3130 Advanced Function Printer

Programming Reference

IBM

3130 Advanced Function Printer

Programming Reference

IBM

Second Edition (September 1996)

The following paragraph does not apply to any other country where such provisions are inconsistent with local law.

Requests for IBM publications should be made to your IBM representative or to your IBM branch office serving your locality. If you request publications from the address given below, your order will be delayed because publications are not stocked there.

IBM welcomes your comments. For your convenience, a form for readers' comments is provided at the back of this publication. You may send your comments by facsimile to 1-800-524-1519, by electronic mail to print_pubs@vnet.ibm.com, or mail your comments to:

IBM Printing Systems Company
Information Development
Department H7FE, Building 003G
P.O. Box 1900
Boulder, CO 80301-9191, U.S.A.

When you send information to IBM, you grant a nonexclusive right to use or distribute the information in any way IBM believes appropriate without incurring any obligation to you.

Contents

Notices

References in this publication to IBM products, programs or services do not imply that IBM intends to make these available in all countries in which IBM operates. Any reference to an IBM licensed product, program, or service is not intended to state or imply that only IBM's product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any of IBM's intellectual property rights may be used instead of the IBM product. Evaluation and verification of operation in conjunction with other products, except those expressly designated by IBM, is the user's responsibility.

Any performance data contained in this document was obtained in a controlled environment based on the use of specific data. The results that may be obtained in other operating environments may vary significantly. Users of this document should verify the applicable data in their specific environment. Therefore, such data does not constitute a performance guarantee or warranty.

IBM may have patents or pending patent applications covering subject matter in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to the IBM Corporation, IBM Director of Licensing, 506 Columbus Ave., Thornwood, N.Y. 105894 U.S.A.

The IBM 3130 Advanced Function Printer meets the requirements of IEC 950, First Edition, Amendments 1 and 2. The laser used in the 3130 complies with IEC 825 and EN 60825.

Trademarks

The following terms are trademarks of the IBM Corporation in the United States or other countries or both:

Advanced Function Presentation
Advanced Function Printing
AFCCU
AFP
AIX®
AIX/6000®
Application System/400®
AS/400®
IBM®
Intelligent Printer Data Stream
IPDS
MVS/ESA
MVS/SP
MVS/XA
OS/2®
OS/400®
Personal System/2®
Print Services Facility
PS/2®
PSF
PSF/6000
RISC System/6000®

WIN-OS/2

The following terms are trademarks or registered trademarks of other companies.

Trademark	Company
Agfa	Agfa-Gevaert A.G.
Agfa Rhombus	Agfa-Gevaert A.G.
AXIS	AXIS Communication, Inc.
CG Intellifont	Miles, Inc.
CG Omega	Miles, Inc.
CG Times	Miles, Inc. under license from Monotype Corp. (Times New Roman)
ITC Avant Garde Gothic	International Typeface Corp.
ITC Bookman	International Typeface Corp.
ITC Zapf Chancery	International Typeface Corp.
ITC Zapf Dingbat	International Typeface Corp.
Lexmark	Lexmark International, Inc.
Marigold	AlphaOmega Typography Corp.
NetWare	Novell Inc.
PostScript	Adobe Systems, Inc.
PCL	Hewlett-Packard Co.
PCL5e	Hewlett-Packard Co.
TrueType	Apple Computer Co.
Univers	Linotype AG and Subsidiaries
Windows	Microsoft Corp.

Communications Statements

Federal Communication Commission (FCC) Statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communication. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used to meet FCC emission limits. IBM is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Shielded Cables (European Statement): Properly shielded and grounded cables must be used in order to reduce the potential for causing interference to radio and TV communications and to other electrical or electronic equipment. Such cables

and connectors are available from IBM authorized dealers. IBM cannot accept responsibility for any interference caused by using other than recommended cables and connectors.

European Community (EC) Conformity Statement: This product is in conformity with the protection requirements of EC Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of non-IBM option cards.

German Conformity Statement: Dieses Gerät erfüllt die Bedingungen der EN 55022 Klasse A. Für diese Klasse von Geräten gilt folgende Bestimmung nach dem EMVG:

Geräte dürfen an Orten, für die sie nicht ausreichend entstört sind, nur mit besonderer Genehmigung des Bundesminesters für Post und Telekommunikation oder des Bundesamtes für Post und Telekommunikation betrieben werden. Die Genehmigung wird erteilt, wenn keine elektromagnetischen Störungen zu erwarten sind.

(Auszug aus dem EMVG vom 9.Nov.92, Para.3, Abs.4)

The United Kingdom Telecommunications Act 1984: This apparatus is approved under approval No. NS/G/1234/J/100003 for the indirect connections to the public telecommunications systems in the United Kingdom.

Canadian Department of Communications Compliance Statement: This Class A digital apparatus meets the requirements of the Canadian Interference-Causing Equipment Regulations.

Avis de conformité aux normes du ministère des Communications du Canada: Cet appareil numérique de la classe A respecte toutes les exigences du Réglement sur le matériel brouilleur du Canada.

Statement of CISPR 22 Edition 2 Compliance: **Warning:** This is a Class A Product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

この装置は，第一種情報装置（商工業地域において使用されるべき情報装置）で商工業地域での電波障害防止を目的とした情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）基準に適合しております。
　従って，住宅地域またはその隣接した地域で使用すると，ラジオ，テレビジョン受信機等に受信障害を与えることがあります。
　取扱説明書に従って正しい取り扱いをして下さい。

Safety Notices

Safety Precautions

Electrical Safety

This printer is inspected and listed by recognized national testing laboratories, such as Underwriters Laboratories, Inc. (UL) in the U.S.A. and Canadian Standards Association (CSA) in Canada. Listing of a product by a national testing laboratory indicates that the product is designed and manufactured in accordance with national requirements intended to minimize safety hazards. IBM equipment meets a very high standard of safety in design and manufacture. Remember, however, that this product operates under conditions of high electrical potentials and heat generation, both of which are functionally necessary.

Because the paper and toner used in the printer can burn, you should take normal precautions to prevent fire. These precautions include common-sense measures, such as keeping potentially combustible materials (for example, curtains and chemicals) away from the printer, providing adequate ventilation and cooling, limiting unattended operation, and having trained personnel available and assigned to the printer.

Laser Safety

This printer complies with the performance standards set by the U.S. Food and Drug Administration for a Class 1 Laser Product. This means that the printer belongs to a class of laser products that does not product hazardous laser radiation. This classification was accomplished by providing the necessary protective housing and scanning safeguards to ensure that laser radiation is inaccessible or within Class 1 limits.

There are various tool-operated machine covers that should be moved, removed, or replaced only by trained service personnel. There are no operator controls or adjustments associated with the laser.

No operator maintenance is required to keep the product in compliance as a Class 1 Laser Product. No adjustments that affect laser operation or power are accessible to the operator.

This printer is a Class 1 Laser Product that contains an enclosed Class 3B laser.

Preface

The *IBM 3130 Advanced Function Printer: Programming Reference* describes how to program data streams in a PCL5 and PostScript Level 2 environment.

Audience

This publication is intended for the *system programmers, application programmers,* and *systems engineers* who are familiar with data streams and are writing or modifying programs to operate the 3130 with PCL5 and PostScript data streams.

Organization and Contents of This Guide

This publication includes the following chapters:

- Chapter 1, "Programming Reference Overview" describes supported data streams, Backend Options for ASCII, and the AIX Colon file.
- Chapter 2, "PostScript Level 2 Emulation" describes the support for PostScript Level 2 Emulation and describes system and user parameters.
- Chapter 3, "PCL 5 Emulation" describes the PCL language as a supported printer language and provides a description of PCL commands and variables
- Chapter 4, "Printer Job Language" describes PJL commands and PCL and PostScript supported commands in the PJL environment.

This publication also contains a list of abbreviations, a glossary, and an index.

Conventions Used

The following typeface conventions are used in this publication.

Boldface and caps is used for menu items, commands and other operators. Two examples are:

- **UNSUPPORTED RESOLUTIONS** (menu item)
- **@PJL COMMENT PCLlanguage, 00000000, DATASTREAM** (command)

Bold italics and lowercase is used for variables. An example is:

- ***clearablewarnings***

Italics and lowercase is used for (1) command options and variables <u>for commands</u>, and for (2) options and switches for variables. An example of each is:

- (1) **-duplex** *boolean*
- (2) ***-jobname*** *string*

Terminology

Paper Input and Output Receptacles
Input receptacles are called *trays*. Output receptacles are called *stackers*.

Related Publications

The following 3130 publications are also available:

- *IBM 3130 Advanced Function Printer: User's Guide*, S544-5337

- *IBM 3130 Advanced Function Printer: System Administration Guide*, S544-5328

- *IBM 3130 and 3160 Advanced Function Printer: Safety Information*, S544-3978

- *IBM 3130 Advanced Function Printer: Introduction and Planning Guide*, G544-3974

- *IBM InfoPrint 60; 3130, 3160, and 3935 Advanced Function Printer: Attachment Configuration Handbook*, S544-3977

- *IBM IPDS Handbook for Printers That Use the Advanced Function Common Control Unit*, G544-3895

The following books contain information that relates to the IBM 3130 Advanced Function Printer:

- *Advanced Function Printer: Cut Sheet Paper Reference for Use with IBM Electrophotographic Printers*, G544-3915.

- *Advanced Function Presentation: Printer Information*, G544-3290. This book contains an extensive list of other publications related to Advanced Function Printing.

- *Guide to Advanced Function Presentation*, G544-3876.

Contact your IBM marketing representative for information concerning either the 3130, its publications, or its associated licensed programs.

In addition, references are made to the following books:

- *PostScript Language Reference Manual*, second edition, by Adobe Systems, Inc.

- *PCL 5 Printer Language Technical Reference Manual* by Hewlett-Packard, Inc.

- *PCL 5 Comparison Guide* by Hewlett-Packard, Inc.

- *Printer Job Language Technical Reference Manual* by Hewlett-Packard, Inc.

Chapter 1. Programming Reference Overview

This chapter provides a brief overview of supported data stream environments for the IBM 3130 Advanced Function Printer. Also included is a description of specific LPR options for ASCII and a description of the colon file options (command line arguments) for AIX. The following topics are included:

- Data Stream Support
- ASCII
- Backend Options for ASCII
- Colon File Options for AIX
- TFTP Subcommands
- NetWare Print Commands

Data Stream Support

The 3130 processes print jobs that are encoded in three different data stream formats:

- Intelligent Print Data Stream (IPDS)

- PostScript Level 2

- Printer Control Language (PCL) level 5e (PCL5e)

IPDS

IPDS is a printer data stream that midrange and large IBM systems use extensively. PCs use IPDS to a lesser extent. When IPDS is in use, the printer and the host maintain a two-way conversation to process the job and handle any errors that arise. On the host, software called Print Services Facility (PSF) handles print data and processes the conversation with the printer.

PostScript

PostScript is a printer data stream that is also a computer programming language. When a printer processes a PostScript job, it is running a PostScript language program. PostScript provides the ability for the printer to communicate with the host computer, but few PostScript print jobs require that two-way host communication. The 3130 does not support two-way host communication for PostScript.

The 3130 supports an advanced form of PostScript called PostScript Level 2, with some minor exceptions and deviations.

PCL

PCL is a printer data stream that is widely used in small laser printers. Early versions of PCL did not have an ability to send data back to the attached host computer. Today, PCL does have that ability but most print jobs do not use it. The 3130 does not support two-way host communication for PCL.

The 3130 supports an advanced form of PCL called PCL5e, with some minor exceptions and deviations.

ASCII

ASCII is a standard format for encoding character data used on PCs and UNIX systems. Both PCL and PostScript are based on ASCII. In this publication, *ASCII* jobs refers to print jobs in either PCL or PostScript form. IPDS is not based on ASCII.

Backend Options for ASCII

When sending an ASCII file to the 3130, there are various options which can be specified in a command line argument. These options are:

- qprt commands (AIX)
- enq commands (AIX)
- lp commands (AIX and other UNIX OS)
- lpr commands (multiple operating systems)

qprt commands

The qprt command creates and queues a print job to print the file specified by the File parameter. A file name of - (dash) represents a file to be read from standard input. If more than one file is specified, the files are concatenated into one print job. These concatenated files are then printed in the order specified in the command line.

Syntax: **qprt** [options] *file*

enq commands

The enq command is a general-purpose utility for enqueuing requests to a shared resource, typically a printer device. Using the enq command will enqueue requests, cancel requests, alter the priority of a request, or will display the status of queues and devices.

Syntax: **enq** [options] *file*

lp commands

The lp command arranges for the files and associated information (called a request) to be printed. If no files are given, the standard input is assumed. The file name - (dash) stands for the standard input and can be supplied on the command line with the named files. The files are printed in the order given with the lp command.

Syntax: **lp** [options] *file*

lpr commands

The lpr uses a spooling daemon to print the file specified in the command line when facilities become unavailable. If no files are specified, the lpr command reads from standard input.

Syntax: **lpr** [options] *file*

The following options are available as command line arguments in the 3130 when printing through either a qprt, lp, enq, or lpr command.

The commands which support the specified options are listed in the first column.

Table 1-1 (Page 1 of 2). Backend Command Options		
Commands	**Option**	**Description**
qprt	**-d**	Specifies the type of data switches: a ASCII data type s PostScript c/g PCL
qprt **lpr**	**-f**	Specifies the type of filter or data switches: l ASCII data type o PostScript p ASCII data type filter = pr filter
qprt	**-g**	Start page (if using pr filter)
qprt	**-h**	TITLE text on the header page
qprt	**-H**	printername (PRINTED AT text on the header page)
qprt	**-i**	indent (specify left margin)
qprt	**-I**	Font id (PCL font id)
qprt	**-l**	Page length (specify number of lines per page)
qprt	**-L**	Specifies wrap or truncate switches: + or 1 specifies long lines wrap to the next line - or 0 specifies long lines do not wrap. Instead, truncate long lines at the right margin.
qprt **lp** **enq**	**-O** **-=** **-@**	Specifies stacker (output stacker) switches: 1 Main stacker 2 Upper Stacker 3 Side Stacker
qprt	**-p**	Specifies the horizontal spacing of fixed space font in characters per inch (pitch)
qprt	**-Q**	Specifies paper size switches: 1 letter 2 legal 3 ledger 4 A4 5 A3 6 B4 7 B5 8 COM10 envelope 9 DL envelope
qprt	**-s**	PCL font style (type style)
qprt	**-t**	Specifies number of lines for top margin (top margin)

Table 1-1 (Page 2 of 2). Backend Command Options		
Commands	**Option**	**Description**
qprt	**-u**	Input bin (paper source) switches: 1 Main Tray 2 Lower Sub Tray 3 Upper Sub Tray 4 Side Tray 5 Envelope Feeder 6 Top Front Tray
qprt	**-v**	Specifies number of lines per inch (line density)
qprt	**-w**	Specifies number of characters per line
qprt	**-x**	Specifies automatic CR/LF (control carriage return & line feed interpretation) switches: 0 unchange 1 add line feed 2 add carrier return 3 add both line feed and carrier return
qprt	**-X**	Specifies PCL symbol set (symbol set)
qprt	**-Y**	Specifies simplex/duplex/tumble duplex switches: 0 no duplex (simplex) 1 normal duplex 2 tumble duplex
qprt	**-z**	Specifies orientation of print job switches: 0 portrait 1 landscape 2 reverse portrait 3 reverse landscape
qprt	**-Z**	Specifies send form feed at end of each file switches: + or 1 add form feed ! or 0 do not add form feed

Other Options (-o options)

The following options are for commands that support a -o option. An example syntax for these options is:

enq -ob=1 or -otray=1   to specify the Main Tray to be the Input Tray

Note: Usage in brackets [ ] provides synonyms for options.

Table 1-2 (Page 1 of 2). Other Options (-o options)	
Option	**Description**
Input Tray	Specifies the input tray selection for this print job.
	usage: **-o**[b bin drawer tray]=[switch]
	switches:
	1 Main Tray 2 Lower Sub Tray 3 Upper Sub Tray 4 Side Tray 5 Envelope Feeder 6 Top Front Tray
Collate Option	Collate by job or pages.
	usage **-o**[col collate]=[switch]
	switches:
	job page
Copies Option	Number of copies to be printed
	usage: **-o**[cop copies]=[range]
	range: 1–999
Datatype Option	Data type of print job
	usage: **-o**[datat datatype qdatatype]=[switch]
	switches:
	p | ps | postscript PostScript gl | hpgl2 HP-GL/2 pcl | pcl5e PCL as | ascii | text ASCII
Distribution Option	Deliver to on header/mail response
	usage: **-o**[di distribution]=*userid*
Jobname Option	Title of job
	usage **-o**[do docname jobname]=*jobname*

Table 1-2 (Page 2 of 2). Other Options (-o options)	
Option	**Description**
Duplex Option	Specify for duplex printing usage: **-o**[du duplex]=[switch] switches: n no y yes t tumble
Print Header Option	Specify to print the header page usage: **-o**[h header]=[switch] switches: n no y yes
Height Option	Height of the font in points usage: **-o**[height]=[range] range: 0.25–999.75
Orientation Option	Specify how the job to be printed (vertical or horizontal) **-o**[o orient orientation]=[switch] switches: p | portrait Portrait (vertical) l | land | landscape Landscape (horizontal)
Space Option	Define the font to be fixed or proportional space usage: **-o**[space spacing]=[switch] switches: fix fixed pro proportional
Stacker Option	Specify where to put the print job usage: **-o**[s stacker stack]=[switch] 1 Base Stacker 2 Upper Stacker 3 Side Stacker
Print Trailer Option	Specify to print trailer page usage: **-o**[t trailer]=[switch] switches: y | yes print trailer page n |no do not print trailer page

Colon file options for AIX

The following information describes options for printing in an AIX environment.

First, the AIX virtual printer customization flags are most easily used with the qprt print command or through changing the corresponding virtual printer flag (_ underbar) attribute with lsvirprt, or smit in AIX 4. The following instructions explain how to use the command line option or make changes to the virtual printer at AIX 3 or AIX 4.

The qprt -z flag and the lsvirprt changes are shown for Duplex printing, but are similar for the other attributes.

Duplex Printing Options for AIX

Duplex printing is supported for both PCL and PostScript emulation by using the _Y virtual printer attribute (-Y qprt flag). The following are the allowed values of Y.

Table 1-3. Normal Duplex Options for AIX	
Y	**Normal Duplex Operations**
0	Simplex
1	Duplex
2	Tumble Duplex

The following options can be taken for duplex printing.

1. Printing with qprt. (for example qprt -Y1 -P3130pcl *filename*)

2. Changing with lsvirprt. For duplex queue.

    a. lsvirprt
    b. Select: proper virtual printer
    c. Y=1 (enter)
    d. (enter)

3. Changing with 'smit chpq' at AIX 4

    a. smit chpq
    b. Use F4 to select queue from list and select (enter)
    c. Select: 2 Default Print Job Attributes
    d. Using the down arrow go down and to the line:
    e. DUPLEX output (simplex (single-sided))
    f. Press F4 to select from the options:
        1) simplex (single-sided)
        2) duplex—long-edge binding
        3) duplex—short-edge binding
    g. Choose duplex—long-edge binding (enter)
    h. Hit (enter) or DO on the Change / Show Default Print Job Attributes menu

Page Orientation Options for AIX

Page Orientation is supported for PCL emulation using the _z attribute.

z	Page Orientation
Table 1-4. Page Orientation Options for AIX	
0	Portrait
1	Landscape left
2	Portrait Upside-down
3	Landscape

The smit chpq popup menu options at AIX 4 for Page Orientation are:

- portrait
- landscape right
- portrait upside-down
- landscape left

Paper Source Options for AIX

The paper source can be selected for both PCL and PostScript with the _u attribute.

u	Input Tray
Table 1-5. Paper Source Options for AIX	
1	Main Tray
2	Lower Sub Tray
3	Upper Sub Tray
4	Side Tray
5	Envelope Feeder
6	Top Front Tray

Paper Size Options for AIX

The Paper size can be selected for PCL with the -Q attribute. The _u flag determines if the size entered is for paper or envelope. Envelopes require both u=5 and Q=8 or 9. Paper size will override the input tray.

Table 1-6. Paper Size Options for AIX	
Q	Paper Size
1	Letter
2	Legal
3	Ledger
4	A4
5	A3
6	B4
7	B5
8	COM10 Envelope
9	DL Envelope

The AIX 4 smit chpq menu options for Paper Size are:

- letter
- legal
- ledger
- A3
- A4
- B4
- B5
- COM10 envelope
- DL envelope

The AIX virtual printer wraps lines based on page size. See Table 1-12 for values used when wrapping at 10 cpi.

Output Stacker Options for AIX

The output stacker uses the _= flag. This flag is not supported until AIX 4.2, and so the output stacker cannot be selected at AIX levels lower than AIX 3.2 without appropriate PTF's.

Table 1-7. Output Stacker Options for AIX	
=	Output Stacker
1	Base Stacker
2	Upper Stacker
3	Side Stacker

Pitch Options for AIX

AIX virtual printers support only fixed point fonts. These are supported by the _p pitch flag and the _s style flag. The following pitch and style flags are supported. The condensed print flag -K is not supported. For condensed printing use -p17. The typestyle and pitch commands are only supported for PCL virtual printers, or in limited context for the PostScript printer in ASCII mode (_d=a). In this case, the flags are used as input to the enscript command.

Table 1-8. Pitch Options for AIX	
Style	**Allowed p values**
courier	5,10,12,15,17,20
courier-bold	10,12
courier-italic	10,12
lineprinter	17

AIX 4 popup menu for TypeStyle and Pitch

- courier   5
- courier   10
- courier   12
- courier   15
- courier   17
- courier   20
- courier-bold   10
- courier-bold   12
- courier-italic   10
- courier-italic   12
- lineprinter   17

AIX Font Number Table

The following fonts can be chosen with the -I qprt flag, or set with the _I attribute using lsvirprt. This attribute is not selectable through smit. The fonts are divided into fixed fonts and proportional fonts. The AIX virtual printer system was designed to work with Fixed fonts and they will give you best results in turns of line wrapping, and alignment. With proportional fonts, tables and other tabulated data will be out of alignment as no adjustment is made for this. These fonts are included for occasional use when needed. The -I flag overrides the -s flag. These fonts are primarily designed to work with word processing applications that preformat the data, and not for use by the virtual printer. The available values of _p will still be limited to those described above.

Fixed Fonts for AIX

These fonts use _p as the pitch (characters per inch). Larger values of _p give smaller fonts.

Font Number	Type Style:
0	Courier, this is the default font for the virtual printer.
39	Courier Bold, Can also be chosen with -scourier-bold
40	Courier Italic, can also be chosen with -scourier-italic
41	Courier Bold Italic
42	Letter Gothic, _p is not exactly cpi, watch width.
43	Letter Gothic Bold
44	Letter Gothic Italic
46	Line Printer ISO 8859-1 Latin 1
49	Line Printer PC-850

Table   1-9. Fixed Fonts for AIX

Proportional Fonts for AIX

These fonts use _p as the point size. Larger values of _p give larger fonts.

Font Number	Type Style
1,2,3,4	CG Times, CG Times Bold, CG Times Italic, CG Times Bold Italic
5,6,7,8	CG Omega, CG Omega Bold, CG Omega Italic, CG Omega Bold Italic
9	Coronet
10	Clarendon Condensed
11,12,13,14	Univers, Univers Bold, Univers Italic, Univers Bold Italic
15,16,17,18	Univers Condensed,... Bold,... Italic,... Bold Italic
19,20,21	Antique Olive, ...Bold, ...Italic
22,23,24,25	Garamond Antiqua,...Halbfett,...Kursiv,... Kursiv Halbfett
26	Marigold
27,28	Albertus Medium, Albertus Extra Bold
29,30,31,32	Arial, Arial Bold, Arial Italic, Arial Bold Italic
33,34,35,36	Times New Roman, ...Bold, ...Italic, ...Bold Italic

Table   1-10. Proportional Fonts for AIX

Examples:

- qprt -l9 -p15 filename Coronet at pointsize of 15.
- qprt -l11 -p20 filename Univers at pointsize of 20.
- qprt -l42 -p12 filename Letter Gothic with pitch c.a. 12.

Other Print Commands for AIX

The following qprt options follow the standards used by other laser printers, but may vary from dot matrix printers.

Table	1-11. Other Print Commands for AIX
Command	**Description**
-E	Double space – Not supported by AIX for laser printers.
-K	Condensed print – not supported for laser printers.
-S	High Speed printing – Not supported for laser printers.
-U	Unidirectional Printing – Not supported for laser printers.
-V	Vertical Printing – Not Supported for laser printers.
-W	Continuous DoubleWide – Not Supported for laser printers.
-d	Datastream options: a – default ascii For a PostScript queue, _d=a, or qprt -da, will cause the virtual printer to run the 'enscript' filter to convert ASCII to PostScript. For a PCL queue, this will cause full formatting with line feeds, carriage returns, and form feeds to be added based on counted characters and lines. p – Passthrough No formatting of data will occur, Data will pass to printer untouched. This works well for formatted graphical PCL data. c – PCL s – PostScript
-e	Emphasized print – Not used for laser printers. Use scourier-bold.
-k	Print Color – Not used except for color printers.
-q	Quality mode – only 300 supported, works fine, but there is nothing to change.
-v	Lines per inch – only 6 and 8 are supported, but this is automatically adjusted if -| > 60. This only affects PCL queues in ASCII mode.
-w	Page width – calculated based on paper size and dir. 80 – default for letter, and portrait. This only affects PCL queues in ASCII mode.
-y	Double strike - Not used for laser printers.

AIX Paper size table for 3130

Note: Cols and Lines at 10 cpi and 8 lpi.

Table 1-12. AIX Paper Size Table for 3130					
Name	**Size**	**Orientation**	**Print Size (pels)**	**Columns**	**Lines**
Paper					
Letter	8.5x11in 216x279mm	Portrait Landscape	2400x3000 3180x2250	80 106	60 45
Legal	8.5x14in 216x356mm	Portrait Landscape	2400x3900 4080x2250	80 136	78 45
Ledger	11x17in 279x432mm	Portrait Landscape	3150x4800 4980x3000	105 166	95 60
A4	8.3x11.7 210x297mm	Portrait Landscape	2338x3207 3389x2180	77 112	64 43
A3	11.7x16.5in 297x420mm	Portrait Landscape	3365x4660 4842x3270	112 161	93 65
B4	10.1x14.3in 257x364mm	Portrait Landscape	2893x3999 4181x2735	96 138	79 54
B5	7.2x10.1in 182x257mm	Portrait Landscape	2008x2735 2917x1850	66 97	54 37
Envelopes					
10	4.125x9.5in 105x241mm	Portrait Landscape	1157x2562 2730x1007	38 91	51 20
DL	4.33x8.66in 110x220mm	Portrait Landscape	1087x2300 2480x937	36 31	46 18

TFTP Subcommands

The following table describes commands that can be used during a TFTP session to control a remote printer.

After establishing a TFTP session, the syntax for these commands at the tftp prompt is:

put [filename]   spools a file to be printed
get [command]   performs command in Table 1-13

Table 1-13. TFTP Command Options	
Command	**Description**
status or **STATUS**	Returns a status file to the local directory. This file provides information on jobs currently spooled to the printer.
cancel.all or **CANCEL.ALL**	Cancels all spooled jobs.
cancel.job_number or **CANCEL.**job_number	Cancels a print job where job_number is the job number listed in the status file.

NetWare Print Commands

The following commands can be used to print files.

CAPTURE

Use CAPTURE from the DOS command line when you are logged into the network to print files. In the following example the autoexec.bat file is being printed from the root of drive C:.

Enter the following two lines at the command line:

```
CAPTURE /L=1 /Q=QNAME /NOTIFY /TI=30 /NT /NFF /NB
COPY C:\AUTOEXEC.BAT LPT1:
```

The CAPTURE switches have the following meanings:

/L=1　　Captures the printouts sent to the PC LPT1 port

/Q=QNAME　Specifies the print queue that you set up previously with PCONSOLE for this printer

/NOTIFY　Enables user messages

/TI=30　Sets the timeout to 30 seconds

NT　　Specifies no tab expansion

/NFF　　Ends the printout without a form feed

/NB　　Disables the banner page, which must be disabled when you print a PostScript file

NPRINT

To print using NPRINT, do the following:

1. Log into a file server.
2. To change the current directory, enter `cd \public`.
3. Enter `printcon` (this is the printcon utility).
4. Select EDIT PRINT JOB CONFIGURATIONS from the menu.
5. Press the **Insert** key.

   Name for Print Job Configuration: PRINTJOB

   (If you get a warning about no forms, press the **Esc** key to continue.)
   netware File Server=(name of the file server you logged into)
   Print queue=(name of the print queue you set up on the file server for the printer)

   Note:　Do not select the banner page if you are printing a PostScript file.

6. Press the **Esc** key and then save the changes.
7. Select Default Print Job Configuration.
8. Select PRINTJOB.
9. Press the **Esc** key to exit `printcon`. Save the Print Job configurations.
10. At F:\> enter the following command:

    `nprint test.txt /queue=qname`

    where `test.txt` is a file that exists in the base directory F:\

    Note:　The file must be an ASCII, PostScript, or PCL file, not an executable file.

where qname is the name of the print queue you set up on the file server for the printer.

PCONSOLE

To print using PCONSOLE, do the following:

1. Under Print Queue Information, select the queue you set up for the printer and select CURRENT PRINT JOBS ENTRIES from the menu.
2. Press the **Insert** key.
3. When the directory appears, press the **Enter** key and pick a file to print from the list. Press the **Enter** key again.

   Note: The file must already exist in the directory and must be an ASCII, PostScript, or PCL file, not an executable file.

4. Select the Print Job Configuration you want to use or use the PCONSOLE defaults.
5. Change any print parameters you want to change and press the **Esc** key.

   Note: Do not select the banner page if you are printing a PostScript file.

6. Select Yes to save any changes.

   The screen should show the job as Ready. The job goes to the Active state as the printer retrieves it and then disappears from the job list.

Chapter 2. PostScript Level 2 Emulation

This chapter describes PostScript Level 2 emulation as a supported printer language, discusses user and system-wide parameters used in PostScript configuration, and describes available PostScript fonts.

- PostScript Language Compatibility Operator Descriptions
- System Parameters
- User Parameters
- Device Parameters
- Resident PostScript Fonts
- Interpreter's Resources

For more information on topics covered in this section, please refer to the *PostScript Language Reference Manual*, second edition, by Adobe Systems, Inc.

PostScript Language Compatibility Operator Descriptions

This section describes the Level 1 compatibility operators present in this implementation of the PostScript Level 2 interpreter. The majority of these operators are located in statusdict while some are located in userdict. There are PostScript Level 2 methods for performing the same operations as the operators described below.

Job Control

The job control operators allow the user to identify the job name and to control timeouts. The operators described in this section are in statusdict unless otherwise noted.

Note: A unique comment syntax has been developed for use by print drivers for the 3130. This syntax allows the 3130 to tag a data stream as PCL or PostScript. This comment, when part of the data stream, can be used to assist in identifying a particular job as PostScript. This unique PostScript comment is:

%POSTSCRIPTlanguage,00000000,DATASTREAM

Timeouts

The only timeout command that the PostScript interpreter supports in the printer is *JobTimeout*. The *WaitTimeout* and *ManualFeedTimeout* are not supported in the implementation. The operators that work with the timeout values, always accept or return all three timeout values, even if the timeout value is not supported.

Table 2-1 (Page 1 of 2). Timeout Variables		
Operator Description	**Syntax**	**Errors**
hp2.defaulttimeouts This operator is located in statusdict and is the query for all the timeout values. Three integers are returned on the stack, where only the **JobTimeout** value is of use.	**- defaulttimeouts** *job manualfeed wait*	stackoverflow
setdefaulttimeouts This operator sets the system parameters **JobTimeout** and **WaitTimeout** to *job* and *wait* respectively, and sets the pagedevice parameter **ManualFeedTimeout** to *manualfeed* The operator always takes three values, even though WaitTimeout and ManualFeedTimeout are not supported. 0=disabled 15...65355 seconds	*job manualfeed wait* **setdefaulttimeouts -**	invalidaccess, rangecheck, stackunderflow, typecheck

Table 2-1 (Page 2 of 2). Timeout Variables		
Operator Description	**Syntax**	**Errors**
jobtimeout The jobtimeout operator is located in statusdict and its usage will query the user parameter **JobTimeout**. An integer is returned on the stack. 0=disabled 15...65355 seconds	**- jobtimeout** *int*	stackoverflow
setjobtimeout The setjobtimeout operator sets the user parameter **JobTimeout** to the value of *int*. 0=disabled 15...65355 seconds	*int* **setjobtimeout**	stackunderflow, typecheck
manualfeedtimeout This operator returns the current setting for Manual Feed Timeout found in the statusdict. The operator is present for compatibility purposes as the **manualfeedtimeout** function is not present in this implementation.	**- manualfeedtimeout** *int*	stackoverflow
waittimeout This operator returns the current value for the amount of time the interpreter waits for receiving data from a host. The operator is present for compatibility purposes as the **waittimeout** function is not present in this implementation.	**- waittimeout** *int*	stackoverflow

Job Name
The job name uniquely identifies each print job to the PostScript interpreter.

Table 2-2. Job Name Variables		
Operator Description	**Syntax**	**Error**
Job Name This operator returns a string with the same value as the user parameter **JobName**. Redefining either jobname or the user parameter **JobName** redefines the other to the same value. The operator is found in statusdict.	**- jobname** *string*	stackoverflow

Paper Tray Operations

The operators in this section have to do with paper and tray selection. All of the operators are in statusdict. Each operator executes setpagedevice while making the actual request.

All of the operators set the PageSize Policy to 0, so that a configuration error is generated if a tray containing the requested paper size is not in the printer.

Table 2-3. Paper Tray Compatibility Operators		
Operator	**Page Size**	**Imaging BBox**
lettertray	[612 792]	null
legaltray	[612 1008]	null
ledgertray	[792 1224]	null
a3tray	[842 1191]	null
a4tray	[595 842]	null
b4tray	[729 1032]	null
b5tray	[516 729]	null
com10envelopetray	[297 684]	null
dlenvelopetray	[312 624]	null

The alternative PostScript Level 2 method for selecting the paper size is directly through the setpagedevice operator. For example, if it is desired to print on legal size paper, then the following PostScript would look like:

<< /PageSize [612 1008] /ImagingBBox null >> setpagedevice

For more information on use of the setpagedevice operator, refer to the *PostScript Language Reference Manual*, second edition, by Adobe Systems, Inc.

The names of the input paper trays for the printer are:

Table 2-4. Input Paper Trays	
Paper Input Tray	**Input Attributes Key Value**
Main Tray	1
LowerSubTray	2
UpperSubTray	3
SideTray	4
EnvelopeFeeder	5
TopFrontTray	6

There are specialized procedures in the statusdict for selection of the paper input trays. Selection of a paper tray means selecting that input tray without any regards to the paper size residing in it. The procedures call on **setpagedevice** to establish the default input tray. All of these procedures set the PageSize Policy to 0, which will generate a configuration error should the input tray not be available.

The names of the procedures in statusdict for selection of an input tray are the same as the names of the trays themselves. All of the procedures do not have the executable attribute and must use **exec** to execute.

As an example of selecting an input tray using the printers naming convention, the following PostScript would be required.

statusdict /InputTrayName **get exec**

where InputTrayName is any of the six names indicated above.

Page Duplex Compatibility Operators

The operators in this section have to do with the duplex feature of the printer. All of the operators are in the statusdict unless otherwise specified.

Table 2-5. Page Duplex Compatibility Operators

Operator Description	Syntax	Errors
duplexmode This operator returns the current value of the page device parameter Duplex.	**- duplex** boolean	stackoverflow
firstside This operator returns true if the current page is a front side, false if the current page is a back side.	**- firstside** boolean	stackoverflow
newsheet This operator forces a new sheet to be started.	**- newsheet -**	none
setduplexmode This operator sets the page device parameter Duplex to the boolean value passed to it. It will call the setpagedevice operator to establish the value in the current page device dictionary.	boolean **setduplexmode -**	stackunderflow, typecheck
settumble This operator sets the page device parameter Tumble to the boolean value passed to it. It will call the setpagedevice operator to establish the value in the current page device dictionary.	boolean **settumble -**	stackunderflow, typecheck
tumble This operator returns the value of the page device parameter Tumble.	**- tumble** boolean	stackoverflow

Note: The operators above are provided for PostScript Level 1 compatibility. In PostScript Level 2, the setpagedevice operator is used to accomplish the same results as the operators above perform.

For example, to turn duplex off, the following PostScript is used:

<< /Duplex false >> setpagedevice

To turn duplex on, and have short-edge binding, the following PostScript is used:

<< /Duplex true /Tumble true >> setpagedevice

Refer to the *PostScript Language Reference Manual*, second edition, by Adobe Systems, Inc for more information on the use of the setpagedevice operator.

Output Stacker Selection

The operators/procedures in this section have deal with selecting one of the output destinations on the printer. The printer is capable of having a maximum three output destinations.

The name of the output destinations in the printer are:

Table 2-6. Printer Output Destinations	
Output Destination Name	**Output Attributes Key Value**
Base Stacker	1
Upper Stacker	2
SideStacker	3

There are specialized procedures in the statusdict for selection of the output destination. The procedures invoke the setpagedevice operator. All of these procedures set the OutputType Policy to 0, which will cause a configuration error to occur should the destination not be available.

The names of the procedures in statusdict for selection of an output destination are the same as the names of the stackers themselves. All of the procedures do not have the executable attribute and must use **exec** to execute.

As an example of selecting an output stacker using the printers naming convention, the following PostScript would be required.

statusdict */OutputDestinationName* **get exec**

where *OutputDestinationName* is any of the three names indicated above.

Note: Once an output stacker is selected, the interpreter will lock on this stacker for the duration of the job.

Other Operators

The following operators relate to unique printer features/identification.

Table 2-7 (Page 1 of 2). Printer features/identification operators		
Operator Description	**Syntax**	**Errors**
seteconomode This operator resides in the status dictionary and enables/disables the toner saver mode inside the printer. This operator will only act on the current job.	*boolean* **seteconomode -**	typecheck, stackoverflow, stackunderflow
currenteconomode This operator resides in the status dictionary and returns the current setting for economode.	**- currenteconomode** *boolean*	stackoverflow
product This operator returns the name of the product. A string is returned on the stack indicating the name of the product. This operator is located in statusdict and its value is read-only.	**- product** *string*	stackoverflow
ramsize This operator returns the amount of memory for use by the interpreter. The value returned does not include memory that is allocated for frame buffers.	**- ramsize** *integer*	stackoverflow
printername Stores the value of the system parameter **PrinterName** in *string* and returns a string object designating the *substring* actually used.	*string* **printername** *substring*	rangecheck, stackunderflow, typecheck
setprintername Sets the system parameter **PrinterName** to the value passed to the operator.	*string* **setprintername -**	invalidaccess, limitcheck, stackunderflow, typecheck
realformat Returns a string on the stack with the same value as the system parameter **RealFormat**.	**- realformat** *string*	stackoverflow
pagecount Returns the value of the system parameter **PageCount**.	**- pagecount** *integer*	stackoverflow
buildtime Returns the value of the system parameter **BuildTime**.	**- buildtime** *integer*	stackoverflow

Table 2-7 (Page 2 of 2). Printer features/identification operators		
Operator Description	**Syntax**	**Errors**
byteorder Returns the value of the system parameter **ByteOrder**.	**- byteorder** *integer*	stackoverflow
checkpassword Checks whether *integer* or *string* is a valid password for either **SystemParamsPassword** or **StartJobPassword**. If it is valid, *true* is returned, otherwise *false* is returned. If either password is not set, then *true* will be returned. A returned value of *true* indicates that integer or string is a valid argument to **startjob** or **exitserver**.	*integer* **checkpassword** *boolean* *string* **checkpassword** *boolean*	stackunderflow, typecheck
margins This operator returns the x and y components of the page device **Margins** parameter as left and top respectively.*	**- margins** *top left*	stackoverflow
setmargins** The two numbers will relocate the page image on the media by *left* device units in the direction of the device x component; and by top device units in the direction of the device y coordinate. This positioning is usually accomplished by device-dependent means.***	*top left* **setmargins -**	rangecheck, stackunderflow, typecheck, invalidaccess
manualfeed Returns the value of 0. Returns the value of 0. This value is meaningless.	**- manualfeed** *boolean*	stackunderflow

*It is strongly recommended to use the printer's factory print adjust for adjustments to the **margins** operator

Using the **setmargins operator sets the page device **Margins** parameter to [*left top*].

***The purpose of this operator is to compensate for mechanical misadjustments in the device. Since the printer has a factory print adjust feature, use of this operator is not recommended.

Non-Supported Operators

The following operators are not supported on the PostScript interpreter implementation in the printer. They are listed here for completeness. Invocation of these operators are allowed; however, they will have no effect on the printer. They will be found in the statusdict.

Table 2-8. Non-Supported Operators		
Operator Description	**Syntax**	**Errors**
dostartpage This operator would normally cause a demonstration page to be printed when the printer is initially turned on. This implementation does not support this feature. Its return value is that which is set by setdostartpage.	**- dostartpage** *boolean*	stackoverflow
setdostartpage Sets the system parameter *DoStartPage* to the value of boolean.	*boolean* **setdostartpage -**	invalidaccess, stackunderflow, typecheck
idlefonts There is no support for font caching during printer idle time. The operator does not exist in the implementation.	**none**	undefined
setidlefonts There is no support for font caching during printer idle time. The operator does not exist in the implementation.	**none**	undefined
TraySwitch & AutoSwitch Both these operators are not supported in the interpreter.	**none**	undefined
Prefeed The operator is not supported in the interpreter.	**none**	undefined
softwareiomode & setsoftwareiomode These operators are not supported in the interpreter. The interpreter does not communicate directly with any attachment device. Use of these operators will cause an undefined error.	**none**	undefined
userdiskpercent Returns the value of 0. This operator is essentially a no-op.	**- userdiskpercent** *integer*	stackoverflow
setuserdiskpercent This operator is essentially a no-op.	*integer* **setuserdiskpercent -**	rangecheck, stackunderflow, typecheck

System Parameters

This section discusses the system parameters for the 3130. Setting system parameters generally requires a password. Setting system parameters is password protected only when the password is changed from the original factory setting.

Note: The initial value is a null string.

Some of the system parameters are read-only. They are returned using the operator *currentsystemparams*, but trying to change them using the operator *setsystemparams* has no effect. Other parameters are write-only. These are set by *setsystemparams*; however, they are not returned by *currentsystemparams*.

The following list of system parameters are described in the *PostScript Language Reference Manual*, second edition, and will not be described in detail below. These parameters are part of the implementation, but their descriptions can be found in the manual mentioned above. The initial settings for these parameters are based on the memory configuration of the printer.

- ByteOrder
- CurFontCache
- CurFormCache
- CurOutlineCache
- CurPatternCache
- CurScreenCache
- CurUPathCache
- MaxFontCache
- MaxFormCache
- MaxOutlineCache
- MaxScreenStorage
- MaxPatternCache
- MaxUPathCache
- RealFormat

Table 2-9 (Page 1 of 4). System Parameters		
Key	**Type**	**Semantics**
BuildTime	integer	*(Read-Only)* A timestamp which indicates a specific build of the PostScript Interpreter. **Range:** Any integer **Errors:** none **Original Factory Setting:** varies
CurInputDevice	string	*(Read-Only)* Identifies the name of the communications protocol that the PostScript interpreter runs on top of in order to receive PostScript jobs to process. **Range:** Any string **Errors:** none **Original Factory Setting:** %AFCCU2simple%
CurOutputDevice	string	*(Read-Only)* Identifies the name of the communications protocol that the PostScript interpreter runs on top in order to send its output results. **Range:** Any string **Errors:** none **Original Factory Setting:** %AFCCU2simple%
CurSourceList	integer	*(Read-Only)* Indicates the number of bytes currently occupied by source lists. The internal data representation for sampled image source data is stored in the source list as well as uncached character pixel arrays. **Range:** Any non-negative integer **Errors:** none **Original Factory Setting:** 0
DoStartPage	boolean	This implementation of the PostScript interpreter does not honor the setting of this system parameter. The parameter's value indicates whether or not the start page should print when the printer is turned on. **Range:** *true, false* **Errors:** typecheck **Original Factory Setting:** false
FactoryDefaults	boolean	This system parameter causes all non-volatile parameters to revert to the factory default values at the next power-up. The exact collection of parameters reset to factory defaults is subject to change on future releases of this product. **Range:** *true, false* **Errors:** typecheck **Original Factory Setting:** false

Table 2-9 (Page 2 of 4). System Parameters		
Key	**Type**	**Semantics**
FatalErrorAddress	integer	The current implementation does not update this parameter during a fatal system software error. The printer uses a trace facility for recording events leading to a fatal system software error. **Range:** any integer **Errors:** none **Original Factory Setting:** 0
FontResourceDir	string	*(Read-Only)* The current implementation of the PostScript interpreter has a font management process that controls the font resources used by the interpreter. Fonts used by the interpreter are protected from the user by the font management process, and the fonts themselves are not centrally located at a single place. This system parameter is therefore not used by the interpreter, and applications and users should access fonts only through the operators findfont and findresource. **Range:** any string with non-null characters **Errors:** limitcheck, typecheck **Original Factory Setting:** Fonts/
GenericResourceDir & GenericResourcePathSep	strings	*(Read-only)*This controls the location of external resources for the Generic category and all categories based upon it (currently **Category, Encoding, Form, Pattern, ProcSet, ColorSpace, Halftone**, and **ColorRendering**). The Generic category implementation concatenates the GenericResourceDir, the category name, the GenericResourcePathSep, and the resource name to get the external location of the resource. **Note:** Applications and users should access external resources only through the resource operators. **Range:** any string with non-null characters **Errors:** limitcheck, typecheck **Original Factory Setting:** Resource/ & /
JobTimeout	integer	This is the value expressed in seconds to which the user parameter **JobTimeout** will be initialized at the beginning of each job. A value of 0 indicates the timeout is infinite. **Range:** 0, or any integer greater than 15 **Errors:** rangecheck, typecheck **Original Factory Setting:** 0

Table 2-9 (Page 3 of 4). System Parameters		
Key	**Type**	**Semantics**
LicenseID	string	This parameter is unique to the product and provides an identifier for the product. **Range:** Any string of non-null characters **Errors:** limitcheck, typecheck **Original Factory Setting:** 00-111-333
ControllerSerialNumber	string	This parameter is unique to the product and provides an identifier for the control unit software. **Range:** Any string of non-null characters **Errors:** none **Original Factory Setting:** varies
EngineSWVersion	string	This parameter is unique to the product and provides an identifier for the printer engine. **Range:** Any string of non-null characters **Errors:** none **Original Factory Setting:** varies
MaxRasterMemory	integer	This indicates the largest amount of memory that may be allocated to the frame buffer. This parameter may be used to limit the amount of raster memory. This parameter allows the user to trade-off raster memory allocation against VM. The parameter is consulted only at printer power-up time so that any changes will not take effect until then. A negative value or 0 indicates that the interpreter will use its default frame buffer size. **Range:** any positive or negative integer **Errors:** typecheck **Original Factory Setting:** 0
MaxSourceList	integer	This is the maximum number of bytes that can be utilized for source lists. A source list holds internal data representation for sampled image source data and uncached character pixel arrays. **Range:** any integer **Errors:** typecheck **Original Factory Setting:** 50000
PageCount	integer	*(Read-only)* Contains the number of pages that have successfully printed. **Range:** any non-negative integer **Errors:** none **Original Factory Setting:** 0

Table 2-9 (Page 4 of 4). System Parameters		
Key	**Type**	**Semantics**
PrinterName	string	Sets up *string* as the current name of the device.
		Range: any string <= 32 non-null characters.
		Errors: limitcheck, typecheck
		Original Factory Setting: IBM 3130
RamSize	integer	*(Read-only)* Indicates in bytes the amount of installed memory available to the interpreter.
		Range: any non-negative integer
		Errors: none
		Original Factory Setting: varies
Revision	integer	*(Read-only)* Designates the current revision level of the printer.
		Range: any integer
		Errors: none
		Original Factory Setting: 0
StartupMode	integer	Indicates whether the system start file should be executed when the device is powered on.
		Range: 0, 1
		Errors: rangecheck, typecheck
		Original Factory Setting: 1
ValidNV	boolean	*(Read-only)* Indicates whether non-volatile memory is currently used to store persistent parameters.
		Range: true, false
		Errors: none
		Original Factory Setting: true
WaitTimeout	integer	Indicates the value in seconds to which the user parameter **WaitTimeout** will be initialized at the beginning of each job.
		Note: This parameter has no effect on the interpreter, it is not supported in the implementation.
		Range: 0 or any integer greater than 15
		Errors: rangecheck, typecheck
		Original Factory Setting: 300

User Parameters

There are three types of parameters that the interpreter uses: user parameters, system parameters, and device parameters. This section describes the user parameters supported by the interpreter. The user parameters can be modified by any user program without the need of a password. The two operators that work with user parameters are **setuserparams** and **currentuserparams**. Any modifications to the user parameters are subject to **save** and **restore** operations in the interpreter.

The following list of user parameters are described in the *PostScript Language Reference Manual*, second edition, and will not be described in detail below. These parameters are part of the implementation, but their descriptions can be found in the manual mentioned above. The initial settings for these parameters are based on the memory configuration of the printer.

- MaxFontItem
- MinFontCompress
- MaxUPathItem
- MaxFormItem
- MaxPatternItem
- MaxScreenItem
- MaxOpStack
- MaxDictStack
- MaxExecStack
- MaxLocalVM
- VMReclaim
- VM Threshold

Table 2-10. User Parameters		
Key	**Type**	**Semantics**
JobName	string	This parameter has string as the name of the current job. **Range:** Any string having non-null characters **Errors:** limitcheck, typecheck **Initial Value:** varies
JobTimeout	integer	This parameter establishes the current job timeout. It represents the number of seconds that a job is allowed to execute prior to the PostScript interpreter aborting with a timeout error. **Range:** Any non-negative integer **Errors:** typecheck **Initial Value:** 0
WaitTimeout	integer	This parameter is not supported by this implementation. The parameter can be set and read at will, but the interpreter will take no action on its value. **Range:** Any non-negative integer **Errors:** typecheck **Initial Value:** 300

Device Parameters

In many printers the PostScript interpreter will support various devices such as: storage devices, communications channels, cartridges, etc. It is in support of these devices that the device parameters are used. The **setdevparams** and **currentdevparams** operators manipulate these parameters.

In this printer, where the PostScript interpreter is running in the *AFCCU* architecture, the interpreter does not control the printer but runs only as a rasterizer in a client/server model. The interpreter does not control the hardware of the printer and therefore does not really support any device parameters. There is no direct interface the interpreter has to any of the attachments such as serial or parallel ports.

Resident PostScript Fonts

The PostScript Level 2 interpreter supports Type 1 font formats in both binary and ascii (that is, *.pfb and *.pfa); as well as TrueType fonts in the Type 42 format, and Type 3 fonts. The interpreter has access to 56 resident Type 1 fonts and 10 resident Type 42 fonts. The resident fonts that the PostScript interpreter has access to are not centrally located on the hard disk of the printer. Fonts are shared between PostScript and the IPDS rasterizer and are managed via a Font Management process.

The following is a list of Type 1 fonts for PostScript emulation.

Table 2-11 (Page 1 of 2). Type 1 Fonts for PostScript Emulation	
Font Name in PostScript Programs	**Full Name of Font**
AvantGarde-Demi	ITC Avant Garde Gothic Demi
AvantGarde-DemiOblique	ITC Avant Garde Gothic Demi Oblique
AvantGarde-Book	ITC Avant Garde Gothic Book
AvantGarde-BookOblique	ITC Avant Garde Gothic Book Oblique
CourierAPL2	Courier APL2
CourierAPL2-Bold	Courier APL2Bold
Boldface	Boldface
Bookman-Demi	ITC Bookman Demi
Bookman-Demitalic	ITC Bookman Demi Italic
Bookman-Light	ITC Bookman Light
Bookman-LightItalic	ITC Bookman Light Italic
CenturySchlbk-Bold	Century Schoolbook Bold
CenturySchlbk-BoldItalic	Century Schoolbook Bold Italic
CenturySchlbk-Italic	Century Schoolbook Italic
Courier	Courier
CourierSymbols	Courier Symbols
CourierSymbols-Bold	Courier Symbols Bold
Courier-Bold	Courier Bold
Courier-BoldItalic	Courier Bold Italic
Courier-Italic	Courier Italic
CenturySchlbk-Roman	Century Schoolbook Roman
GothicText	Gothic Text
GothicKatakana	Gothic Katakana
Helvetica	Helvetica
HelveticaSymbols	Helvetica Symbols
HelveticaSymbols-Bold	Helvetica Symbols Bold
Helvetica-Bold	Helvetica Bold
Helevtica-BoldItalic	Helvetica Bold Italic
Helevtica-Italic	Helvetica Italic

Table 2-11 (Page 2 of 2). Type 1 Fonts for PostScript Emulation	
Font Name in PostScript Programs	**Full Name of Font**
Helvetica-Black	Helvetica Black
Helvetica-Black Oblique	Helvetica Black Oblique
Helvetica-Light	Helvetica Light
Helvetica-LightOblique	Helvetica Light Oblique
Helvetica-Narrow	Helvetica Narrow
Helvetica-Narrow-Bold	Helvetica Narrow Bold
Helvetica-Narrow-BoldOblique	Helvetica Narrow Bold Oblique
Helvetica-Narrow-Oblique	Helvetica Narrow Oblique
LetterGothic	Letter Gothic
LetterGothic-Bold	Letter Gothic Bold
OCRA	OCR A
OCRB	OCR B
Palatino-Bold	Palatino Bold
Palatino-BoldItalic	Palatino Bold Italic
Palatino-Italic	Palatino Italic
Palatino-Roman	Prestige
Prestige-Bold	Prestige-Italic
TimesNewRoman	Times New Roman
TimesNewRomanSymbols	Times New Roman Symbols
TimesNewRomanSymbols-Bold	Times New Roman Symbols Bold
TimesNewRoman-Bold	Times New Roman Bold
Times New Roman-BoldItalic	Times New Roman Bold Italic
TimesNewRoman-Italic	Times New Roman Italic
Zapf Chancery-MediumItalic	ITC Zapf Chancery Medium Italic
ZapfDingbats	ITC Zapf Dingbats

The following is a list of Type 42 fonts for PostScript Emulation.

Table 2-12. Type 42 Fonts for PostScript Emulation	
Font Name in PostScript Program	**Full Name of Font**
Arial	Arial
Arial-Bold	Arial Bold
Arial-BoldItalic	Arial Bold Italic
Arial-Italic	Arial Italic
TimesNewRomanTT	Times New Roman
TimesNewRoman-BoldTT	Times New Roman Bold
TimesNewRoman-BoldItalicTT	Times New Roman Bold Italic
TimesNewRoman-ItalicTT	Times New Roman Italic
Wingdings	Wingdings
Symbol	Symbol

Interpreter's Resources

The resources used by the interpreter are grouped into categories and are identified by a name. There are basically three classes of resources: Regular resources, implicit resources, and resources that are used in defining new resource categories. For more information about named resources, refer to the *PostScript Language Reference Manual*, second edition, in Section 3.9, "Named Resources."

The following tables depicts the resources provided in the interpreter.

Table 2-13. Regular Resources	
Category Name	**Instances**
OutputDevice	Default
Font	*Printer's supplied fonts*
Encoding	StandardEncoding, ISOLatin1Encoding
ColorRendering	*none*
ColorSpace	*none*
Emulator	*none*
Halftone	*none*
Pattern	*none*
Form	*none*
ProcSet	*none*

Table 2-14. Implicit Resources	
Category Name	**Instances**
Filter	ASCII85Decode, ASCII85Encode, ASCIIHexDecode, ASCIIHexEncode, CCITTFaxDecode, CCITTFaxEncode, DCTDecode, DCTEncode, LZWDecode, LZWEncode, RunLengthDecode, RunLengthEncode, SubFileDecode, NullEncode
ColorSpaceFamily	CIEBasedA, CIEBasedABC, DeviceCMYK, DeviceGray, DeviceRGB, Indexed, Pattern, Separations
ColorRenderingType	*1*
FMapType	*2, 3, 4, 5, 6, 7, 8*
FontType	*1, 3, 42*
FormType	*1*
HalftoneType	*1, 2, 3, 4, 5, 6*
ImageType	*1*
PatternType	*1*

Table 2-15. Resources for creating new resource categories	
Category Name	**Instances**
Category	Category, Generic, Font, Encoding, Form, Pattern, ProcSet, ColorSpace, Halftone, ColorRendering, OutputDevice, Filter, ColorSpaceFamily, Emulator, ColorRenderingType, FMapType, FontType, FormType, HalftoneType, ImageType, PatternType

Chapter 3. PCL 5 Emulation

This chapter describes PCL 5 Emulation as a supported printer language, discusses user and system-wide parameters used in PCL configuration, and provides a list of available PCL fonts. The following topics are covered:

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

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

Page Dimensions

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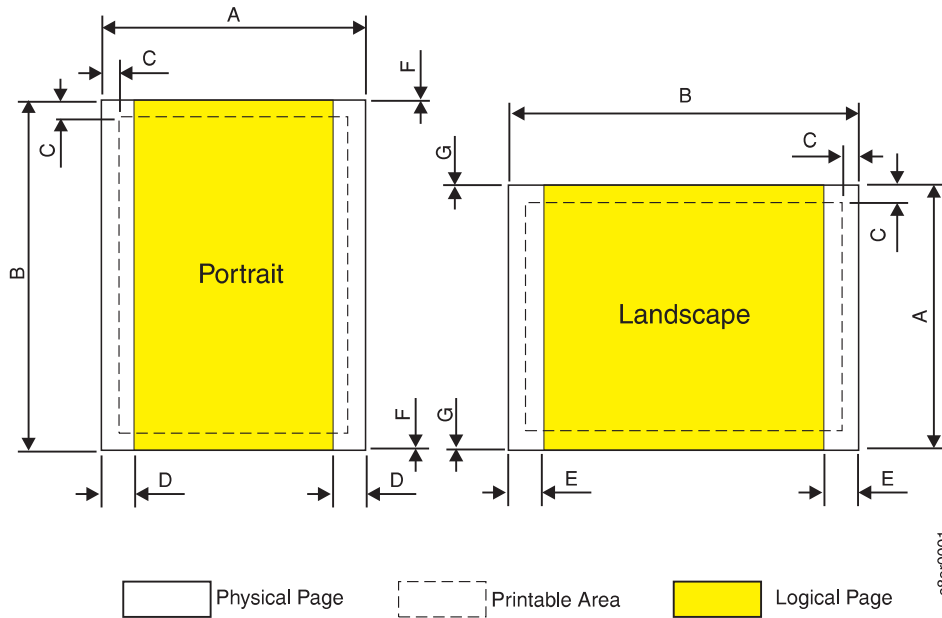
Key

A. Physical Page width (portrait) and length (landscape)
B. Physical Page length (portrait) and width (landscape)
C. Distance between edge of physical page and printable area
D. Distance between left or right edge of the physical page compared to the logical page (portrait)
E. Distance between left or right edge of the physical page compared to the logical page (landscape)
F. Distance between top or bottom edge of the physical page compared to the logical page (portrait)
G. Distance between the top or bottom edge of the physical page compared to the logical page (landscape)

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

Table 3-1 (Page 1 of 2). Logical Page and Printable Area Dimensions for PCL Emulation									
Selection	**Paper Dimensions**		**Dimensions by Area (pels)***						
Page Size Parameters	**Millimeters**	**Inches**	**A**	**B**	**C**	**D**	**E**	**F**	**G**
Paper									
Letter	216 x 279	8.5 x 11	2550	3300	50	75	60	0	0
Legal	216 x 356	8.5 x 14	2550	4200	50	75	60	0	0
Ledger	279 x 432	11 x 17	3300	5100	50	75	60	0	0
A4	210 x 297	8.3 x 11.7	2480	3507	50	71	59	0	0

Table 3-1 (Page 2 of 2). Logical Page and Printable Area Dimensions for PCL Emulation									
Selection	**Paper Dimensions**		**Dimensions by Area (pels)***						
Page Size Parameters	**Millimeters**	**Inches**	**A**	**B**	**C**	**D**	**E**	**F**	**G**
A3	297 x 420	11.7 x 16.5	3507	4960	50	71	59	0	0
JIS B5	182 x 257	7.2 x 10.1	2150	3035	50	71	59	0	0
JIS B4	257 x 364	10.1 x 14.3	3035	4299	50	71	59	0	0
Envelopes									
COM 10	105 x 241	4.1 x 9.5	1237	2850	50	75	60	0	0
International DL	110 x 220	4.3 x 8.7	1299	2598	50	71	59	0	0

* Pel dimensions are for 300 dpi.

Paper Bin Assignments

The paper tray assignments for the 3130 are:

Table 3-2. Paper Tray Operators	
Input Tray	**Assignment**
Main Tray	1
Lower Sub Tray	2
Upper Sub Tray	3
Side Tray	4
Envelope Feeder	5
Top Front Tray	6

When an input tray is requested, it must be installed and enabled. If it has not been installed and enabled, another input bin which is installed, enabled, and contains paper of the same size will be used.

Table 3-3. Output Stacker Assignments	
Output Stacker	**Assignment**
Base Stacker	1
Upper Stacker	2
Side Stacker	3

When an output stacker is requested, it must be installed and enabled. If it has not been installed and enabled, another output stacker which is installed and enabled will be used.

Resident PCL Fonts

The following are the resident PCL fonts available in the 3130.

Table 3-4 (Page 1 of 2). Resident PCL Fonts in the 3130		
Font Number	**Typeface**	**Font Type**
0	Courier	Intellifont
1	CG Times	Intellifont
2	CG Times Bold	Intellifont
3	CG Times Italic	Intellifont
4	CG Times Bold Italic	Intellifont
5	CG Omega	Intellifont
6	CG Omega Bold	Intellifont
7	CG Omega Italic	Intellifont
8	CG Omega Bold Italic	Intellifont
9	Coronet	Intellifont
10	Clarendon Condensed	Intellifont
11	Univers	Intellifont
12	Univers Bold	Intellifont
13	Univers Italic	Intellifont
14	Univers Bold Italic	Intellifont
15	Univers Condensed	Intellifont
16	Univers Condensed Bold	Intellifont
17	Univers Condensed Italic	Intellifont
18	Univers Condensed Bold Italic	Intellifont
19	Antique Olive	Intellifont
20	Antique Olive Bold	Intellifont
21	Antique Olive Italic	Intellifont
22	Garamond Antiqua	Intellifont
23	Garamond Halbfett	Intellifont
24	Garamond Kursiv	Intellifont
25	Garamond Kursiv Halbfett	Intellifont
26	Marigold	Intellifont
27	Albertus Medium	Intellifont
28	Albertus Extra Bold	Intellifont
29	Arial	True Type
30	Arial Bold	True Type
31	Arial Italic	True Type
32	Arial Bold Italic	True Type
33	Times New Roman	True Type
34	Times New Roman Bold	True Type

Table 3-4 (Page 2 of 2). Resident PCL Fonts in the 3130		
Font Number	**Typeface**	**Font Type**
35	Times New Roman Italic	True Type
36	Times New Roman Bold Italic	True Type
37	Symbol	True Type
38	Wingdings	True Type
39	Courier Bold	Intellifont
40	Courier Italic	Intellifont
41	Courier Bold Italic	Intellifont
42	Letter Gothic	Intellifont
43	Letter Gothic Bold	Intellifont
44	Letter Gothic Italic	Intellifont
45	Line Printer Roman-8	Bitmapped (8U)*
46	Line Printer ISO 8859-1 Latin 1	Bitmapped (0N)*
47	Line Printer PC-8	Bitmapped (10U)*
48	Line Printer PC-8 D/N	Bitmapped (11U)*
49	Line Printer PC-850	Bitmapped (12U)*
50	Line Printer Legal	Bitmapped (1U)*
51	Line Printer ISO 8859-2 Latin 2	Bitmapped (2N)*
52	Line Printer ISO 8859-9 Latin 5	Bitmapped (5N)*

*Information in parenthesis ( ) is the Symbol Set ID.

Resident Symbol Sets

The following are the resident symbol sets available in the 3130.

Table 3-5 (Page 1 of 2). Resident Symbol Sets in the 3130			
Symbol Set Name (Operator Panel Selection)	**Symbol Set ID**	**Language**	**PJL Value**
ROMAN-8	8U	Roman-8	ROMAN8
LATIN 1	0N	Latin 1	ISOL1
LATIN 2	2N	Latin 2	ISOL2
LATIN 5	5N	Latin 5	ISOL5
PC-8	10U	Multilingual	PC8
PC-8 D/N	11U	Danish/Norwegian	PC8DN
PC-850	12U	Multilingual	PC850
PC-852	17U	Latin 2	PC852
PC-TURKISH	9T	Turkish	PC8TK
WIN 3.1 LATIN 1	19U	Latin 1	WINL1
WIN 3.1 LATIN 2	9E	Latin 2	WINL2
WIN 3.1 LATIN 5	5T	Latin 5	WINL5

Symbol Set Name (Operator Panel Selection)	Symbol Set ID	Language	PJL Value
DESKTOP	7J	Multilingual	DESKTOP
PS TEXT	10J	Multilingual	PSTEXT
VENTURA INTL	13J	Multilingual	VNINTL
VENTURA US	14J	English	VNUS
MS PUBLISHING	6J	Multilingual	MSPUBL
MATH-8	8M	Multilingual	MATH8
PS MATH	5M	Multilingual	PSMATH
VENTURA MATH	6M	Multilingual	VNMATH
PI FONT	15U	Multilingual	PIFONT
LEGAL	1U	Multilingual	LEGAL
ISO-4 UK	1E	UK	ISO4
ISO-6 ASCII	0U	Multilingual	ISO6
ISO-11 SWED:NAMES	0S	Swedish	ISO11
ISO-15 ITALIAN	OI	Italian	ISO15
ISO-17 SPANISH	2S	Spanish	ISO17
ISO-21 GERMAN	1G	German	ISO21
ISO-60 NORWEG V1	0D	Norwegian	ISO60
ISO-69 FRENCH	1F	French	ISO69
WIN 3.0 LATIN 1	9U	Latin 1	WIN30
MC TEXT	12J	Multilingual	MCTEXT
SYMBOL	19M	Multilingual	SYMBOL
WINGDINGS	579L	Multilingual	WINGDINGS

Table 3-5 (Page 2 of 2). Resident Symbol Sets in the 3130

PCL Commands

The following section describes the command sequence and supported PCL commands for the 3130.

The 3130 supports the following groups of commands:

- Job Control

- Page Control

- Cursor Positioning

- Font Selection

- Text Operations

- Font Management

- User-Defined Symbol Set

- Soft Font Creation

- Macros

- Print Model Imaging

- User-Defined Patterns

- Rectangular Area Fill

- Picture Frame

- Display Functions Mode

PCL 5 Command Syntax

The syntax for PCL 5 commands (also called the escape sequence) contains two components: The first is always the ASCII escape control code, designated "Esc" in this chapter. This character identifies the following string of characters is to be interpreted as a printer command. The second component is the string of characters which specifies the command type and any data associated with the command.

Note: The "ℓ" symbol is used to designate a lower case "L" in this chapter.

Job Control

The following table describes specific PCL Job Control commands which are supported by the 3130.

Table 3-6 (Page 1 of 2). PCL Job Control Commands	
Command	**Description**
Esc %-12345X	**UEL (Universal Exit Language)**
	The **Universal Exit Language (UEL)** command causes the 3130 to print all data received before the UEL command, perform a reset (which has the same effect as **Esc E**), and then to exit and turn control over to the Printer Job Language (PJL) command interpreter.
Esc E	**Reset**
	The **Reset** command forces the 3130 to print any partial pages, reset the print environment to the PJL Current Environment and to delete all temporary downloaded resources, such as macros, fonts, and patterns.
Esc & ℓ #S	**Simplex/Duplex Print**
	The **Simplex/Duplex Print** command sets the printing mode to simplex, normal duplex, or tumble duplex for a duplex printer.
	0 Simplex 1 Normal Duplex 2 Tumble Duplex
Esc & ℓ #U	**Left Offset Registration**
	The **Left Offset Registration** command sets the position of the logical page across the width of the physical page.
Esc & ℓ #Z	**Top Offset Registration**
	The **Top Offset Registration** command sets the position of the logical page along the length of the physical page.

Table 3-6 (Page 2 of 2). PCL Job Control Commands	
Command	**Description**
Esc & a#G	**Duplex Page Side Selection***
	The **Duplex Page Side Selection** command causes a Form Feed and designates which side of the sheet to print.
	0 Select next side 1 Select front side 2 Select back side
	* On non-duplex printers, this command causes a page eject.
Esc & ℓ 1T	**Job Separation**
	The **Job Separation** command is used to distinguish one print job from another in the output tray by physically offsetting the print jobs.
Esc & ℓ #G	**Output Bin**
	The **Output Bin** command selects one of the output stackers for output. This command will only take effect when OVERRIDE STACKER for PCL is set to NONE on the operator panel and there is no header page. Additionally, the stacker selected for the first page of the job is the stacker that is used for the entire job.
	1 Base Stacker 2 Upper Stacker 3 Side Stacker
Esc & ℓ #X	**Number of Copies**
	The **Number of Copies** command sets the number of printed copies for each page.
Esc & u #D	**Unit of Measure**
	The **Unit of Measure** command designates the unit of measure for PCL unit cursor movements, where # is in units-per-inch.

Page Control

The following table describes the specific page control commands in PCL supported by the 3130.

Table 3-7 (Page 1 of 3). PCL Page Control Commands	
Command	**Description**
Esc & ℓ #A	**Page Size**
	The **Page Size** command selects the exact size of he paper to be used. If the **Paper Source** command and the **Page Size** command match; that is, if paper with the requested paper size is contained in the selected paper tray, the job will print with no difficulty. However, if the selected paper tray does not contain the paper size requested, another paper tray which contains the same size paper will be selected [for example: if the Main Tray(1) is selected, but does not contain the requested paper size, then the LowerSub Tray(2) will be selected if it contains the requested paper size, and so forth].*
	2 Letter 3 Legal 6 Ledger 26 A4 27 A3 45 JIS B5 46 JIS B4 81 COM10 Envelope 90 International DL Envelope
	Note: The procedure described above only occurs when a **Page Size** command follows a **Paper Source** command. In the event that a **Paper Source** command follows a **Page Size** command, the **Paper Source** command will take precedence and the job will be printed to fit on the size of the paper in the selected paper tray.
	*If none of the trays contain the requested paper size, another paper size, that is close to the requested paper size, will be substituted.
Esc & ℓ #H	**Paper Source**
	The **Paper Source** command designates the input tray. The job will be printed to fit on the size of the paper in the selected tray.
	0 Eject Page 1 Main Tray 2 Lower Sub Tray 3 Upper Sub Tray 4 Side Tray 5 Envelope Feeder 6 Top Front Tray
	Note: The procedure described above only occurs when a **Paper Source** command follows a **Page Size** command. In the event that a **Page Size** command follows a **Paper Source** command, the **Page Size** command will take precedence and the job will be printed from an input tray containing paper of the requested size.

Command	Description
Esc & ℓ #O	**Orientation**
	The **Orientation** command defines the rotation of the logical page relative to the physical page.
	0 Portrait 1 Landscape 2 Reverse Portrait 3 Reverse Landscape
Esc & a#P	**Print Direction**
	The **Print Direction** command rotates the page coordinate system relative to the current position in 90° increments.
	Default 0 Range 0, 90, 180, 270 (other values are ignored)
Esc & a#L	**Left Margin**
	The **Left Margin** command sets the left margin to the left edge of the selected column.
Esc & a#M	**Right Margin**
	The **Right Margin** command sets the right margin to the right side of the selected column.
Esc 9	**Clear Horizontal Margins**
	The **Clear Horizontal Margins** command resets the left and right margins.
Esc & ℓ #E	**Top Margin**
	The **Top Margin** command designates the number of lines between the top of the logical page and the top of the text area.
Esc & ℓ #F	**Text Length**
	The **Text Length** command designates the number of lines available for printing text on a page. It sets the bottom margin.
Esc & ℓ #L	**Perforation Skip**
	The Perforation Area includes the area from the bottom margin of the current page to the top margin of the next page. The **Perforation Skip** command enables Line Feed or Half-line Feed ending in the perforation region to cause the cursor to move to the top of the text area on the next page.
Esc & k#H	**Horizontal Motion Index**
	The **Horizontal Motion Index** command designates the width of the columns, where # is in 1/120 inch increments.
Esc & ℓ #C	**Vertical Motion Index**
	The **Vertical Motion Index** command designates the height of rows, where # is in 1/48 inch increments.

Table   3-7 (Page 2 of 3). PCL Page Control Commands

Table 3-7 (Page 3 of 3). PCL Page Control Commands	
Command	**Description**
Esc & ℓ **#D**	**Line Spacing**
	The **Line Spacing** command sets the number of lines printed per inch.

Cursor Positioning

The following table describes specific PCL commands for Cursor Positioning which are supported by the 3130.

Note: 1 Decipoint=1/720 inch.

Table 3-8. PCL Cursor Positioning	
Command	**Description**
Esc & a#C (Columns) **Esc & a#H** (Decipoints) **Esc * p#X** (PCL Units)	**Horizontal Positioning** The three **Horizontal Positioning** commands allow the cursor to be moved to a new: 1. column on the current line (Columns), 2. position on the horizontal axis in decipoints (Decipoints), or 3. position on the horizontal axis in PCL Units (PCL Units).
Esc & a#R (Rows) **Esc & a#V** (Decipoints) **Esc * p#Y** (PCL Units)	**Vertical Positioning** The **Vertical Positioning** commands allow the cursor to be moved to a new: 1. line in the same column (Rows), 2. position along the vertical axis in decipoints (Decipoints), or 3. position along the vertical axis in PCL Units (PCL Units).
Esc =	**Half Line Feed** The **Half Line Feed** command moves the cursor one half-line down in the same character position.
Esc & k#G	**Line Termination** The **Line Termination** command determines the way the printer interprets CR, LF, and FF control codes. 0 CR=CR; LF=LF; FF=FF 1 CR=CR-LF; LF=LF; FF=FF 2 CR=CR; LF=CR-LF; FF=CR-FF 3 CR=CR-LF; LF=CR-LF; FF=CR-FF
Esc & f#S	**Push/Pop position** The **Push/Pop position** command permits the current cursor position to be stored and then recalled. 0 Push (Store cursor position) 1 Pop (Recall cursor position)

Font Selection

Fonts in the 3130 are selected by matching font selection criteria with characteristics of available fonts. A priority order for these criteria is defined below.

Symbol Set   Highest
Spacing
Pitch
Height
Style
Stroke Weight
Typeface Family
Location*
Orientation**   Lowest

c8or0002
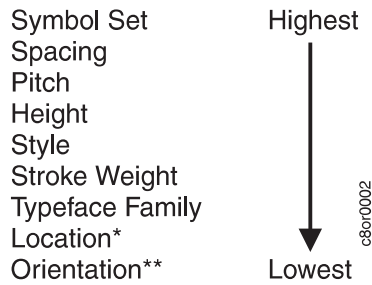
*Downloaded fonts are higher priority than resident fonts.

**Only considered for bitmapped fonts.

When selecting a font, the 3130 first attempts to match the specified Symbol Set with the symbol sets supported by the collection of available fonts. If more than one font supports the specified Symbol Set, then the next criteria (spacing) is matched against the fonts supporting the Symbol Set, eliminating those fonts with the wrong spacing. This process continues until there is only one font left and that font is then selected. Although it is possible to select a font which differs in only one characteristic from the previous selected font by only specifying that one characteristic, it is recommended that all the characteristics be specified by the PCL job to ensure that the desired font is selected.

The following table describes specific supported PCL commands for font selection supported by the 3130.

Note: The primary font printer commands in Table 3-9 can be specified as secondary font commands by replacing the left parenthesis "(" in the command with the right parenthesis ")."

Table 3-9 (Page 1 of 2). PCL Font Selection Commands	
Command	**Description**
Esc (ID	**Symbol Set** The **Symbol Set** command selects a primary font with a specific set of symbols.
Esc (s#P	**Spacing** The **Spacing** command selects a primary font with inter-character spacing as either proportional or fixed. 0 Fixed Spacing 1 Proportional Spacing
Esc (s#H	**Pitch** The **Pitch** command designates the horizontal spacing of a fixed-spaced primary font in number of characters per inch.

Table   3-9 (Page 2 of 2). PCL Font Selection Commands

Command	Description
Esc (s#V	**Height** The **Height** command sets the height of a proportionally-spaced primary font in points.
Esc (s#S	**Style** The **Style** command selects a primary font with a particular style, such as the "posture" of a character, its width, and structure of the font symbols. 0 upright 1 italic 4 condensed 5 condensed italic 8 compressed or extra condensed 24 expanded 32 outline 64 inline 128 shadowed 160 outline shadowed
Esc (s#B	**Stroke Weight** The **Stroke Weight** command selects a primary font with a particular stroke thickness. -7 Ultra Thin -6 Extra Thin -5 Thin -4 Extra Light -3 Light -2 Demi Light -1 Semi Light 0 Medium, Book, or Text 1 Semi Bold 2 Demi Bold 3 Bold 4 Extra Bold 5 Black 6 Extra Black 7 Ultra Black
Esc (s#T	**Typeface** The **Typeface** command selects a primary font with a particular design of its symbols.
Esc (#X	**Font Selection by ID#** The **Font Selection** by ID# command selects the soft font with the associated ID number as the primary font.
Esc (3@	**Select Default Font** The **Select Default Font** command selects the font characteristics set on the operator panel as the primary font.

Text Operations

The following table describes specific PCL text operations commands supported by the 3130.

Table 3-10. Text Operations	
Command	**Description**
Esc & p#X *[data]*	**Transparent Print Data** The **Transparent Print Data** command allows printing access to those characters which the 3130 normally defines as unprintable, where # is the number of bytes of transparent print data.
Esc & d#D *(Enable)* **Esc & d@** *(Disable)*	**Underline** The **Underline** command controls automatic text underlining. 0 Fixed Position - 5 PELs below cursor position 3 Floating Position - position determined by information in the font header

Font Management

The following table describes specific PCL font management commands supported by the 3130.

Table 3-11. PCL Font Management Commands	
Command	**Description**
Esc * c#D	**Assign Font ID** The **Assign Font ID** command associates a font to be downloaded with an ID Number to be used in subsequent font management commands.
Esc * c#F	**Font Control** The **Font Control** command allows soft fonts to be made permanent, temporary, or to be deleted. 0 Delete all soft fonts 1 Delete all temporary soft fonts 2 Delete soft font (last ID specified) 3 Delete Character Code (last ID and Character Code specified) 4 Make soft font temporary (last ID specified) 5 Make soft font permanent (last ID specified) 6 Copy/Assign current invoked font as temporary (last ID specified)

User-Defined Symbol Set

The following table describes PCL user-defined symbol set commands supported by the 3130.

Command	Description
Esc * c#R	**Symbol Set ID Code**
	The **Symbol Set ID Code** command assigns a symbol set ID Code to a user-defined symbol set to be downloaded.
Esc (f#W *[data]*	**Define Symbol Set**
	The **Define Symbol Set** command defines the characters and character mapping for a user-defined symbol set, where # is the number of bytes of symbol set data.
Esc * c#S	**Symbol Set Control**
	The **Symbol Set Control** command allows user-defined symbol sets to be made permanent or temporary, or to be deleted.
	0 Delete all temporary and permanent user-defined symbol sets
	1 Delete all temporary user-defined symbol sets
	2 Delete current user-defined symbol set (last specified)
	4 Make current user-defined symbol set temporary
	5 Make current user-defined symbol set permanent

Table 3-12. PCL User-Defined Symbol Set Commands

Soft Font Creation

The following table describes specific PCL soft font creation commands supported by the 3130.

Command	Description
Esc) s#W *[data]*	**Font Header**
	The **Font Header** command is used to download font header data to the printer, where # is the number of bytes of font header data.
Esc * c#E	**Character Code**
	The **Character Code** command assigns the decimal code that is associated with the next downloaded character.
Esc (s#W *[data]*	**Character Descriptor and Data**
	The **Character Descriptor and Data** command is used to download character data blocks. It is used for both bitmap and scalable fonts, where # is the number of bytes in the following character data block.

Table 3-13. PCL Soft Font Creation

Macros

The following table describes specific PCL macro commands supported by the 3130.

Table 3-14. PCL Macros Commands	
Command	**Description**
Esc & f#Y	**Macro ID** The **Macro ID** command assigns a unique ID number to a macro for use in subsequent macro control commands.
Esc & f#X	**Macro Control** The **Macro Control** command is used to define, invoke, and delete macros. 0 Start macro definition (last ID specified) 1 Stop macro definition 2 Execute macro (last ID specified) 3 Call macro (last ID specified) 4 Enable macro for automatic overlay (last ID specified) 5 Disable automatic overlay 6 Delete all macros 7 Delete all temporary macros 8 Delete macro (last ID specified) 9 Make macro temporary (last ID specified) 10 Make macro permanent (last ID specified)

Print Model Imaging

The following table describes specific PCL commands for print model imaging supported by the 3130.

Table 3-15 (Page 1 of 2). PCL Print Model Imaging Commands	
Command	**Description**
Esc * v#N	**Source Transparency Mode** The **Source Transparency Mode** affects how white pixels from the source image are copied onto the destination. It sets the source image's transparency mode to transparent or opaque. 0 transparent 1 opaque
Esc * v#O	**Pattern Transparency Mode** The **Pattern Transparency Mode** command sets the pattern's transparency mode to transparent or opaque. 0 transparent 1 opaque

Command	Description
Esc * c#G	**Pattern ID** The **Pattern ID** command indicates the specific shading, cross-hatch, or user-defined pattern used to fill a defined area. Shaded Patterns: 1-2 1-2% shade 3-10 3-10% shade 11-20 11-20% shade 21-35 21-35% shade 36-55 36-55% shade 56-80 56-80% shade 81-99 81-99% shade 100 100% shade Cross-Hatch Patterns: 1 Pattern #1 2 Pattern #2 3 Pattern #3 4 Pattern #4 5 Pattern #5 6 Pattern #6 c8cr0003 User-Defined Patterns: # = ID number of user-defined pattern
Esc * v#T	**Select Current Pattern** The **Select Current Pattern** command identifies the type of pattern to be applied to the destination. For options 2, 3, and 4, the particular pattern is specified by the Pattern ID command. 0 Solid Black 1 Solid White 2 Shading Pattern 3 Cross-Hatch Pattern 4 User-Defined Pattern
Esc * ℓ #O	**Logical Operation** The **Logical Operation** command specifies the logical operation to be performed on the source, texture (pattern), and destination images to produce a new destination image.
Esc * ℓ #R	**Pixel Placement** The **Pixel Placement** command determines how pixels are placed on the layout grid during polygon fill operations. 0 Grid intersection 1 Grid centered

Table   3-15 (Page 2 of 2). PCL Print Model Imaging Commands

User-Defined Patterns

The following table describes PCL user-defined patterns commands supported by the 3130.

Table   3-16. PCL User-Defined Pattern Commands

Command	Description
Esc * c#W *[data]*	**User-Defined Pattern**
	The **User-Defined Pattern** command provides the ability to download the binary pattern data that defines the user pattern, where # is the number of bytes of pattern data.
Esc * p#R	**Set Pattern Reference Point**
	The **Set Pattern Reference Point** command enables the 3130 to tile patterns in relation to the current cursor position. It also specifies how patterns appear relative to the print direction.
	0 Rotate patterns with print direction 1 Keep patterns fixed
Esc * c#Q	**User-Defined Pattern Control**
	The **User-defined Pattern Control** command is used to manage user-defined patterns.
	0 Delete all patterns (both temporary and permanent) 1 Delete all temporary patterns 2 Delete pattern (last ID specified) 3 Reserved 4 Make pattern temporary (last ID specified) 5 Make pattern permanent (last ID specified)

Raster Graphics

The following table describes specific PCL Raster Graphics commands supported by the 3130:

Table   3-17 (Page 1 of 2). PCL Raster Graphics Commands

Command	Description
Esc * t#R	**Resolution**
	The **Resolution** command designates the resolution of the subsequent raster data transfers in dpi.
	75 75 Dots/Inch* 100 100 Dots/Inch* 150 150 Dots/Inch* 200 200 Dots/Inch* 300 300 Dots/Inch 600 600 Dots/Inch*
	* Printing is only supported at 300 dpi. Other resolutions are supported in a "best-can-do" manner (or the job is canceled if this option is selected under the **UNSUPPORTED RESOLUTIONS** menu item in the operator panel).

Command	Description
Esc * r#F	**Raster Graphics Presentation** The **Raster Graphics Presentation** command specifies the orientation of the raster image with respect to the logical page. 0 Raster Image prints in the same orientation as the logical page 3 Raster image prints along the width of the physical page.
Esc * r#T	**Raster Height** The **Raster Height** command specifies the height in raster rows of the raster area.
Esc * r#S	**Raster Width Source** The **Raster Width Source** command specifies the width in pixels of the raster area.
Esc * r#A	**Start Raster Graphics** The **Start Raster Graphics** command specifies the beginning of the raster data and also specifies the left graphics margin. 0 Start graphics at default left graphics margin 1 Start graphics at current cursor position
Esc * b#Y	**Raster Y Offset** The **Raster Y Offset** command moves the cursor position vertically the specified number of raster lines from the current raster position in the raster area.
Esc * b#M	**Set Compression Method** The **Set Compression Method** command allows raster data to be coded in one of four compressed formats: Run-length encoded, Tagged Imaged File Format (TIFF), Delta Row compression, and Adaptive compression. 0 unencoded 1 run-length encoded 2 Tagged Image File Format (TIFF) 3 Delta Row compression 4 Reserved 5 Adaptive compression
Esc * b#W *[data]*	**Transfer Raster Data** The **Transfer Raster Data** command is used to transfer a row of raster data to the printer, where # is the number of bytes of raster data.
Esc * rB **Esc * rC** (preferred command)	**End Graphics** The **End Graphics** command specifies that raster graphic data transfer has ended.

Table 3-17 (Page 2 of 2). PCL Raster Graphics Commands

Rectangular Area Fill

The following table describes specific PCL Rectangular Area Fill commands supported by the 3130.

Note: 1 decipoint=1/720 inch

Table 3-18. PCL Rectangular Area Fill Commands	
Command	**Description**
Esc * c#H (Decipoints) **Esc * c#A** (PCL Units)	**Horizontal Rectangle Size** The **Horizontal Rectangle Size** command specifies the rectangle width in Decipoints or PCL Units.
Esc * c#V (Decipoints) **Esc * c#B** (PCL Units)	**Vertical Rectangle Size** The **Vertical Rectangle Size** command specifies the rectangle height in Decipoints or PCL Units.
Esc * c#P	**Fill Rectangle Area** The **Fill Rectangle Area** command prints a rectangular area of the specified width and height with the specified area fill. For options 2, 3, and 4, the particular fill pattern is specified by the Pattern ID command in Table 3-15. 0 Black (solid) 1 White (erase) 2 Shaded (gray) 3 Cross-hatched pattern 4 User-defined pattern 5 Current pattern

Picture Frame

The following table describes specific PCL Picture Frame commands supported by the 3130.

Note: 1 Decipoint=1/720 inch

Table 3-19 (Page 1 of 2). PCL Picture Frame Commands	
Command	**Description**
Esc * c#X	**Picture Frame Horizontal Size** The **Picture Frame Horizontal Size** command determines the horizontal dimension of the window to be used for printing (in Decipoints).
Esc * c#Y	**Picture Frame Vertical Size** The **Picture Frame Vertical Size** command determines the vertical dimension of the window to be used for printing (in Decipoints).
Esc * c#T	**Set Picture Frame Anchor Point** The **Set Picture Frame Anchor Point** command assigns the location of the PCL Picture Frame anchor point. 0 assign to the current cursor position

Command	Description
	Table 3-19 (Page 2 of 2). PCL Picture Frame Commands
Esc*c#K	**HP-GL/2 Horizontal Plot Size**
	The **HP-GL/2 Horizontal Plot Size** command specifies the horizontal size in inches of the HP-GL/2 drawing that is imported. The drawing is scaled to fit the PCL Picture Frame Horizontal Size.
Esc*c#L	**HP-GL/2 Vertical Plot Size**
	The **HP-GL/2 Vertical Plot Size** command specifies the vertical size in inches of the HP-GL/2 drawing that is imported. The drawing is scaled to fit the PCL Picture Frame Vertical Size.
Esc%#B	**Enter HP-GL/2 Mode**
	The **Enter HP-GL/2** Mode command causes subsequent commands to be interpreted as HP-GL/2 instead of PCL.
	0 Position pen at previous HP-GL/2 pen position 1 Position pen at current PCL pen position
Esc%#A	**Enter PCL Mode**
	The **Enter PCL Mode** command returns the 3130 to PCL Mode from HP-GL/2 mode.
	0 Position cursor at previous PCL cursor position 1 Position cursor at current HP-GL/2 per position

Display Functions Mode

The following table describes the Display Functions Mode.

Command	Description
	Table 3-20. Display Functions Mode
Esc Y (Enable) **Esc Z** (Disable)	**Display Functions**
	When the Display Functions Mode has been enabled, all escape sequences and control codes are printed instead of executed as commands.

Unsupported Commands

The following PCL commands are not supported and are ignored by the 3130:

- Status Readback Location Type
- Status Readback Location Unit
- Inquire Entity
- Free Memory
- Flush All Pages
- Echo
- Mechanical Print Quality
- Media Type

- Negative Motion

- Configuration (AppleTalk)

HP Graphics Language (HP-GL/2)

HP-GL/2 is a PCL 5 capability supported in the 3130 which allows the printer to print vector graphics using HP-GL/2 graphics language commands. The command sequence for HP-GL/2 commands is described in the *PCL 5 Printer Language Technical Reference Manual* and the *PCL5 Comparison Guide*. The tables in this section show the general syntax of each command. Information contained within brackets "[ ]" is considered optional.

The 3130 supports the following groups of commands:

- Configuration Group

- Vector Group

- Polygon Group

- Character Group

- Line and Fill Attributes Group

Configuration Group

The following table describes HP-GL/2 Configuration Group commands supported by the 3130.

Table 3-21. HP-GL/2 Configuration Group Commands	
Command	**Description**
CO *"text" [;]*	Comment
DF *[;]*	Default
IN *[;]*	Initialize
IP $[x_{p1}, y_{p1}[x_{p2}, y_{p2}]]$ *[;]*	Input P1 and P2
IR $[x_{p1}, y_{p1} [x_{p2}, y_{p2}]]$ *[;]*	Input Relative P1 and P2
IW $[x_1, y_1, x_2, y_2][;]$	Input Window
MC *[mode [,opcode]] [;]*	Merge Control
PP *[mode] [;]*	Pixel Placement
RO *[Angle] [;]*	Rotate Coordinate System
SC $[x_{min}, x_{max}, y_{min}, y_{max}[,type[,left,bottom]]]$ *[;]*	Scale

Vector Group

The following table describes HP-GL/2 Vector Group commands supported by the 3130.

Table 3-22. HP-GL/2 Vector Group Commands	
Command	**Description**
AA X_{center},Y_{center}, *sweep_angle[,chord_angle] [;]*	Arc Absolute
AR $X_{increment}$,$Y_{increment}$, *sweep_angle[,chord_angle] [;]*	Arc Relative
AT X_{inter},Y_{inter}, X_{end},Y_{end}, *sweep_angle[,chord_angle] [;]*	Absolute Arc Three Point
BR *X1,Y1,X2,Y2,X3,Y3, ...[X1,Y1,X2,Y2,X3,Y3] [;]*	Bezier Relative
BZ *X1,Y1,X2,Y2,X3,Y3, ...[X1,Y1,X2,Y2,X3,Y3] [;]*	Bezier Absolute
CI *radius[,chord_angle] [;]*	Circle
PA *X,Y [, ...] [;]*	Plot Absolute
PD *X,Y [, ...] [;]*	Pen Down
PE *[flag[value]]|coord_pair...[flag[value]]|coord_pair [;]*	Polyline Encoded
PR *X,Y [, ...] [;]*	Plot Relative
PU *X,Y [, ...] [;]*	Pen Up
RT $X_{incr\ inter}$,$Y_{incr\ inter}$,$X_{incr\ end}$,$Y_{incr\ end}$*[,chord_angle] [;]*	Relative Arc Three Point

Polygon Group

The following table describes HP-GL/2 Polygon Group commands supported by the 3130.

Table 3-23. HP-GL/2 Polygon Group Commands	
Command	**Description**
EA *X,Y[;]*	Edge Rectangle Absolute
EP *[;]*	Edge Polygon
ER *X,Y[;]*	Edge Rectangle Relative
EW *radius, start_angle, sweep_angle, [,chord_angle] [;]*	Edge Wedge
FP *fill method [;]*	Fill Polygon
PM *polygon_definition [;]*	Polygon Mode
RA *X,Y[;]*	Fill Rectangle
RR *X,Y[;]*	Fill Rectangle Relative
WG *radius, start_angle, sweep_angle, [,chord_angle] [;]*	Fill Wedge

Line and Fill Attributes Group

The following table describes HP-GL/2 Line and Fill Attributes Group commands supported by the 3130.

Table 3-24. HP-GL/2 Line and Fill Attributes Group Commands	
Command	**Description**
AC *X,Y [;]*	Anchor Corner
FT:ehp2/ *fill_type[,option1[,option2;]] [;]*	Fill Type
LA *kind,value[,kind,value [,kind,value]] [;]*	Line Attributes
LT *line_type[,pattern_length[,mode]] [;]*	Line Type
PW *width[,pen] [;]*	Pen Width
RF *index,width,height,pen_number[,...pen_number] [;]*	Raster Fill Definition
SM *character [;]*	Symbol Mode
SP *pen_number [;]*	Select Pen
SV *[screen_type [,option1 [option2]]] [;]*	Screened Vectors
TR *[n] [;]*	Transparency Mode
UL *index [,gap1,...,gap20] [;]*	User-Defined Line Type
WU *type [;]*	Pen Width Unit Selection

Character Group

The following table describes HP-GL/2 Character Group commands supported by the 3130.

Table 3-25 (Page 1 of 2). HP-GL/2 Character Group Commands	
Command	**Description**
AD *kind,value...[,kind,value] [;]*	Alternate Font Definition
CF *fill mode [,edge_pen] [;]*	Character Fill Mode
CP *spaces,lines [;]*	Character Plot
DI *run,rise [;]*	Absolute Direction
DR *run,rise [;]*	Relative Direction
DT *label_terminator [,mode] [;]*	Define Label Terminator
DV *path[,line] [;]*	Define Variable Text Path
ES *width[,height] [;]*	Extra Space
FI *font_ID [;]*	Select Primary Font
FN *font_ID [;]*	Select Secondary Font

Table 3-25 (Page 2 of 2). HP-GL/2 Character Group Commands	
Command	**Description**
LB *text...text_label_terminator [;]*	Label
LO *position [;]*	Label Origin
SA *[;]*	Select Alternate Font
SB *[n;]*	Scalable or Bitmap Fonts
SD *kind,value... [,kind,value][;]*	Standard Font Definition
SI *width,height [;]*	Absolute Character Size
SL *tangent_of_angle [;]*	Character Slant
SR *width,height [;]*	Relative Character Size
SS *[;]*	Select Standard Font
TD *mode [;]*	Transparent Data

Programming Hints

Under PCL configuration in operator panel, the **Print Hex Mode** option allows the user to print a PCL job in hexadecimal mode. This mode can be used to debug PCL jobs. If set to OFF, PCL jobs will print normally. If set to ON, the PCL job will be printed unformatted with all PCL (and PJL) data (including commands) printed in hexadecimal.

Note: If the printer is powered off or restarted, this setting reverts to OFF.

Chapter 4. Printer Job Language

The 3130 Advanced Function Printer provides limited support of Printer Job Language (PJL). PJL topics which are described in this chapter are:

- PJL Environments

- Supported PJL Commands and Variables

- Unsupported PJL Commands and Variables

- PJL Variables for PCL Emulation

- PJL Variables for PostScript Level 2 Emulation

- PJL Password Protection

For more information on topics covered in this section, please refer to the *Printer Job Language Technical Reference Manual* by Hewlett-Packard, Inc.

PJL Environments

The printer's current settings are referred to as the print environment. Based on certain printer commands, the print environment settings can change and default to the settings of other stored environments.

The 3130 has four print environments, listed below.

- Factory Default Environment
- User Default Environment
- PJL Current Environment
- Modified Print Environment

The Modified Print Environment is the one used by the 3130 to print jobs. The other three environments are updated and loaded into the Modified Print Environment by specific PJL and Printer Language commands as illustrated in Figure 4-1.

A After the printer has been initially powered on after it has left the factory (or after the @**PJL INITIALIZE** command has been received), the Original Factory Settings are loaded into the User Default Environment and the PJL Current Environment.

B The User Default Environment settings are modified using the operator panel keys and/or the @**PJL DEFAULT** command.

C When a PJL reset* occurs, the User Default Environment settings are loaded into the PJL Current Environment.

D The PJL application changes the PJL Current Environment settings using the @**PJL SET** command.

E A language reset (for example, **Esc E** for PCL, or @**PCL ENTER**) loads the PJL Current Environment values into the Modified Print Environment.

F Printer language commands alter the settings in the Modified Print Environment. The Modified Print Environment is used to print each page.

* A PJL reset is defined as any one of the following:

    Power On
    @**PJL RESET** command
    @**PJL JOB** or **EOJ** command
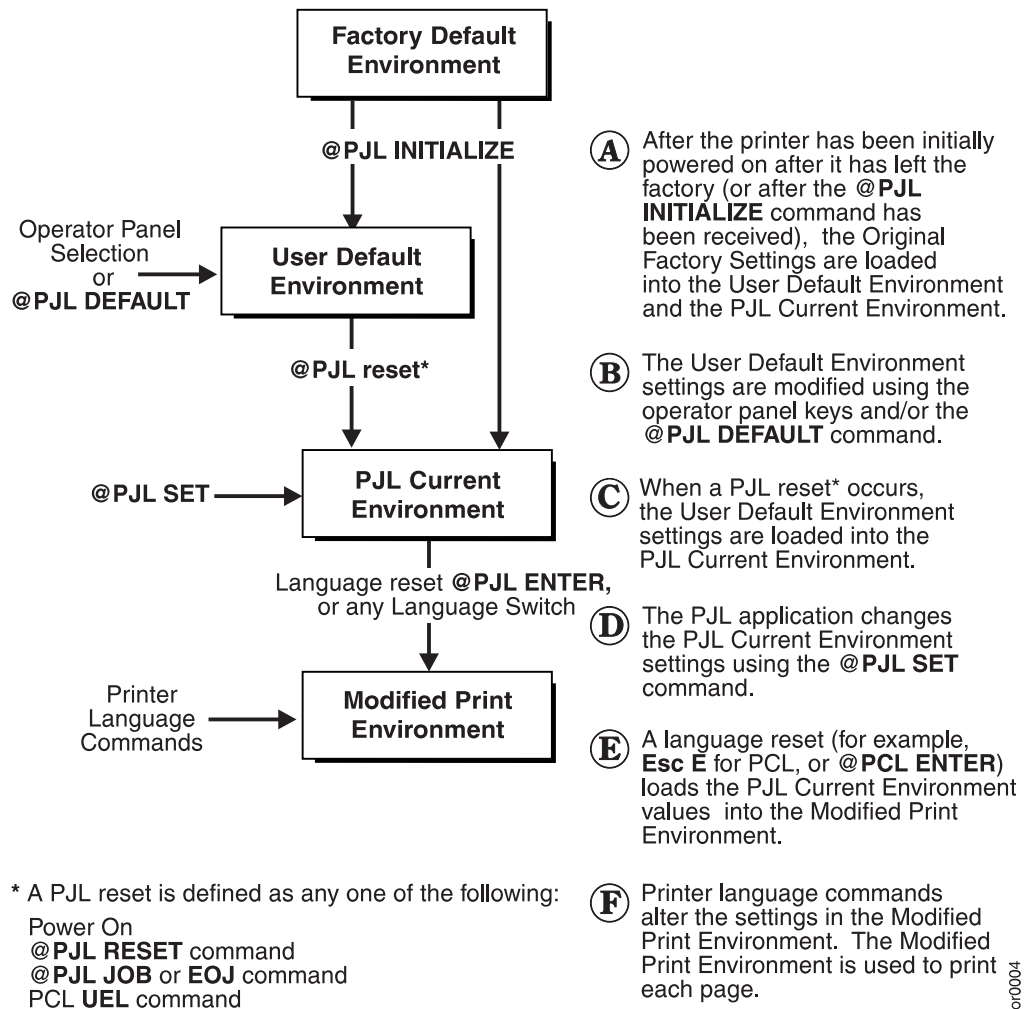   PCL **UEL** command

c8on0004

Figure   4-1. Environment Hierarchy for PJL

Supported PJL Commands and Variables

The 3130 supports PJL commands and variables. Some of the support for these commands and variables differs from the PJL descriptions found in the *Printer Job Language Technical Reference Manual*.

PCL Emulation primarily supports PJL commands which deal with the various print environments and presentation of the output. PostScript Emulation will accept jobs having well-constructed PJL; however, no action will be taken on any PJL commands for PostScript. Any PJL contained within a PostScript job is ignored.

The following table describes specific supported PJL commands, both those which are fully supported and also those which have specific options for the 3130. Information contained within brackets "[ ]" is considered optional.

Table 4-1 (Page 1 of 3). Supported PJL Commands and Variables	
Command/Variable	**Description**
Commands	
COMMENT	The **COMMENT** command is used for adding a line of information or a comment within a set of PJL command lines.
	Syntax:
	@PJL COMMENT [text of comment]
	A unique comment command is used by the 3130 print drivers to tag a data stream as PCL.
	@PJL COMMENT PCLlanguage,00000000,DATASTREAM*
	This comment, when part of the data stream, can be used to assist the 3130 in identifying the job as PCL.
	*The 00000000 field is reserved for future support.
JOB	The parameters of *Name, Start, End*, and *Password* are only supported for PCL jobs.
	Syntax: **@PJL JOB** *[NAME="job name"] [START=first page]* *[END=last page] [PASSWORD=number]* *[<CR>]<LF>*
	The operator panel has an option under PCL configuration to reset the PJL password to the original factory setting (zero). The PJL password is also settable with the **PJL DEFAULT** command.
	ASCII job timeout is not affected by **JOB/EOJ** commands.
EOJ	The **EOJ** command marks the end of the job which was started with the previous **JOB** command. It resets the PJL Current Environment to the User Default Environment. The **JOB** and **EOJ** commands should always be used in pairs. Do not use one without the other.
	Syntax: **@PJL EOJ** *[NAME="job name"] [<CR>]<LF>*

Table 4-1 (Page 2 of 3). Supported PJL Commands and Variables	
Command/Variable	**Description**
ENTER	The only supported LANGUAGE options are *POSTSCRIPT* and *PCL*. The operator panel has options to enable automatic data stream sensing from the various attachment applications without using the **PJL ENTER** command. Syntax: **@PJL ENTER** LANGUAGE=*personality* [*<CR>]<LF>*
RESET	The **RESET** command resets the PJL Current Environment variables to their User Default Environment values (see Figure 4-1 on page 4-2 for a description of PJL Environments).* Syntax: **@PJL RESET** *[<CR>]<LF>* *The **PJL RESET** command is only supported for PCL jobs.
INITIALIZE**	The **INITIALIZE** command resets the PJL Current Environment and the User Default Environment variables to their Factory Default Environment values. Syntax: **@PJL INITIALIZE** *[<CR>]<LF>*
DEFAULT**	The **DEFAULT** command sets the User Default Environment value for a specified environment variable. Syntax: **@PJL DEFAULT** *[**LPARM**:personality] variable=value [<CR>]<LF>*
SET	The **SET** command allows the user to change the value of PJL Current variables for the length of a PJL job, or until a PJL reset condition returns the value to its default. Syntax: *@PJL SET [**LPARM**:personality] variable=value [<CR>]<LF>*
Variables – The following variables are supported in both the DEFAULT and SET commands.	
Binding	Sets the relationship of the front and back images on pages printed in duplex. Options: LONGEDGE, SHORTEDGE
Copies	Number of copies of each page. Range: 1–999
Duplex	Sets the mode to enable/disable printing on both sides of the paper. Options: ON, OFF
Economode	Sets the mode for the 3130 toner-saving feature. Options: ON, OFF
Formlines	Number of lines per page. Range: 5–128

Table 4-1 (Page 3 of 3). Supported PJL Commands and Variables	
Command/Variable	**Description**
Mediasource	Sets the default input tray.
	Options: MAIN LOWERSUB UPPERSUB SIDE ENVELOPE TOPFRONT
Orientation	Sets the default page orientation.
	Options: PORTRAIT LANDSCAPE RPORTRAIT RLANDSCAPE
Outbin	Sets the output stacker. The selected output stacker is used when OVERRIDE STACKER for PCL is set to NONE on the operator panel.
	Options: BASESTACKER UPPERSTACKER SIDESTACKER
Paper*	Sets the default physical paper size.
	Options: LETTER LEGAL LEDGER A3 A4 JISB4 JISB5 COM10 DL
	*The paper variable is ignored if the printer does not have the requested paper size in an installed input bin at the time the command is received.
Password	Default password for PJL security. Original factory setting is 0 (no password protection).
	The operator panel has an option under PCL configuration to reset the PJL password to the original factory setting (zero).
	Range: 1–65,535

****INITIALIZE** and **DEFAULT** commands are only accepted within a secure job or if the PJL PASSWORD is set to zero. Otherwise, these commands are non-operations in the 3130.

Unsupported PJL Commands and Variables

The 3130 does not support commands which return data to the host. In addition, PJL commands used within PostScript jobs are ignored.

When a job error occurs due to an unsupported command, the PJL command is ignored. No error messages are displayed on the operator panel. Also, any invalid or unsupported parameters (or unsupported options) within a PJL command are ignored.

The following table shows commands and variables which are either non-operations or are supported in a different manner than the listed PJL command. All commands and variables in this section are non-operations unless otherwise specified.

Table 4-2 (Page 1 of 2). Unsupported PJL Commands and Variables	
Command/Variable	**Notes**
Commands	
RDYMSG, OPMSG, STMSG	All device attendance commands which alter the message on the operator panel are unsupported.
Variables	
IPARM:Port	All port-specific variables are unsupported.
LPARM:EscP	All **Esc/P** specific variables are unsupported.
Autocount	
Autoselect	
Clearablewarnings	
Cplock	
Density	
Disklock	Operator panel functions which can modify the 3130 configuration on the hard disk are protected by a Key Op password.
Imageadapt	Set to OFF in the 3130. Lossy compression is never used.
Intray*n*	
Intray*n***Size**	
IObuffer	
IOsize	
Joboffset	Offset stacking between jobs is controlled by a setting on the operator panel.
Lang	The operator panel language is controlled by a setting on the operator panel.
Lowtoner	
Manualfeed	
Mediatype	
Mptray	
Pageprotect	Page protection is always on in the 3130.
Parallel	Data is only received on the parallel port, never sent.

Table 4-2 (Page 2 of 2). Unsupported PJL Commands and Variables	
Command/Variable	**Notes**
Personality	Personality selections are controlled by a setting on the operator panel.
Powersave	Powersave selections are controlled by a setting on the operator panel.
Powersavetime	Powersavetime selections are controlled by a setting on the operator panel.
Printquality	Printquality selections are controlled by a setting on the operator panel.
Rendermode	
Resolution	Printing is only supported at 300 dpi. Jobs requiring other print resolutions are printed in a "best-can-do" manner or rejected, according to the operator panel setting under the **UNSUPPORTED RESOLUTIONS** menu item.
Resourcesave	Resourcesave is always on in the 3130.
Resourcesavesize	An appropriate value is selected in the 3130; customer modification is not allowed.
RET	
Timeout	Timeout values for the printer are controlled by a setting on the operator panel.

PJL Variables for PCL 5 Emulation

The following supported PJL variables are unique to PCL Emulation. The sequence for these variables is:

@PJL SET *LPARM*:PCL variable=option

or **@PJL DEFAULT *LPARM*:**PCL variable=option

Table 4-3 (Page 1 of 2). PCL-specific Lparm variables for PJL	
Variable	**Description**
Fontnumber	Sets the default font number. Options: 0,1,2,...n
Fontsource	Sets the default font source. Options: I=INTERNAL S=DOWNLOADED PERMANENT SOFT FONTS
Pitch	Sets the pitch of the default fixed-spaced font in characters per inch. Range: 0.1–99.0
Ptsize	Sets the point size of the default proportionally-spaced font in points. Range: 0.25–999.75

Table 4-3 (Page 2 of 2). PCL-specific Lparm variables for PJL	
Variable	**Description**
Symset	Sets the symbol set for the default font. (See Table 3-5 for a description of the Symbol Set). Options: ROMAN8 DESKTOP ISO11 ISOL1 PSTEXT ISO15 IOSL2 VNINTL ISO17 ISOL5 VNUS ISO21 PC8 MSPUBL ISO60 PC8DN MATH8 ISO69 PC850 PSMATH WIN30 PC852 VNMATH WIN31J PC8TK PIFONT MCTEXT WINL1 LEGAL SYMBOL WINL2 ISO4 WINGDINGS WINL5 ISO6

PJL Variables for PostScript Level 2 Emulation

The following supported PJL variables are concerned only with PostScript Level 2 Emulation.

Table 4-4. PostScript-specific Lparm variables for PJL	
Variable	**Description**
Jamrecovery	Enables or disables the printing of jammed pages following a paper jam. This setting is always ON in the 3130.
Prtpserrs	This variable enables or disables the printing of a PostScript error page. This is an non-operation in the 3130.

PJL Password Protection

The PJL Password parameter is supported on the 3130. With this variable, the modification of the User Default Environment in the printer can be disabled.

Setting the PJL password will disable the **PJL DEFAULT** and **INITIALIZE** commands when they are issued outside of a secure job. To create a secure job, issue a **@PJL JOB *Password*=**number command where number is the correct PJL password. Subsequent **PJL DEFAULT** and **PJL INITIALIZE** commands will be accepted and executed. The **PJL EOJ** command is used to terminate the secure job.

The operator panel has an option under PCL configuration to reset the PJL password to the original factory setting (zero).

Abbreviations

This list explains the acronyms and abbreviations used in this manual and in the other manuals that are part of the 3130 documentation library.

ABIC   Adoptive Bi-Level Image Compression.

AEA   Alternate Exception Action.

AFIG   Advanced Function Image and Graphics.

AFP   Advanced Function Presentation

Advanced Function Printing.

AFPDS   Advanced Function Printing Data Stream.

AFPF   Advanced Function Print Finishing.

AIX   Advanced Interactive Executive.

APA   All-Points Addressable.

ARQ   Active Record Queue.

ASCII   American National Standard Code for Information Interchange.

ASHRAE   American Society of Heating, Refrigeration, and Air Conditioning Engineers.

CCITT   Comite Consultatif International Telegraphique et Telephonique.

CCW   Channel Command Word.

CE   Customer Engineer (IBM).

CPI   Characters per Inch.

CSW   Channel Status Word.

CU   Control Unit.

DBCS   Double-byte Character Set.

DASD   Direct Access Storage Device.

DPE   Decompression Performance Enhancement.

DPI   Dots Per Inch.

EBCDIC   Extended Binary-Coded Decimal Interchange Code.

EC   Engineering Change.

EHC   Exception Handling Control command.

EMTF   European Money Transfer Form.

EP   Electrophotographic.

ESCON   Enterprise Systems Connection.

ESMM   End Select Medium Modification.

FORMDEF   Form Definition.

HAID   Host-Assigned ID.

HFSI   High Frequency Service Items.

IHF   Image Handling Facility.

IML   Initial Microcode Load.

IP   Internet Protocol.

IPDS   Intelligent Printer Data Stream.

ISO   International Organization for Standardization.

JES2   Job Entry System 2.

JES3   Job Entry System 3.

LCD   Liquid Crystal Display.

LED   Light-Emitting Diode.

LF   Load Font command.

LU   Logical Unit.

MAC   Medium Access Control.

MB   Megabyte (1MB=1 048 576 bytes).

MICR   Magnetic Ink Character Recognition.

MIH   Missing-Interrupt Handler.

MMR   Modified-Modified READ 2 dimensional image.

MR   Modified READ Relative Element Address Designate) 2-dimensional image compression algorithm. Also referred to as CCITT Group 3.

MTU   Maximum Transmission Unit.

MVS   Multiple Virtual Storage.

NACK   Negative Acknowledge reply.

NOP   No Operation instruction.

OBR   Outboard Recorder.

OCR   Optical Character Recognition.

OPC   Organic Photoconductor.

OS/VS   Operating System/Virtual Storage.

PAGEDEF   Page Definition.

PCL   Hewlett-Packard Printer Command Language.

PC   Photoconductor.

PEL   Picture Element.

PEM   Print-Error Marker.

PJL   Hewlett-Packard Printer Job Language.

PSF   Print Services Facility.

RAM   Random Access Memory.

RPQ   Request for Price Quotation.

RRL   Request Resource List.

SBCS	Single-byte Character Set.	**TCS**	Two-Channel Switch.
SCSW	Subchannel Status Word.	**VM**	Virtual Machine.
SDLC	Synchronous Data Link Control.	**VSE**	Virtual Storage Extended.
SMM	Select Medium Modification.	**VSE/AF**	Virtual Storage Extended/Advanced Functions.
SNA	System Network Architecture.		
SRC	System Reference Code.	**VSE/SP**	Virtual Storage Extended/System Package.
TCP/IP	Transmission Control Protocol/Internet Protocol.	**XOA**	Execute Order Anystate command.
		XOH	Execute Order Homestate command.

Glossary

The following terms are defined as they are used in 3130 documentation. If you do not find the term you need, refer to the index or to the *IBM Dictionary of Computing*, ZC20-1699 or the *IBM Dictionary of Printing*, G544-3973.

A

A3-size paper. Paper that is 297 x 420 mm (11.7 x 16.5 in.). An ISO standard size.

A4-size paper. Paper that is 210 x 297 mm (8.3 x 11.7 in.). An ISO standard size.

adhesive label. Special-application material; typically consists of paper labels coated on one side with an adhesive mixture temporarily affixed to backing material. See also *carrier*.

adjust print. To adjust a preprinted form's point of origin horizontally or vertically so that text lines up correctly on the preprinted form.

Advanced Function Image and Graphics. This allows the 3130 to decompress compressed graphics in GOCA format and images in IOCA format.

Advanced Function Printing (AFP). The set of licensed programs, together with user applications, that use the all-points-addressable concept to print data (text, images, and graphics) on a wide variety of printers. Advanced Function Printing includes creating, formatting, distributing, and printing information.

Advanced Function Printing data stream (AFP data stream). A printing data stream that is processed in AFP environments.

all-points addressability. The capability to address, reference, and position text, overlays, and images at any defined point on the printable area of a page.

application. The use to which an information processing system is put.

application program. A program written for or by a user that applies to the user's work, such as a program that does inventory control or payroll.

application programmer. A person who develops application programs. Contrast with *system programmer*.

ASCII. American National Standard Code for Information Interchange. The standard code, using a coded character set consisting of 7-bit coded characters (8 bits including parity check), that is used for information interchange among data processing systems, data communication systems, and associated equipment. The ASCII set consists of control characters and graphic characters.

autostart. A printer configuration setting. When the printer is powered on, the printer automatically enables the last enabled attachment and makes the printer Ready.

autoswitch. An alternate tray. If an autoswitch tray is selected for an input tray, that autoswitch tray starts feeding paper when the original input tray becomes empty.

B

B4-size paper. Paper that is 257 x 363 mm (10.1 x 14.33 in.). A JIS standard size.

B5-size paper. Paper that is 182 x 257 mm (7.17 x 10.12 in.). A JIS standard size.

bar code. A code representing characters by sets of parallel bars of varying thickness and separation that are read optically by transverse scanning.

basis weight. The weight in pounds of a ream (500 sheets) of paper cut to a given standard size for that grade; for example, 25 x 38 inches for book papers, 17 x 22 inches for bond papers, and other sizes for other grades.

binder holes. A series of holes or slots punched at set intervals that allows the form to be inserted in a loose-leaf or ring binder.

bond (paper). Paper formulated with at least 80% wood pulp. Bond-paper forms work best in the IBM 3130.

buffer. A routine or storage used to compensate for a difference in rate of flow of data, or time of occurrence of events, when transferring data from one device to another.

C

calender. A process to make paper smooth or glossy by passing it through a series of metal rollers during the last steps of a paper-making machine.

calender cut. Slits, glazed lines, or discolored lines across the paper caused when wrinkles pass through the calender rollers.

caliper. The thickness of forms. This is usually expressed in thousandths of an inch.

carrier. The backing material for labels. Labels consist of the printable material, the adhesive, and the carrier. See also *adhesive label*.

chad. (1) The material separated from a data medium when punching a hole. (2) The residue separated from the carrier holes in continuous forms.

character. A letter, number, punctuation mark, or special graphic used for the production of text.

character set. (1) A finite set of different characters that is complete for a given purpose; for example, the character set in ISO Standard 646, "7-bit Coded Character Set of Information Processing Interchange." (2) A group of characters used for a specific reason; for example, the set of characters a printer can print.

coated paper. Paper that has had a surface coating applied to produce smoothness.

code page. A font library member that associates code points and character identifiers.

code point. An element of a code page or site in a code table to which a character can be assigned.

coded font. A font file (data set, library member, or resource object) that associates a code page and font character set. For double-byte fonts, a coded font associates multiple pairs of code pages and font character sets.

command. A control signal that initiates an action or the beginning of a sequence of actions.

configuration. (1) The arrangement of a computer system or network as defined by the nature, the number, and the chief characteristics of its functional units. More specifically, the term configuration may refer to a hardware configuration or a software configuration. (2) The devices and programs that make up a system, subsystem, or network.

configure. The procedure used to customize the 3130 for a specific operating and communication environment.

connector. A means of establishing electrical flow.

constant data. Data that does not change; for example, the company letterhead and standard text in form letters, or the headings and boxes on a preprinted form. Contrast with *variable data*.

constant spaced font. A font in which the graphic characters are contained in character cells of uniform size. The distance between reference points of adjacent graphic characters is constant in the in-line progression. The white spaces between graphic characters may vary. Synonymous with *fixed-space font*. Contrast with *proportionally spaced font*.

control storage. In the 3130, a portion of storage that contains microcode and other data.

control unit (CU). (1) A device that controls input and output operations at one or more devices. (2) In the 3130, the electronics and code that control the printer and the communication attachment.

controlling computer. The processing unit to which the 3130 is attached through a communication attachment.

controlling computer system. The data-processing system to which a network is connected and with which the system can communicate.

corner cut. In a form, a cut or opening of any size containing one or more right angles.

corona. A small diameter wire (or wires, depending on the function) to which a high voltage is applied, causing ionization of the air. The ionization creates an electrical charge to perform various functions during the printing process.

copy group. One or more copies of a sheet of paper. Each may have modifications applied; for example, overlays and text suppression.

copy modification. The process of adding, deleting, or replacing data on selected copies of certain sheets of paper.

copy separation. The mechanism for distinguishing consecutive copies of a single data set. In the stacker, it consists of offset stacking.

cure. The process of drying ink sufficiently for minimum transfer of the ink to any parts of the printer it contacts.

curl. See *paper curl*.

customer engineer. The person responsible for installing and repairing the printer. Synonymous with *service representative*.

cut. The severed part of a perforation. Cuts are separated by ties.

cutout. A part of the form that has been eliminated or perforated for subsequent removal; for example, corner cuts and binder holes.

cut-sheet paper. Paper that is cut into sheets.

D

data stream. (1) All data transmitted through a data channel in a single read or write operation. (2) A continuous stream of data elements being transmitted, or intended for transmission, in character or binary-digit form, using a defined format.

data-transfer mode. See *data-transfer phase*.

data-transfer phase. The phase of a data call during which data signals can be transferred between data terminal equipments (DTEs) connected via the network.

default. An alternative value, attribute, or option that is assumed when none has been specified.

developed image. The image that has been exposed onto the photoconductor and covered with toner by the developer.

developer. The unit in the process assembly that supplies a flow of developer mix over the photoconductor to develop the electrostatic image.

diagnostic. Pertaining to the detection and isolation of errors in programs and faults in equipment.

diagnostic mode. The operational mode in which the printer can check itself in case of a malfunction. When the 3130 is in diagnostic mode, it is not accepting information from the attached controlling computer system. In the 3130, only customer engineers can use diagnostic mode. Contrast with *print mode* and *test mode*.

direct attach. The environment in which an application program directly allocates the 3130 printer.

disable. To make non-functional. Contrast with *enable*.

disabled mechanism. If necessary, the operator can disable some printer functions. In the 3130, the mechanisms that can be disabled are the paper trays, stackers, and the duplex mechanism.

diskette. A thin, flexible magnetic disk and a protective jacket, in which the disk is permanently enclosed. A flexible magnetic disk enclosed in a protective container.

diskette-storage device. A direct-access-storage device that uses diskettes as the storage medium.

double-byte character set. A font in which the characters are defined by two bytes; the first defines a coded-font section, the second defines a code point. Contrast with *double-byte coded font*.

double-tag interlock. See *high-speed transfer*.

dry ink. The material that forms the image on the paper. Synonymous with *toner*.

duplex printing. Printing on both sides of a sheet of paper. Synonym for *two-sided printing*. Contrast with *simplex printing*.

E

edge sensitivity. A setting designed for paper with a nonstandard edge. Example: 3-hole paper.

electronic form. See *electronic overlay*.

electronic overlay. (1) A collection of constant data that is electronically composed in the host system and may be combined with variable data on a sheet during printing. (2) The library member that contains the definition of the electronic overlay. See also *forms, preprinted form, overlay*, and *forms overlay*.

electrophotographic process. The creation of an image on forms by uniformly charging the photoconductor, creating an electrostatic image on the photoconductor, attracting negatively charged toner to the discharged areas of the photoconductor, and transferring and fusing the toner to forms.

electrostatic image. The invisible image consisting of discharged areas of the photoconductor as a result of exposure from digital data.

emboss. To press and raise the surface of paper into a design. Embossed paper appears thicker than non-embossed paper, can increase printer wear, and can degrade print quality.

enable. To make functional. Contrast with *disable*.

error log. (1) A data set or file in a product or system where error information is stored for later access. (2) A record of machine checks, device errors, and volume statistical data.

error-recovery procedure. Procedures designed to help isolate and, where possible, to recover errors in equipment. The procedures are often used in conjunction with programs that record the statistics of machine malfunctions.

Ethernet. A 10-megabit baseband local area network that allows multiple stations to access the transmission medium at will without prior coordination, avoids contention by using carrier sense and deference, and resolves contention by using collision detection and transmission. Ethernet uses carrier sense multiple access with collision detection (CSMA/CD).

European money transfer form. A form used for financial transactions. Its size is 210 mm x 317 mm (8.3 in. x 12.5 in.).

exception. (1) An invalid or unsupported data-stream construction. (2) In IPDS, a condition requiring host notification or requiring the host to resend data.

F

font. (1) A family or assortment of characters of a given size and style; for example, 9-point Bodoni modern. A font has a unique name and may have a registry number. (2) A font is data used to create an image of each graphic character; for example, a raster pattern.

font section. A subdivision of a double-byte font character set. The section consists of a maximum of 256 characters.

format. (1) The arrangement or layout of data on a data medium. (2) The size, style, type of page, margins, printing requirements, and so on, of a printed page.

form definition (FORMDEF). In Print Services Facility (PSF), a resource object that defines the characteristics of the form, which include: overlays to be used, text suppression, position of page data on the form, and number and modifications of a page.

forms. The material on which output data is printed, such as paper or adhesive labels. See *electronic overlay* and *preprinted form*.

forms overlay. In the 3130, that function of the printer that allows customer-prepared data to be printed with variable-page data. See also *overlay* and *electronic overlay*.

forms path. The entire route that forms travel during processing. The forms path usually begins where the forms are loaded and ends at the stacker. Synonym for *paper path*.

function key. A key that performs a specified set of operations when it is pressed.

fuse. To use heat and pressure to blend toner onto forms to make a permanent bond.

fuser. The assembly that bonds the toned image to the paper, using heat and pressure.

G

graphic. A symbol produced by a process such as handwriting, drawing, or printing. See also *vector graphics*.

graphic character. A character that is normally represented by a graphic, independent of code points or fonts. A graphic character is often in the form of a spatial arrangement of adjacent or connected strokes; for example, a letter or digit.

Graphic Object Content Architecture (GOCA). An IPDS command set that provides data control information for printing graphics on a page, page segment, or overlay.

H

hardware. Physical equipment used in data processing, as opposed to programs, procedures, rules, and associated documentation. Contrast with *software*.

Hewlett-Packard Printer Command Language (HP-PCL). A data stream used for printing on Hewlett-Packard laser printers and compatible printers.

Hewlett-Packard Printer Job Language (HP-PJL). A language for controlling the printer at the job level.

high-speed transfer. A transfer method using service out'/'service in' and data out'/'data in' lines. This method is faster than single-tag interlock.

host system. (1) The primary or controlling computer in a multiple-computer installation. (2) A computer used to prepare programs for use on another computer or on another data-processing system; for example, a computer used to compile, link edit, or test programs to be used on another system.

I

IBM branch office. The local IBM sales office.

IBM customer engineer. An IBM representative who services IBM products in the field. See also *service representative*.

icon. A pictorial representation of an object.

ideographic. Pertaining to 2-byte characters consisting of pictograms, symbolic characters, and other types of symbols.

image. (1) A string of picture elements organized in scan lines to represent the contrasting portions of a picture. (2) A likeness or imitation of an object. (3) In this printer, an image comprises a string of pels organized in scan lines to represent the contrasting portions of a picture. The image may consist of any data stored as a raster pattern. The term image is interchangeable with impression and is printed on one side of a sheet of paper. See also *impression*.

Image Object Content Architecture (IOCA). An IPDS command set to print image data on a page, page segment, or overlay.

image printer. A printer in which printing is the result of mechanical impacts. Contrast with *nonimpact printer*.

impression. An implied or physical page. Used when calculating the reduction of printer output caused by switching the printer between duplex and simplex modes or upper and lower paper supplies. See also *image*.

Initial microcode load (IML). A procedure that prepares the 3130 for use.

input. The data that is entered into a device for processing or storage.

installation. (1) In system development, preparing and placing a functional unit in position for use. (2) A particular computing system, including the work it does and the people who manage it, operate it, apply it to problems, service it, and use the results it produces.

installation verification procedure. A procedure distributed with IBM licensed programs that tests the newly installed IBM programs to verify that the basic facilities of the programs are functioning correctly.

intelligent printer data stream (IPDS). An all-points-addressable data stream that allows users to position text, images, and graphics at any defined point on a printed page.

interface. A shared boundary. An interface might be a hardware component to link two devices or it might be a portion of storage or registers accessed by two or more computer programs.

interlocked mode. Prevents a machine or device from initiating further operations until an operation in process is completed.

internal print job. A print job originated on the printer itself. Example: print samples, current attachment configuration print-out.

intervention. An unexpected condition that requires user intervention to clear it, for example, out of toner.

ISO sizes. Pertaining to a set of paper sizes selected from those standardized by the International Organization for Standardization (ISO) for use in data processing.

J

jam. In a printer, a condition where forms have become blocked or wedged in the forms path so the printer cannot operate.

JIS. Japanese Industry Standards. Used in reference to paper standards for size.

job separation. (1) The hardware mechanism that uses the mark form sequence to distinguish jobs, which are consecutively stacked in the output stacker. (2) In the 3130, job offset stacking is used to indicate job termination. See also *offset stacking*.

K

key operator. A user assigned to perform routine maintenance and configuration of the printer.

L

landscape orientation. Text and images that are printed parallel to the longer side of the forms. Contrast with *portrait orientation*.

laser (light amplification by stimulated emission of radiation). A device that emits a beam of coherent light.

latent image. In a printer, the invisible image that exists in the sensitized material after exposure but before development.

layout plan. A list of requirements, such as electrical and space, that must be considered before installing the 3130.

ledger-size paper. Paper that is 279 x 432 mm (11.0 x 17.0 in.).

legal-size paper. Paper that is 216 x 356 mm (8.5 x 14.0 in.).

letter-size paper. Paper that is 216 x 279 mm (8.5 x 11.0 in.).

library. A collection of related files. For example, one line of an invoice may form an item, a complete invoice may form a file, and the collection of inventory control files may form a library. The libraries used by an organization are known as the data bank.

licensed program. A separately priced program that bears an IBM copyright and is offered to customers under the terms and conditions of the Agreement for IBM Licensed Programs.

line printer. A printer that prints a line of characters as a unit. Contrast with *page printer*.

logical page. The print on the page, such as composed text, graphics, and fonts within defined margins. See also *page*. Contrast with *physical page*.

logo. An identifying emblem, statement, or motto of a company.

M

medium access control. For local area networks, the method of determining which device has access to the transmission medium at any time.

menu. A list of procedures or actions available for selection.

microcode. In the 3130, refers to the microprogramming stored on the microcode diskette. Microcode is used by the control unit to manage the printer and its functions.

N

nonimpact printer. A printer in which printing is not the result of mechanical impacts. Contrast with *impact printer*.

normal duplex. Printing of both sides of a sheet where the top is in the same position on both sides. Contrast with *tumble duplex*.

O

offline. Not connected to an installed and enabled attachment. Contrast with *online*.

offset paper. A grade of paper to which sizing is added to resist moisture and surface during printing by ink presses.

offset stacking. The jogged stacking of output media in the output stacker so that jobs protrude from the balance of the stack to give physical identification. See also *job separation*.

OK. With the 3130 printer, an operator panel keyboard selection that causes the printer to accept and save any changed information.

online. Connected to an installed and enabled attachment. Contrast with *offline*.

operating environment. The physical environment; for example, temperature, humidity, layout, or power requirements.

operating requirements. A list of requirements, such as environmental, electrical, and space, that must be satisfied before the 3130 can be installed.

Optical Character Recognition (OCR). Character recognition that uses optical means to identify graphic characters.

orientation. The number of degrees an object is rotated relative to a reference; for example, the orientation of an overlay relative to the page point of origin. See also *text orientation*.

outboard recorder (OBR). A feature that records pertinent data on the system recorder file when an unrecoverable I/O exception occurs.

overlay. (1) A collection of predefined data, such as lines, shading, text, boxes, or logos, that can be combined with variable data on a sheet while printing. (2) The library member that contains the definition of an overlay. See also *electronic overlay* and *forms overlay*.

overrun condition. Loss of data because a receiving device is unable to accept data at the rate it is transmitted.

overstrike. The merging of two or more graphic characters in the same position on a sheet of paper.

P

page. A collection of information bound by the beginning page control and its associated end control. A page of printing is one side of a sheet of paper or form. See also *logical page* and *physical page*.

page buffer storage. Writable control storage in which data to be printed is stored. The data is stored one line at time until a page is complete and ready to print.

page definition (PAGEDEF). A statement that specifies attributes of a logical page, such as the width of its margins and the orientation of text.

page printer. A device that prints one page at a time (for example, xerographic printer, cathode-ray-tube printer, film printer). Contrast with *line printer*.

page printer data stream.   A data stream that enables a printer to format a complete page at one time, including text, images, and page segments. It is characterized by a composed-page data-stream format.

page segment.   (1) An object that can include text and images and that can be printed on any addressable point on a page or electronic overlay. It assumes the environment of the object in which it is included. (2) The library member which contains the definition of a page segment.

pallet.   A portable platform for handling, storing, or moving materials.

paper curl.   The curve or bend of the paper.

paper path.   The entire route that forms travel while they are being processed. The paper path usually begins where the forms are loaded and ends at the stacker.

parallel channel.   A channel having a System/360 and System/370 channel-to-control-unit I/O interface that uses bus-and-tag cables as a transmission medium.

parameter.   A variable that is given a constant value during printer and attachment configuration.

pattern storage.   Pattern storage contains the fonts and images used for printing the character data, overlays, and segments contained in the page buffer.

PC drum.   A hollow cylinder that is covered with photoconductive material.

PC parallel.   A standard interface between a personal computer and another device, such as a printer.

PCL.   See Hewlett-Packard Printer Command Language.

pel (picture element).   (1) An element of a raster pattern; a point where a toned area on the photoconductor may appear. (2) On an all-points-addressable output medium, each pel is an addressable unit. On a row-column addressable output medium, the only pel addressable is the beginning of a character cell.

photoconductor.   The material that is used as the medium for transferring images to paper.

physical page.   The form on which the printer is printing, such as an 8-1/2 x 11-inch sheet of paper. See also *page*. Contrast with *logical page*.

physical planner.   The person in an organization who plans the environmental, electrical, and space requirements for your facility.

pitch.   A unit of measurement for the width of a printed character. It identifies the number of graphic characters per inch; for example, 10-pitch has ten graphic characters per inch. Uniformly spaced fonts are measured in pitches. Contrast with *point*.

PJL.   See Hewlett-Packard Printer Job Language.

planning coordinator.   The person in your organization who is responsible for coordinating all the planning and installation activities for the 3130.

plant.   A manufacturing location.

point.   A unit of measurement for describing type sizes. There are 12 points to a pica, about 72 points to an inch.

point of origin.   The location of the first print position on a logical page. The point of origin is usually stated in terms of X and Y coordinates. The point of origin used by a printer can be affected by factors such as printable area and forms orientation.

portrait orientation.   Pertaining to a display or hard copy with greater height than width. Contrast with *landscape orientation*.

PostScript.   (1) A page description language with interactive graphics capabilities that was developed by Adobe Systems, Inc. (2) An interpretive programming language that describes the appearance of text, graphical shapes, and sampled images on a printed page by defining a print file format that is the interface between document composition applications and raster printing devices.

power off.   To remove power to the printer.

power on.   To provide power to the printer.

preprinted form.   A sheet of forms containing a preprinted design of constant data with which variable data can be combined. See also *forms* and *electronic overlay*.

Presentation Text Object Content Architecture (PTOCA).   IPDS control sequences used to present text information on a page, page segment, or overlay.

printer.   A device that writes output data from a system onto paper or other media.

Print-Error Marker (PEM).   Small, black, rectangular marks that indicate incorrectly placed data in the valid printable area.

print mode.   The operational mode in which information is received from the attached controlling computer system and printed output is produced. Contrast with *test mode* and *diagnostic mode*.

print position. The physical positions of the characters constituting a print line relative to the form.

print quality. The quality of printed output relative to existing standards and in comparison with jobs printed earlier.

Print Services Facility (PSF). An IBM licensed program that manages and controls the input data stream and output data stream required by supported IBM page printers. PSF combines print data (from the system spool) with other resources and printing controls to produce the printer data stream (including printer commands) for AFP printers.

print surface. The side of a form that receives the printed image.

proportionally spaced font. A font in which the graphic characters are contained in character cells that may vary with the size of each graphic character and have varying character increments. This allows for even spacing between printed characters and eliminates excess white space around narrow characters. Contrast with *constant spaced font*.

R

Random-Access Memory (RAM). A storage device into which data is entered and from which data is retrieved in a nonsequential manner.

raster. (1) In computer graphics, a predetermined pattern of lines that provides uniform coverage of a display space. (2) The coordinate grid that divides the display area of a display device. (3) In the 3130, an on/off pattern of electrostatic images produced by the laser print head under control of the character generator.

raster pattern. A series of picture elements (pels) arranged in scan lines to form an image.

raster scan. A technique of generating or recording the elements of an image by a line-by-line sweep across the entire output medium.

registration. In printing, refers to the relative print positions of images that are printed at different times. For example, when you process preprinted forms, the registration is good if the new image printed by the 3130 aligns correctly with the preprinted image. Print that extends beyond box edges and text that overlaps other text are examples of poor registration.

resident font. Those font data sets that are resident within the printer. They usually reside on the printer disk media (diskette or hard disk). These font sets are usually commonly used fonts. Having them resident

reduces font load time. These fonts may also be used during offline testing of the printer.

resource. (1) People, equipment, or material used to perform a task or a project. (2) Any facility of a computing system or operating system required by a job or task, including main storage, input/output devices, processing units, data sets, and controller processing programs; for example, page printers use resources such as form definitions, page definitions, and fonts.

reverse heading. A heading where each character is highlighted by reversing the color of the character with its background; for example, changing a black character on a white background to a white character on a black background.

S

scanner. A device that examines OCR, graphics, MICR, or barcode patterns and generates electrical signals corresponding to the pattern. It sends the signals to a computing device for processing.

screen or screening. (1) In document printing, a sheet of material, usually film, carrying a regular pattern of small dots. When printing, ink adheres only to the dots, and many dots close together appear solid. This method prints large areas of ink on paper but uses much less ink than printing the same area with solid ink. (2) The viewing area of a workstation's display.

scrolling. Moving a display image vertically or horizontally in order to view data not otherwise visible within the boundaries of the display.

security paper. Specially formulated paper used for negotiable documents, such as checks, which improves the antifraud characteristics of the document.

sense byte. A byte that contains sense (exception) information.

sense data. Sense information used to indicate the causes of command-stream and device exceptions and to direct the host program to the appropriate exception-recovery actions.

service representative. The person responsible for installing and repairing the printer. Synonymous with *customer engineer*. See also *IBM customer engineer*.

sheet. In reference to paper, a single sheet may be printed on one side (simplex) or both sides (duplex).

side sensitivity. A setting designed for paper with a sensitive side. Example: letterhead paper.

simplex printing. Printing on one side of a sheet of paper. Contrast with *duplex printing*.

single-byte coded font.   A font in which the characters are defined by one byte. A single-byte coded font has only one coded-font section. Contrast with *double-byte coded font*.

sizing.   A process where paper is treated to give it resistance against penetration of liquids.

skew.   Refers to the paper going through the paper path at a slight angle. This will cause the printing lines to not be aligned properly.

software.   Programs, procedures, rules, and associated documentation pertaining to the operation of a computer system or word-processing system. Contrast with *hardware*.

special-application materials.   Items such as adhesive labels and preprinted paper that the 3130 can print on.

special-purpose materials.   Printable items other than blank forms; for example, adhesive labels and preprinted forms.

SRC.   System Reference Code.

stacker.   A device used to hold paper or forms that have been printed; the output device of a printer.

stack lean.   A measurable slope from the vertical of a stack of forms. Excessive stack lean can cause failures when feeding forms.

storage.   (1) The retention of data in a storage device. (2) In word processing, a unit into which recorded text can be entered, in which it can be retained and processed, and from which it can be retrieved. (3) A device, or part of a device, that can retain data.

Synchronous Data Link Control (SDLC).   For managing synchronous, code-transparent, serial-by-bit, information transfer over a link connection.

system programmer.   A programmer who plans, generates, maintains, extends, and controls the use of an operating system, with the aim of improving overall productivity of an installation. Contrast with *application programmer*.

System Reference Code (SRC).   A code that contains information, such as a failing field-replaceable unit, for a customer engineer.

T

task.   A basic unit of work to be accomplished by a device or an operator.

tensile strength.   A measure of the force that the paper forms can withstand without tearing.

test mode.   The operational mode in which the customer engineer runs diagnostic tests.

text orientation.   The position of text as a combination of print direction and baseline direction. See also *orientation*.

throughput.   A measure of the amount of work performed by the printer over a period of time, for example, number of jobs per day.

token ring.   A network with a ring topology that passes tokens from one attaching device to another, for example, the IBM Token-Ring Network.

toner.   (1) In a document-printing machine, image-forming material used in electrostatic processes. (2) A supply item for the printer. The black powder used for printing images. Synonymous with *dry ink*.

trace.   (1) A record of the running of a computer program. It exhibits the sequences in which the instructions were executed. (2) To record a series of events as they occur. (3) In the 3130, a customer engineer analysis procedure.

trailing edge.   The trailing edge of the paper is the edge of the paper that proceeds into the printer last as it is fed from one of the paper supplies.

tray.   A device for holding paper forms used for printing. Contrast with stacker.

tumble duplex.   Printing of both sides of a sheet where the top on the second side is in the opposite position as the top on the first side. Contrast with *normal duplex*.

twinaxial.   A cable consisting of two conductors, usually small copper tubes or wires insulated from each other, within and insulated from another conductor of larger diameter, usually copper tubing or copper braid.

two-sided printing.   Printing on both sides of a sheet of paper. Synonymous with duplex *printing*. Contrast with *simplex printing*.

V

value.   A quantity assigned to a constant, a variable, a parameter, or a symbol.

variable data.   The data that can vary; for example, the names and addresses in form letters.   Contrast with *constant data*.

vector graphics.   Computer graphics in which display images are generated from display commands and coordinate data.   See also *graphic*.   Contrast with *raster pattern*.

void.   (1) A missing part of the printed character.
(2) A missing piece of a continuous form.

X

xerographic paper.   A paper that is manufactured specifically for the xerographic process, in which key paper qualities are carefully controlled.

Index

Readers' Comments — We'd Like to Hear from You

3130 Advanced Function Printer
Programming Reference

Publication No. S544-5329-01

Use this form to provide comments about this publication, its organization, or subject matter. Understand that IBM may use the information any way it believes appropriate, without incurring any obligation to you. Your comments will be sent to the author's department for the appropriate action. Comments may be written in your language.

Note: IBM publications are not stocked at the location to which this form is addressed. Direct requests for publications or for assistance in using your IBM system, to your IBM representative or local IBM branch office.

	Yes	No
• Does the publication meet your needs?	____	____
• Did you find the information:		
Accurate?		
Easy to read and understand?	____	____
Easy to retrieve?	____	____
Organized for convenient use?	____	____
Legible?		
Complete?	____	____
Well illustrated?	____	____
Written for your technical level?	____	____
• Do you use this publication:		
As an introduction to the subject?	____	____
As a reference manual?		
As an instructor in class?	____	____
As a student in class?	____	____
• What is your occupation?		

Thank you for your input and cooperation.

Note: You may either send your comments by fax to 1-800-524-1519, or mail your comments. If mailed in the U.S.A., no postage stamp is necessary. For residents outside the U.S.A., your local IBM office or representative will forward your comments.

Comments:

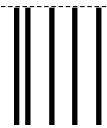Name   Address
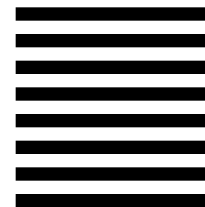

Company or Organization

Phone No.

IBM®

Fold and Tape   **Please do not staple**   Fold and Tape

NO POSTAGE
NECESSARY
IF MAILED IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST-CLASS MAIL   PERMIT NO. 40   ARMONK, NEW YORK

POSTAGE WILL BE PAID BY ADDRESSEE

Information Development
The IBM Printing Systems Company
Department H7FE Building 003G
P O Box 1900
BOULDER CO 80301-9817

Fold and Tape   **Please do not staple**   Fold and Tape

IBM ®