i>boolean</i>	true	This parameter indicates whether data arriving at the printer should be scheduled for execution. If it is <code>true</code> , data is executed. If it is <code>false</code> , data is not executed. The value persists across power cycles and printer restarts.
Filtering	<i>name</i>	None	<p>This parameter indicates whether the input stream needs further filtering before the data can be correctly interpreted as a page-description language. There are two settings:</p> <ul style="list-style-type: none"> ■ If the setting is <code>None</code>, the data is passed unchanged to the interpreter. ■ If the setting is <code>InterpreterBased</code>, the input stream is filtered as necessary to conform to the language. <p>The value persists across power cycles and printer restarts.</p>
HasNames	<i>boolean</i>	false	This read-only constant indicates whether the printer supports named files. If the printer is not mounted, or if <code>Type</code> is <code>/Communications</code> , this value is <code>false</code> .
Interpreter	<i>name</i>	PostScript	This read-only constant indicates the type of executable job represented by the arriving data.
LocalTalkType	<i>string</i>	(LaserWriter)	This parameter represents the <code>Type</code> piece of the <code>LocalTalk</code> entity name. It is set to the name of the printer type. In the case of the Color LaserWriter 12/600 PS, the type is <code>LaserWriter</code> . The value persists across power cycles and printer restarts.

continued

Table 2-10 %LocalTalk%, %LocalTalk_NV%, and %LocalTalk_Pending% parameters (continued)

Key	Type	Default	Description
NodeID	<i>integer</i>	0	This parameter represents the local network address of the printer. Legal addresses are values between 128 and 254. A value of 0 indicates that the address has not yet been set. The value persists across power cycles and printer restarts.
On	<i>boolean</i>	true	<p>This parameter determines whether the communication channel is turned on and is able to receive and send data. If the value is true, data transmitted to the channel by a host computer is buffered, and flow control protocols are applied. If the value is false, data sent to the channel is lost.</p> <p>If two communication devices share the same physical port on the printer, and both channels are set so that On is true, the device that was turned on first is turned off and disabled, while the second device is turned on. This means that one communication device cannot monopolize this port for an indefinite period.</p> <p>If On is true and Enabled is false, the channel is not considered to be available for scheduled jobs. However, it can be used by a PostScript language job to send and receive data by means of the file operators.</p> <p>The value persists across power cycles and printer restarts.</p>
Type	<i>name</i>	/Communications	This read-only constant indicates the general category of device represented by the parameter set.

continued

Table 2-10 %LocalTalk%, %LocalTalk_NV%, and %LocalTalk_Pending% parameters (continued)

Key	Type	Default	Description
WaitTimeout	<i>integer</i>	40	This parameter indicates the value, in seconds, to which the user parameter WaitTimeout is initialized at the beginning of each job from the %LocalTalk% channel. The system parameter WaitTimeout is not used. If you set the value to 0, the timeout is indefinite. If you set the value to a negative number, the setting is ignored, and the previous value retained. The value persists across power cycles and printer restarts.

NOTE All the terms in the first column are one word. They may be split onto multiple lines because of column width restrictions.

Parallel Port Support

The Centronics parallel connector provides the same level of functionality as the Hewlett-Packard LaserJet 4 parallel interface. “Centronics Parallel Connector (IEEE 1284)” on page 6 describes the physical link, and “Parallel Communication Protocols” on page 113 provides information about the parallel communication channel.

Table 2-11 lists the factory defaults settings for %Parallel%, %Parallel_NV%, and %Parallel_Pending%.

Table 2-11 %Parallel%, %Parallel_NV%, and %Parallel_Pending% parameters

Key	Type	Default	Description
DelayedOutputClose	<i>boolean</i>	false	<p>This parameter selects the way the output channel is managed after each job has finished executing. The printer does not wait for the pages of one job to finish printing before it starts executing the next job. DelayedOutputClose is set independently for each communication channel.</p> <p>When DelayedOutputClose is true:</p> <ul style="list-style-type: none"> ■ An EOF (end of file) is not sent until all pages of a job have been printed. The channel remains open until the job finishes printing.

continued

Table 2-11 %Parallel%, %Parallel_NV%, and %Parallel_Pending% parameters (continued)

Key	Type	Default	Description
DelayedOutputClose (continued)			<ul style="list-style-type: none"> ■ If a job produces output, and there are preceding jobs that have not finished printing and that are using the same output channel, the output will not be sent until those jobs have finished printing and the EOFs for them have been sent. ■ Spontaneous messages, such as printer error messages, are sent to the channel if it is either the output channel for the job executing or the output channel for jobs that have finished executing, but have not finished printing. <p>When DelayedOutputClose is false:</p> <ul style="list-style-type: none"> ■ An EOF (end of file) is sent as soon as the job finishes executing in the interpreter. The connection may be closed as soon as the job finishes executing, even though pages produced by the job have not finished printing. ■ Output generated by a job can be transmitted without delay, even if there are previous jobs that have not finished printing using the same output channel. For these jobs EOFs will already have been sent. ■ Spontaneous messages, such as printer error messages, are sent to the channel only if it is the output channel for the job executing, even if it is the output channel for previous jobs that have not finished printing.
Enabled	<i>boolean</i>	true	<p>This parameter indicates whether data arriving at the printer should be scheduled for execution. If it is <code>true</code>, data is executed. If it is <code>false</code>, data is not executed. The value persists across power cycles and printer restarts.</p>

continued

Table 2-11 %Parallel%, %Parallel_NV%, and %Parallel_Pending% parameters (continued)

Key	Type	Default	Description
Handshake	<i>integer</i>	1	<p>This parameter indicates the hardware/software signal interface to be used for communication across the parallel interface. If this key is not present, the default is the unidirectional Centronics interface. The legal values are 0 and 1:</p> <ul style="list-style-type: none"> ■ 0 specifies the unidirectional communication commonly used by IBM PCs (personal computers), and PC-compatible computers. ■ 1 specifies bidirectional communication as defined by version 0.6 of the Hewlett-Packard Boise specification. <p>The value persists across power cycles and printer restarts.</p>
HasNames	<i>boolean</i>	false	<p>This read-only constant indicates whether the printer supports named files. If the printer is not mounted, or if Type is /Communications, this value is false.</p>
Interpreter	<i>name</i>	/PostScript	<p>This read-only constant indicates the type of executable job represented by the arriving data.</p>
On	<i>boolean</i>	true	<p>This parameter determines whether the communication channel is turned on and is able to receive and send data. If the value is true, data transmitted to the channel by a host computer is buffered, and flow control protocols are applied. If the value is false, data sent to the channel is lost.</p> <p>If two communication devices share the same physical port on the printer, and both channels are set so that On is true, the device that was turned on first is turned off and disabled, while the second device is turned on. This means that one communication device cannot monopolize this port for an indefinite period.</p>

continued

Table 2-11 %Parallel%, %Parallel_NV%, and %Parallel_Pending% parameters (continued)

Key	Type	Default	Description
On (continued)			<p>If On is true and Enabled is false, the channel is not considered to be available for scheduled jobs. However, it can be used by a PostScript language job to send and receive data by means of the file operators.</p> <p>The value persists across power cycles and printer restarts.</p>
OutputDevice	string	(%Parallel%)	<p>This parameter specifies which communications device is to be used for stdout and stderr. The legal values for the parallel channel are %Parallel%, or the empty string. If the value is the empty string, stdout and stderr information is forfeited. The value persists across power cycles and printer restarts.</p>
Protocol	name	/TBCP	<p>This parameter indicates the communications protocol used. The protocols available are TBCP (tagged binary communication protocol), Normal, and Raw. The default with the Color LaserWriter 12/600 PS is TBCP. The value persists across power cycles and printer restarts.</p>
Type	name	/Communications	<p>This read-only constant indicates the general category of device represented by the parameter set.</p>
WaitTimeout	integer	40	<p>This parameter indicates the value, in seconds, to which the user parameter WaitTimeout is initialized at the beginning of each job from the %Parallel% channel. The system parameter WaitTimeout is not used. If you set the value to 0, the timeout is indefinite. If you set the value to a negative number, the setting is ignored, and the previous value retained. The value persists across power cycles and printer restarts.</p>

NOTE All the terms in the first column are one word. They may be split onto multiple lines because of column width restrictions.

Ethernet Support

The Color LaserWriter 12/600 PS implements a wide variety of Ethernet protocols by means of the 14-pin Ethernet connector. “Ethernet Connector” on page 9 describes the physical connector, and “AppleTalk Protocols” on page 111 describes the protocols supported by the Ethernet connector. Table 2-12 lists the factory defaults settings for %EtherTalk%, %EtherTalk_NV%, and %EtherTalk_Pending% implemented via the Ethernet connector.

Table 2-12 %EtherTalk%, %EtherTalk_NV%, and %EtherTalk_Pending% parameters

Key	Type	Default	Description
DelayedOutputClose	<i>boolean</i>	false	<p>This parameter selects the way the output channel is managed after each job has finished executing. The printer does not wait for the pages of one job to finish printing before it starts executing the next job. DelayedOutputClose is set independently for each communication channel.</p> <p>When DelayedOutputClose is true:</p> <ul style="list-style-type: none"> ■ An EOF (end of file) is not sent until all pages of a job have been printed. The channel remains open until the job finishes printing. ■ If a job produces output, and there are preceding jobs that have not finished printing and that are using the same output channel, the output will not be sent until those jobs have finished printing and the EOFs for them have been sent. ■ Spontaneous messages, such as printer error messages, are sent to the channel if it is either the output channel for the job executing, or the output channel for jobs that have finished executing, but have not finished printing.

continued

Table 2-12 %EtherTalk%, %EtherTalk_NV%, and %EtherTalk_Pending% parameters (continued)

Key	Type	Default	Description
DelayedOutputClose (continued)			<p>When DelayedOutputClose is false:</p> <ul style="list-style-type: none"> ■ An EOF (end of file) is sent as soon as the job finishes executing in the interpreter. The connection may be closed as soon as the job finishes executing, even though pages produced by the job have not finished printing. ■ Output generated by a job can be transmitted without delay, even if there are previous jobs that have not finished printing using the same output channel. For these jobs EOFs will already have been sent. ■ Spontaneous messages, such as printer error messages, are sent to the channel only if it is the output channel for the job executing, even if it is the output channel for previous jobs that have not finished printing.
Enabled	<i>boolean</i>	true	Indicates whether data arriving at the printer should be scheduled for execution. If it is true, data is executed. If it is false, data is not executed. The value persists across power cycles and printer restarts.
Ethernet Address	<i>string</i>	Depends on the hardware configuration	This read-only constant is a unique string that represents the Ethernet address of the printer. The format of the string is x:x:x:x:x:x:, where each x represents a hexadecimal byte. Any correctly formatted string of 17 characters is valid.

continued

Table 2-12 %EtherTalk%, %EtherTalk_NV%, and %EtherTalk_Pending% parameters (continued)

Key	Type	Default	Description
EtherTalkType	<i>string</i>	(Laserwriter)	<p>This parameter represents the type piece of the EtherTalk entity name. The entity name consists of three pieces: zone, type, and object. Each piece is a string of 32 (or fewer) non-null characters.</p> <p>Since the Color LaserWriter 12/600 PS also supports LocalTalk communications, setting the EtherTalkType string also sets the LocalTalkType parameter to the same value. The appletalktype compatibility operator is also affected by changes to EtherTalkType. This means that getting the EtherTalkType parameter yields the same value as the LocalTalkType parameter, which matches what is returned by the appletalktype compatibility operator.</p> <p>The value persists across power cycles and printer restarts.</p>
EtherTalkZone	<i>string</i>	(*)	<p>This parameter represents the zone piece of the EtherTalk entity name. Any string of 32 (or fewer) non-null characters is valid. The value persists across power cycles and printer restarts.</p>
Filtering	<i>name</i>	None	<p>This parameter indicates whether the input stream needs further filtering before the data can be correctly interpreted as a page-description language. There are two settings:</p> <ul style="list-style-type: none"> ■ If the setting is None, the data is passed unchanged to the interpreter. ■ If the setting is InterpreterBased, the input stream is filtered as necessary to conform to the language. <p>The value persists across power cycles and printer restarts.</p>

continued

Table 2-12 %EtherTalk%, %EtherTalk_NV%, and %EtherTalk_Pending% parameters (continued)

Key	Type	Default	Description
HasNames	<i>boolean</i>	false	This read-only constant indicates whether the printer supports named files. If the printer is not mounted, or if Type is /Communications, this value is false.
Interpreter	<i>name</i>	PostScript	This read-only constant indicates the type of executable job represented by the arriving data.
On	<i>boolean</i>	true	<p>This parameter determines whether the communication channel is turned on and is able to receive and send data. If the value is true, data transmitted to the channel by a host is buffered, and flow control protocols are applied. If the value is false, data sent to the channel is lost.</p> <p>If two communication devices share the same physical port on the printer, and both channels are set so that On is true, the device that was turned on first is turned off and disabled, while the second device is turned on. This means that one communication device cannot monopolize this port for an indefinite period.</p> <p>If On is true and Enabled is false, the channel is not considered to be available for scheduled jobs. However, it can be used by a PostScript language job to send and receive data by means of the file operators.</p> <p>The value persists across power cycles and printer restarts.</p>
Type	<i>name</i>	/Communications	This read-only constant indicates the general category of device represented by the parameter set.

continued

Table 2-12 %EtherTalk%, %EtherTalk_NV%, and %EtherTalk_Pending% parameters (continued)

Key	Type	Default	Description
WaitTimeout	<i>integer</i>	40	This parameter indicates the value, in seconds, to which the user parameter WaitTimeout is initialized at the beginning of each job from the %EtherTalk% channel. The system parameter WaitTimeout is not used. If you set the value to 0, the timeout is indefinite. If you set the value to a negative number, the setting is ignored, and the previous value retained. The value persists across power cycles and printer restarts.

NOTE All the terms in the first column are one word. They may be split onto multiple lines because of column width restrictions.

Table 2-13 lists the factory defaults settings for %LPR%, %LPR_NV%, and %LPR_Pending%, implemented via the Ethernet connector. These parameters are used when the printer is operating with a UNIX system. The UNIX command `lpr` sends a printer job to the Color LaserWriter 12/600 PS. On the printer side, LPR is the device name used as a job source for incoming `lpr` jobs.

Table 2-13 %LPR%, %LPR_NV%, and %LPR_Pending% parameters

Key	Type	Default	Description
Enabled	<i>boolean</i>	true	Indicates whether data arriving at the printer should be scheduled for execution. If it is true, data is executed. If it is false, data is not executed. The value persists across power cycles and printer restarts.
Filtering	<i>name</i>	/None	<p>This parameter indicates whether the input stream needs further filtering before the data can be correctly interpreted as a page description language. There are two settings:</p> <ul style="list-style-type: none"> ■ If the setting is None, the data is passed unchanged to the interpreter. ■ If the setting is InterpreterBased, the input stream is filtered as necessary to conform to the language. <p>The value persists across power cycles and printer restarts.</p>

Table 2-13 %LPR%, %LPR_NV%, and %LPR_Pending% parameters (continued)

Key	Type	Default	Description
HasNames	<i>boolean</i>	false	This read-only constant indicates whether the printer supports named files. If the printer is not mounted, or if Type is /Communications, this value is false.
Interpreter	<i>name</i>	/PostScript	This read-only constant indicates the type of executable job represented by the arriving data.
On	<i>boolean</i>	true	<p>This parameter determines whether the communication channel is turned on and is able to receive and send data. If the value is true, data transmitted to the channel by a host is buffered, and flow control protocols are applied. If the value is false, data sent to the channel is lost.</p> <p>If two communication devices share the same physical port on the printer, and both channels are set so that On is true, the device that was turned on first is turned off and disabled, while the second device is turned on. This means that one communication device cannot monopolize this port for an indefinite period.</p> <p>If On is true and Enabled is false, the channel is not considered to be available for scheduled jobs. However, it can be used by a PostScript language job to send and receive data by means of the file operators.</p> <p>The On parameter found in %LPR_NV% has the same value as the On parameters found in the %TCP% and the %IP% sets. The value in one place will change the value in all three places. In addition, when On in the %LPR_NV% set is changed to false, the Enabled parameter in that set is changed from true to false as a side effect.</p> <p>The value persists across power cycles and printer restarts.</p>

continued

Table 2-13 %LPR%, %LPR_NV%, and %LPR_Pending% parameters (continued)

Key	Type	Default	Description
PrintHost	<i>string</i>	()	<p>This parameter is a list consisting of up to 16 IP (Internet Protocol) address-mask combinations for hosts that have access to the Color LaserWriter 12/600 PS. An empty string () gives unrestricted access.</p> <p>An IP address mask can take one of two forms:</p> <ul style="list-style-type: none"> ■ N.N.N.N/n.n.n.n, where N.N.N.N is the IP address, and n.n.n.n is the IP mask. ■ N.N.N.N, where a mask of 255.255.255.255 is assumed.
Type	<i>name</i>	/Communications	This read-only constant indicates the general category of device represented by the parameter set.
WaitTimeout	<i>integer</i>	30	<p>This parameter indicates the value, in seconds, to which the user parameter WaitTimeout is initialized at the beginning of each job from the %EtherTalk% channel. The system parameter WaitTimeout is not used. If you set the value to 0, the timeout is indefinite. If you set the value to a negative number, the setting is ignored, and the previous value retained. The value persists across power cycles and printer restarts.</p>

Table 2-14 lists the factory default settings for %RemotePrinter%, %RemotePrinter_NV%, and %RemotePrinter_Pending%, implemented via the Ethernet connector.

Table 2-14 %RemotePrinter%, %RemotePrinter_NV%, and %RemotePrinter_Pending% parameters

Key	Type	Default	Description
DelayedOutputClose	<i>boolean</i>	false	<p>This parameter selects the way the output channel is managed after each job has finished executing. The printer does not wait for the pages of one job to finish printing before it starts executing the next job. DelayedOutputClose is set independently for each communication channel.</p> <p>When DelayedOutputClose is true:</p> <ul style="list-style-type: none"> ■ An EOF (end of file) is not sent until all pages of a job have been printed. The channel remains open until the job finishes printing. ■ If a job produces output, and there are preceding jobs that have not finished printing and that are using the same output channel, the output will not be sent until those jobs have finished printing and the EOFs for them have been sent. ■ Spontaneous messages, such as printer error messages, are sent to the channel it if is either the output channel for the job executing or the output channel for jobs that have finished executing, but have not finished printing. <p>When DelayedOutputClose is false:</p> <ul style="list-style-type: none"> ■ An EOF (end of file) is sent as soon as the job finishes executing in the interpreter. The connection may be closed as soon as the job finishes executing, even though pages produced by the job have not finished printing. ■ Output generated by a job can be transmitted without delay, even if there are previous jobs that have not finished printing using the same output channel. For these jobs EOFs will already have been sent.

continued

Table 2-14 %RemotePrinter%, %RemotePrinter_NV%, and %RemotePrinter_Pending% parameters (continued)

Key	Type	Default	Description
DelayedOutput Close (continued)			<ul style="list-style-type: none"> ■ Spontaneous messages, such as printer error messages, are sent to the channel only if it is the output channel for the job executing, even if it is the output channel for previous jobs that have not finished printing.
Enabled	<i>boolean</i>	true	Indicates whether data arriving at the printer should be scheduled for execution. If it is true, data is executed. If it is false, data is not executed. The value persists across power cycles and printer restarts.
Filtering	<i>name</i>	/None	<p>This parameter indicates whether the input stream needs further filtering before the data can be correctly interpreted as a page-description language. There are two settings:</p> <ul style="list-style-type: none"> ■ If the setting is None, the data is passed unchanged to the interpreter. ■ If the setting is InterpreterBased, the input stream is filtered as necessary to conform to the language. <p>The value persists across power cycles and printer restarts.</p>
HasNames	<i>boolean</i>	false	This read-only constant indicates whether the printer supports named files. If the printer is not mounted, or if Type is /Communications, this value is false.
Interpreter	<i>name</i>	/PostScript	This read-only constant indicates the type of executable job represented by the arriving data.

continued

Table 2-14 %RemotePrinter%, %RemotePrinter_NV%, and %RemotePrinter_Pending% parameters (continued)

Key	Type	Default	Description
On	<i>boolean</i>	true	<p>This parameter determines whether the communication channel is turned on and is able to receive and send data. If the value is <i>true</i>, data transmitted to the channel by a host is buffered, and flow control protocols are applied. If the value is <i>false</i>, data sent to the channel is lost.</p> <p>If two communication devices share the same physical port on the printer, and both channels are set so that <i>On</i> is <i>true</i>, the device that was turned on first is turned off and disabled, while the second device is turned on. This means that one communication device cannot monopolize this port for an indefinite period.</p> <p>If <i>On</i> is <i>true</i> and <i>Enabled</i> is <i>false</i>, the channel is not considered to be available for scheduled jobs. However, it can be used by a PostScript language job to send and receive data by means of the file operators.</p> <p>The value persists across power cycles and printer restarts.</p>
Type	<i>name</i>	/Communications	This read-only constant indicates the general category of device represented by the parameter set.
WaitTimeout	<i>integer</i>	10	<p>This parameter indicates the value, in seconds, to which the user parameter <i>WaitTimeout</i> is initialized at the beginning of each job from the %RemotePrinter% channel. The system parameter <i>WaitTimeout</i> is not used. If you set the value to 0, the timeout is indefinite. If you set the value to a negative number, the setting is ignored, and the previous value retained. The value persists across power cycles and printer restarts.</p>

NOTE All the terms in the first column are one word. They may be split onto multiple lines because of column width restrictions.

PostScript Software

Table 2-15 lists the factory defaults settings for %PrintServer%, %PrintServer_NV%, and %PrintServer_Pending%, implemented via the Ethernet connector. These parameters are used by the Color LaserWriter 12/600 PS when it is operating in a Novell network.

Table 2-15 %PrintServer%, %PrintServer_NV%, and %PrintServer_Pending% parameters

Key	Type	Default	Description
DelayedOutput Close	<i>boolean</i>	false	<p>This parameter selects the way the output channel is managed after each job has finished executing. The printer does not wait for the pages of one job to finish printing before it starts executing the next job. DelayedOutputClose is set independently for each communication channel.</p> <p>When DelayedOutputClose is true:</p> <ul style="list-style-type: none"> ■ An EOF (end of file) is not sent until all pages of a job have been printed. The channel remains open until the job finishes printing. ■ If a job produces output, and there are preceding jobs that have not finished printing and that are using the same output channel, the output will not be sent until those jobs have finished printing and the EOFs for them have been sent. ■ Spontaneous messages, such as printer error messages, are sent to the channel if it is either the output channel for the job executing or the output channel for jobs that have finished executing, but have not finished printing.

continued

Table 2-15 %PrintServer%, %PrintServer_NV%, and %PrintServer_Pending% parameters (continued)

Key	Type	Default	Description
DelayedOutputClose (continued)			<p>When DelayedOutputClose is false:</p> <ul style="list-style-type: none"> ■ An EOF (end of file) is sent as soon as the job finishes executing in the interpreter. The connection may be closed as soon as the job finishes executing, even though pages produced by the job have not finished printing. ■ Output generated by a job can be transmitted without delay, even if there are previous jobs that have not finished printing using the same output channel. For these jobs EOFs will already have been sent. ■ Spontaneous messages, such as printer error messages, are sent to the channel only if it is the output channel for the job executing, even if it is the output channel for previous jobs that have not finished printing.
Enabled	<i>boolean</i>	true	<p>Indicates whether data arriving at the printer should be scheduled for execution. If it is true, data is executed. If it is false, data is not executed. The value persists across power cycles and printer restarts.</p>
Filtering	<i>name</i>	/None	<p>This parameter indicates whether the input stream needs further filtering before the data can be correctly interpreted as a page description language. There are two settings:</p> <ul style="list-style-type: none"> ■ If the setting is None, the data is passed unchanged to the interpreter. ■ If the setting is InterpreterBased, the input stream is filtered as necessary to conform to the language. <p>The value persists across power cycles and printer restarts.</p>

continued

Table 2-15 %PrintServer%, %PrintServer_NV%, and %PrintServer_Pending% parameters (continued)

Key	Type	Default	Description
HasNames	<i>boolean</i>	false	This read-only constant indicates whether the printer supports named files. If the printer is not mounted, or if Type is /Communications, this value is false.
Interpreter	<i>name</i>	/PostScript	This read-only constant indicates the type of executable job represented by the arriving data.
LoginPassword	<i>string</i>	()	This parameter specifies the password that the PrintServer uses to gain access to the job queue. Any string of up to 32 characters is valid. Setting this parameter to the empty string indicates that no password has been specified. The currentdevparams operator always returns the string (Invalid), regardless of the password setting. If you attempt to use the word Invalid as the password, it will be ignored.
NetworkName	<i>string</i>	(Apple_LWxxxxxxx)	This parameter reflects the name actually chosen by the printer on the Novell network. Note that owing to name conflicts, this name may be different from the system parameter PrinterName. The last six digits (xxxxxxx) in the default are the first six digits of the Ethernet address.
On	<i>boolean</i>	true	<p>This parameter determines whether the communication channel is turned on and is able to receive and send data. If the value is true, data transmitted to the channel by a host is buffered, and flow control protocols are applied. If the value is false, data sent to the channel is lost.</p> <p>If two communication devices share the same physical port on the printer, and both channels are set so that On is true, the device that was turned on first is turned off and disabled, while the second device is turned on. This means that one communication device cannot monopolize this port for an indefinite period.</p>

continued

Table 2-15 %PrintServer%, %PrintServer_NV%, and %PrintServer_Pending% parameters (continued)

Key	Type	Default	Description
On (continued)			<p>If On is true and Enabled is false, the channel is not considered to be available for scheduled jobs. However, it can be used by a PostScript language job to send and receive data by means of the file operators.</p> <p>The value persists across power cycles and printer restarts.</p>
Type	<i>name</i>	/Communications	This read-only constant indicates the general category of device represented by the parameter set.
WaitTimeout	<i>integer</i>	10	<p>This parameter indicates the value, in seconds, to which the user parameter WaitTimeout is initialized at the beginning of each job from the %PrintServer% channel. The system parameter WaitTimeout is not used. If you set the value to 0, the timeout is indefinite. If you set the value to a negative number, the setting is ignored, and the previous value retained. The value persists across power cycles and printer restarts.</p>

NOTE All the terms in the first column are one word. They may be split onto multiple lines because of column width restrictions.

PostScript Software

Table 2-16 lists the factory defaults settings for %TCP%, implemented via the Ethernet connector. These parameters are used by the Color LaserWriter 12/600 PS when it is operating in a UNIX environment with TCP (Transmission Control Protocol).

Table 2-16 %TCP% parameters

Key	Type	Default	Description
On	<i>boolean</i>	true	<p>This parameter determines whether the communication channel is turned on and is able to receive and send data. If the value is <code>true</code>, data transmitted to the channel by a host is buffered, and flow control protocols are applied. If the value is <code>false</code>, data sent to the channel is lost.</p> <p>If two communication devices share the same physical port on the printer and both channels are set so that <code>On</code> is <code>true</code>, the device that was turned on first is turned off and disabled, while the second device is turned on. This means that one communication device cannot monopolize this port for an indefinite period.</p> <p>If <code>On</code> is <code>true</code> and <code>Enabled</code> is <code>false</code>, the channel is not considered to be available for scheduled jobs. However, it can be used by a PostScript language job to send and receive data by means of the file operators.</p> <p>The <code>On</code> parameter found in %TCP% has the same value as the <code>On</code> parameters found in the %LPR_NV% and the %IP% sets. Changing the value in one place will change the value in all three places.</p> <p>The value persists across power cycles and printer restarts.</p>
Type	<i>name</i>	/Communications	<p>This read-only constant indicates the general category of device represented by the parameter set. The value persists across power cycles and printer restarts.</p>

PostScript Software

Table 2-17 lists the factory defaults settings for %IP% implemented via the Ethernet connector. These parameters are used by the Color LaserWriter 12/600 PS when it is operating in a UNIX environment with IP (Internet Protocol). The parameter `IPAddressDynamic` is not used in this parameter set, since dynamic routing is always in effect.

Table 2-17 %IP% Parameters

Key	Type	Default	Description
GatewayAddress	<i>string</i>	()	This parameter contains the address of the gateway to other networks. The parameter can be set to at most one IP address, from which the network address of the gateway may be derived. In this case, static routing is implied. If the parameter is set to the empty string (), which is the default for the Color LaserWriter 12/600 PS, dynamic routing is implied. The value persists across power cycles and printer restarts.
IPAddress	<i>string</i>	()	This parameter is a unique string that represents the Internet Protocol address of the Color LaserWriter 12/600 PS. The IP address is mapped to the lowest physical address by which the unit is known. The value persists across power cycles and printer restarts. <code>IPAddressDynamic</code> is not part of this parameter set, since dynamic routing is always in effect.
NetworkMask	<i>string</i>	(0.0.0.0)	This parameter indicates the fields of <code>IPAddress</code> that designate the network portion of the address and those that designate the node portion. This mask is used to determine if a certain IP address is on the same network as the printer. Any string of up to 15 non-null characters is a valid setting for this parameter. The value persists across power cycles and printer restarts.

continued

Table 2-17 %IP% Parameters (continued)

Key	Type	Default	Description
On	<i>boolean</i>	true	<p>This parameter determines whether the communication channel is turned on and is able to receive and send data. If the value is <code>true</code>, data transmitted to the channel by a host is buffered, and flow control protocols are applied. If the value is <code>false</code>, data sent to the channel is lost.</p> <p>If two communication devices share the same physical port on the printer, and both channels are set so that <code>On</code> is <code>true</code>, the device that was turned on first is turned off and disabled, while the second device is turned on. This means that one communication device cannot monopolize this port for an indefinite period.</p> <p>If <code>On</code> is <code>true</code> and <code>Enabled</code> is <code>false</code>, the channel is not considered to be available for scheduled jobs. However, it can be used by a PostScript language job to send and receive data by means of the file operators.</p> <p>The <code>On</code> parameter found in %IP% has the same value as the <code>On</code> parameters found in the %LPR_NV% and the %TCP% sets. Changing the value in one place will change the value in all three places.</p> <p>The value persists across power cycles and printer restarts.</p>
Transmit Encapsulation	<i>name</i>	/DIX	<p>This read-only constant specifies the type of encapsulation used during transmission:</p> <ul style="list-style-type: none"> ■ 802.3-2 indicates IEEE 802.3 MAC header followed by a 802.2 LLC and SNAP header. ■ DIX indicates Ethernet Version II.
Type	<i>name</i>	/Parameters	<p>This read-only constant indicates the general category of device represented by the parameter set. The value persists across power cycles and printer restarts.</p>

NOTE All the terms in the first column are one word. They may be split onto multiple lines because of column width restrictions.

PostScript Software

Table 2-18 lists the factory defaults settings for %SPX%, implemented via the Ethernet Connector. These parameters are used by the Color LaserWriter 12/600 PS when it is operating with a Novell print server.

Table 2-18 %SPX%, %SPX_NV%, and %SPX_Pending% parameters

Key	Type	Default	Description
On	<i>boolean</i>	true	<p>This parameter determines whether the communication channel is turned on and is able to receive and send data. If the value is <code>true</code>, data transmitted to the channel by a host is buffered, and flow control protocols are applied. If the value is <code>false</code>, data sent to the channel is lost.</p> <p>If two communication devices share the same physical port on the printer and both channels are set so that <code>On</code> is <code>true</code>, the device that was turned on first is turned off and disabled, while the second device is turned on. This means that one communication device cannot monopolize this port for an indefinite period.</p> <p>If <code>On</code> is <code>true</code> and <code>Enabled</code> is <code>false</code>, the channel is not considered to be available for scheduled jobs. However, it can be used by a PostScript language job to send and receive data by means of the file operators.</p> <p>The value persists across power cycles and printer restarts.</p>
Type	<i>name</i>	/Parameters	<p>This read-only constant indicates the general category of device represented by the parameter set. The value persists across power cycles and printer restarts.</p>

Engine Device Parameters

The %Engine% device contains parameters that control the print engine itself. The %Engine% device of the Color LaserWriter 12/600 PS contains the parameters listed in Table 2-19.

Table 2-19 %Engine% parameters

Key	Type	Default	Details
DarknessCyan	<i>real</i>	Depends on engine	This read-only constant controls the overall lightness or darkness of the cyan color applied to the paper. A value of 0.0 signifies minimum darkness, and a value of 1.0 signifies maximum darkness. Values outside this range are not legal. The DarknessCyan parameter is not sent to the engine until there are no pages in the paper path, either feeding or being copied. This parameter does not affect the frame buffer, and it does not have any computational overhead. The value persists across power cycles and printer restarts.
DarknessMagenta	<i>real</i>	Depends on engine	This read-only constant controls the overall lightness or darkness of the magenta color applied to the paper. A value of 0.0 signifies minimum darkness, and a value of 1.0 signifies maximum darkness. Values outside this range are not legal. The DarknessMagenta parameter is not sent to the engine until there are no pages in the paper path, either feeding or being copied. This parameter does not affect the frame buffer, and it does not have any computational overhead. The value persists across power cycles and printer restarts.
DarknessYellow	<i>real</i>	Depends on engine	This read-only constant controls the overall lightness or darkness of the yellow color applied to the paper. A value of 0.0 signifies minimum darkness, and a value of 1.0 signifies maximum darkness. Values outside this range are not legal. The DarknessYellow parameter is not sent to the engine until there are no pages in the paper path, either feeding or being copied. This parameter does not affect the frame buffer, and it does not have any computational overhead. The value persists across power cycles and printer restarts.

continued

Table 2-19 %Engine% parameters (continued)

Key	Type	Default	Details
DarknessBlack	<i>real</i>	Depends on engine	This read-only constant controls the overall lightness or darkness of the black toner applied to the paper. A value of 0.0 signifies minimum darkness, and a value of 1.0 signifies maximum darkness. Values outside this range are not legal. Changes in the DarknessBlack parameter are not sent to the engine until there are no pages in the paper path, either feeding or being copied. This parameter does not affect the frame buffer, and it does not have any computational overhead. The value persists across power cycles and printer restarts.
PageCount	<i>integer</i>	0	This parameter is a count of all pages fed by the engine. It includes pages that were spoiled as well as those that were successfully printed. You can find the value of PageCount by querying the engine. The value persists across power cycles and printer restarts.
TimeToStandby	<i>integer</i>	60	<p>If no pages are sent to the printer, it goes into a standby mode. In standby mode the printer does not remain in a ready state, with its fuser hot, ready to print a page. The period of inactive time the printer waits before it goes into standby mode is decided by this parameter. The legal values for it are 0–720 (seconds). If you specify 0, the printer will never go into standby mode.</p> <p>The printer comes out of standby mode the next time the controller sends a feed or a prefeed command. The engine then goes through a “warming up” state until it is ready to print.</p> <p>The value persists across power cycles and printer restarts.</p>
Type	<i>name</i>	/Parameters	This read-only constant designates the category of parameters in a device parameter set. Each set contains a Type entry. In the case of engine devices it is /Parameters.

File System Device Parameters

The PostScript language allows you to access files in a secondary storage device, such as a hard disk drive. This section describes the parameters that allow you to access a hard disk drive, and ROM.

Table 2-20 lists the parameters required to define hard disk storage devices.

Table 2-20 %disk0% through %disk6% parameters

Key	Type	Default	Description
BlockSize	<i>integer</i>	1024	This read-only constant indicates the formatting size, in bytes, of a page in hard disk storage. The value may be any nonzero positive integer. The Color LaserWriter 12/600 PS uses a 1024 byte page format.
Free	<i>integer</i>	Depends on the disk mounted	This read-only parameter indicates the amount of space available on the hard disk. The unit of measurement is pages, and the page size is indicated by the parameter BlockSize. This parameter is valid only if a hard disk device is mounted (Mounted is set to true). If the value of the parameter is 0, the disk is either not mounted or is completely full. The value persists across power cycles and printer restarts.
HasNames	<i>boolean</i>	true	This read-only constant indicates whether the hard disk supports named files. The parameter is valid only if the hard disk is mounted (Mounted set to true). If the hard disk is not mounted, the parameter has a value of false.
Initialize Action	<i>integer</i>	0	<p>This parameter specifies the action required to initialize the disk. The following values are valid:</p> <ul style="list-style-type: none"> ■ 0 indicates no action. This is the value returned when the parameter is read. ■ 1 indicates that the current file system (if any) is to be deleted and a new one of the size indicated by LogicalSize is to be created. The disk is assumed to have been already formatted. The disk must first be mounted, otherwise an <code>ioerror</code> will result.

continued

Table 2-20 %disk0% through %disk6% parameters (continued)

Key	Type	Default	Description
Initialize Action (continued)			<ul style="list-style-type: none"> ■ 2 reformats the entire disk before creating a new file system of the size indicated by LogicalSize. ■ 3 (or greater) has the same effect as the value 2, and it also carries out product-dependent actions, which typically consist of reformatting the disk and running integrity tests before creating the file system. Some disks can have additional parameters that serve as arguments to InitializeAction.
LogicalSize	<i>integer</i>	Depends on the disk mounted	<p>This parameter specifies the size of the file system to be created. It is used as an argument to the action carried out by InitializeAction.</p> <p>If LogicalSize is set to 0, InitializeAction uses a default size that is normally the size of the entire disk installed in the printer.</p> <p>When this parameter is queried, it indicates in pages the current size of the hard disk. A value of 0 indicates that a hard disk is not mounted.</p> <p>The value persists across power cycles and printer restarts.</p>
Mounted	<i>boolean</i>	true	<p>If this parameter is set to true, the system attempts to mount the device. If it is set to false, the system attempts to dismount the device. Mounting the device makes it known to the system, and readable. A disk will not mount successfully if it does not contain a valid file system.</p>
PhysicalSize	<i>integer</i>	Depends on the disk mounted	<p>This read-only parameter indicates the size in pages of the disk drive. The parameter is valid only when a disk is mounted, and Mounted is set to true. A value of 0 indicates that there is no disk mounted. The value persists across power cycles and printer restarts, but changes if the capacity of the disk installed changes.</p>

continued

Table 2-20 %disk0% through %disk6% parameters (continued)

Key	Type	Default	Description
Removable	<i>boolean</i>	Depends on the disk mounted	This read-only constant indicates whether or not the printer supports a removable disk. The setting <code>true</code> indicates that the disk is removable, while <code>false</code> indicates it is not removable.
Searchable	<i>boolean</i>	<code>true</code>	This read-only constant indicates whether or not the disk participates in file system search operations, during which a file name is specified, but the storage device is not. The setting <code>true</code> indicates the disk is searchable, while <code>false</code> indicates it is not.
SearchOrder	<i>integer</i>	Depends on the disk mounted	This read-only constant indicates the level of priority at which the disk participates when a file search is initiated during which no drive has been specified (see <code>Searchable</code>). The lower the value of the integer, the higher the priority. This parameter is ignored if the <code>Searchable</code> parameter is <code>false</code> .
Type	<i>name</i>	<code>/FileSystem</code>	This read-only constant always has a value of <code>FileSystem</code> . Each set of device parameters contains a <code>Type</code> entry.
Writeable	<i>boolean</i>	<code>false</code>	This parameter indicates whether or not the disk can be accessed for a write operation. You can set this parameter to <code>true</code> , but only when the disk is being mounted (that is when <code>Mounted</code> is being set to <code>true</code>), and only if the disk is not write protected. If the disk is not mounted, this parameter indicates whether or not the disk slot will support writeable media.

NOTE All the terms in the first column are one word. They may be split onto multiple lines because of column width restrictions.

Table 2-21 lists the parameters required to define storage devices, such as ROM or tape cartridges. In the case of the Color LaserWriter 12/600 PS, the device supported is ROM.

Table 2-21 %rom% parameters

Key	Type	Default	Description
BlockSize	<i>integer</i>	1	This read-only constant indicates the formatting size, in bytes, of a page in ROM storage. The Color LaserWriter 12/600 PS uses a 1 byte page format.
CartridgeID	<i>integer</i>	Depends on the ROM installed	Each ROM (or storage cartridge) installed has a unique identification, which is set by this read-only parameter. The value can be any integer. The PostScript interpreter uses this parameter to determine if the ROM has been removed from a slot and a different storage device inserted. The value persists over power cycles and printer restarts.
CartridgeType	<i>integer</i>	Depends on the ROM installed	This read-only constant indicates the category of the storage device installed in the slot, that is, whether it is a ROM, cartridge, or other category. It is a read-only parameter, and is a registry maintained by Adobe Systems. The value changes, depending on the device installed, but it persists over power cycles and printer restarts.
Free	<i>integer</i>	Depends on the ROM installed	This read-only constant indicates the amount of space available in the ROM. The unit of measurement is pages, and the page size is indicated by the parameter BlockSize. This parameter is valid only if a ROM is installed (Mounted set to true). If the value of the parameter is 0, the ROM is either not installed or is completely full. The value persists over power cycles and printer restarts, but it changes as the amount of available ROM changes.
HasNames	<i>boolean</i>	true	This read-only constant indicates whether the ROM supports named files. The parameter is valid only if the ROM is installed (Mounted set to true). If the ROM is not mounted, the parameter has a value of false.

continued

Table 2-21 %rom% parameters (continued)

Key	Type	Default	Description
Initialize Action	<i>integer</i>	0	<p>This parameter specifies the action required to initialize the ROM. The following values are valid:</p> <ul style="list-style-type: none"> ■ 0 indicates no action. This is the value returned when the parameter is read. ■ 1 indicates that the current file system (if any) is to be deleted and a new one of the size indicated by LogicalSize is to be created. The ROM is assumed to have been already formatted. The ROM must first be mounted, otherwise an <i>ioerror</i> will result. ■ 2 reformats the entire ROM before creating a new file system of the size indicated by LogicalSize. ■ 3 (or greater) has the same effect as the value 2, and it also carries out product dependent actions, which typically consist of reformatting the disk and running integrity tests before creating the file system. Some ROMs can have additional parameters that serve as arguments to InitializeAction.
LogicalSize	<i>integer</i>	Depends on the ROM installed	<p>This read-only constant specifies the size of the file system to be created. It is used as an argument to the action carried out by InitializeAction.</p> <p>If LogicalSize is set to 0, InitializeAction uses a default size that is normally the size of the entire ROM installed in the printer.</p> <p>When this parameter is queried, it indicates in pages the current size of the ROM. A value of 0 indicates that a ROM is not installed.</p> <p>The value persists across power cycles and printer restarts, but changes when the ROM size changes.</p>

continued

Table 2-21 %rom% parameters (continued)

Key	Type	Default	Description
Mounted	<i>boolean</i>	true	If this parameter is set to <code>true</code> , the system attempts to mount the ROM. If it is set to <code>false</code> , the system attempts to dismount the ROM. Mounting the ROM makes it known to the system and readable. A ROM will not mount successfully if it does not contain a valid file system. The value persists across power cycles and printer restarts, but changes when the ROM size changes.
PhysicalSize	<i>integer</i>	Depends on the ROM installed	This read-only constant indicates the size in pages of the ROM. The parameter is valid only when a ROM is installed and <code>Mounted</code> is set to <code>true</code> . A value of 0 indicates that there is no ROM installed. The value persists across power cycles and printer restarts, but changes when the ROM size changes.
Removable	<i>boolean</i>	false	This read-only constant indicates whether or not the printer supports a removable ROM. The setting <code>true</code> indicates that it supports removable ROM, <code>false</code> indicates it does not.
Searchable	<i>boolean</i>	true	This read-only constant indicates whether or not the ROM participates in file system search operations, during which a file name is specified, but the storage device is not. The setting <code>true</code> indicates it participates, while <code>false</code> indicates it does not.
SearchOrder	<i>integer</i>	11	This read-only constant indicates the level of priority assigned to the ROM when a file search is initiated during which no drive has been specified (see <code>Searchable</code>). The lower the value of the integer, the higher the priority. This parameter is ignored if the <code>Searchable</code> parameter is <code>false</code> .
Type	<i>name</i>	/FileSystem	This read-only constant always has a value of <code>FileSystem</code> . Each set of device parameters contains a <code>Type</code> entry.

continued

Table 2-21 %rom% parameters (continued)

Key	Type	Default	Description
Writeable	<i>boolean</i>	false	This read-only constant indicates whether or not the storage device can be accessed for a write operation. It is always <code>false</code> for a ROM device, which by definition is a read-only device.

NOTE All the terms in the first column are one word. They may be split onto multiple lines because of column width restrictions.

Resource Categories

In PostScript language Level 2, PostScript objects such as fonts, patterns, and filters can be managed as open-ended collections of resources grouped into categories. A resource is requested by resource category and name. If the resource does not reside in virtual memory, the resource management mechanism loads it from an external source, such as a disk, a ROM cartridge, or a network file server. The *PostScript Language Reference Manual*, second edition, discusses named resources in detail.

There are several groups of resources:

- New resources in the regular resource categories can be added. These include such items as font and pattern resources. (See Table 2-22 on page 82.)
- Categories of implicit resources represent built-in capabilities of the Color LaserWriter 12/600 PS interpreter. For example, the `FormType` category indicates that the interpreter understands Type 1 only. (See Table 2-24 on page 84.)
- Some resources are used to define new categories. (See Table 2-25 on page 86.)

Most of the instances listed in the following tables are described in the *PostScript Language Reference Manual*, second edition, or the *PostScript Language Reference Manual Supplement*.

Table 2-22 lists the new resources in regular resource categories. The Color LaserWriter 12/600 PS supports 39 fonts, and the font list may vary from printer to printer. The ones listed in Table 2-22 are the most likely to be supported.

Table 2-22 Regular resource categories

Category name	Instances
Font	AvantGarde-Book AvantGarde-BookOblique AvantGarde-Demi AvantGarde-DemiOblique Bookman-Demi Bookman-DemiItalic Bookman-Light Bookman-LightItalic Courier Courier-Bold Courier-BoldItalic Courier-Oblique Helvetica Helvetica-Bold Helvetica-BoldOblique Helvetica-Oblique Helvetica-Condensed Helvetica-Condensed-Bold Helvetica-Condensed-BoldOblique Helvetica-Condensed-Oblique Helvetica-Narrow Helvetica-Narrow-Bold Helvetica-Narrow-BoldOblique Helvetica-Narrow-Oblique NewCenturySchlbk-Bold NewCenturySchlbk-BoldItalic NewCenturySchlbk-Italic NewCenturySchlbk-Roman Palatino-Bold Palatino-BoldItalic Palatino-Italic Palatino-Roman Symbol Times-Bold Times-BoldItalic Times-Italic Times-Roman ZapfChancery-MediumItalic ZapfDingbats
Encoding	ISOLatin1Encoding StandardEncoding
Form	No instances defined

continued

Table 2-22 Regular resource categories (continued)

Category name	Instances
Pattern	No instances defined
ProcSet	SamplePages Test ProcSet is a procedure set, or a dictionary, containing named procedures. The Color LaserWriter 12/600 PS has two predefined ProcSet instances. SamplePages contains named start page procedures, including StartPage, which is used to print out the Color LaserWriter 12/600 PS startup page. Test is used by Adobe for testing. You should not use it.
ColorSpace	No instances defined
Halftone	DefaultHalftone
ColorRendering	DefaultColorRendering AbsoluteColorMetric.null.none Perceptual.null.none RelativeColorMetric.null.none Saturation.null.none
OutputDevice	Default Printer The Color LaserWriter 12/600 PS supports one OutputDevice type, and that is Printer. The Default output device is equivalent to the Printer instance. The Printer (or Default) resource instance is represented as a dictionary that contains key-value pairs describing certain capabilities of that particular output device. See Table 2-23 for further information.
HWOptions	No instances defined

Table 2-23 lists the keys in the resource dictionary for OutputDevice type /Printer.

Table 2-23 Resource dictionary for OutputDevice type /Printer

Key	Value
HWResolution	[[600 600]]
ManualSize	[[612 792] [612 1008] [516 729] [595 842]]
PageSize	[[612 792] [612 1008] [516 729] [595 842]]
ProcessColorModel	[/DeviceCMYK /DeviceCMY] (DeviceCMY appears only if you have a 12 MB system and are requesting legal-size paper.)

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Table 2-24 lists categories of implicit resources with the built-in capabilities of the Color LaserWriter 12/600 PS interpreter.

Table 2-24 Resources with implicit instances

Category name	Instances
ColorRenderingType	1
ColorSpaceFamily	CIEBasedA CIEBasedABC DeviceCMYK DeviceGray DeviceRGB Indexed Pattern Separation
Filter	ASCII85Decode ASCII85Encode ASCIIHexDecode ASCIIHexEncode CCITTFaxDecode CCITTFaxEncode DCTDecode DCTEncode LZWDecode LZWEncode NullEncode RunLengthDecode RunLengthEncode SubFileDecode
FMaptype	2, 3, 4, 5, 6, 7, 8
FontType	0, 1, 3, 4, 5, 6, 42
	The integers 0, 1, 3, 4, 5, and 6 are the instances supported for the Color LaserWriter 12/600 PS . Type 42, a TrueType font with the PostScript wrapper, is also supported.
FormType	1
HalftoneType	1, 2, 3, 4, 5, 6
ImageType	1

continued

Table 2-24 Resources with implicit instances (continued)

Category name	Instances
IIODevice	%Engine% %LocalTalk% %LocalTalk_NV% %LocalTalk_Pending% %EtherTalk% %EtherTalk_NV% %EtherTalk_Pending% %Parallel% %Parallel_NV% %Parallel_Pending% %LPR% %LPR_NV% %LPR_Pending% %RemotePrinter% %RemotePrinter_NV% %RemotePrinter_Pending% %PrintServer% %PrintServer_NV% %PrintServer_Pending% %rom% %TCP% %IP% %SPX% %disk0% %disk1% %disk2% %disk3% %disk4% %disk5% %disk6%
PatternType	1

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Table 2-25 defines resources used to define new categories.

Table 2-25 Resources to define new categories

Category	Instances
Category	Category
	ColorRendering
	ColorRenderingType
	ColorSpace
	ColorSpaceFamily
	Encoding
	Filter
	FMapType
	Font
	FontType
	Form
	FormType
	Generic
	Halftone
	HalftoneType
	HWOptions
	ImageType
	IODevice
	OutputDevice
	Pattern
	PatternType
	ProcSet
Generic	No instances defined

Compatibility Operators

Compatibility Operators

The PostScript language is designed to be a universal standard for device-independent page descriptions, but each PostScript language implementation supports features and capabilities particular to that implementation and for that purpose has undergone a number of significant extensions. Appendix D, “Compatibility Strategies,” in the *PostScript Language Reference Manual*, second edition, presents guidelines for taking advantage of language extensions while maintaining compatibility with PostScript interpreters.

The Color LaserWriter 12/600 PS is a Level 2 printer. This chapter describes the compatibility operators that make the printer compatible with existing PostScript Level 1 language driver software. It also explains how to set system, page device, user, device, and communication parameters.

Overview of Compatibility Operators

The compatibility operators present in the Color LaserWriter 12/600 PS appear in two dictionaries: `statusdict` and `userdict`. These operators set

- system parameters
- page device parameters
- user parameters
- device parameters
- communication parameters

This chapter describes the page size and paper tray compatibility operators. It also shows you how to set system, page device, user, device, and communication parameters.

▲ **WARNING**

The operators described in this chapter are included only to support compatibility. You should not use them in PostScript Level 2 programs. ▲

Compatibility Operators

Table 3-1 provides a complete list of compatibility operators arranged by dictionary group.

Table 3-1 Compatibility operators

statusdict

a4tray	papersize
appletalktype	papertray
b5tray	prINTERname
buildtime	processcolors
byteorder	product
checkpassword	ramsize
defaultmultipurposetraysize	realformat
defaultpapertray	revision
defaulttimeouts	setdefaultmultipurposetraysize
diskonline	setdefaultpapertray
diskstatus	setdefaulttimeouts
dostartpage	setdostartpage
dosysstart	setdosysstart
hardwareiomode	sethardwareiomode
initializedisk	setjobtimeout
jobname	setmargins
jobtimeout	setpagestackorder
legaltray	setpapertray
lettertray	setprINTERname
manualfeed	setsoftwareiomode
manualfeedtimeout	setuserdiskpercent
margins	softwareiomode
pagecount	userdiskpercent
pagestackorder	waittimeout

userdict

#copies	legal
a4	letter
a4small	lettersmall
b5	note

systemdict

devdismount	devmount
devforall	devstatus
devformat	

Page Size Compatibility Operators

The page size operators are in the user dictionary `userdict`. Each operator requests a specific paper size and imaging boundary box, as shown in Table 3-2. The operators use the sizes indicated in the table as a page device `PageSize` parameter. All operators set `PageSizePolicy` to 7, which guarantees that the imaging area established is correct for the size requested, regardless of which paper tray is chosen.

The only error generated is `limitcheck`, which occurs when there is not sufficient memory for the imaging area requested.

Table 3-2 Page size compatibility operators

Operator	Page size	Imaging boundary box
<code>a4</code>	[595 842]	null
<code>a4small</code>	[595 842]	[25 25 570 817]
<code>b5</code>	[516 729]	null
<code>legal</code>	[612 1008]	null
<code>letter</code>	[612 792]	null
<code>lettersmall</code>	[612 792]	[25 254 587 767]
<code>note</code>	[width height]	[25 25 <i>width</i> – 25 <i>height</i> – 25]

NOTE Units shown (595, for example) are points. 1 point is 1/72 inch.

The `note` operator modifies the current page device settings by establishing an `ImagingBBox` parameter of [25 25 *width* minus 25 *height* minus 25] if the current `PageSize` parameter is [*width height*].

Paper Tray Compatibility Operators

The paper tray operators are in the status dictionary `statusdict`. Each operator requests a tray containing a specific paper size. The only difference between the operators is the size of paper requested. The `PageSize` and `ImagingBBox` parameters requested are the same as those for the corresponding page size operator. These operators use the specified size as a page device `PageSize` parameter. All the operators set the `PageSizePolicy` parameter to 0, which guarantees that a `rangecheck` error is generated if a tray containing the requested paper size is not found. In addition, a `limitcheck` error can occur if there is not sufficient memory for the imaging area requested.

Compatibility Operators

The paper tray compatibility operators and associated page sizes and imaging boundary box parameters are shown in Table 3-3.

Table 3-3 Paper tray compatibility operators

Operator	Page size	Imaging boundary box
a4tray	[595 842]	null
legaltray	[612 1008]	null
lettertray	[612 792]	null

Setting System Parameters

System parameters have a systemwide impact, and they may be changed only by a program that presents a valid password. Alterations made to system parameters may persist through restarts of the PostScript interpreter. This section describes the compatibility operators that set Level 2 system parameters.

a4tray

Syntax – **a4tray** *int*

Definition This operator executes `setpagedevice` to request a tray containing A4-size paper. The operator sets `PageSizePolicy` to 0, guaranteeing that a `configurationerror` is generated if a tray containing the requested size is not present. The compatibility operators convert `configurationerror` to `rangecheck` in order to maintain compatibility with PostScript language Level 1 implementations. A `limitcheck` error occurs if there is insufficient memory for the requested imaging area.

Standard value: 595 842

Error(s) `limitcheck`, `rangecheck`

b5tray

Syntax	– b5tray <i>int</i>
Definition	This operator executes <code>setpagedevice</code> to request a tray containing B5-size paper. The operator sets <code>PageSizePolicy</code> to 0, guaranteeing that a <code>configurationerror</code> is generated if a tray containing the requested size is not present. The compatibility operators convert <code>configurationerror</code> to <code>rangecheck</code> in order to maintain compatibility with PostScript language Level 1 implementations. A <code>limitcheck</code> error occurs if there is insufficient memory for the requested imaging area. Standard value: 516 729
Error(s)	<code>limitcheck</code> , <code>rangecheck</code>

buildtime

Syntax	– buildtime <i>int</i>
Definition	This operator is a time stamp that identifies the specific time a build of the PostScript interpreter took place. It returns an integer with the same value as the system parameter <code>BuildTime</code> . Standard value: The actual date the interpreter was built.
Error(s)	<code>stackoverflow</code>

byteorder

Syntax	– byteorder <i>bool</i>
Definition	This is a Boolean operator with the same value as the system parameter <code>ByteOrder</code> . Standard value: <code>false</code>
Error(s)	<code>stackoverflow</code>

checkpassword

Syntax	<i>int</i> checkpassword <i>bool</i> or <i>string</i> checkpassword <i>bool</i>
Definition	This operator checks whether <i>string</i> or <i>int</i> (<i>int</i> is converted to a <i>string</i>) is the valid password for either SystemParamsPassword or StartJobPassword. If the password is valid, it returns true. Otherwise, after delaying for one second, it returns false. Standard values: 0 true () true
Error(s)	stackoverflow, stackunderflow, typecheck

defaultmultipurposetraysize

Syntax	– defaultmultipurposetraysize <i>name bool</i>
Definition	This operator returns the <i>name</i> and <i>bool</i> parameters used with setdefaultmultipurposetraysize to set the default multipurpose tray size. The Boolean <i>bool</i> is true if the paper feeds short edge first and false if it feeds long edge first. Standard values: /letter true
Error(s)	stackoverflow

defaultpapertray

Syntax	– defaultpapertray <i>int</i>
Definition	This operator returns the first element of the Priority array in the InputAttributes dictionary found within the current page device. This number represents the default paper tray slot which may or may not be installed. If there is no Priority array within InputAttributes at the time that defaultpapertray is executed, an arbitrary slot number is returned. Standard value: 0
Error(s)	stackoverflow

defaulttimeouts

Syntax	– defaulttimeouts <i>job manualfeed wait</i>
Definition	This operator returns the following values: <ul style="list-style-type: none"> ■ default job ■ manual feed ■ wait timeout Standard values: 0 60 40 Time is measured in seconds.
Error(s)	stackoverflow

dostartpage

Syntax	– dostartpage <i>bool</i>
Definition	This operator returns the Boolean value set during the most recent execution of DoStartPage. Standard value: true
Error(s)	stackoverflow

dosysstart

Syntax	– dosysstart <i>bool</i>
Definition	This operator returns the value <i>false</i> only if the value of system parameter StartupMode is 0. When the value of StartupMode is 1, it returns <i>true</i> . Standard value: 1
Error(s)	stackoverflow

hardwareiomode

Syntax	– hardwareiomode <i>int</i>
Definition	This operator returns <i>int</i> . This integer indicates the current communications channel for which the corresponding device parameter <i>Enabled boolean</i> is true. Because multiple channels may be enabled, the smallest <i>int</i> is returned. The interpretation of <i>int</i> is as follows: <ul style="list-style-type: none"> ■ 1 %Parallel% ■ 2 %LocalTalk% and %EtherTalk% Standard value: Depends on configuration.
Error(s)	invalidaccess, rangecheck, stackoverflow, stackunderflow

legaltray

Syntax	– legaltray <i>int</i>
Definition	This operator executes <code>setpagedevice</code> to request a tray containing legal-size paper. The operator sets <code>PageSizePolicy</code> to 0, guaranteeing that a <code>configurationerror</code> is generated if a tray containing the requested size is not present. The compatibility operators convert <code>configurationerror</code> to <code>rangecheck</code> to maintain compatibility with PostScript language Level 1 implementations. A <code>limitcheck</code> error occurs if there is insufficient memory for the requested imaging area. Standard value: 612 1008
Error(s)	<code>limitcheck</code> , <code>rangecheck</code>

lettertray

Syntax	– lettertray <i>int</i>
Definition	This operator executes <code>setpagedevice</code> to request a tray containing letter-size paper. The operator sets <code>PageSizePolicy</code> to 0, guaranteeing that a <code>configurationerror</code> is generated if a tray containing the requested size is not present. The compatibility operators convert <code>configurationerror</code> to <code>rangecheck</code> to maintain compatibility with PostScript language Level 1 implementations. A <code>limitcheck</code> error occurs if there is insufficient memory for the requested imaging area. Standard value: 612 792
Error(s)	<code>limitcheck</code> , <code>rangecheck</code>

prINTERname

Syntax	<i>string prINTERname substring</i>
Definition	This operator stores the value of the system parameter PrinterName in <i>string</i> and returns a string object designating the substring actually used. Standard value: (Color LaserWriter 12/600 PS)
Error(s)	stackoverflow

processColors

Syntax	- processColors <i>int</i>
Definition	This operator returns the number of device process color components in the current page device: <ul style="list-style-type: none"> ■ 1 for black (monochrome-only device) ■ 3 for RGB or CMY ■ 4 for RGBK or CMYK CMYK and CMY are the only legal values in the Color LaserWriter 12/600 PS. Standard value: 4
Error(s)	stackoverflow

product

Syntax	- product <i>string</i>
Definition	This operator is a <i>string</i> object that is the name of the laser printer product. If a program needs to know what type of printer it is running on, it should check this string. Standard value: (Color LaserWriter 12/600 PS)
Error(s)	stackoverflow

ramSize

Syntax	- ramSize <i>int</i>
Definition	This operator returns the number of bytes of RAM in the printer. It does this by returning an integer with the same value as the system parameter RamSize. Standard value: 12582912
Error(s)	stackoverflow

realformat

Syntax	– realformat <i>string</i>
Definition	This operator is a string with the same value as the system parameter <code>RealFormat</code> . Standard value: <code>IEEE</code>
Error(s)	<code>stackoverflow</code>

revision

Syntax	– revision <i>int</i>
Definition	This operator is an integer that designates the current revision level of the machine-dependent portion of the PostScript interpreter. It does this by returning an integer with the same value as the system parameter <code>Revision</code> . Standard value: <code>1</code>
Error(s)	<code>stackoverflow</code>

setdefaultmultipurposetraysize

Syntax	<i>name bool</i> setdefaultmultipurposetraysize
Definition	This operator tells the interpreter what paper size is installed in the multipurpose tray. It sets the <code>PageSize</code> of the multipurpose tray in the <code>InputAttributes</code> dictionary to the size corresponding to the value of the <i>name</i> operand. The Boolean <i>bool</i> is <code>true</code> if the paper feeds short edge first and <code>false</code> if the paper feeds long edge first. This operator is supplied for compatibility purposes only. You can perform the same function using the <code>setpagedevice</code> operator directly. If the <code>setdefaultmultipurposetraysize</code> compatibility operator is invoked at any save level other than zero, an <code>invalidaccess</code> error occurs. Standard values: <i>name</i> depends on tray installed, <i>bool</i> is <code>true</code> .
Error(s)	<code>invalidaccess</code> , <code>rangecheck</code> , <code>stackunderflow</code> , <code>typecheck</code>

setdefaultpapertray

Syntax	<i>int</i> setdefaultpapertray –
Definition	This operator copies the values of <code>PageSize</code> , <code>MediaType</code> , <code>MediaColor</code> , and <code>MediaWeight</code> , all found in the <code>InputAttributes</code> dictionary for the specified tray, into a dictionary with keys for <code>PageSize</code> , <code>MediaType</code> , <code>MediaColor</code> , and <code>MediaWeight</code> . It also writes the requested tray number into the first element of the <code>Priority</code> array in the <code>InputAttributes</code> dictionary and places this entry in the dictionary it is building. This dictionary is then passed to <code>setpagedevice</code> . This results in the requested tray being selected as a default that will be used by any PostScript language job that does not expressly select a paper size or medium. If this operator is invoked at any level other than 0, an <code>invalidaccess</code> error occurs. Standard value: Not applicable.
Error(s)	<code>invalidaccess</code> , <code>rangecheck</code> , <code>stackunderflow</code> , <code>typecheck</code>

setdefaulttimeouts

Syntax	<i>job manualfeed wait</i> setdefaulttimeouts –
Definition	This operator establishes the default values for the three timeouts. It returns the following: <ul style="list-style-type: none"> ■ system parameter <code>JobTimeout</code> for <i>job</i> ■ page device parameter <code>ManualFeedTimeout</code> for <i>manualfeed</i> ■ system parameter <code>WaitTimeout</code> for <i>wait</i> Standard values: 0 false 40
Error(s)	<code>invalidaccess</code> , <code>rangecheck</code> , <code>stackunderflow</code> , <code>typecheck</code>

setdostartpage

Syntax	<i>bool</i> setdostartpage –
Definition	Since the Color LaserWriter 12/600 PS has no start page, executing this operator with a value of <code>true</code> has no effect and is ignored. The operator is present to maintain compatibility with the Personal LaserWriter NT. Standard value: <code>false</code>
Error(s)	<code>invalidaccess</code> , <code>stackunderflow</code> , <code>typecheck</code>

setdosysstart

Syntax	<i>bool</i> setdosysstart -
Definition	This operator sets the system parameter StartupMode according to the value of <i>bool</i> . StartupMode is set to 1 if <i>bool</i> is true, and to 0 if <i>bool</i> is false. Standard value: true
Error(s)	invalidaccess, stackunderflow, typecheck

sethardwareiomode

Syntax	<i>int</i> sethardwareiomode
Definition	This operator opens the specified channel for communications, and closes all other channels. The channel selected depends on the value of <i>int</i> : <ul style="list-style-type: none"> ■ 1 Open %Parallel%, close all others ■ 2 Open %LocalTalk% and %EtherTalk%, close all others Standard value: Depends on configuration.
Error(s)	invalidaccess, rangecheck, stackunderflow, typecheck

setpapertray

Syntax	<i>int</i> setpapertray -
Definition	This operator copies the values of PageSize, MediaType, MediaColor, and Media Weight, all found in the InputAttributes dictionary for the specified tray, into a dictionary with keys for PageSize, MediaType, MediaColor, and Media Weight. It also writes the requested tray number into the first element of the Priority array in the InputAttributes dictionary and places this entry in the dictionary it is building. This dictionary is then passed to setpagedevice. This results in the requested tray being selected until some other setpagedevice operation, or tray selection compatibility operator, causes a different tray to be selected. Standard value: Depends on configuration.
Error(s)	rangecheck, stackunderflow, typecheck

setprintername

Syntax	<i>string</i> setprintername -
Definition	<p>This operator establishes the string to be the printer's name by setting the system parameter <code>PrinterName</code> to the value of <i>string</i>. The string should be no longer than 32 characters. It should consist entirely of printing characters and should not contain the following five characters: colon (:), comma (,), at sign (@), asterisk (*), or equivalent sign (≈).</p> <p>Standard value: <code>Color LaserWriter 12/600 PS</code></p>
Error(s)	<code>invalidaccess</code> , <code>limitcheck</code> , <code>stackunderflow</code> , <code>typecheck</code>

setsoftwareiomode

Syntax	<i>int</i> setsoftwareiomode -						
Definition	<p>This operator sets the values of the interpreter and, if appropriate, protocol device parameters for the current communication device parameter set. The following integer value is used with the Color LaserWriter 12/600 PS:</p> <table><tr><td><i>int</i></td><td>Interpreter value</td><td>Protocol value</td></tr><tr><td>0</td><td>PostScript</td><td>Normal</td></tr></table> <p>Since the Color LaserWriter 12/600 PS does not use binary protocol, it uses control characters as quoted characters. For example, Control-D is seen as Control-A / ASCII-D.</p> <p>The <code>softwareiomode</code> operator does not need to be set outside the server loop to be compatible with other printer implementations of <code>setsoftwareiomode</code>. However, changes to it do not take effect until the job that makes the changes is completed.</p> <p>Standard value: 0</p>	<i>int</i>	Interpreter value	Protocol value	0	PostScript	Normal
<i>int</i>	Interpreter value	Protocol value					
0	PostScript	Normal					
Error(s)	<code>invalidaccess</code> , <code>rangecheck</code> , <code>stackunderflow</code> , <code>typecheck</code>						

softwareiomode

Syntax	- softwareiomode <i>int</i>
Definition	<p>This operator returns an integer value, which indicates the interpretation code for the current communications device. See <code>setsoftwareiomode</code>.</p> <p>Standard value: 0</p>
Error(s)	<code>stackoverflow</code>

Setting Page Device Parameters

Page device parameters control page formatting, for example, margins and paper size. They also control the output processing of pages, determining whether pages are output face up or face down, which paper tray is selected, and so forth. This section describes compatibility operators that set Level 2 page device parameters in the Color LaserWriter 12/600 PS.

margins

Syntax	– margins <i>top left</i>
Definition	This operator returns the <i>x</i> and <i>y</i> components of the page device Margins parameter as <i>left</i> and <i>top</i> , respectively. Standard value: 0 0
Error(s)	stackoverflow

pagecount

Syntax	– pagecount <i>int</i>
Definition	This operator returns the value of the system parameter PageCount. That is, it returns the number of pages that have been printed by the Color LaserWriter 12/600 PS. Standard value: Not applicable.
Error(s)	stackoverflow

pagestackorder

Syntax	– pagestackorder <i>bool</i>
Definition	This operator returns the last value set by setpagestackorder. It should be <i>true</i> if the pages are to be stacked face down in the output tray, and <i>false</i> if the pages are to be stacked face up. Standard value: <i>true</i>
Error(s)	stackoverflow

papersize

Syntax	– papersize <i>name bool</i>
Definition	<p>This operator returns the name of the compatibility operator that selects a tray containing paper of the current size. For example, if the current paper size is letter, this operator returns the value <code>/lettertray</code>. The value of <i>bool</i> is <code>true</code> if the page feeds short edge first, <code>false</code> if the page feeds long edge first.</p> <p>Note that if there is more than one tray installed with the same paper size, and the operator returned by <code>papersize</code> is executed again later, the operator will not necessarily select the same tray it selected the previous time.</p> <p>Standard values: <i>name</i> is variable, <i>bool</i> is <code>true</code>.</p>
Error(s)	<code>stackoverflow</code>

papertray

Syntax	– papertray <i>int</i>
Definition	<p>This operator returns the paper tray number most recently set by the <code>setpapertray</code> operator. It returns the first element of the <code>Priority</code> array in the <code>InputAttributes</code> dictionary found within the current page device. This number represents the current paper tray slot which may or may not have a paper tray installed. If there is no <code>Priority</code> array within <code>InputAttributes</code> at the time that <code>papertray</code> is executed, an arbitrary slot number is returned.</p> <p>Standard value: Variable</p>
Error(s)	<code>stackoverflow</code>

setmargins

Syntax	<i>top left</i> setmargins –
Definition	<p>This operator sets the two margin adjustment parameters defined by <code>setmargins</code>.</p> <p>Standard value: 0 0</p>
Error(s)	<code>invalidaccess</code> , <code>rangecheck</code> , <code>stackunderflow</code> , <code>typecheck</code>

setpagestackorder

Syntax	<i>bool</i> setpagestackorder -
Definition	This operator sets the value returned by <code>pagestackorder</code> . A value of <code>true</code> indicates that the output is going to the face-down tray. A value of <code>false</code> indicates that the output is directed to the face-up tray. Standard value: <code>true</code>
Error(s)	<code>invalidaccess</code> , <code>rangecheck</code> , <code>stackunderflow</code> , <code>typecheck</code>

Setting User Parameters

User parameters enable you to control certain printer functions, such as defining job names and selecting the length of time the printer will wait before aborting a print job. Using a PostScript language program, you can change user parameters within reasonable limits, without special authorization. This section describes the compatibility operators that set Level 2 user parameters in the Color LaserWriter 12/600 PS.

initializedisk

Syntax	<i>pages action</i> initializedisk -
Definition	This operator initializes each writeable disk, setting the disk device parameter <code>LogicalSize</code> to the value <code>pages+1</code> , and <code>InitializeAction</code> to <code>action+1</code> . Standard values: Variable
Error(s)	<code>invalidaccess</code> , <code>ioerror</code> , <code>rangecheck</code> , <code>stackunderflow</code> , <code>typecheck</code>

jobname

Syntax	- jobname <i>string</i>
Definition	This operator is a string with the same value as the user parameter <code>JobName</code> . It specifies the name of the current job. If a PostScript language program defines <code>jobname</code> , status responses generated during the remainder of the job in progress will include a job field that reports the text of this string. The string should not contain the character semicolon (;) or end bracket (]), since they disrupt the syntax of the status messages. Standard value: Empty string ()
Error(s)	<code>stackoverflow</code>

jobtimeout

Syntax	– jobtimeout <i>int</i>
Definition	This operator returns the number of seconds remaining before the job timeout occurs. It does this by returning the value of the user parameter <code>JobTimeout</code> . If the returned value is 0, the job will never time out. Standard value: 0
Error(s)	stackoverflow

manualfeedtimeout

Syntax	– manualfeedtimeout <i>bool</i>
Definition	This operator is a Boolean that works in conjunction with the page device parameter <code>ManualFeed</code> to determine whether a page is fed manually. If either <code>manualfeed</code> or <code>ManualFeed</code> is <code>true</code> at the time of a <code>showpage</code> or <code>copypage</code> , then that page will be fed manually. Otherwise it will be fed automatically. The values of <code>manualfeed</code> and <code>ManualFeed</code> are determined independently, and the setting of one does not affect the value of the other. The <code>manualfeed</code> key is present in <code>statusdict</code> only if the page device parameter <code>ManualFeed</code> is defined for the product. The initial value of <code>manualfeed</code> when the printer is powered up is <code>false</code> . Standard value: <code>false</code>
Error(s)	stackoverflow

setjobtimeout

Syntax	<i>int</i> setjobtimeout –
Definition	This operator sets the timeout for the current job to the value <i>int</i> , a nonnegative integer specifying a time interval in seconds. If the current job continues for <i>int</i> seconds without either completing or executing <code>setjobtimeout</code> again, the PostScript interpreter executes a <code>timeout</code> error. The value 0 disables the job timeout. At the beginning of a job, the server initially sets the job timeout to the default job timeout returned by <code>defaulttimeouts</code> . However, in interactive mode, the initial job timeout is always 0. Standard value: 0
Error(s)	rangecheck, stackunderflow, typecheck

setuserdiskpercent

Syntax	<i>int</i> setuserdiskpercent -
Definition	This operator pops <i>int</i> off the stack. It is essentially a nonoperand. Standard value: 0
Error(s)	invalid access, rangecheck, stackunderflow, typecheck

userdiskpercent

Syntax	- userdiskpercent <i>int</i>
Definition	This operator returns the value 0. It is essentially a nonoperand. Standard value: 0 0
Error(s)	stackoverflow

waittimeout

Syntax	- waittimeout <i>int</i>
Definition	This operator is the wait timeout currently in effect. It is the number of seconds the Color LaserWriter 12/600 PS will wait to receive additional characters from the host before it aborts the current job by executing a timeout. At the beginning of a job, the server initializes waittimeout to the default wait time returned by defaulttimeout. However, a PostScript language program may change it to any nonnegative integer value. In interactive mode, the wait timeout is always 0. Standard value: 40
Error(s)	stackoverflow

Setting Device Parameters

Each PostScript interpreter supports a collection of input/output devices, such as disks, cartridges, and printers. Device parameters perform functions similar to the functions performed by system parameters. However, they are device dependent, which means they impact only the printer for which they are set. This section describes the compatibility operator that sets Level 2 device parameters.

diskonline

Syntax	– diskonline <i>bool</i>
Definition	This operator returns true only if a writeable hard disk device is mounted. The printer determines this by searching all device parameter sets named %disk*%, where * represents additional characters in the name. If the Writeable parameter is true for any of the sets searched, <i>bool</i> is set to true, otherwise it is set to false. Note that a disk parameter set with Writeable true need not have an initialized file system.
	Standard value: false
Error(s)	stackoverflow

diskstatus

Syntax	– diskstatus <i>free total</i>
Definition	This operator returns the number of disk pages (a page is 1024 characters) free, and the total number of pages available on all writeable disk devices. This is determined by searching all device parameters named %disk*% that have a Writeable parameter set to true. <i>free</i> is the sum of the Free parameters from all such parameter sets, and <i>total</i> is the sum of the LogicalSize parameters from all such parameter sets.
	Standard value: 0 0
Error(s)	stackoverflow

manualfeed

Syntax	– manualfeed <i>bool</i>
Definition	This operator is a Boolean that works in conjunction with the page device parameter ManualFeed to determine whether a page is to be fed manually. If either manualfeed or ManualFeed is true at the time of a showpage or copypage, then that page will be fed manually. Otherwise, the page will be fed automatically. The manualfeed compatibility operator is present in statusdict only if the page device parameter ManualFeed is defined for the product.
	Standard value: false
Error(s)	stackoverflow

Setting Communication Parameters

Communication parameters control the functions of the different communication channels, such as LocalTalk, EtherTalk, and the parallel channel. The following compatibility operator sets Level 2 communications parameters in the Color LaserWriter 12/600 PS.

appletalktype

Syntax	– appletalktype <i>string</i>
Definition	This operator is a string with the same value as the LocalTalkType device parameter that is found in the %LocalTalk% parameter set. Standard value: (LaserWriter)
Error(s)	stackoverflow

Communication Channels

Communication Channels

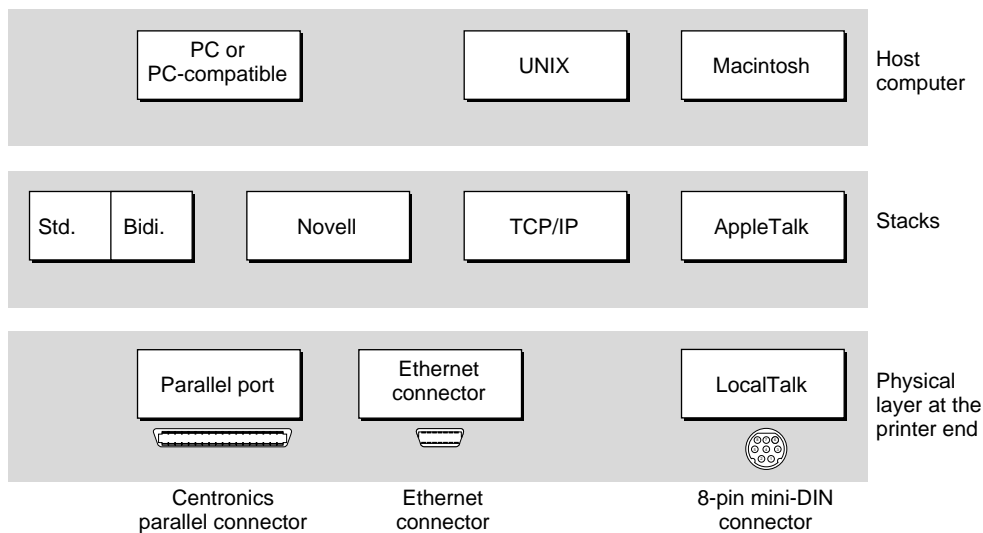
The Color LaserWriter 12/600 PS has three communication ports that support a variety of communication channels:

- The 8-pin mini-DIN port supports LocalTalk (%LocalTalk%).
- The 36-pin Centronics parallel port supports standard parallel and IEEE 1284 (bidirectional) communication. It is used, for example, to connect the printer to IBM-PC compatible computers (%parallel%).
- The Ethernet connector supports EtherTalk, the Novell NetWare and NetWare Lite protocols, and TCP/IP protocols.

All ports are active at all times. The Color LaserWriter 12/600 PS accepts print jobs from all ports, sampling each port in turn, and giving each port equal priority.

Figure 4-1 gives an overview of the ports, the stacks they support, and the host computers with which they communicate.

Figure 4-1 Overview of communication channels



Std. indicates standard, unidirectional parallel port communication.

Bidi. indicates bidirectional parallel port communication.

This chapter takes a general look at the following four stacks and the protocols that comprise these stacks in the Color LaserWriter 12/600 PS application:

- The AppleTalk stack is implemented via the 8-pin mini-DIN connector (LocalTalk) and via the Ethernet connector (EtherTalk). It is used, for example, to connect the printer to Macintosh computers.
- Standard and bidirectional parallel communication is implemented via the Centronics parallel connector. It is used, for example, to connect the printer to the IBM PC and PC-compatible computers.

Communication Channels

- Novell stacks, such as NetWare and NetWare lite, are implemented via the Ethernet connector. They allow the printer to communicate with IBM PCs and PC-compatible computers and with Novell print servers.
- The TCP/IP stack is implemented via the Ethernet connector. The most common clients of TCP/IP are UNIX systems.

Note

This chapter is not intended to be a tutorial on communication stacks and protocols. There are excellent reference books available for TCP/IP, AppleTalk, and so forth. You should refer to the standard references for the communication channel you are implementing.

You will find other information about the communication channels in the following areas of this publication:

- physical characteristics of the communication channel connectors in Chapter 1, "Communication Ports"
- software support for the channels in Chapter 2, "Communication Device Parameters"
- communication parameters in Chapter 3, "Setting Communication Parameters"

The chapter also provides information about the queries and messages that enable the host computer to know what the printer is doing.

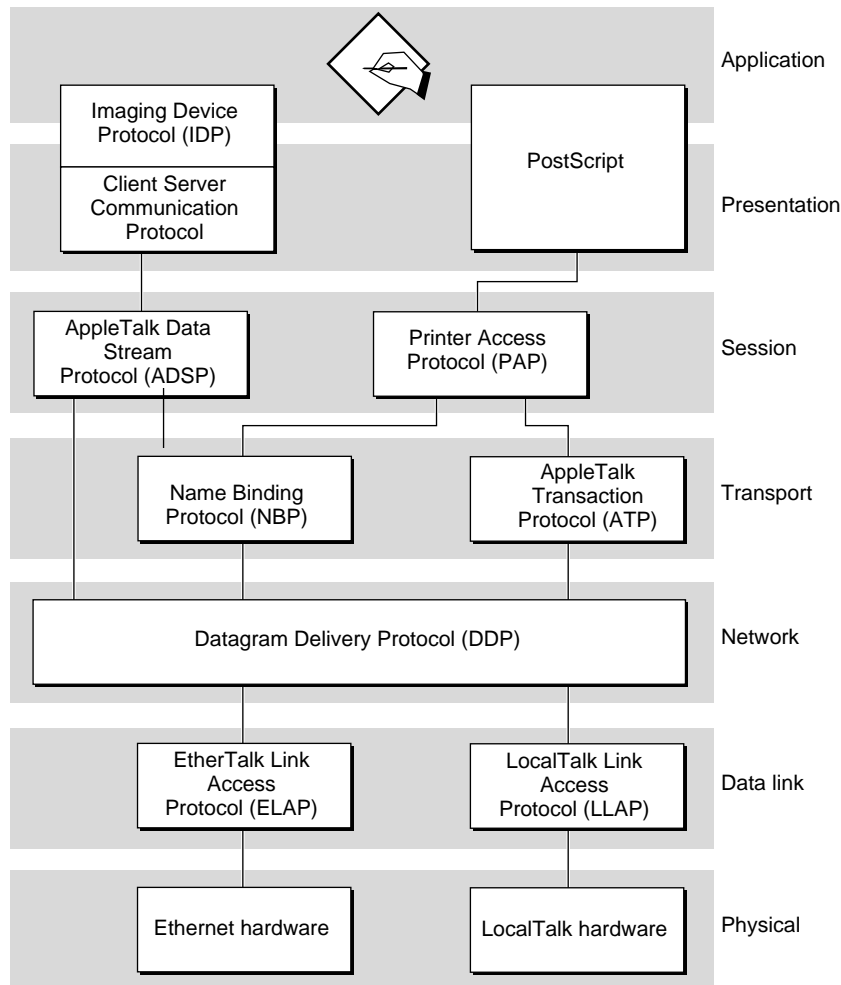
AppleTalk Protocols

The Color LaserWriter 12/600 PS can communicate with the Macintosh computer or with other peripheral devices using the AppleTalk network system.

The printer implements AppleTalk protocols in one of two ways:

- Using the LocalTalk physical link, described in the section "LocalTalk Connector" on page 5. The transceiver for transmitting and receiving information over LocalTalk is built into every Macintosh host computer, as well as into the Color LaserWriter 12/600 PS, making it easy to set up the printer-host interface.
- Using the EtherTalk physical link, implemented by the Ethernet connector described "Ethernet Connector" on page 9.

Figure 4-2 shows a simplified view of the AppleTalk protocols used with the Color LaserWriter 12/600 PS, and the relationship between the protocols. For detailed information about AppleTalk refer to *Inside AppleTalk*, second edition, published by Addison-Wesley.

Figure 4-2 AppleTalk protocol relationships

The following sections provide general information about the protocols that implement each of the AppleTalk network layers. However, as a developer, you will be most concerned with the upper layers of the network.

Presentation and Application Protocols

The Color LaserWriter 12/600 PS implements the presentation and application layers of the AppleTalk stack in two ways:

- **PostScript** — the commands and data transferred between the printer and the host computer are written in the PostScript language. Refer to other sections of this developer note for information on the PostScript language and to the *PostScript Language Reference Manual* and the *PostScript Language Reference Manual*, second edition. Both books are published by Addison-Wesley.

Communication Channels

- **Imaging Device Protocol (IDP)** — IDP is an application layer network protocol that enhances two-way communication between a host computer and the printer. IDP allows a client to read and set the printer's configurations and to examine the printer's status. Using IDP, the printer can initiate a connection with the host computer, and the host can also initiate a connection with the printer. IDP is independent of the layers below it, requiring only that the transport be bidirectional. This protocol was developed to enable concurrent printer setup and job processing and to provide a centralized job queue and job arbitration.

The LaserWriter utility uses AppleTalk IDP to communicate with Macintosh computers and with PCs running Microsoft Windows.

Session Protocols

The Color LaserWriter 12/600 PS uses the two following session protocols to implement AppleTalk:

- **Printer Access Protocol (PAP)** — PAP is the AppleTalk protocol that manages interaction between workstations and print servers. It sets up, maintains, and terminates the network connection. In addition, it transfers data. PAP allows you to connect multiple workstations and servers.

Note

The default Color LaserWriter 12/600 PS Type with the PAP protocol is `Laserwriter`.

- **AppleTalk Data Stream Protocol (ADSP)** — ADSP is a connection-oriented protocol that provides a reliable, full-duplex byte stream between the printer and the host computer. It is a symmetrical protocol, in that the printer and the host are equal entities, and can perform the same operations.

Note

The default Color LaserWriter 12/600 PS Type with ADSP is `Laserwriter_CSCP`.

Parallel Communication Protocols

The Centronics parallel port protocols provide the same level of functionality as the Hewlett-Packard LaserJet 4 Bi-Tronics parallel interface protocol. You can use this parallel port to communicate with the IBM PC or a PC-compatible computer.

The IBM PC parallel port comes in two types: standard Centronics, which is a unidirectional link from computer to printer; and bidirectional, which allows the printer to communicate with the computer and the computer to communicate with the printer.

Some systems have a variety of protocols to which the bidirectional port can be set. These protocol names are often listed as EPP, ECP, and EPP-ECP. The printer uses standard and ECP (IEEE 1284) modes. The parallel port connector on the printer is the smaller Centronics 36-pin connector. You can obtain the cable that connects the IBM PC to this port from Apple Computer, Inc.

Communication Channels

Normally the parallel port is set to time out when the printer takes several seconds to read a byte of data. To prevent the parallel port from timing out on complex PostScript print jobs, you can issue the following command from the DOS prompt:

```
MODE LPT1: , , P
```

In standard Centronics mode, the IBM PC sends data to the printer but never receives data from the printer. The PostScript interpreter in the printer expects to be able to send data back from the port when data comes in from the port. In standard mode, the printer will discard the outbound data from the PostScript interpreter.

In bidirectional mode, the outbound data coming from the PostScript interpreter is sent from the printer to the IBM PC, provided that the IBM PC reads the data from the printer's parallel port. You will need a program to read the data from the parallel port, since DOS and Windows do not perform this function for you. If the data is not read from the parallel port, it is discarded after a short interval.

Novell Protocols

The Color LaserWriter 12/600 PS can also communicate with an IBM PC or a PC-compatible computer via the Ethernet connector and Novell stacks. (See Figure 4-1 on page 110.) The printer supports the complete SPX/IPX implementation of a Novell print sever. NetWare 286 and NetWare 386 are supported with NetWare versions 2.15, 2.20, 3.10, 3.11, 3.12, 4.0.

Novell, Inc., provides everything needed to install and configure the NetWare environment. Refer to documentation supplied by Novell, Inc., for further information on this subject.

The print server environment includes support for both remote printer mode (RPRINTER) and dedicated print server mode (PSERVER). The following server features are also supported:

- multiple file servers (up to 32)
- multiple file queues (up to 64)
- automatic reattachment to the file server
- encrypted passwords
- compatibility with Novell Print Server VAP/NLM/EXE

TCP/IP Protocols

The Color LaserWriter 12/600 PS communicates with UNIX systems via the Ethernet connector, using the TCP/IP stack. In the TCP/IP environment the printer appears as a remote UNIX system with an attached printer. Users on the TCP/IP network perform print job setup and spool print jobs for the printer to a spool directory through the `lpr` command. The UNIX system `lpd` (line printer daemon) scans the spool directory. When it encounters a print job, it sends it to the specified printer.

The printer's TCP/IP network implementation includes support for

- `lpd` (line printer daemon)
- up to five hosts
- Internet Protocol (IP)
- Transmission Control Protocol (TCP)
- User Datagram Protocol (UDP)
- Internet Control Message Protocol (ICMP)
- Address Resolution Protocol (ARP)
- Reverse Address Resolution Protocol (RARP)
- Bootstrap Protocol (BOOTP)

The UNIX system network administrator must configure the following network parameters for the Color LaserWriter 12/600 PS:

- IP address. This is obtained using RARP or BOOTP protocols or by gleaning the address from the first ICMP **ping** packet if it has not already been specified by the LaserWriter utility with IDP.
- Subnet mask and default network gateway. They may be specified by BOOTP or set by the LaserWriter utility with IDP.
- Banner pages: Specifies whether banner pages should always or never be printed.

Note

Network setup for the Color LaserWriter 12/600 PS can be done with the Apple Printer Utility. This utility, which supports both Macintosh computers and Windows compatible computers, is provided as part of the software package included with the printer. Detailed instructions for setting up the printer for the various supported network protocols can be found in the user documentation for the Color LaserWriter 12/600 PS. ♦

Refer to standard UNIX networking documentation for further information on TCP/IP.

Communication Dynamics With PostScript

Data transmitted by the Color LaserWriter 12/600 PS, whether it is generated by executing the PostScript language program or by some other spontaneous event such as an error, is logically asynchronous with respect to the data received. This means that the host computer must be prepared to consume data received from the printer while waiting to send more data to the printer. If the host computer is not set up to do this, the printer and the host may each wait for the other to consume data, and a deadlock will occur.

Typically, characters written to the standard output file by PostScript operators such as `print` are not sent immediately. They are buffered until a flush is executed. A flush occurs automatically

- at the end of a job
- in interactive mode, whenever the user is prompted to make an entry

IMPORTANT

If a PostScript language program writes data that is needed immediately by the host, for example a reply to an environmental query, it is important to flush after writing the data. Otherwise, a deadlock may occur. ▲

Status Queries and Spontaneous Messages

The Color LaserWriter 12/600 PS provides a status query facility that enables the host or user to determine what the printer is doing. The printer responds to a status query asynchronously with respect to normal job execution. That is, it sends a response immediately, regardless of what has gone on before, or how much input data has been buffered. This facility primarily enables spoolers (printer control programs) to track the activities of the printers under their control.

If the printer receives a Control-T character from the active input channel, it replies with a one-line status message over the active port's output channel. The message is bracketed by the text sequences `%%[` and `]%%`, to enable the host software to extract the message from the ordinary data generated by the job being executed.

The status message has standardized syntax that is intended to be machine readable. It consists of one or more key value pairs, separated by semicolons. For example:

```
%%[job: Eddie's report; status: busy; source: parallel ]%%
```

Communication Channels

The possible keys, values, and meanings are as follows:

job	The name of the job is stored as the <code>jobname</code> entry in <code>statusdict</code> . (Refer to Chapter 3.) This field is omitted if the current job has not defined <code>jobname</code> .
status	Indicates what the printer is currently doing: <ul style="list-style-type: none"> ■ <code>idle</code> indicates there is no job in progress ■ <code>busy</code> means the printer is executing the user's PostScript language program ■ <code>waiting</code> means the I/O is waiting in the middle of a job ■ <code>printing</code> indicates the printer is printing, and paper is in motion ■ <code>PrinterError: reason</code> means there is a printer error such as a paper jam, or printer out of paper ■ <code>initializing</code> indicates the printer is starting up
source	This field indicates the source of the job that the server is currently serving: <ul style="list-style-type: none"> ■ <code>parallel</code> ■ <code>LocalTalk</code> ■ <code>EtherTalk</code> <p>This field is omitted if the server is idle.</p>

All messages generated spontaneously by the server (as opposed to those messages produced when the PostScript language program executes `print`) conform to the same syntax as status messages. They are sent as ordinary data through the communication channel, in sequence with any other characters written to the standard output file. Consequently, they are always bracketed with `%%[` and `]%%`, for either serial or parallel channels:

```
%%[ Error:error; OffendingCommand: operator ]%%
```

An error has been detected by the PostScript interpreter and the standard error handle (`handleerror`) has been invoked.

`error` is the name of the error operator originally invoked.

`operator` is the operator or other PostScript object being executed at the time of the error.

Refer to the *PostScript Language Reference Manual* for further information on error handling.

```
%%[ PrinterError:reason ]%%
```

A problem has been reported by the printer mechanism. The type of problem is indicated by `reason`: no paper, no paper tray, paper jam, cover open, and so forth.

A printer error can occur only during execution of `showpage` or `copypage`, that is, when the printer is actually trying to print a page. After generating this message, the server usually waits for the condition to be corrected and then continues printing automatically.

The server's behavior when it encounters a printer error is controlled by the `printererror` procedure.

Communication Channels

%%[Flushing: rest of job (to end-of-file) will be ignored]%%

Because of a previous error or abort condition, for example stop or Control-C interrupt, the remainder of the current job is being discarded. The server reads and discards characters from the standard input file until it receives an end-of-file indication.

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

The PostScript language program has successfully exited from the server's normal *save/restore* context, and may now make permanent changes to the system parameters or to the virtual memory.

Glossary

Apple Contone Compression Technology (ACCT) A proprietary compression technique that enables the printer to store high-quality full-page images in the frame buffer without consuming a massive amount of RAM.

color gamut A printer's color gamut is the full range of colors that the device can reliably produce.

Color PhotoGrade Technology A proprietary technology that enables the printer to produce near-photographic image quality, with hundreds of shades for each color. Implemented in firmware stored on an ASIC (application-specific integrated circuit), it works in conjunction with **ACCT**, to support a variety of halftoning techniques without sacrificing printer throughput performance.

echo-request packet See **ping packet**.

normal protocol With normal protocol, certain control characters are reserved as communication functions, such as end-of-file, and so on. These codes cannot be carried as data. The protocol is suitable for use only when sending ASCII-encoded PostScript language jobs. It is not suitable for PostScript language jobs containing binary data or for any printer emulation jobs.

ping packet Ping is a utility used in the TCP environment to see if a remote system is alive. A ping packet is an ICMP echo-request packet. If you are setting up an IP address for the printer, you can glean the IP address from the first ping packet that specifically targets that printer.

raw protocol With raw protocol, all the characters are treated as data. There are no reserved characters, and no communication functions are available. Normally, this protocol is used only with printer emulation, and not with the PostScript interpreter.

tagged binary communication protocol (TBCP) With this protocol, an encoding system allows the full range of 8-bit values to be transmitted as data. It also provides for certain communication functions, such as end-of-file, and provides explicit begin-protocol and end-protocol sequences that permit the receiver to switch automatically between normal and TBCP protocols. This protocol is suitable for use with any language, particularly the PostScript interpreter or a printer emulation.

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