Performance Series, Workstation Series & H-8308p

Programmer's Guide

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1 Programmer's Guide

Overview

This Programmer's Guide provides information about printer specific commands that are supported by the following printer(s):

- p1115
- p1120n
- p1125
- p1115s
- p1725
- w1110
- H-8308p

The Datamax-O'Neil Performance Series, Workstation Series and H-8308p printers language is based on Hewlett Packard® PCL 5e. Because this language does not have native support for barcode printing, Datamax-O'Neil has extended the language by adding barcode specific commands. Methods exist to print barcodes in a Windows® environment without using these new commands. Examples include using commercially available barcode fonts or label design packages.

Scope

This document describes Datamax-O'Neil PCL barcode commands, internal variable commands and various commands specific to thermal print devices. Knowledge of PCL is helpful but not required. A full explanation of PCL is beyond the scope of this guide, please refer to the reference documents listed below.

Referenced Documents

The following documents referenced herein shall apply unless otherwise superseded by requirements specified elsewhere in this document.

- Hewlett Packard Corporation, "PCL 5 Printer Technical Reference Manual"
- Hewlett Packard Corporation, "HP PCL/PJL Technical Reference Manual"

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Datamax-O'Neil Commands

There are frequent references to Hewlett Packard's (HP) PCL Technical Reference Manual (TRM). This document can be found on HP's website listed in the Referenced Documents above. Datamax-O'Neil provides unique commands not within the command set found in the HP's PCL TRM. No command defined within this document supersedes or negates any commands found within the PCL TRM. This does not imply that all commands defined within the PCL TRM are implemented by the Datamax-O'Neil Barcode Label Printers. Many commands found within the PCL TRM are irrelevant within the context of the Barcode Label Printer. Examples of these are commands for selecting discrete pages sizes such as Letter, Legal, A4, and Executive. Features such as duplexing and stapling do not currently exist in D-O Barcode Printers and these commands, if found within the data stream, are silently ignored without error.

PCL Language

PCL Command Structure

General Information

As per Hewlett Packard's specification on the syntax of escape sequences, there are two forms of PCL escape sequences: two-character escape sequences and parameterized escape sequences.

Two character escape sequences have the following form:

<ESC>X

"X" is a character that defines the operation to be performed. Two examples of two-character escape sequences are <ESC>E and <ESC>9. The first example resets the printer to default conditions and the second resets the left and right margins to their default value. The value of "X" may be any character within the range 0x30 – 0x7E.

Parameterized escape sequences have the following form:

<ESC>X y z1 [+|-]#[.#] z2 [+|-]#[.#] z3 ... [+|-]#[.#] Zn[data]

The following characters y, #, zi and data may be optional. The parameterized character X is within the range of 0x21 – 0x2F. The group character "y" is within the range of 0x60 – 0x7E. Group characters specify the type of control being performed.

Table 1: Parameterized Character <ESC> X...

Character (X)	Symbol	Purpose
0x21	!	Reserved by D-O for debug firmware
0x22	"	Not Used
0x23	#	Not Used
0x24	$	D-O Barcode Parameter

Character (X)	Symbol	Purpose
0x25	%	PCL Language Parameter
0x26	&	PCL Cursor Parameter
0x27	‘	Not Used
0x28	(	PCL Font Parameter
0x29	)	PCL Font Parameter
0x2A	*	PCL Graphic Parameter
0x2B	+	Not Used
0x2C	,	Not Used
0x2D	-	Not Used
0x2E	.	Not Used
0x2F	/	Not Used

The **value field** ‘#’ is a group of characters specifying a numeric value. The value is an ASCII string of characters within the range 0x30 – 0x39. The string may be preceded with an optional ‘+’ or ‘-‘ sign and may contain a decimal portion separated by the decimal point. Consider the following example:

<ESC>&l5.81C

This command will set the printer to print 33 lines per label on a 4 inch high label. The value specified is the number of 1/48 inch increments between rows (5.81 = 4/33 x 48).

The parameter character is any character from the ASCII table within the range of 0x60 – 0x7E. This character specifies the parameter to which the previous value field applies. This character is used when combining escape sequences as described below in the section titled “Combining Escape Sequences.”

The Termination Character is any character from the ASCII table within the range 0x40 – 0x5E. This character specifies the parameter to which the previous value field applies. This character terminates the escape sequence.

The Binary Data is eight-bit data (for example, graphics data, downloaded fonts, etc.). The number of bytes of binary data is specified by the value field of the escape sequence. Binary data immediately follows the terminating character of the escape sequence. Data that is to be encoded into barcode images will be considered as binary data.

Combining Escape Sequences

All escape sequences that have the same first two characters AFTER the “<ESC>” (the parameterized and group character) can be combined into a single escape sequence. For example, the three commands (each begins with the <ESC> character) are of the type “EC&l”.

The following:

<ESC>&l1O<ESC>&l2A <ESC>&l5.81C

can be combined into the following single escape sequence:

<ESC>&l1o2a5.81C

In the example above, the capital 'O' becomes a lower case 'o', the 'A' of the second command becomes an 'a' and the 'EC&l' are dropped from the second and third commands. The printer commands are performed in the order they are combined, from left to right.

Barcode Clipping

PCL normally clips print objects at the dot level on the logical page boundary. Barcodes clipped in this manner can easily go undetected. Because of this, any portion of a barcode that falls beyond the boundaries of the logical print area will be dropped and a shaded rectangle will be printed, inscribing the area within the logical print page where the barcode would have been. This will provide visual evidence to the user the barcode has been clipped and is therefore invalid.

Barcodes that are not generated internally by the printer will not be clipped in this manner and may not be readable by scanning devices.

Cursor Positioning Commands

The PCL cursor refers to the Current Active Position (CAP) which identifies the current position on the label where a print command begins laying out page data. The cursor can be moved anywhere within the logical page using a combination of the horizontal and vertical cursor position commands and control codes. Although there are many different ways to move the cursor, there are three types of cursor positioning units. These include PCL Units, Decipoints, and Row/Column units.

The size of a PCL unit is determined by the value specified by the Unit of Measure command. The format of this command is <ESC>&u#D where # is the number of units per inch. The "units per inch" value is a discrete value from the following set of values: {96, 100, 120, 144, 150, 160, 180, 200, 225, 240, 288, 300, 360, 400, 450, 480, 600, 720, 800, 900, 1200, 1440, 1800, 2400, 3600, and 7200}. If the Unit of Measure is not set, the default value is 300.

A decipoint, in PCL terminology, is 1/720 inch or one-tenth of a PCL point. A PCL point is exactly 1/72 inch as opposed to a typographic point which is approximately 1/72 inch. Decipoints are resolution independent. Labels that are designed using units of decipoints will be resolution independent and are therefore easily portable across PCL printers of different resolutions. This is the preferred unit of measure in label design.

Cursor Positioning after Printing Barcode

PCL has a procedure for cursor positioning after printing a text character. Set the Current Active Position (CAP) to the right at a distance equal to the width of that character, ready

for the next character to be rendered. With raster images, the CAP is moved vertically to the next dot row below the raster image previously rendered and then returned to the horizontal start position of the raster image. The terminus CAP of the barcode is selectable with the commands described below.

Set the Current Active Position (CAP) to the right of the last printed text character at a distance equal to the width of that character so the next character can be rendered. With raster images, the CAP is moved vertically to the next dot row below the previously rendered raster image and returned to the horizontal start position of the raster image. The terminus CAP of the barcode is selectable with the commands described below.

Orientation and the Influence on Label Dimensions

HP PCL defines the portrait orientation to be the page configuration where the X dimension moves to the left along the short edge of the paper and the Y dimension moves downward along the long edge of the paper. This seems perfectly reasonable until both the label stock and the arbitrary dimensions a label may have on a given roll of media are considered. As an example, for the common label stock size of 4" by 6", it is obvious the label is in the portrait orientation. For 4" by 3" label stock, HP PCL regards this label as being in the landscape orientation and will automatically rotate the text, images, rules, and coordinates by 90 degrees to maintain the portrait orientation with respect to the shorter distance on the side. This may not be what an experienced user of thermal printers would expect to see. In order for the same image to be produced on a shorter label, the printer must be programed to produce the image in the landscape orientation. Orientation takes precedence over label dimensions. If the printer is in the portrait orientation, HP PCL will rotate the image to align it to the short edge of the label.

This subtle design characteristic may cause problems with users of legacy label printers therefore we have chosen to modify this behavior to be more in-line with thermal printers.

Fonts and Symbol Sets Supported

Resident Scalable Fonts

The table below provides a list of the 53 resident scalable fonts and the escape sequence needed to select that font as the current primary font. The <ESC> tag represents the escape character 0x1B. The <symset> tag represents the symbol set to use with the selected font (see section 13 below). The <ptsize> tag represents the requested point size of the font, up to two decimal places. The <pitch> tag represents horizontal spacing of a fixed pitch font in characters per inch.

Refer to the Symbol Set Mapping Table resident symbol sets. The tags must be replaced with their appropriate values. Developers may choose to define their own symbol sets.

Note: The resident fonts for your printer may vary in number from those listed in this table.

Table 2: Fonts and Escape Sequences

Font Name	Escape Sequence
Albertus Medium	<ESC>(<symset><ESC>(s1p<ptsize>v0s1b4362T
Albertus Extra Bold	<ESC>(<symset><ESC>(s1p<ptsize>v0s4b4362T
Antique Olive	<ESC>(<symset><ESC>(s1p<ptsize>v0s0b4168T
Antique Olive Italic	<ESC>(<symset><ESC>(s1p<ptsize>v1s0b4168T
Antique Olive Bold	<ESC>(<symset><ESC>(s1p<ptsize>v0s3b4168T
Arial	<ESC>(<symset><ESC>(s1p<ptsize>v0s0b16602T
Arial Italic	<ESC>(<symset><ESC>(s1p<ptsize>v1s0b16602T
Arial Bold	<ESC>(<symset><ESC>(s1p<ptsize>v0s3b16602T
Arial Bold Italic	<ESC>(<symset><ESC>(s1p<ptsize>v1s3b16602T
Clarendon Condensed Bold	<ESC>(<symset><ESC>(s1p<ptsize>v4s3b4140T
Coronet	<ESC>(<symset><ESC>(s1p<ptsize>v1s0b4116T
Courier	<ESC>(<symset><ESC>(s0p<pitch>h0s0b4099T
Courier Italic	<ESC>(<symset><ESC>(s0p<pitch>h1s0b4099T
Courier Bold	<ESC>(<symset><ESC>(s0p<pitch>h0s3b4099T
Courier Bold Italic	<ESC>(<symset><ESC>(s0p<pitch>h1s3b4099T
Garamond Antiqua	<ESC>(<symset><ESC>(s1p<ptsize>v0s0b4197T
Garamond Kursiv	<ESC>(<symset><ESC>(s1p<ptsize>v1s0b4197T
Garamond Halbfett	<ESC>(<symset><ESC>(s1p<ptsize>v0s3b4197T
Garamond Kursiv Halbfett	<ESC>(<symset><ESC>(s1p<ptsize>v1s3b4197T
Letter Gothic	<ESC>(<symset><ESC>(s0p<pitch>h0s0b4102T
Letter Gothic Italic	<ESC>(<symset><ESC>(s0p<pitch>h1s0b4102T
Letter Gothic Bold	<ESC>(<symset><ESC>(s0p<pitch>h0s3b4102T
Marigold	<ESC>(<symset><ESC>(s1p<ptsize>v0s0b4297T
CG Omega	<ESC>(<symset><ESC>(s1p<ptsize>v0s0b4113T
CG Omega Italic	<ESC>(<symset><ESC>(s1p<ptsize>v1s0b4113T
CG Omega Bold	<ESC>(<symset><ESC>(s1p<ptsize>v0s3b4113T
CG Omega Bold Italic	<ESC>(<symset><ESC>(s1p<ptsize>v1s3b4113T
CG Times	<ESC>(<symset><ESC>(s1p<ptsize>v0s0b4101T
CG Times Italic	<ESC>(<symset><ESC>(s1p<ptsize>v1s0b4101T
CG Times Bold	<ESC>(<symset><ESC>(s1p<ptsize>v0s3b4101T
CG Times Bold Italic	<ESC>(<symset><ESC>(s1p<ptsize>v1s3b4101T
Times New Roman	<ESC>(<symset><ESC>(s1p<ptsize>v0s0b16901T
Times New Roman Italic	<ESC>(<symset><ESC>(s1p<ptsize>v1s0b16901T
Times New Roman Bold	<ESC>(<symset><ESC>(s1p<ptsize>v0s3b16901T

Font Name	Escape Sequence
Times New Roman Bold Italic	<ESC>(<symset><ESC>(s1p<ptsize>v1s3b16901T
Univers Medium	<ESC>(<symset><ESC>(s1p<ptsize>v0s0b4148T
Univers Medium Italic	<ESC>(<symset><ESC>(s1p<ptsize>v1s0b4148T
Univers Bold	<ESC>(<symset><ESC>(s1p<ptsize>v0s3b4148T
Univers Bold Italic	<ESC>(<symset><ESC>(s1p<ptsize>v1s3b4148T
Univers Condensed Medium	<ESC>(<symset><ESC>(s1p<ptsize>v4s0b4148T
Univers Condensed Medium Italic	<ESC>(<symset><ESC>(s1p<ptsize>v5s0b4148T
Univers Condensed Bold	<ESC>(<symset><ESC>(s1p<ptsize>v4s3b4148T
Univers Condensed Bold Italic	<ESC>(<symset><ESC>(s1p<ptsize>v5s3b4148T
Symbol	<ESC>(19M<ESC>(s1p<ptsize>v0s0b16686T
Wingdings	<ESC>(579L<ESC>(s1p<ptsize>v0s0b31402T
OCR A	<ESC>(<symset><ESC>(s1p<pitch>h0s0b23584T
OCR A Fixed	<ESC>(<symset><ESC>(s0p<pitch>h0s0b23584T
OCR B	<ESC>(<symset><ESC>(s1p<pitch>h0s0b23590T
OCR B Fixed	<ESC>(<symset><ESC>(s0p<pitch>h0s0b23590T
VeraMono	<ESC>(<symset><ESC>(s1p<ptsize>v3s0b23410T
CG Triumvirate	<ESC>(<symset><ESC>(s1p<ptsize>v0s0b26708T
CG Triumvirate Bold Condensed	<ESC>(<symset><ESC>(s1p<ptsize>v0s0b26714T

Symbol Sets

Symbol sets are used to map character codes to the associated character image. The most familiar symbol set is the ASCII character mapping for characters occupying the character codes ranging from 0x20, which is the space character, through 0x7E, which is the tilde '~' character. These symbol sets are used to support the internationalization of labels.

Table 3: Symbol Sets

PCL Symbol Set	PJL Symbol Name	Control Panel Name	Symbol Set Description
10U	PC8	PC-8	PC-8
8U	ROMAN8	Roman-8	Roman-8
4U	ROMAN9	Roman-9	Roman-9
0N	ISOL1	ISO-L1	ISO 8859-1 Latin 1
2N	ISOL2	ISO-L2	ISO 8859-2 Latin 2
4N	ISOL4	ISO-L4	ISO 8859-4 Latin 4
5N	ISOL5	ISO-L5	ISO 8859-9 Latin 5

PCL Symbol Set	PJL Symbol Name	Control Panel Name	Symbol Set Description
6N	ISOL6	ISO-L6	ISO 8859-10 Latin 6
9N	ISOL9	ISO-L9	ISO 8859-15 Latin 9
26U	PC775	PC-775	PC-775
5M	PSMATH	PS MATH	PS-Math
8M	MATH8	MATH-8	Math-8
15U	PIFONT	IP FONT	Pi Font
6J	MSPUBL	MS PUBL	Microsoft Publishing
11U	PC8DN	PC-8 DN	PC-8 Danish/Norwegian
12U	PC850	PC-850	PC-850 Multilingual
17U	PC852	PC-852	PC-852
13U	PC858	PC-858	PC-858 Multilingual
9T	PC8TK	PC-8 TK	PC-Turkish
9J	PC1004	PC-1004	PC-1004
19U	WINL1	WIN L1	Windows CP1252 Latin 1
9E	WINL2	WIN L2	Windows CP1250 Latin 2
5T	WINL5	WIN L5	Windows CP1254 Latin 5
19L	WINBALT	WINBALT	Windows CP1257 Baltic
7J	DESKTOP	DESKTOP	Desktop
10J	PSTEXT	PS TEXT	PS Text
1U	LEGAL	LEGAL	Legal
1E	ISO4	ISO-4	United Kingdom Code Set
0U	ISO6	ISO-6	7 Bit ASCII Code Set
0S	ISO11	ISO-11	7 Bit Western Europe (Swedish)
0I	ISO15	ISO-15	7 Bit Western Europe (Italian)
2S	ISO17	ISO-17	7 Bit Western Europe (Spanish)
1G	ISO21	ISO-21	7 Bit Western (German)
0D	ISO60	ISO-60	7 Bit Western Europe (Norwegian)
1F	ISO69	ISO-69	7 Bit Western Europe (French)
9U	WIN30	WIN 3.0	Windows CP1252 (obsolete)
12J	MCTEXT	MC TEXT	MC Text
18N	UCS2	UCS-2	Unicode 2 Byte Encoding
0E	ROMANEXT	RomanExt	Roman Extensions
579L	WINGDINGS	WindDings	Wingdings Font
14L	ZAPDINGBATS	ZapDingBats	Windows Dingbats Font

PCL Symbol Set	PJL Symbol Name	Control Panel Name	Symbol Set Description
19M	SYMBOL	Symbol	Symbol Font

The table below (PC-850 Symbol Set) is an example of character code mapping and the character image associated with that code.

Figure: 1 - 1 PC-850 Symbol Set

12U **PC85**

NUL 0	☺ 1	☻ 2	♥ 3	♦ 4	♣ 5	♠ 6	• 7	◘ 8	○ 9	◙ 10	♂ 11	♀ 12	♪ 13	♫ 14	☼ 15
► 16	◄ 17	↕ 18	‼ 19	¶ 20	§ 21	▬ 22	↨ 23	↑ 24	↓ 25	→ 26	← 27	∟ 28	↔ 29	▲ 30	▼ 31
space 32	! 33	" 34	# 35	$ 36	% 37	& 38	' 39	(40	) 41	* 42	+ 43	, 44	- 45	. 46	/ 47
0 48	1 49	2 50	3 51	4 52	5 53	6 54	7 55	8 56	9 57	: 58	; 59	< 60	= 61	> 62	? 63
@ 64	A 65	B 66	C 67	D 68	E 69	F 70	G 71	H 72	I 73	J 74	K 75	L 76	M 77	N 78	O 79
P 80	Q 81	R 82	S 83	T 84	U 85	V 86	W 87	X 88	Y 89	Z 90	[91	\ 92	] 93	^ 94	_ 95
` 96	a 97	b 98	c 99	d 100	e 101	f 102	g 103	h 104	i 105	j 106	k 107	l 108	m 109	n 110	o 111
p 112	q 113	r 114	s 115	t 116	u 117	v 118	w 119	x 120	y 121	z 122	{ 123	| 124	} 125	~ 126	⌂ 127
Ç 128	ü 129	é 130	â 131	ä 132	à 133	å 134	ç 135	ê 136	ë 137	è 138	ï 139	î 140	ì 141	Ä 142	Å 143
È 144	æ 145	Æ 146	ô 147	ö 148	ò 149	û 150	ù 151	ÿ 152	Ö 153	Ü 154	ø 155	£ 156	Ø 157	× 158	ƒ 159
á 160	í 161	ó 162	ú 163	ñ 164	Ñ 165	ª 166	º 167	¿ 168	® 169	¬ 170	½ 171	¼ 172	¡ 173	« 174	» 175
▒ 176	▓ 177	▓ 178	| 179	┤ 180	Á 181	Â 182	À 183	© 184	╣ 185	‖ 186	╗ 187	╝ 188	¢ 189	¥ 190	┐ 191
└ 192	┴ 193	┬ 194	├ 195	─ 196	┼ 197	ã 198	Ã 199	╚ 200	╔ 201	╩ 202	╦ 203	╠ 204	═ 205	╬ 206	¤ 207
ð 208	Ð 209	Ê 210	Ë 211	È 212	ı 213	Í 214	Î 215	Ï 216	┘ 217	┌ 218	▉ 219	▄ 220	¦ 221	Ì 222	▀ 223
Ó 224	ß 225	Ô 226	Ò 227	õ 228	Õ 229	µ 230	þ 231	Þ 232	Ú 233	Û 234	Ù 235	ý 236	Ý 237	¯ 238	´ 239
240	± 241	‗ 242	¾ 243	¶ 244	§ 245	÷ 246	¸ 247	° 248	¨ 249	· 250	¹ 251	³ 252	² 253	■ 254	space 255

Printing Unicode Characters in PCL

To print Unicode characters, the symbol set 18N (UCS-2) should be used to set handling to Unicode mapping together with UTF-8 text parsing method. Refer to the following syntax:

<ESC>&t83P<ESC>(18N<ESC>(sn$_1$Tdata ...

The 83P in <ESC>&t command signifies the UTF-8 text parsing method. The 18N in <ESC> (command sets the Unicode mode.) The n_1T is used to select a font in the <ESC> (s command where n_1 is the typeface id of the font.) Immediately following are the characters to print in UTF-8 format. Refer to the example below:

<ESC>&t83P<ESC>(18N<ESC>(s1p16v0s0b9999T<D8><B6><CE><B1><E0><B8><82><EA><B0><95><E8><90><81>

This prints the characters "ض α๗ 강其 " (an Arabic, Greek, Thai, Korean and Chinese symbol) assuming the font supports all of these characters. The font selection command parameters are "1p" for proportional spacing, "16v" for point size of 16, "0s" for no italic, "0b" for no bold and "9999T" for typeface ID.

Datamax-O'Neil Barcode Command Structure

Command Structure Syntax

As stated earlier, printer commands are performed in the order that they are combined, from left to right. There are several barcode parameters that are only relevant to a subset of the total number of barcodes provided.

All Datamax-O'Neil barcodes and their support parameters will begin with the following sequence:

<ESC>$b... 0x1b 0x24 0x62

There are several escape commands associated with barcodes. Any escape command that modifies a property of a barcode will only affect the currently selected barcode. For a label design with multiple barcode types, modification of one or more barcode properties does not affect the properties of any other barcode type.

The following commands illustrate how one might handle modifying the default parameters for multiple barcode types on a single label. Note that the examples below have line numbers. For ease of reading each line is separated by a carriage return and line feed. When sending this data to the printer, all the lines in the examples should NOT have a carriage return and line feed except where you see the symbol "CRLF". The "CRLF" symbol indicates a carriage return/line feed combination should be inserted into the data stream. The "<ESC>" symbol indicates the escape character (hex value 0x1B) should be inserted into the data stream.

Table 4: Example of Printing Barcodes (Compressed Commands)

Commands	Description
<ESC>%-12345X@PJL SET RESOLUTION = 300$^{C}_{R}{}^{L}_{F}$	Reset the printer and enter into PJL mode, Set the resolution to 300 DPI
@PJL SET PAPERWIDTH=2880$^{C}_{R}{}^{L}_{F}$	Set the label width to 2880 decipoints (4 inches)
@PJL SET PAPERLENGTH=2880$^{C}_{R}{}^{L}_{F}$	Set the label length to 2880 decipoints (4 inches)
@PJL ENTER LANGUAGE = PCL$^{C}_{R}{}^{L}_{F}$	Select the PCL emulation
<ESC>&a2160h720v270P	Set the horizontal cursor position at 2160 decipoints (3 inches) and the vertical cursor position at 720 decipoints (1 inch) and set the writing direction at 270 degrees counter clockwise from horizontal (down the label).
<ESC>$b1030c360h2a10W9876543210	Select barcode 1030 (Code 128 w/ Auto select). Set the barcode height of this barcode to 360 decipoints and enable autoprint w/ checksum (human readable). With the currently selected barcode (1030), print the data 9876543210 (10 bytes of data)
<ESC>&a0p720h540V	Set the writing direction to 0 degrees, the horizontal cursor position at 720 decipoints horizontally (1 inch) and 540 decipoints vertically (¾ inch).
<ESC>$b1061c360h0a10W1234567890	Select barcode 1061 (Interleave 2 of 5 w/ Bearer Bars), the height of the barcode to 360 decipoints (1/2 inch), no autoprint and print the following 10 bytes: 1234567890
<ESC>E	Reset PCL (this causes any imaged data to be printed)
<ESC>%-12345X	Reset the printer and wait for more PJL commands

Table 5: Example of Printing Barcodes (Uncompressed Commands)

Commands	Descriptions
<ESC>%-12345X@PJL SET RESOLUTION = 300$^{C}_{R}{}^{L}_{F}$	Reset the printer and enter PJL mode
@PJL SET PAPERWIDTH=2880$^{C}_{R}{}^{L}_{F}$	Set the label width to 2880 decipoints (4 inches)
@PJL SET PAPERLENGTH=2880$^{C}_{R}{}^{L}_{F}$	Set the label length to 2880 decipoints (4 inches)
@PJL ENTER LANGUAGE = PCL$^{C}_{R}{}^{L}_{F}$	Select the PCL emulation
<ESC>&a2160H	Set the horizontal cursor position to 2160 decipoints
<ESC>&720V	Set the vertical cursor position to 720 decipoints

Commands	Descriptions
<ESC>&a270P	Set the writing direction to 270 degrees counter clockwise from horizontal
<ESC>$b1030C	Select barcode number 1030 (Code 128 /w Auto select)
<ESC>$b360H	Set the barcode height to 360 decipoints (½ inch)
<ESC>$b2A	Enable barcode autoprint with checksum
<ESC>$b10W9876543210	With the current barcode (1030) print the 10 bytes of data: 9876543210
<ESC>&0P	Set the writing direction at 0 degrees.
<ESC>&a720H	Set the horizontal cursor position to 720 decipoints
<ESC>&a540V	Set the vertical cursor position to 1440 decipoints
<ESC>$b1061C	Select barcode number 1061 (Interleave 2 of 5)
<ESC>$b360H	Set the barcode height to 180 decipoints (¼ inch)
<ESC>$b0A	Disable barcode autoprint for this barcode
<ESC>$b10W0123456789	With the current barcode type (1061) print data 0123456789
<ESC>E	Reset PCL (print the imaged data)
<ESC>%-12345X	Reset the printer and wait for more PJL commands

Comparing the two tables above there is a noticeable difference in the amount of data saved by compressing the commands. In general, three bytes for each combined command will be saved. This becomes significant with larger, more complex labels, especially if the labels will be stored in the printer as macros.

Enable/Disable Barcode Autoprint

The following command will enable or disable human readable autoprint of the barcode data:

<ESC>$b#A 0x1b 0x24 0x62 <0|1|2> 0x41

The command will affect only those barcodes with a human readable component. The following arguments are valid:

0 – Disable human readable text
1 – Enable human readable text
2 – Enable human readable with checksum information

Note: The autoprint field is considered part of the barcode object. It is implied that when the height of the barcode is specified, the height of the autoprint is included in that barcode height. For example, if a Code 3 of 9 barcode is selected with autoprint in the normal orientation and has a height of 1 inch, the height is measured from the top of the barcode to the baseline of the autoprint text.

Set Autoprint Typeface

The following command will set the typeface value of the human readable font.

<ESC>$b#T 0x1b 0x24 0x62 <value> 0x54

The default is OCR-B, value 23590. See the resident fonts report for the available typeface values.

Set Autoprint Point Size

The following command will set the point size of the human readable font.

<ESC>$b#V 0x1b 0x24 0x62 <value> 0x56

The selected font should be a proportional spacing font for point size to take affect. The default value is 12 point.

Set Autoprint Pitch Size

The following command will set the pitch size of the human readable font.

<ESC>$b#P 0x1b 0x24 0x62 <value> 0x50

The selected font should a fixed space font, i.e., Courier, Letter Gothic, etc., for the pitch to take affect. The default value is 10.

Set Autoprint Style

The following command will set the style (italics) of the human readable font.

<ESC>$b#I 0x1b 0x24 0x62 <value> 0x49

The default value is 0 for no italics.

Set Autoprint Weight

The following command will set the weight (boldness) of the human readable font.

<ESC>$b#U 0x1b 0x24 0x62 <value> 0x55

The default value is 0 for no bold.

Select Guard Boxes/Bars

The following will select guard boxes or bars on barcodes that support them:

<ESC>$b#B 0x1b 0x24 0x62 <value> 0x42

Select Barcode Type

The following will select the current barcode type:

<ESC>$b#C 0x1b 0x24 0x62 <value> 0x43

Note that all barcode commands below operate on the currently selected barcode. The table below contains the list of barcodes and their numerical values.

Set Barcode Data Delimiter

The following will select the data delimiter for the currently selected barcode:

<ESC>$b#D 0x1b 0x24 0x62 <value> 0x44

The value parameter is the ASCII value of the character to be used as a delimiter. Refer to the print barcode data below for a description of the "Print Barcode Data" command and note how this command extends the capabilities of the "Print Barcode Data" command. The following combined[1] command will select the Code 39 barcode, set the Data Delimiter to the tilde character '~' (ASCII 127) and print the barcode with the data '0123456789'.

<ESC>$b1000c126d0W0123456789~

In this example the value of the width command is set to zero. This will instruct the printer to read data after the 'W' command until the data delimiter (~) is found. The delimiter is discarded and not printed. The default value for the data delimiter is the carriage return (ASCII 13). The delimiter value must be a value not found in the data set being encoded in the barcode.

Select Error Correction Capacity

The following will set the ECC for 2D barcodes - Datamatrix, PDF417, QR and Aztec, where:

<ESC>$b#E 0x1b 0x24 0x62 <value> 0x45

1. See Section on Combined Escape Sequences.

Values:

Aztec (0-4)	PDF 417 (0-8)
0 - 23% 1 - 10% 2 - 23% 3 - 36% 4 - 50%	0 - 2 Codewords 1 - 4 Codewords 2 - 8 Codewords 3 - 16 Codewords 4 - 32 Codewords 5 - 64 Codewords 6 - 128 Codewords 7 - 256 Codewords 8 - 512 Codewords
Datamaxtrix (1)	
1 - ECC 200	
QR Code (1-4)	
1 - High Density 7% 2 - Standard Density 15% 3 - High Reliablity 25% 4 - Ultra Reliabilty 30%	

For Maxicode barcodes:

<ESC>$b#E 0x1b 0x24 0x62 <value> 0x45

Where *n*=

2 = Structured carrier, numeric, US
3 = Structured carrier, alphanumeric, non US
4 = Standard
5 = Full ECC
6 = Reader program

Select Barcode Terminating Current Active Position

The following will place the cursor position at the location depicted in the diagram below. This escape sequence must be sent prior to sending any data that is to appear in the barcode.

<ESC>$b#F 0x1b 0x24 0x62 <value> 0x46

Select Barcode Height (Decipoints)

The following will set the barcode height in decipoints with 1 decimal.

<ESC>$b#H 0x1b 0x24 0x62 <value> 0x48

If the barcode auto print is enabled prior to sending the barcode data, the height of the barcode will include the height of any human readable text if enabled. The number of pixels used in the barcode height will always be rounded. As an example, if the barcode height is specified to be 97 decipoints, the number of dots used on a 300 DPI printer is [(97 x 300)/720 = 40.417] and will round down to 40 dots. If the height is specified to be 98 [(98 x 300)/720 = 40.833] the number of dots will be 41. The default barcode height is 720 decipoints (1 inch) for linear barcodes.

Figure: 1 - 2 Terminating Current Active Position

Select Barcode Height (PCL Units)

The following will set the barcode height in PCL units with 1 decimal. The number of codewords per line are as follows: PDF417 (0-30), Micro PDF (0-4), QR Code (0-40). For Datamatrix it is the symbol size value per the table below.

<ESC>$b#J 0x1b 0x24 0x62 <value> 0x48

1 - 10x10	7 - 22x22	13 - 44x44	19 - 88x88	25 - 8x18
2 -12 x12	8 - 24x24	14 - 48x48	20 - 96x96	26 - 8x32
3 - 14x14	9 - 26x26	15 - 52x52	21 - 104x104	27 - 12x26
4 - 16x16	10 - 32x32	16 - 64x64	22 - 120x120	28 - 12x36
5 - 18x18	11 - 36x36	17 - 72x72	23 - 132x132	29 - 16x36
6 - 20x20	12 - 40x40	18 - 80x80	24 - 144x144	30 - 16x48

If the barcode auto print is enabled prior to sending the barcode data, the height of the barcode will include the height of any human readable text if enabled. The number of pixels used in the barcode height will always be rounded. As an example, if the barcode height is specified to be 97 decipoints, the number of dots used on a 300 DPI printer is [(97 x 300)/720 = 40.417] and will round down to 40 dots. If the height is specified to be

98 [(98 x 300)/720 = 40.833] the number of dots will be 41. The default barcode height is 720 decipoints (1 inch) for linear barcodes.

Select Narrow Bar Width (Decipoints)

The following command will set the width of a narrow bar in Decipoints (720/inch) with one decimal:

<ESC>$b#M 0x1b 0x24 0x62 <value> 0x4d

An example of this command might be:

<ESC>$b9.6M

This will set the width of the narrow bar to 9.6 Decipoints which is equivalent to 4 dots at 300 dpi or 8 dots at 600dpi. This command will round for example (2*300)/720 = 0.833 and will round up to 1 dot. (3*300)/720 = 1.25 and will round down to 1 dot. (4*300)/720= 1.667 and will round up to 2 dots. The printer will not ensure that the narrow element width is within specification for that barcode type. The default narrow element width will be defaulted to a reasonable value for each barcode type.

Select Narrow Bar Width (Dots)

The following command, like the one above, will set the width of a narrow bar in PCL units.

<ESC>$b#N 0x1b 0x24 0x62 <value> 0x4e

The PCL unit defaults to 300 units per inch. This may be modified with the <ESC>&u#D command. See the PCL Technical Reference Manual for details about this command. If the user's environment contains printers with various print densities, refer to the section titled "Select Barcode Width using Decipoints."

Select Barcode Anchor

The following will select the point that will serve as the barcode anchor point that coincides with the beginning cursor position:

<ESC>$b#O 0x1b 0x24 0x62 <value> 0x4F

The diagram below provides the value used to designate where the barcode anchor point will be. The value may be modified at any time for any subsequent barcodes that follow.

Many barcodes require quiet zones. A quiet zone is the area immediately surrounding the barcode and must be free of any text or graphic images. It is the user's responsibility to insure no text, lines, boxes or graphic images of any kind encroach within the quiet zone. Failure to do so could render the barcode unreadable by some barcode scanners.

Figure: 1 - 3 Barcode Anchor Point

Select Leading and Trailing Quiet Zone Size

The following command will set the quite zone size

<ESC>$b#Q 0x1b 0x24 0x62 <value> 0x51

Select Barcode Ratio

The following command will set the wide-to-narrow bar ratio.

<ESC>$b#R 0x1b 0x24 0x62 <value> 0x52

The value of '**#**' may be one of the following:

1 = 2:1
2 = 7:3
3 = 5:2
4 = 3:1

Any other value will default to the standard ratio of the currently selected barcode. This command only affects Code 3 of 9 and Interleaved 2 of 5.

Print Barcode Data

The following command will use the provided data in this sequence to print the currently selected barcode.

<ESC>$b#W 0x1b 0x24 0x62 <value> 0x57

The number of data bytes is specified in the <value> parameter field. As an example:

<ESC>$b1000C <ESC>$b10W1234567890THIS IS A BARCODE

The following condensed command is also valid:

<ESC>$b1000c10W1234567890THIS IS A BARCODE

Either command will select the Code 39 Barcode as the default barcode then send the 10 characters following the barcode selection command to the Code 39 module for rendering at the current cursor position. It will be followed by the text "This is a Barcode" using the currently selected font (not the autoprint typeface). A width value of zero will trigger the data scanning process to read barcode data until the barcode data delimiter is encountered. Refer to the section titled "Set Barcode Data Delimiter" for details of the "Barcode Data Delimiter Command".

Print Internal Variable Barcode Data

The following command will use data described by internal variables such as Date, Time or Counting fields:

<ESC>$b#Y 0x1b 0x24 0x62 <value> 0x59

Since the length of the data at any given moment is unknown by the host, this provides a means for internal data fields to be processed into barcodes. Refer to section "PJL GPIO Write Test" for the details on usage of internal data fields and for a "<value>" parameter to specify in the command.

Default Barcode Parameters

Several of the barcodes provided by the printer are user configurable including line width, barcode heights and the bar/space ratio. The table above contains the default values for the user configurable parameters. Note that every effort has been made to insure every resident barcode produced by Datamax-O'Neil Barcode Printers are within industry specification. Upon deciding to modify these values, be aware that some barcode scanners may not be able to property decode the barcode. Also, note that any modified values are not stored permanently in the printer. Once the job of labels has completed, the default values are restored.

Table 6: Barcode Defaults

Barcode ID	Barcode Description	Narrow Element Width		Default Ratio	Default Height	
		Dots	Decipoints		Dots	Decipoints
1000 (Default)	Code 3 of 9	4	9.6	3:1	150	360
1001	Code 3 of 9 Extended	4	9.6	3:1	150	360
1003	Code 3 of 9 Mod 43	4	9.6	3:1	150	360
1006	Code 3 of 9 Extended Mod 43	4	9.6	3:1	150	360
1010	UPC A	4	9.6	N/A	300	720
1011	UPC A + 2 Add-On	4	9.6	N/A	300	720
1012	UPC A + 5 Add-On	4	9.6	N/A	300	720
1020	UPC E	4	9.6	N/A	300	720
1021	UPC/EAN Add-On	4	9.6	N/A	300	720
1023	UPC E +2 Add-On	4	9.6	N/A	300	720
1024	UPC E +5 Add-On	4	9.6	N/A	300	720
1030	Code 128 Auto Select	3	7.2	N/A	150	360
1031	Code 128 Set A	3	7.2	N/A	150	360
1032	Code 128 Set B	3	7.2	N/A	150	360
1033	Code 128 Set C	3	7.2	N/A	150	360
1040	EAN 8	4	9.6	N/A	240	576
1041	EAN 8 +2 Add-On	4	9.6	N/A	240	576
1042	EAN 8 +5 Add-On	4	9.6	N/A	240	576
1050	EAN 13	4	9.6	N/A	300	720
1052	EAN 13 +2 Add-On	4	9.6	N/A	300	720
1053	EAN 13 +5 Add-On	4	9.6	N/A	300	720
1060	Interleaved 2 of 5 Mod 10	3	7.2	3:1	150	360
1061	Interleaved 2 of 5 Bearer Bars	3	7.2	3:1	150	360

Barcode ID	Barcode Description	Narrow Element Width		Default Ratio	Default Height	
		Dots	Decipoints		Dots	Decipoints
1062	Interleaved 2 of 5	3	7.2	3:1	150	360
1070	GS1-128	4	9.6	N/A	450	1080
1080	Codabar	3	7.2	N/A	150	360
1090	Plessey	3	7.2	N/A	150	360
1091	MSI Plessey Mod 10	3	7.2	N/A	150	360
1100	Code 93	3	7.2	N/A	150	360
1110	HIBC Code 39	3	7.2	N/A	150	360
1111	HIBC Code 128	3	7.2	N/A	150	360
1120	Telepen	3	7.2	N/A	150	360
1130	GS1 Databar (linear only)	3	7.2	N/A	141	338.4
1131	GS1 Databar Expanded (linear only)	3	7.2	N/A	144	345.6
1500	Postnet	6	14.4	N/A	38	91.2
1510	Planet	6	14.4	N/A	38	91.2
1520	FIM	9	21.6	N/A	187	448.8
1530	USPS Intelligent Mail (OneCode)	5	12	N/A	45	108

Table 7: 2D Barcodes

2000	QR Code Auto
2010	PDF 417
2020	Micro PDF
2030	Datamatrix
2040	UPS MaxiCode
2050	Aztec

Table 8: Valid Barcode Data

Barcode ID	Barcode Description	Length	Valid Characters	Checksum
1000	Code 3 of 9	1-75	0-9, A-Z, $,%,+,-,.,/,space [1]	No
1001	Code 3 of 9 Extended	1-66	ASCII 0-0x7F	No
1003	Code 3 of 9 Mod 43	1-75	0-9, A-Z, $,%,+,-,.,/, space [1]	Yes
1006	Code 3 of 9 Extended Mod 43	1-66	0-0x7F	Yes
1010	UPC A	1-11	0-9 [3]	Yes [2]
1011	UPC A +2 Add-On	1-13	0-9 [3]	Yes [2]

Barcode ID	Barcode Description	Length	Valid Characters	Checksum
1012	UPC A +5 Add-On	1-16	0-9 [3]	Yes [2]
1020	UPC E	1-7	0-9 [3]	Yes [2]
1021	UPC/EAN Add-On	2 or 5	0-9	Yes
1023	UPC E +2 Add-On	1-9	0-9 [3]	Yes [2]
1024	UPC E +5 Add-On	1-12	0-9 [3]	Yes [2]
1030	Code 128 Auto Select	1-79	ASCII 0-0x7F	Yes
1031	Code 128 Set A	1-79	A-Z	Yes
1032	Code 128 Set B	1-79	ASCII 0-0x7F	Yes
1033	Code 128 Set C	1-79	0-9	Yes
1040	EAN 8	1-7	0-9	Yes [2]
1041	EAN 8 +2 Add-On	1-9	0-9	Yes [2]
1042	EAN 8 +5 Add-On	1-12	0-9	Yes [2]
1050	EAN 13	1-12	0-9	Yes [2]
1052	EAN 13 +2 Add-On	1-14	0-9	Yes [2]
1053	EAN 13 +5 Add-On	1-17	0-9	Yes [2]
1060	Interleaved 2 of 5 Mod 10	1-89	0-9	Yes
1061	Interleaved 2 of 5 Bearer Bars	1-89	0-9	Yes
1062	Interleaved 2 of 5	1-89	0-9	No
1070	GS1-128	1-79	ASCII 0x20-0x7F The leading AI value must be placed in square brackets and a trailing checksum must be included.	Yes
1080	Codabar	1-60	0-9, A-D [1]	No
1090	UK Plessey	1-65	0-9, A-F	No
1091	MSI Plessey Mod 10	1-55	0-9	Yes
1100	Code 93	1-107	0-9, A-Z, $,%,+,-,.,/,space, "a" for Shift 1, "b" for Shift 2, "c" for Shift 3, "d" for Shift 4	No
1110	HIBC Code 39	1-36	0-9, A-Z, $,%,+,-,.,/,space	Yes
1111	HIBC Code 128	1-36	0-9, A-Z, $,%,+,-,.,/,space	Yes
1120	Telepen	1-30	ASCII 0x20-0x7F	Yes
1130	GS1 Databar (linear only)	1-13	0-9	Yes
1131	GS1 Databar Expanded (linear only)	1-45	ASCII 0x20-0x7F	Yes

Barcode ID	Barcode Description	Length	Valid Characters	Checksum
1500	Postnet	1-38	0-9	Yes
1510	Planet	1-38	0-9	Yes
1520	FIM	1	A-D	No
1530	USPS Intelligent Mail (OneCode)	20	0-9	Yes
2000	QR Code Auto	1-256	ASCII 0x20-0x7F	Yes
2010	PDF 417	1-256	Full ASCII (0 – 0xFF)	Yes
2020	Micro PDF	1-256	Full ASCII (0 – 0xFF)	Yes
2030	Datamatrix	1-256	Full ASCII (0 – 0xFF)	Yes
2040	UPS MaxiCode	1-138	Alphanumeric, ASCII 0x1E, 0x1D,0x04,[,),>	Yes
2050	Aztec	1-256	Full ASCII (0 – 0xFF)	Yes

[1] Lower case alpha characters will be converted to upper case.

[2] If checksum is given and is incorrect, it will be recalculated.

[3] A "+" can be used to separate UPC and additional data.

Barcode Samples

The following sequence will print a code 3 of 9 barcode, height of 300 dots (includes text), narrow bar width 4 dots and data "ABCD123456".

<ESC>$b1000c300j4n10WABCD123456

The following sequence will print a UPC E barcode, human readable text, narrow bar width 3 dots, 200 dots height and data "12345678901"

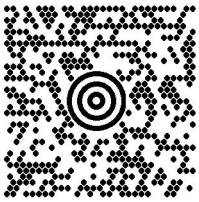
<ESC>$b1010c1a3n200j11W12345678901

The following sequence will print a QR Code (Auto) barcode with error correction capacity of 2, height 10 units, anchor position bottom left and data "This is a test, this is only a test."

<ESC>$b2000c2e10j0o36WThis is a test, this is only a test.

The following sequence will print a UPS Maxicode with anchor point top left, mode 2 - structured carrier U.S. numeric. The first 15 primary characters represent a 9-digit postcode ("328081234"), 3-digit country code ("840") and 3-digit service code ("016") followed by standard secondary data.

<ESC>$b2040c3o2e102W328081234840016[)><RS>01<GS>961Z93400914<GS>UPSN<GS>654321<GS>123<GS>SHIPPERNUM30<GS>1/1<GS>1<GS>N<GS>12345 MAIN STREET ANYTOWN<GS>FL<RS><EOT>



Note: For UPS Maxicode modes 2 and 3 the primary data must be 15 characters long formatted as:

Characters	Meaning
1-9	Postcode data which can consist of up to 9 digits (for mode 2) or up to 6 alphanumeric characters (for mode 3). Remaining unused characters should be filled with the SPACE character (ASCII 32).
10-12	Three digit country code according to ISO 3166.
13-15	Three digit service code. This depends on your parcel courier.

PJL (Printer Job Language) Commands

Standard PJL Commands

The following are standard PJL commands supported by Datamax-O'Neil thermal printers with modifications listed below. Please refer to the HP PCL/PJL Technical Reference Manual for more information on these commands.

Table 9: PJL Commands

Command	Description	Modifications
[1]FSDOWNLOAD	Downloads a file to the printer file system	Restrictions added (See below)
[1]FSMKDIR	Creates the specified directory on the printer file system	Restrictions added (See below)
[1]FSDELETE	Deletes files or empty directories from the printer file system	Restrictions added (See below)
[1]FSINIT	Initializes (formats) the mass storage system	Clears user flash file system and reboots (See below)
COMMENT	Adds a line of information as comments	N/A
DINQUIRE	Obtain the default value of a specified PJL environment variable	N/A
DEFAULT	Sets the user default environment value for the specified environment variable. These values are shown on front panel equipped printers. This command should only be used with the default configuration setting of the printer and NOT with each print job. See the SET command below for setting up a specific print job.	N/A
ECHO	Prompts the printer to return a specified message to the host computer	N/A
ENTER	Selected a printer language for processing the current job	N/A
INITIALIZE	Resets the PJL current environment and user default environment variables to the factory default values	N/A
INFO	Requests a specified category of printer information	More categories added (See below)
INQUIRE	Requests the current value for a specified PJL environment variable	N/A
RESET	Resets current PJL variables to user default values	Also writes flash if changes to user default values
SET	Sets a current environment variable to a specified value for the duration of a PJL job	N/A
USTATUS	Allows printer to send unsolicited status messages	N/A
USTATUSOFF	Turns off all unsolicited status	N/A
JOB	Informs printer of the start of a print job	Added additional security option (See below)
EOJ	Tells the printer the print job is complete	Also writes flash if changes to user default values
RDYMSG	Displays a message on the printer front panel	N/A

Caution: Exercise caution when issuing these PJL Commands. They cannot be undone.

[1]Use the PJL DISKLOCK variable to prevent unauthorized file system access. Refer to the PJL Technical Reference document for more information.

PJL File System Commands

For the FSDOWNLOAD, FSMKDIR, and FSDELETE commands, the additional parameter "TYPE" is used to restrict access to the user flash file system. Also, specific extensions must be used on file names if they are to be accessed via front panel user file functions. Sub folders will not be accessible from the front panel in these directories therefore the NAME parameter should not contain directory paths. If using a filename that already exists the new file will replace the older one.

The following is the syntax to download a file:

@PJL FSDOWNLOAD FORMAT:BINARY SIZE = nnn TYPE = n NAME = "0:filename.ext" <LF>

Above, the size is the amount of data starting after the end of line.

Type and filename extension are as follows:

Table 10: Type and File Name Extensions

Type (n) - User File Location	File Name
0 - User Labels (default)	xxx.pcl
1 - User Setups	xxx.stc
2 - User Media	xxx.stm
3 - User Images	xxx.png, xxx.jpg
4 - User Languages	xxx.qm
5 - User Fonts	xxx.ttf

***Note*:** Macros are typically downloaded to o:\pcl\macros directory. This resides under user labels internally.

User Font Download via PJL

To download a user font, it must be a True Type format and unbounded, meaning there are more than 256 supported characters typically addressed via Unicode. It is the user's responsibility to obtain the appropriate licenses to use the fonts. There must be sufficient space in the user flash section to download a font. Currently, there is a limit of ten (10) downloaded fonts.

Use the PJL FSDOWNLOAD command to download a font to the printer. The syntax is as follows:

@PJL FSDOWNLOAD FORMAT:BINARY SIZE=aaa TYPE=5 NAME="0:FontName=bbb.ttf" <CR><LF>data…

In this example, "aaa" is the binary size of the font to be downloaded. "FontName" is the desired internal name of the font. The maximum length of "FontName" is 16 characters. "bbbbb" is the desired typeface id (1-65535) used to access the font in PCL. "data" is the actual True Type font. Note the "TYPE" parameter must be 5 to download to the user fonts directory in user flash. The filename should be in quotes with the leading 0: to maintain the HP convention. The equals sign must be present as well as the lower case ttf extension. The actual True Type font data immediately follows the <LF> terminator.

PJL FSDELETE Command

Use the PJL FSDELETE command to remove a file, command syntax is as follows:

@PJL FSDELETE TYPE=n NAME = "0:filename.ext" <LF>

PJL FSINIT Command

To format the user flash file system in case of corruption issue the following command:

<ESC>%-12345X@PJL JOB NAME = "JOB_INIT_USERFS" <LF>
@PJL FSINIT VOLUME = "0:" <LF>
@PJL EOJ <LF>
<ESC>%-12345X

This will erase the user flash system and reboot the printer. Upon restart, the empty file system will be formatted, necessary default files copied internally, and the printer will be reset to factory defaults. Note that the following will be deleted permanently from the printer:

- Wired, wireless and serial communication settings
- SNMP settings
- Time zone setting
- Touch screen calibration
- Internal user setup files
- Internal user labels
- Internal user languages files (except English, German, Spanish, French, Italian and Portuguese)
- Internal media setup files
- Downloaded fonts

After reset, the touchscreen calibration procedure will appear on the display. In addition, the services for web pages, SSH, NTP, SNMP and LPD will revert to defaults.

PJL INFO Read-Back Command

This command is used to read back printer information. In addition to standard parameters the following options are also available, where:

<ESC>%-12345X@PJL INFO xxx <LF>
@PJL EOJ <LF>
<ESC>%-12345X

"xxx" is the desired parameter as noted below:

Table 11: PJL INFO Read-Back Command Parameters

Parameter	Description
DATETIME	Returns the date and time from the printer.
SENSORS	Returns value of system sensors.
SYSTEMSTATUS	Returns system status
SYSTEMINFO	Returns system info.
MEDIAFILES	Returns list of internal media setup files.
SETUPFILES	Returns list of internal user setup files.
LABELFILES	Returns list of internal user labels files.
LANGUAGEFILES	Returns list of language files.
FONTFILES	Returns list of user font files.
RESIDENTFONTS	Returns list of resident and downloaded fonts.
IMAGEFILES	Returns list of internal images
PRINTHEADINFO	Returns list of printhead info.

Note: Responses may vary depending on model and available options. A value, "---" means that the option is not supported.

The following is a sample DATETIME response:

@PJL INFO DATETIME
Wed Jan 4 10:53:44 EST 2012

The following is a sample SENSORS response:

@PJL INFO SENSORS
HEADTEMP=265;
MOTORTEMP=---;
HEADVOLTAGE=271;
HEADPRESSURE=7;
RIBBONDIAMETER=0;
REWINDERDIAMETER=0;
HEADUP=0;
HEADUNLATCHED=0;
PRESENTSENSOR=0;
CUTTERHOME=0;

COVEROPEN=1;
HEADTEMPADC=226;
MOTORTEMPADC=---;
HEADVOLTAGEADC=211;
TOFADC=190;
PAPERLOWADC=137;
AUTOLOADADC=213;
HEADPRESSUREDECODE=2;
PAPERWIDTHDECODE=3;
PAPERWIDTHSECTIONS=6;
REWINDERCTR=0;
PRESENTSENSORADC=---;
RIBBNONCTR=---;
PAPERLENGTH=1787; (dots)
GAPMARKLENGTH=43; (dots)
PAPERLENGTH=0;
RIBBONPERCENT=0;
PAPERPERCENT=0;
REWINDERPERCENT=0;

The following is sample SYSTEMSTATUS response:

@PJL INFO SYSTEMSTATUS
ENGINE=IDLE;
WARNING=NONE;
ERROR=NONE;
LASTSYSWARNING=0; (for debug)
LASTSYSERROR=0; (for debug)
ERRORCOUNT=0; (self test errors)
LASTLABELCOUNT=0; (current label count for job)
LASTLABELCOPIES=0; (total label count for job)
SESSIONLABELS=0; (number of labels printed since reset)
EQUIPPED=0; (bitwise value indicating installed and enabled options)

NOTE: "Engine" is the state of print engine and does not reference data communication or parsing/imaging. The values are:

PRINTERROR = Error occurred while printing.
NEWPRINTERROR = Error occurred while initial printing.
WAITINGREMOVE = Waiting for user to remove label when present sensor is in use.
WAITINGPROMPT = Waiting for user to press pause.
WAITINGGPIO = Waiting for GPIO system.
THROTTLING = Head cowling.
ENGDEBUG = Engine is busy, such as when running dotcheck.
STOPPED = Pause; no pending job.
ABORTED = Action canceled.
CUTTING = Cut in process.
MOVING = Feeding without printing.
PRINTING = Normal printing.
RESUMABLEERRROR = An error while printing that can be corrected by user action.
STOPPEDWITHJOB = Paused with job parsing.

"WARNING" and "ERROR" messages are listed in User's Guide > Troubleshooting with prefix "PENG_" attached.

The following is a sample SYSTEMINFO response:

@PJL INFO SYSTEMINFO
PRINTERMODEL=p1120n;
PRINTHEADMODEL=G5199;
SOFTWAREVERSION=12.01.04y; (firmware version)
FIRMWAREVERSION=0x5021; (fpga version)
RIBBONVERSION=0xD;
BOOTVERSION=BL12.01.03x;
BOARDID=104584-002E;
RAMSIZE=64 MB;
FLASHSIZE=32 MB;
SECURITYKEY=0x00005AC2;
PRINTERODOMETER=17162; (inches)
PRINTHEADODOMETER=4210;) (inches)
DETECTEDOPTIONS= REWINDER RIBBONCONTROLLER GPIO USBHOST AUDIO ALARM;
PRINTERSERIALNUM= A123567;
PRINTHEADSERALNUM=A7654321;
MACADDRESS=10:C6:AE:00:17:CF;

The following is a sample MEDIAFILES response:

@PJL INFO MEDIAFILES
File1.stm
File2.stm
File3.stm
File4.stm

The following is a sample SETUPFILES response:

@PJL INFO SETUPFILES
File1.stc
File2.stc
File3.stc
File4.stc

The PJL INFO RESIDENTFONTS command will return the list of resident fonts, the font number and a PCL sample sequence. There are place holders for the ten allowed download fonts named "Downloaded Font0", "Downloaded Font1", "Downloaded Font2", etc. These names will be replaced with the downloaded font name starting from Font 0. Refer to the example below:

0, "CG Times ","<ESC>(s1p__v0s0b4101T";
1,"CG Times It","<Esc>(s1p__v1s0b4101T";
2,"CG Times Bd","<Esc>(s1p__v0s3b4101T";
3,"CG Times BdIt","<Esc>(s1p__v1s3b4101T";
4,"Univers Md","<Esc>(s1p__v0s0b4148T";

(...)

51,"CG Triumv BdCd","<Esc>(s1p__v0s0b26714T";
52,"MyFont1 ","<Esc>(s1p__v0s0b9998T";
53,"MyFont2 ","<Esc>(s1p__v0s0b9999T";
54,"Downloaded Font2","<Esc>(s1p__v0s0b0T";
55,"Downloaded Font3","<Esc>(s1p__v0s0b0T";

PJL JOB Command

The parameter "SECURITY" is used to allow changes to defaults for printer specific items such as adjustments and media calibration values. The value of the SECURITY parameter must match the printer's security key to take effect.

The following is a sample command:

<ESC>%-12345X@PJL JOB SECURITY = "0x00005AC2" <LF>
@PJL DEFAULT HEADPRESSUREADJ = 5 <LF>
@PJL EOJ <LF>

The parameter "MODEL" can be used to ensure a model match when sending a file. The value is the printer model name in quotes, such as "p1125". If the values do not match then a Model Mismatch warning will be displayed.

PJL PERFORM Command

The custom PJL PERFORM command is used for various functions on the printer. PJL password security in the JOB command is used to protect against unauthorized use of this command. Please refer to the HP PCL/PJL Technical Reference Manual for more information on PJL security. These commands will perform an immediate action when received and should not be part of a PCL data stream. It is recommended to send one command at a time.

The syntax of the command is as follows:

<ESC>%-12345X@PJL JOB NAME = "JOB_NAME" <LF>
@PJL PERFORM PARAMETER [= value] <LF>
@PJL EOJ <LF>

The value is optional as noted below:

Table 12: PJL PERFORM Command

Parameter	Description	Value	Notes
DOTCHECK	Performs a dotcheck diagnostic on the print head	Number of dots to check. 0 for all	
EMPTYCAL	Performs empty calibration	N/A	Media should be removed prior to issue
ABORTALL	Abort all current functions	N/A	

Parameter	Description	Value	Notes
CAL	Performs paper calibration	Distance in dots to move	Media should be loaded prior to issue
FEED	Feeds media to next Top-of-Form	N/A	
STOP	Pause engine	N/A	
HEADCLEAN	Performs head clean	0,1	0 - Resets Counter 1 - Cleans Head
RESUME	Un-pauses engine	N/A	
MOVE	Moves media a certain distance	Distance in dots to move	
CUT	Engage cutter	Number of cut cycles	
RIBBONFRONT	Performs test of front (take-up) ribbon spindle assembly	N/A	Must be in self test mode (See below)
RIBBONBACK	Performs test of back (supply) ribbon spindle assembly	N/A	Must be in self test mode (See below)
REWIND	Performs test of rewinder assembly	N/A	Must be in self test mode (See below)
SELFTEST	Initialize self-test mode	0 for disable, 1 for enable, 2 for reset counters	
HEADCLEANMODE	Initialize head clean mode	0 for disable, 1 for enable	
GPIOSELFTEST	Performs GPIO wrap test	N/A	
GPIOWRITE	Test of GPIO input pins	Integer representing on/off state of output pins	Must be in self test mode (See below)
GPIOREAD	Test of GPIO output pins	N/A	Must be in self test mode (See below)
PRINTSETTINGS	Print the settings report	N/A	
PRINTINFO	Print system info report	N/A	
PRINTNETWORK	Print network report	N/A	
PRINTSERIAL	Print serial report	N/A	
PRINTGPIO	Print Applicator (GPIO) report	N/A	
PRINTFONTS	Print fonts report	N/A	
PRINT10	Print internal 10% pattern	Quantity to print	
PRINT20	Print internal 20% pattern	Quantity to print	
PRINT50	Print internal 50% pattern	Quantity to print	

Parameter	Description	Value	Notes
PRINTQL	Print internal quality label	Quantity to print	
SETDATETIME	Set data and time	String "HHHH-MM-DD hh:mm:ss"	
SETTIMEZONE	Set time zone	String, i.e. "EST+5" for Eastern Standard Time	
PRINTSYSREPORT	Print abbreviated system report	N/A	Workstation Series only
REBOOT	Restart printer	N/A	
PRINTFILE	Print user label	"filename.pcl"	File must be in User Labels. This typically has a .pcl extension.
PRINTPHINFO	Print printhead info	N/A	Varies by model
RESETSESSIONCOUNT	Resets the session label count	N/A	

PJL Head Cleaning Procedure/Command

Prior to performing print head cleaning the head clean mode must be entered as follows:

<ESC>%-12345X@PJL JOB NAME = "JOB_CLEAN_INIT" <LF>
@PJL PERFORM HEADCLEANMODE = 1 <LF>
@PJL EOJ <LF>

The media should then be removed and a special cleaning card inserted. Issue the PERFORM HEADCLEAN command:

<ESC>%-12345X@PJL JOB NAME = "JOB_CLEAN" <LF>
@PJL PERFORM HEADCLEAN <LF>
@PJL EOJ <LF>

When the cleaning is complete disable the head clean mode:

<ESC>%-12345X@PJL JOB NAME = "JOB_CLEAN_END" <LF>
@PJL PERFORM HEADCLEANMODE = 0 <LF>
@PJL EOJ <LF>

PJL Cutter, Rewinder, and Ribbon Assembly Self-Test Commands

Prior to performing self test procedures for options, the self test mode must be entered as the following:

<ESC>%-12345X@PJL JOB NAME = "JOB_SELFTEST_INIT" <LF>
@PJL PERFORM SELFTEST = 1 <LF>
@PJL EOJ <LF>

For rewinder or ribbon assembly tests the media should be detached from the mechanism. To perform the rewinder test, issue the following:

<ESC>%-12345X@PJL JOB NAME = "JOB_REWIND_TEST" <LF>
@PJL PERFORM REWIND <LF>
@PJL EOJ <LF>

Ribbon front and back assemblies can be tested using the PERFORM RIBBONFRONT or RIBBONBACK commands, respectively.

For testing the cutter, insert a value for the number of cuts as seen below.

<ESC>%-12345X@PJL JOB NAME = "JOB_REWIND_TEST" <LF>
@PJL PERFORM CUT = n <LF>
@PJL EOJ <LF>

"n" is the number of cut cycles to perform.

View test results by using the PJL INFO SYSTEMSTATUS read-back command. The value LASTLABELCOUNT is the total cycles requested and ERRORCOUNT is the number that failed.

The PERFORM ABORTALL command is used to cancel ongoing tests. To re-test and clear counters issue PERFORM SELFTEST = 2

When the self tests are complete the command below can be used to disable the self test mode:

<ESC>%-12345X@PJL JOB NAME = "JOB_SELFTEST_END" <LF>
@PJL PERFORM SELFTEST = 0 <LF>
@PJL EOJ <LF>

PJL GPIO Self Test

Prior to performing self test procedures for GPIO the self test mode must be entered as follows:

<ESC>%-12345X@PJL JOB NAME = "JOB_SELFTEST_INIT" <LF>
@PJL PERFORM SELFTEST = 1 <LF>
@PJL EOJ <LF>

When the self tests are complete the following command is used to disable the self test mode:

<ESC>%-12345X@PJL JOB NAME = "JOB_SELFTEST_END" <LF>
@PJL PERFORM SELFTEST = 0 <LF>
@PJL EOJ <LF>

PJL GPIO Wrap Test

To run the GPIO wrap test, either the wrap connector or the GPIO test board with wrap jumper should be connected to the printer and the following command should be issued:

```
<ESC>%-12345X@PJL JOB NAME = "JOB_GPIOWRAP_TEST"  <LF>
@PJL PERFORM GPIOSELFTEST <LF>
@PJL EOJ <LF>
```

The PJL INFO SYSTEMSTATUS read back command is used to view test results. The value LASTLABELCOUNT refers to the total cycles requested and ERRORCOUNT refers to the number failed.

PJL GPIO Read Test

Prior to performing the GPIO read test, the GPIO parameters in the database should be set accordingly using the either front panel, the PJL variables or other means. The signal function for all pins should be "None". The signal type for all pins should be set to "High". The I/O configuration should be set with an integer representing a bitwise value where first bit is pin 1, the second bit is pin 2, etc. One is an input pin and zero is an output pin. Bits 8 – 15 are fixed at 1. For instance if pins 1-4 are input and pins 5-8 are output this value is 65295 (1111111100001111).

Note: Pins are coupled 1/2, 3/4, 5/6, 7/8.

To start the test, enter the following command:

```
<ESC>%-12345X@PJL JOB NAME = "JOB_GPIOREAD_TEST" <LF>
@PJL PERFORM GPIOREAD <LF>
@PJL EOJ <LF>
```

While the test is running, check the ERRORCOUNT value from the PJL INFO SYSTEMSTATUS read back command to view the GPIO read status. Use bitwise operand AND of this value against 0x01 for pin1, 0x02 for pin 2, 0x04 for pin 3, etc. If the result is true then it is considered a high signal. If the result is false, it is considered a low signal.

Note: This is only for input pins. Output pins are a "do not care".

PJL GPIO Write Test

Prior to performing the GPIO write test, the GPIO parameters in the database should be set using either the front panel, PJL variables or by other means. The signal function for all pins should be "None". The signal type for all pins should be "High". For pulse mode, the "High Pulse" value should be used for output pins. The I/O configuration should be set with an integer representing a bitwise value where first bit is pin 1, the second bit is pin 2, etc. One is an input pin and zero is an output pin. Bits 8 – 15 are fixed at 1. For example, if pins 1-4 are input and pins 5-8 are output, then the resulting value would be 65295 (1111111100001111).

Note: Pins are coupled 1/2, 3/4, 5/6, 7/8.

To start the test, enter the following command:

<ESC>%-12345X@PJL JOB NAME = "JOB_GPIOWRITE_TEST" <LF>
@PJL PERFORM GPIOWRITE = n <LF>
@PJL EOJ <LF>

Where "n" is an integer representing a bitwise value and when the first bit is pin 1, the second bit will be pin2, etc. One is ON state and zero is OFF state. Only output pins are used.

For example, if pins 1-4 are output ON and pins 5-8 are input then the resulting value would be 15 (00001111).

Note: Pins are coupled 1/2, 3/4, 5/6, 7/8.

PJL CONFIG PRINTFILE

To print an internal user label file, issue the following command:

<ESC>%-12345X@PJL JOB NAME = "JOB_NAME" <LF>
@PJL PERFORM PRINTFILE = "0:filename.pcl" <LF>
@PJL EOJ <LF>

Note: The extension.pcl must be used in order to see the file listed under the internal user label files on front panel-equipped printers.

PJL CONFIG Command

The custom PJL CONFIG command is used with various functions for printer configurations. PJL password security in the JOB command protects against unauthorized use of this command. Please refer to the HP PCL/PJL Technical Reference Manual for more information on PJL security. These commands will perform an immediate action when received and should not be part of a PCL print data stream.

The syntax of the command is as follows:

<ESC>%-12345X@PJL JOB NAME = "JOB_NAME" <LF>
@PJL PERFORM CONFIG [= value] <LF>
@PJL EOJ <LF>

The value is optional as noted below.

Table 13: PJL CONFIG Command

Parameter	Description	Value	Notes
SAVEMEDIA	Saves current media settings to internal media setups	"0:filename.stm"	See below
SAVESETUP	Saves current setup settings to internal user setups	"0:filename.stc"	See below

Parameter	Description	Value	Notes
LOADMEDIA	Loads a media configuration from internal media	"filename.stm"	See below
LOADSETUP	Loads a user setup configuration from internal user setups	"filename.stc"	See below
LOADLANGUAGE	Loads a user language file from internal user flash	"filename.qm"	Will restart front panel application

Saving and Loading Configuration

To capture the current printer settings to a user setup file, enter the following command:

<ESC>%-12345X@PJL JOB NAME = "JOB_NAME" <LF>
@PJL CONFIG SAVESETUP = "0:filename.stc" <LF>
@PJL EOJ <LF>

To restore the file, enter the following:

<ESC>%-12345X@PJL JOB NAME = "JOB_NAME" <LF>
@PJL CONFIG LOADSETUP = "filename.stc" <LF>
@PJL EOJ <LF>

Note: The extension, .stc must be used in order to see the file listed under the internal user setup files on front panel equipped printers. Media setup files are performed as similarly to the example above but using the SAVEMEDIA and LOADMEDIA CONFIG parameters with file extension .stm instead.

PJL UPGRADE Command

The custom PJL UPGRADE command is used for printer software upgrades. PJL password security in the JOB command protects against unauthorized use of this command. Please refer to the HP PCL/PJL Technical Reference Manual for more information about PJL security. The software package file with name "SW[modelname]_SW[revision].bin" should be placed on a TFTP server. Afterward, the following PJL command should be entered:

<ESC>%-12345X@PJL JOB NAME = "JOB_UPGRADE" <LF>
@PJL UPGRADE SERVERIP = "xxx.xxx.xxx.xxx" FILENAME = "SW…bin" <LF>
@PJL EOJ<LF>
<ESC>%-12345X

SERVERIP is the IP address of the TFTP server and FILENAME is the software package name.

PJL Variables

The PJL variables supported by the printer include some standard as well as custom variables. The DEFAULT command allows the user to set a variable permanently, however this should never appear in a configuration header for a PCL print job. Only a

few select parameters can use the SET command in a PCL print job. To see all PJL variables use the PJL Info Variables command.

Table 14: PJL Variables

Variable	Description	Range	Default
HEAT[6, 7]	Controls the heat energy	1 – 30	4
HEATBALANCE[6, 7]	Controls the energy of the leading edges of the printed image	1 – 10	7
HEADPRESSURE[6]	Adjusts the printer head pressure to enhance the quality of print	1 - 10	7
PAPERSENSORTYPE[6]	Specifies the type of mark used to indicate the top of a label. NONE implies continuous.	NONE, GAP, MARKTOPSIDE, MARKUNDERSIDE, NOTCH	GAP
PAPERSENSORSIDE[6]	Specifies which media sensor to use	INSIDE, OUTSIDE	OUTSIDE
RIBBON[6]	Specifies thermal transfer (TT) or direct thermal (DT)	NONE, INSIDE, OUTSIDE	INSIDE
RIBBONLOWDIAMETER	The diameter at which a ribbon low warning will be triggered	100 - 2000 (1/1000")	1380
RIBBONTENSIONF[6]	This sets tension of the front ribbon motor	1 - 30	20
RIBBONTENSIONR[6]	This sets tension of the rear ribbon motor	1 - 20	15
REWINDTENSION[6]	This sets tension of the rewinder motor	1 - 20	11
SETUPFILE	Last loaded setup	N/A	“”
PAPERID[6]	Paper ID code	N/A	"X+40"
RIBBONID[6]	Ribbon ID code	N/A	"Y+20"
GAPMARKOFFSET[6]	Sets offset for TOF sensing	-229 - 6.00 (in)	0
GAPMARKNOISE[6]	Sets size to ignore for TOF sensing	0 - 600 (dots)	0
NUMBEROFFORMS[6]	Number of labels on roll	0 - 10000	0
FORMLENGTH[6]	Length of labels	0 - 99 (in)	4 in
RIBBONLENGTH[6]	Length of ribbon	0 - 1000 (m)	0
KEYPROMPT	Informs the user interface to prompt the user for the next label	OFF, ON	OFF
PAUSEMODE	Same as KEYPROMPT	OFF, ON	OFF

Variable	Description	Range	Default
CUTTER[7]	When a cutter is installed, this controls the cutting action for the media	OFF, ON, PERLABEL	OFF
CUTBYCOUNT[10]	The number of labels to print before cutting	0-32767	1
REWINDER	When the rewinder is installed, this controls the operation and direction of the powered internal label rewinder	OFF, CLOCKWISE, COUNTERCLOCKWISE	OFF
PRESENTSENSOR	This controls the "on-demand" dispensing of labels	OFF, ON	OFF
ERRORBUZZER	Used to select the buzzer sound for an error	DISABLE, SOUND1, SOUND2	DISABLE
WARNINGBUZZER	Used to select the buzzer sound for a warning	DISABLE, SOUND1, SOUND2	DISABLE
PRINTSPEED[6, 7, 9]	Sets the print speed of the printer	20 – 80 (1/10 IPS)	60
FEEDSPEED[9]	Sets the feed speed of the printer	0 – 120 (1/10 IPS)	0 (auto)
REVERSESPEED [9]	Sets the speed at which the label will be retracted into the printer	0 – 50 (1/10 IPS)	0 (auto)
RETRACTTIMEOUT	The length of time before the presented label is retracted to the next top of label	0 – 1000 (sec)	0
RETRACTDELAY	The length of time before the label is retracted at the next top of label after the label has been removed	10 – 1000 (ms)	70
LABELPRESENTDIST	The distance, beyond the bottom edge of the label, that the label will be presented to the user for removal. This is measured in decipoints.	0 - 2880 (decipoints)	0 (auto)
PAPERLOWWARNING	Show paper low warning	OFF, ON	OFF
PAPEROUTWARNING	Show paper out warning	OFF, ON	ON
COVEROPENWARNING	Show cover open warning	OFF, ON	ON
AUTOLOAD	Sensors will trigger the automatic load process when paper is detected	OFF, ON	ON
AUTOOPTIONDETECT	Controls the hardware automatic detection	OFF, ON	ON
PAPERCHANGEWARNING	Controls media tracking features	OFF, ON	OFF
REWINDERFULLWARNING	Shows warning when rewinder is near capacity	OFF, ON	ON

Variable	Description	Range	Default
AUTOCALIBRATE	Automatically calibrates the paper out sensors after loading the paper	OFF, ON	ON
AUTOPRESENTDIST	Enables the automatic setting of the present distance	OFF, ON	ON
AUTOTENSION [6]	Enables the automatic setting of tension	OFF, ON	ON
AUTOPRESSURE [6]	Enables the automatic setting of pressure	OFF, ON	ON
AUTOMEDIAGLOBAL [6]	Enables the automatic setting of media parameters	OFF, ON	ON
AUTOSPEEDADJUST	Enables the automatic speed adjust	OFF, ON	ON
PAPERLENGTH [7]	Sets the print length of the label in decipoints (1/720th of an inch)	72 - 71280 (decipoints)	2880
PAPERWIDTH [7, 8, 11]	Sets the print width of the label in decipoints (1/720th of an inch)	72 - 3074 (decipoints)	2880
HORIZONTALOFFSET[7]	Shifts the print area of the logical page to the left or right on the physical page in decipoints	0 - 2800 (decipoints)	0
VERTICALOFFSET[7]	Shifts the print area of the logical page up or down on the physical page in decipoints	0 - 7200 (decipoints)	0
ORIENTATION[7]	Controls the orientation of the logical page on the physical page	PORTRAIT, LANDSCAPE, RPORTRAIT, RLANDSCAPE	PORTRAIT
RASTERMODE[7]	This controls how overlapping images are placed on the paper	TRANSPARENT, OPAQUE	TRANSPARENT
FONTNUMBER[1]	This is the typeface number the printer uses if none is specified in the command stream	0 – 62	23
PITCH[1]	This specifies the default character pitch in characters per inch. The default font must be a fixed pitch font.	0.44 - 99.99	10.00
PTSIZE[1]	This specifies the default point size of the default font. The default font must be scalable for this to be effective.	4.00 - 999.75	12.00
SYMSET[1]	This specifies the default symbol set. The symbol set must be resident in the printer.	PJL sym set name3	PC8
PRINTTRUNCATION[7]	This clips the print image at the MARK or GAP. If the PAPERTOFTYPE is "NONE" then clip at PAPERLENGTH.	OFF, ON	ON

Variable	Description	Range	Default
PRINTONGAP	Sets the printer to print on gap/ mark or not	OFF, ON	OFF
DARKNESS[7]	This allows for the adjustment of the darkness of the printed image due to printhead thermal variations	± 20	0
SHARPNESS[4, 7]	This allows for the adjustment of the leading edge darkness of the printed image due to printhead thermal variations	± 10	0
CONTRAST [4, 7]	Same as SHARPNESS	± 10	0
VERTICALADJ [4]	This allows for the vertical adjustment of the start of image relative to the horizontal leading label edge due to mechanical variations	± 100 (dots)	0
HORIZONTALADJ [4]	This allows for the horizontal adjustment of the image relative to the printhead center	± 100 (dots)	0
PRESENTDISTANCEADJ[4]	This allows for the adjustment of the tear bar position due to mechanical variations	± 100 (dots)	0
CUTDISTANCEADJ [4]	This allows for the adjustment of the cut position due to mechanical variations	± 100 (dots)	0
HEADPRESSUREADJ [4]	This allows for the adjustment the pressure the printhead exerts down on the media	± 5	0
RIBBONTENSIONFADJ[4]	This provides for the adjustment of the front ribbon motor	± 10	0
RIBBONTENSIONRADJ[4]	This provides for the adjustment of the rear ribbon motor	± 10	0
REWINDTENSIONADJ [4]	This provides for the adjustment of the rewinder motor.	± 10	0
PAPERTRANSLEFT [4]	Paper transmissive sensor threshold for the inside sensor	0-255	128
PAPERTRANSRIGHT [4]	Paper transmissive sensor threshold for the outside sensor	0-255	128
PAPERREFLUPLEFT [4]	Paper reflective sensor threshold for the top inside sensor	0-255	128
PAPERREFLUPRIGHT [4]	Paper reflective sensor threshold for the top outside sensor	0-255	128
PAPERREFLDOWNLEFT[4]	Paper reflective sensor threshold for the bottom inside sensor	0-255	128

Variable	Description	Range	Default
PAPERREFLDOWNRIGHT[4]	Paper reflective sensor threshold for the bottom outside sensor	0-255	128
GAPTRANSLEFT [4]	Gap transmissive sensor threshold for the inside sensor	0-255	128
GAPTRANSRIGHT [4]	Gap transmissive sensor threshold for the outside sensor	0-255	128
MARKREFLUPLEFT [4]	Mark reflective sensor threshold for the top inside sensor	0-255	128
MARKREFLUPRIGHT [4]	Mark reflective sensor threshold for the top outside sensor	0-255	128
MARKREFLDOWNLEFT [4]	Mark reflective sensor threshold for the bottom inside sensor	0-255	128
MARKREFLDOWNRIGHT [4]	Mark reflective sensor threshold for the bottom outside sensor	0-255	128
TRANSCURRENTLEFT [4]	Transmissive sensor current for the inside sensor	0-32	16
TRANSCURRENTRIGHT [4]	Transmissive sensor current for the outside sensor	0-32	16
REFLCURRENTUPLEFT [4]	Reflective sensor gain for the top inside sensor	0-32	16
REFLCURRENTUPRIGHT [4]	Reflective sensor gain for the top outside sensor	0-32	16
REFLCURRENTDOWNLEFT [4]	Reflective sensor gain for the bottom inside sensor	0-32	16
REFLCURRENTDOWNRIGHT [4]	Reflective sensor gain for the bottom outside sensor	0-32	16
AUTOLOADEMPTY	Autoload empty sensor value	0-255	128
AUTOLOADCURRENT	Autoload sensor current value	0-15	2
TOFGAIN	TOF gain sensor	0-7	0
FRONTPANELUNITS	The units displayed on the printer front panel	IMPERIAL, METRIC	IMPERIAL
TIMEONFRONTPANEL	Used to display time on the front panel, or not	OFF, ON	OFF
MAINTENANCEALARMDIST	This notifies the user when maintenance is required. It is specified in thousands of inches. 0 is no alarm.	0 – 1000 (1000")	0
ERRORRECOVERY	Used to reprint labels after an error, or not	REPRINT, NORERPINT	REPRINT
PASSWORD	Default password for PJL security	0 – 65535	0

Variable	Description	Range	Default
TIMEOUT	Used to set the duration of I/O timeout in seconds. If the printer waits longer than the timeout value without receiving any data, it ends the print job and begins accepting data from other I/O ports.	0-300 (s)	1
COPIES [7]	The number of copies of each label for a print job	1 – 9999	1
PORTNUMBER	The TCP port number	0 - 65535	9100
DISKLOCK	Prevents writing to user flash	OFF, ON	OFF
GPIO	Enables use of external GPIO device	OFF, MODE1	OFF
HEXTRANSFERMODE	Enables Hex Transfer mode	OFF, ON	OFF
ECHO	File capture	OFF, ON	OFF
GPIOSIGNALTYPE1	Selects the type of input/output signal for pin 1	LOW, HIGH, LOWPULSE, HIGHPULSE, EDGE	LOW
GPIOSIGNALTYPE2	Selects the type of input/output signal for pin 2	LOW, HIGH, LOWPULSE, HIGHPULSE, EDGE	LOW
GPIOSIGNALTYPE3	Selects the type of input/output signal for pin 3	LOW, HIGH, LOWPULSE, HIGHPULSE, EDGE	LOW
GPIOSIGNALTYPE4	Selects the type of input/output signal for pin 4	LOW, HIGH, LOWPULSE, HIGHPULSE, EDGE	LOW
GPIOSIGNALTYPE5	Selects the type of input/output signal for pin 5	LOW, HIGH, LOWPULSE, HIGHPULSE, EDGE	LOW
GPIOSIGNALTYPE6	Selects the type of input/output signal for pin 6	LOW, HIGH, LOWPULSE, HIGHPULSE, EDGE	LOW
GPIOSIGNALTYPE7	Selects the type of input/output signal for pin 7	LOW, HIGH, LOWPULSE, HIGHPULSE, EDGE	LOW
GPIOSIGNALTYPE8	Selects the type of input/output signal for pin 8	LOW, HIGH, LOWPULSE, HIGHPULSE, EDGE	LOW
GPIOSIGNALNAME1	Selects the function of pin 1	SOP, REPRINT, SLEW, PAUSE, EOP, READY, MEDIALOW, SERVICE	SOP
GPIOSIGNALNAME2	Selects the function of pin 2	SOP, REPRINT, SLEW, PAUSE, EOP, READY, MEDIALOW, SERVICE	REPRINT
GPIOSIGNALNAME3	Selects the function of pin 3	SOP, REPRINT, SLEW, PAUSE, EOP, READY, MEDIALOW, SERVICE	SLEW
GPIOSIGNALNAME4	Selects the function of pin 4	SOP, REPRINT, SLEW, PAUSE, EOP, READY, MEDIALOW, SERVICE	PAUSE
GPIOSIGNALNAME5	Selects the function of pin 5	SOP, REPRINT, SLEW, PAUSE, EOP, READY, MEDIALOW, SERVICE	EOP

Variable	Description	Range	Default
GPIOSIGNALNAME6	Selects the function of pin 6	SOP, REPRINT, SLEW, PAUSE, EOP, READY, MEDIALOW, SERVICE	READY
GPIOSIGNALNAME7	Selects the function of pin 7	SOP, REPRINT, SLEW, PAUSE, EOP, READY, MEDIALOW, SERVICE	MEDIALOW
GPIOSIGNALNAME8	Selects the function of pin 8	SOP, REPRINT, SLEW, PAUSE, EOP, READY, MEDIALOW, SERVICE	SERVICE
GPIOPULSEWIDTH	Width of pulse in ms.	1 – 2000 (ms)	1000
GPIOIOCONFIG	Configuration of input/output pins	0 – 655355	65295
SLEWSPEED	Controls the rate of paper movement between printing areas when using a GPIO applicator	20 – 160 (1/10 IPS)	80

[1]When using PJL commands to query for font number, pitch, point size or symbol set the "LPARM : PCL" entry is needed before the variable name.

[2]Refer to the section titled “Resident Scalable Fonts” for a list of fonts by font number.

[3]Refer to the section titled “Symbol Sets” for list of symbol sets by PJL name.

[4]Refer to the section titled “PJL JOB command” for SECURITY parameter used to protect these printer-specific items.

[5]The I/O configuration should be set with an integer representing a bitwise value where the first bit is pin 1, the second bit is pin 2, etc. One is an input pin and zero is an output pin. Bits 8 – 15 are fixed at 1. For example, if pins 1-4 are input and pins 5-8 are output the resulting value is 65295 (1111111100001111).

[6]When changing media setup, it is highly recommended that all of the PJL variables are used. These correspond to all the parameters stored in a media configuration file. Some of these may actually be ignored if using valid combinations from the paper/ribbon list and will then use auto settings. As a minimum, PAPERID, RIBBONID, PAPERSENSORTYPE, PAPERSENSORSIDE and RIBBON should always be set when configuring media.

[7]These parameters can be sent with each job using the SET command.

[8]Refer to Appendix 1 for more specific details on the Printer Model Printable Print Widths.

[9]Refer to Appendix 2 for more specific details on the Printer Model Print Speeds.

[10] To enable the cutter option via PJL, set the variable CUTTER to ON. To cut after every label, the variable CUTBYCOUNT should be set to 1 which is the default. To cut after a certain number of labels, set the CUTBYCOUNT to the desired value. A cut will not occur at the end of the job if the number of labels printed is not a multiple of the CUTBYCOUNT. For instance printing five labels with a cut by count of 3 will result in 3 labels printed, then a cut followed by two more labels with no ensuing cut.

To cut at the end of a job, the CUTBYCOUNT should be set to 0. A PJL EOJ command must be used at end of the print job to trigger the cut.

Note: The PERLABEL value for CUTTER has been maintained for backwards compatibility. This is really the same as CUTTER equals ON and CUTBYCOUNT equals 1.

[11] Max PAPERWIDTH varies by model. For p1120n and1125 = 3074 decipoints; p1115, p1115s, and w1110 = 2995 decipoints; p1725 = 4917 decipoints.

PJL Internal Variables

The following PCL commands provide access to internal variables:

Table 15: PJL Internal Variables

Command Name	D-O CMD	Purpose
DATE/TIME OF PRINT, INCREMENT FIELD	<ESC>$i<#>I	To embed an internal variable in the specified format into the data stream.
BARCODE VARIABLE DATA	<ESC>$b<#>Y	See <> below for values of <var type>.

As mentioned above, the escape sequence <ESC> $b#W is used to process data within the data stream. This escape sequence requires a byte count '#' which represents the number of bytes to encode following the character "W". The second form of the Print Barcode Data escape sequence is the <ESC>$b#Y command. This command takes an ID number of the internal print data as the argument '#' and that represents an increment ID number or a Date/Time ID number.

Defining Internal Variables

Many thermal printers have the ability to generate an internal counting field (increment field) and a time-date stamp. HP PCL has no internal means of producing or maintaining these types of fields. In order to provide these features to users familiar with this capability, Datamax-O'Neil has extended PCL and PJL to accommodate the definition and utilization of these internal variable fields in a two-step process. The first step is to allocate a variable field through PJL. Then the field is accessed and utilized within the PCL body of the label.

PJL Increment Command

The increment field provides counting fields within the label. There can be any number of references to unique counting fields within the label and each can be referenced any number of times either as text or barcodes. The following PJL command defines the format of the INCREMENT field definition:

<ESC>%-12345X @PJL INCREMENT ID=<integer> [START=[±]<integer>] [STEP=[±]<integer>] [FILL=<value>] [PREFIX="<string>"] [SUFFIX="<string>"] [LENGTH=<integer>]"> <LF>
@PJL EOJ <LF>
<ESC>%-12345X

This PJL command will create or reset the ID variable to the value specified. The ID value must be a unique number between 1 and 32767. This value is used within the PCL body as a reference to the internal variable accessed. Multiple formats of the time, date, or increment fields may be specified as demonstrated in the examples below. The total number of Increment and Date/Time definitions must not exceed 15.

The variable STEP is the value added to the INCREMENT variable after the label is imaged and ejected from the printer. The STEP value can be positive or negative. The default value of STEP is 1. A STEP value of 0 implies that a constant value will be used as specified by the START value.

The default value of START is 0 if not otherwise specified. The MIN value is the minimum value the increment can be. If the STEP value is negative then when MIN is reached, the next value will be the MAX value. The PREFIX and SUFFIX values hold constant strings used to prepend to the beginning and append to the end of the increment value. The FILL option accepts either "0" (the number zero) or " " (a space character). The default is an increment field with a zero fill if a LENGTH is specified. If no LENGTH value is specified, the length of the field will be determined by the current number of digits in the field. The minimum length of the field is one. Note that the LENGTH field does not include the length of any PREFIX or SUFFIX string; it only specifies the length of the actual increment value.

Increment fields used within barcodes must be appropriate for the barcode type selected. For example, barcodes that are numeric only will fail if increment values that include alphabetic characters are used.

PJL Date/Time Command

The following PJL command defines the format the DATETIME field definition:

<ESC>%-12345X@PJL DATETIME ID=<integer> [FORMAT=<"format string">] [OFFSET=nnnn]
<LF>@PJL EOJ <LF>

The DATETIME field provides the current date and/or time in various formats. This data may be used within the label incorporating the currently selected font or within the currently selected barcode. For text, use the <ESC>$i<ID#> I command. For barcodes, use the <ESC>$b<ID#>Y command. The "ID#" is the value defined in the PJL header

block and can be any value between 1 and 32767. The offset is a value in seconds and can be used for expiration dates.

The FORMAT string encompasses the following values:

Table 16: Date/Time Template Definitions

Template	Action
%a	Abbreviated weekday name (Sun, Mon, etc.)
%A	Full weekday name (Sunday, Monday, etc.)
%b	Abbreviated month name (Jan, Feb, etc.)
%B	Full month name (January, February, etc.)
%c	Full date and time (Thu May 26 16:03:27 2011)
%d	Day of the month as two-digit decimal integer (01 – 31)
%D	Date as %m/%d/%y
%e	Day of the month (1 – 31), single digits are preceded by a space
%h	Same as %b (An extension to the ANSI standard)
%H	Hour as a two-digit 24 hour clock (00 – 23)
%I	Hour as a two-digit 12 hour clock (01 – 12)
%j	Julian day as a three-digit decimal integer (001-366)
%m	Month as a two-digit decimal integer (01 – 12)
%M	Minute as a two-digit decimal integer (00 – 59)
%n	New-line character (like \n). Use with care within a barcode.
%p	Provides the "AM" or "PM" designator
%r	Time expressed as %I:%M:%S %p (this is an extension to the ANSI standard)
%R	Time expressed as %H:%M (this is an extension to the ANSI standard)
%S	Second as a two digit integer (00 – 59)
%t	Horizontal tab (\t) (this is an extension to the ANSI standard)
%T	Time expressed as %H:%M:%S (an extension to the ANSI standard)
%U	Number of week in the year as a two-digit decimal integer (00 – 52) with Sunday as the first day of the week
%w	Weekday as one-digit decimal integer (0 – 6) with Sunday as 0
%W	Number of week in the year as two-digit decimal integer (00 – 52) with Monday considered as the first day of the week.
%x	Full date string (no time); in the locale's appropriate date representation.
%X	Full time string (no date); in the locale's appropriate date representation.
%y	Year without the century as a decimal number [00-99].
%Y	Year with century as four-digit decimal number
%Z	Time zone name (e.g. PST). No string will be provided if it cannot be obtained.

Template	Action
%%	Prints the percent sign.

The string values may be connected together to form a compound string such as "%d%m%Y". This would provide the day, month, and year format with digits only (e.g. 26052011). Note that some values in the table are "short hand" version of a compound format string (for example %c). The format string may have additional text as well. For example: FORMAT "TIME: %d%m%Y".

The following is a hex dump of a test file that uses the increment field and the date/time stamp. The printed output is included below the example.

Figure: 1 - 4 Increment Field and Date/Time Stamp Examples

```
00000000  1b 25 2d 31 32 33 34 35  58 40 50 4a 4c 20 49 4e  |.%-12345X@PJL IN|
00000010  43 52 45 4d 45 4e 54 20  49 44 3d 33 32 37 36 37  |CREMENT ID=32767|
00000020  20 53 54 41 52 54 3d 30  20 53 54 45 50 3d 33 20  | START=0 STEP=3 |
00000030  46 49 4c 4c 3d 22 30 22  20 50 52 45 46 49 58 3d  |FILL="0" PREFIX=|
00000040  22 31 31 30 31 34 2d 41  22 20 53 55 46 46 49 58  |"11014-A" SUFFIX|
00000050  3d 22 45 4e 44 22 20 4c  45 4e 47 54 48 3d 35 0d  |="END" LENGTH=5.|
00000060  0a 40 50 4a 4c 20 44 41  54 45 54 49 4d 45 20 49  |.@PJL DATETIME I|
00000070  44 3d 31 32 38 20 46 4f  52 4d 41 54 3d 22 4a 75  |D=128 FORMAT="Ju|
00000080  6c 69 61 6e 20 44 61 79  3a 25 59 2d 25 6a 22 0d  |lian Day:%Y-%j".|
00000090  0a 40 50 4a 4c 20 44 41  54 45 54 49 4d 45 20 49  |.@PJL DATETIME I|
000000a0  44 3d 31 32 30 20 46 4f  52 4d 41 54 3d 22 43 75  |D=120 FORMAT="Cu|
000000b0  72 72 65 6e 74 20 54 69  6d 65 3a 20 25 63 20 25  |rrent Time: %c %|
000000c0  5a 22 0d 0a 40 50 4a 4c  20 49 4e 43 52 45 4d 45  |Z"..@PJL INCREME|
000000d0  4e 54 20 49 44 3d 31 30  0d 0a 40 50 4a 4c 20 53  |NT ID=10..@PJL S|
000000e0  45 54 20 52 45 53 4f 4c  55 54 49 4f 4e 20 3d 20  |ET RESOLUTION = |
000000f0  33 30 30 0d 0a 40 50 4a  4c 20 53 45 54 20 50 41  |300..@PJL SET PA|
00000100  50 45 52 57 49 44 54 48  20 3d 20 32 38 38 30 20  |PERWIDTH = 2880 |
00000110  0d 0a 40 50 4a 4c 20 53  45 54 20 50 41 50 45 52  |..@PJL SET PAPER|
00000120  4c 45 4e 47 54 48 20 3d  20 38 37 30 20 0d 0a 40  |LENGTH = 870 ..@|
00000130  50 4a 4c 20 45 4e 54 45  52 20 4c 41 4e 47 55 41  |PJL ENTER LANGUA|
00000140  47 45 20 3d 20 50 43 4c  0a 1b 26 61 30 50 1b 26  |GE = PCL..&a0P.&|
00000150  6c 33 58 1b 28 30 41 1b  2a 70 31 35 78 31 35 59  |l3X.(0A.*p15x15Y|
00000160  1b 2a 63 31 31 35 35 61  36 62 30 50 1b 2a 70 31  |.*c1155a6b0P.*p1|
00000170  31 36 34 78 31 35 59 1b  2a 63 36 61 33 34 35 62  |164x15Y.*c6a345b|
00000180  30 50 1b 2a 70 31 35 78  31 35 59 1b 2a 63 36 61  |0P.*p15x15Y.*c6a|
00000190  33 34 35 62 30 50 1b 2a  70 31 35 78 33 35 35 59  |345b0P.*p15x355Y|
000001a0  1b 2a 63 31 31 34 39 61  36 62 30 50 1b 28 73 31  |.*c1149a6b0P.(s1|
000001b0  70 31 30 68 31 30 76 30  73 30 62 32 33 35 39 30  |p10h10v0s0b23590|
000001c0  54 1b 2a 70 33 30 78 35  30 59 1b 26 70 31 36 58  |T.*p30x50Y.&p16X|
000001d0  49 6e 74 65 72 6e 61 6c  20 56 61 72 69 61 62 6c  |Internal Variabl|
000001e0  65 20 54 65 73 74 1b 2a  70 33 30 78 39 30 59 49  |e Test.*p30x90YI|
000001f0  6e 63 72 65 6d 65 6e 74  3a 1b 24 69 33 32 37 36  |ncrement:.$i3276|
00000200  37 49 1b 26 61 2b 32 37  35 56 1b 2a 70 33 30 30  |7I.&a+275V.*p300|
00000210  58 1b 24 62 31 30 33 30  63 32 61 32 35 30 68 33  |X.$b1030c2a250h3|
00000220  32 37 36 37 59 1b 2a 70  2b 34 35 59 1b 2a 70 33  |2767Y.*p+45Y.*p3|
00000230  30 58 1b 24 69 31 32 30  49 1b 2a 70 33 30 78 2b  |0X.$i120I.*p30x+|
00000240  34 35 59 1b 24 69 31 32  38 49 1b 2a 70 33 30 78  |45Y.$i128I.*p30x|
00000250  2b 34 35 59 53 65 74 3a  1b 24 69 31 30 49 0c 1b  |+45YSet:.$i10I..|
```

```
00000260  26 6c 32 58 1b 28 30 41  1b 2a 70 31 35 78 31 35  |&l2X.(0A.*p15x15|
00000270  59 1b 2a 63 31 31 35 35  61 36 62 30 50 1b 2a 70  |Y.*c1155a6b0P.*p|
00000280  31 31 36 34 78 31 35 59  1b 2a 63 36 61 33 34 35  |1164x15Y.*c6a345|
00000290  62 30 50 1b 2a 70 31 35  78 31 35 59 1b 2a 63 36  |b0P.*p15x15Y.*c6|
000002a0  61 33 34 35 62 30 50 1b  2a 70 31 35 78 33 35 35  |a345b0P.*p15x355|
000002b0  59 1b 2a 63 31 31 34 39  61 36 62 30 50 1b 28 73  |Y.*c1149a6b0P.(s|
000002c0  31 70 31 30 68 31 30 76  30 73 30 62 32 33 35 39  |1p10h10v0s0b2359|
000002d0  30 54 1b 2a 70 33 30 78  35 30 59 1b 26 70 31 36  |0T.*p30x50Y.&p16|
000002e0  58 49 6e 74 65 72 6e 61  6c 20 56 61 72 69 61 62  |XInternal Variab|
000002f0  6c 65 20 54 65 73 74 1b  2a 70 33 30 78 39 30 59  |le Test.*p30x90Y|
00000300  49 6e 63 72 65 6d 65 6e  74 3a 1b 24 69 33 32 37  |Increment:.$i327|
00000310  36 37 49 1b 26 61 2b 32  37 35 56 1b 2a 70 33 30  |67I.&a+275V.*p30|
00000320  30 58 1b 24 62 31 30 33  30 63 32 61 32 35 30 68  |0X.$b1030c2a250h|
00000330  33 32 37 36 37 59 1b 2a  70 2b 34 35 59 1b 2a 70  |32767Y.*p+45Y.*p|
00000340  33 30 58 1b 24 69 31 32  30 49 1b 2a 70 33 30 78  |30X.$i120I.*p30x|
00000350  2b 34 35 59 1b 24 69 31  32 38 49 1b 2a 70 33 30  |+45Y.$i128I.*p30|
00000360  78 2b 34 35 59 53 65 74  3a 1b 24 69 31 30 49 0c  |x+45YSet:.$i10I.|
00000370  1b 26 6c 31 58 1b 28 30  41 1b 2a 70 31 35 78 31  |.&l1X.(0A.*p15x1|
00000380  35 59 1b 2a 63 31 31 35  35 61 36 62 30 50 1b 2a  |5Y.*c1155a6b0P.*|
00000390  70 31 31 36 34 78 31 35  59 1b 2a 63 36 61 33 34  |p1164x15Y.*c6a34|
000003a0  35 62 30 50 1b 2a 70 31  35 78 31 35 59 1b 2a 63  |5b0P.*p15x15Y.*c|
000003b0  36 61 33 34 35 62 30 50  1b 2a 70 31 35 78 33 35  |6a345b0P.*p15x35|
000003c0  35 59 1b 2a 63 31 31 34  39 61 36 62 30 50 1b 28  |5Y.*c1149a6b0P.(|
000003d0  73 31 70 31 30 68 31 30  76 30 73 30 62 32 33 35  |s1p10h10v0s0b235|
000003e0  39 30 54 1b 2a 70 33 30  78 35 30 59 1b 26 70 31  |90T.*p30x50Y.&p1|
000003f0  36 58 49 6e 74 65 72 6e  61 6c 20 56 61 72 69 61  |6XInternal Varia|
00000400  62 6c 65 20 54 65 73 74  1b 2a 70 33 30 78 39 30  |ble Test.*p30x90|
00000410  59 49 6e 63 72 65 6d 65  6e 74 3a 1b 24 69 33 32  |YIncrement:.$i32|
00000420  37 36 37 49 1b 26 61 2b  32 37 35 56 1b 2a 70 33  |767I.&a+275V.*p3|
00000430  30 30 58 1b 24 62 31 30  33 30 63 32 61 32 35 30  |00X.$b1030c2a250|
00000440  68 33 32 37 36 37 59 1b  2a 70 2b 34 35 59 1b 2a  |h32767Y.*p+45Y.*|
00000450  70 33 30 58 1b 24 69 31  32 30 49 1b 2a 70 33 30  |p30X.$i120I.*p30|
00000460  78 2b 34 35 59 1b 24 69  31 32 38 49 1b 2a 70 33  |x+45Y.$i128I.*p3|
00000470  30 78 2b 34 35 59 53 65  74 3a 1b 24 69 31 30 49  |0x+45YSet:.$i10I|
00000480  0c 1b 28 30 41 1b 2a 70  31 35 78 31 35 59 1b 2a  |..(0A.*p15x15Y.*|
00000490  63 31 31 35 35 61 36 62  30 50 1b 2a 70 31 31 36  |c1155a6b0P.*p116|
000004a0  34 78 31 35 59 1b 2a 63  36 61 33 34 35 62 30 50  |4x15Y.*c6a345b0P|
000004b0  1b 2a 70 31 35 78 31 35  59 1b 2a 63 36 61 33 34  |.*p15x15Y.*c6a34|
000004c0  35 62 30 50 1b 2a 70 31  35 78 33 35 35 59 1b 2a  |5b0P.*p15x355Y.*|
000004d0  63 31 31 34 39 61 36 62  30 50 1b 28 73 31 70 31  |c1149a6b0P.(s1p1|
000004e0  30 68 31 30 76 30 73 30  62 32 33 35 39 30 54 1b  |0h10v0s0b23590T.|
000004f0  2a 70 33 30 78 35 30 59  1b 26 70 31 36 58 49 6e  |*p30x50Y.&p16XIn|
00000500  74 65 72 6e 61 6c 20 56  61 72 69 61 62 6c 65 20  |ternal Variable |
00000510  54 65 73 74 1b 2a 70 33  30 78 39 30 59 49 6e 63  |Test.*p30x90YInc|
00000520  72 65 6d 65 6e 74 3a 1b  24 69 33 32 37 36 37 49  |rement:.$i32767I|
00000530  1b 26 61 2b 32 37 35 56  1b 2a 70 33 30 30 58 1b  |.&a+275V.*p300X.|
00000540  24 62 31 30 33 30 63 32  61 32 35 30 68 33 32 37  |$b1030c2a250h327|
00000550  36 37 59 1b 2a 70 2b 34  35 59 1b 2a 70 33 30 58  |67Y.*p+45Y.*p30X|
00000560  1b 24 69 31 32 30 49 1b  2a 70 33 30 78 2b 34 35  |.$i120I.*p30x+45|
00000570  59 1b 24 69 31 32 38 49  1b 2a 70 33 30 78 2b 34  |Y.$i128I.*p30x+4|
00000580  35 59 53 65 74 3a 1b 24  69 31 30 49 0c 1b 28 30  |5YSet:.$i10I..(0|
00000590  41 1b 2a 70 31 35 78 31  35 59 1b 2a 63 31 31 35  |A.*p15x15Y.*c115|
000005a0  35 61 36 62 30 50 1b 2a  70 31 31 36 34 78 31 35  |5a6b0P.*p1164x15|
000005b0  59 1b 2a 63 36 61 33 34  35 62 30 50 1b 2a 70 31  |Y.*c6a345b0P.*p1|
```

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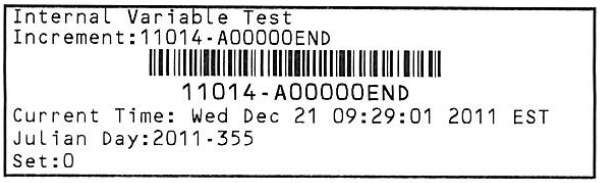
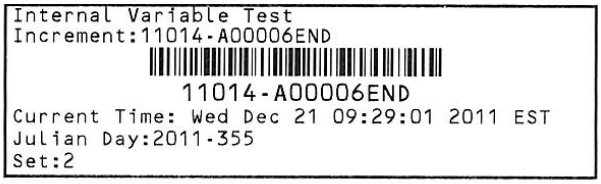
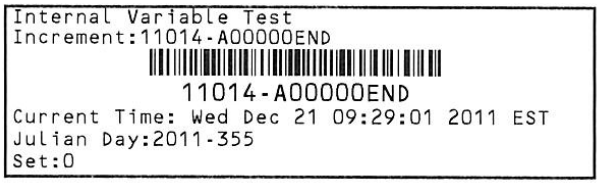
000005c0  35 78 31 35 59 1b 2a 63  36 61 33 34 35 62 30 50  |5x15Y.*c6a345b0P|
000005d0  1b 2a 70 31 35 78 33 35  35 59 1b 2a 63 31 31 34  |.*p15x355Y.*c114|
000005e0  39 61 36 62 30 50 1b 28  73 31 70 31 30 68 31 30  |9a6b0P.(s1p10h10|
000005f0  76 30 73 30 62 32 33 35  39 30 54 1b 2a 70 33 30  |v0s0b23590T.*p30|
00000600  78 35 30 59 1b 26 70 31  36 58 49 6e 74 65 72 6e  |x50Y.&p16XIntern|
00000610  61 6c 20 56 61 72 69 61  62 6c 65 20 54 65 73 74  |al Variable Test|
00000620  1b 2a 70 33 30 78 39 30  59 49 6e 63 72 65 6d 65  |.*p30x90YIncreme|
00000630  6e 74 3a 1b 24 69 33 32  37 36 37 49 1b 26 61 2b  |nt:.$i32767I.&a+|
00000640  32 37 35 56 1b 2a 70 33  30 30 58 1b 24 62 31 30  |275V.*p300X.$b10|
00000650  33 30 63 32 61 32 35 30  68 33 32 37 36 37 59 1b  |30c2a250h32767Y.|
00000660  2a 70 2b 34 35 59 1b 2a  70 33 30 58 1b 24 69 31  |*p+45Y.*p30X.$i1|
00000670  32 30 49 1b 2a 70 33 30  78 2b 34 35 59 1b 24 69  |20I.*p30x+45Y.$i|
00000680  31 32 38 49 1b 2a 70 33  30 78 2b 34 35 59 53 65  |128I.*p30x+45YSe|
00000690  74 3a 1b 24 69 31 30 49  0c 1b 28 30 41 1b 2a 70  |t:.$i10I..(0A.*p|
000006a0  31 35 78 31 35 59 1b 2a  63 31 31 35 35 61 36 62  |15x15Y.*c1155a6b|
000006b0  30 50 1b 2a 70 31 31 36  34 78 31 35 59 1b 2a 63  |0P.*p1164x15Y.*c|
000006c0  36 61 33 34 35 62 30 50  1b 2a 70 31 35 78 31 35  |6a345b0P.*p15x15|
000006d0  59 1b 2a 63 36 61 33 34  35 62 30 50 1b 2a 70 31  |Y.*c6a345b0P.*p1|
000006e0  35 78 33 35 35 59 1b 2a  63 31 31 34 39 61 36 62  |5x355Y.*c1149a6b|
000006f0  30 50 1b 28 73 31 70 31  30 68 31 30 76 30 73 30  |0P.(s1p10h10v0s0|
00000700  62 32 33 35 39 30 54 1b  2a 70 33 30 78 35 30 59  |b23590T.*p30x50Y|
00000710  1b 26 70 31 36 58 49 6e  74 65 72 6e 61 6c 20 56  |.&p16XInternal V|
00000720  61 72 69 61 62 6c 65 20  54 65 73 74 1b 2a 70 33  |ariable Test.*p3|
00000730  30 78 39 30 59 49 6e 63  72 65 6d 65 6e 74 3a 1b  |0x90YIncrement:.|
00000740  24 69 33 32 37 36 37 49  1b 26 61 2b 32 37 35 56  |$i32767I.&a+275V|
00000750  1b 2a 70 33 30 30 58 1b  24 62 31 30 33 30 63 32  |.*p300X.$b1030c2|
00000760  61 32 35 30 68 33 32 37  36 37 59 1b 2a 70 2b 34  |a250h32767Y.*p+4|
00000770  35 59 1b 2a 70 33 30 58  1b 24 69 31 32 30 49 1b  |5Y.*p30X.$i120I.|
00000780  2a 70 33 30 78 2b 34 35  59 1b 24 69 31 32 38 49  |*p30x+45Y.$i128I|
00000790  1b 2a 70 33 30 78 2b 34  35 59 53 65 74 3a 1b 24  |.*p30x+45YSet:.$|
000007a0  69 31 30 49 0c 1b 28 30  41 1b 2a 70 31 35 78 31  |i10I..(0A.*p15x1|
000007b0  35 59 1b 2a 63 31 31 35  35 61 36 62 30 50 1b 2a  |5Y.*c1155a6b0P.*|
000007c0  70 31 31 36 34 78 31 35  59 1b 2a 63 36 61 33 34  |p1164x15Y.*c6a34|
000007d0  35 62 30 50 1b 2a 70 31  35 78 31 35 59 1b 2a 63  |5b0P.*p15x15Y.*c|
000007e0  36 61 33 34 35 62 30 50  1b 2a 70 31 35 78 33 35  |6a345b0P.*p15x35|
000007f0  35 59 1b 2a 63 31 31 34  39 61 36 62 30 50 1b 28  |5Y.*c1149a6b0P.(|
00000800  73 31 70 31 30 68 31 30  76 30 73 30 62 32 33 35  |s1p10h10v0s0b235|
00000810  39 30 54 1b 2a 70 33 30  78 35 30 59 1b 26 70 31  |90T.*p30x50Y.&p1|
00000820  36 58 49 6e 74 65 72 6e  61 6c 20 56 61 72 69 61  |6XInternal Varia|
00000830  62 6c 65 20 54 65 73 74  1b 2a 70 33 30 78 39 30  |ble Test.*p30x90|
00000840  59 49 6e 63 72 65 6d 65  6e 74 3a 1b 24 69 33 32  |YIncrement:.$i32|
00000850  37 36 37 49 1b 26 61 2b  32 37 35 56 1b 2a 70 33  |767I.&a+275V.*p3|
00000860  30 30 58 1b 24 62 31 30  33 30 63 32 61 32 35 30  |00X.$b1030c2a250|
00000870  68 33 32 37 36 37 59 1b  2a 70 2b 34 35 59 1b 2a  |h32767Y.*p+45Y.*|
00000880  70 33 30 58 1b 24 69 31  32 30 49 1b 2a 70 33 30  |p30X.$i120I.*p30|
00000890  78 2b 34 35 59 1b 24 69  31 32 38 49 1b 2a 70 33  |x+45Y.$i128I.*p3|
000008a0  30 78 2b 34 35 59 53 65  74 3a 1b 24 69 31 30 49  |0x+45YSet:.$i10I|
000008b0  0c 1b 45                                          |..E|
```

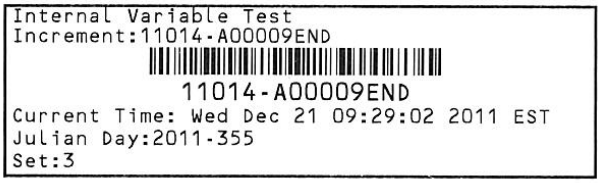
The data stream above produces the output below. These examples demonstrate several different key features when using internal variable fields. When specifying a copy count within the PCL data stream using the <ESC>&l<val>X command (see line

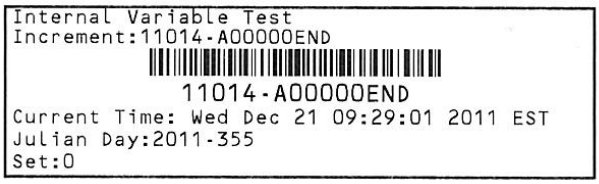
0000260 above) all variable data will maintain their current values until the last copy is printed. Only then will the variable fields be updated.

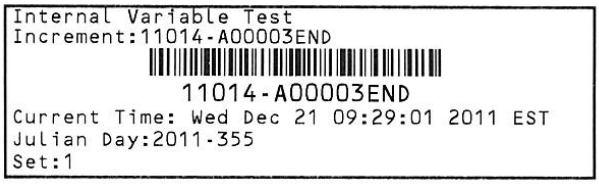


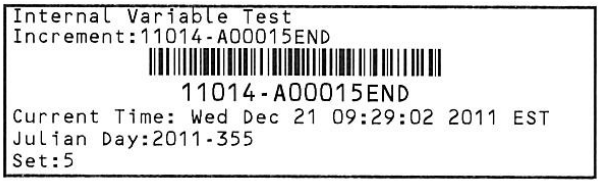


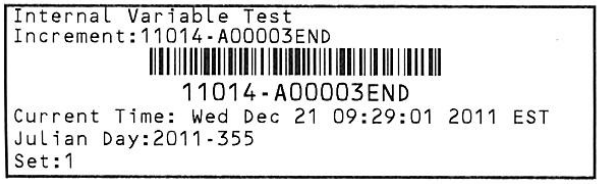


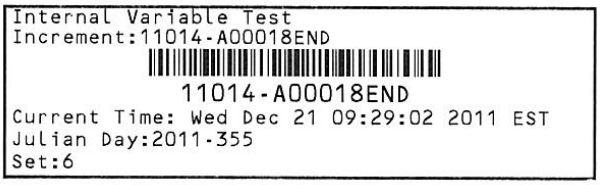












Hex Transfer Method

The hex transfer method allows the user to send PCL escape sequence printer commands to the printer with ASCII text strings. Any valid command or data sequence can be sent using this method. The printer will convert the sequences to the appropriate binary data used internally.

Syntax:

&%X1X2…$

where the characters "&%" initiate the sequence, X1X2 are a hexadecimal pair representing the character value. For instance the <ESC> character is value 1B. The "$" character terminates the sequence.

To enable hex transfer mode:

On display-equipped models enter Menu->Advanced->Comm->General->Host Settings->Tab 2 and select check box next to Hex Transfer. Save Settings.

or

Send the PJL command DEFAULT with variable HEXTRANSFERMODE and value ON.

or

Using webpages by clicking Advanced->Communication->General->Host Settings and setting Hex Transfer to True. Save settings.

The following is a sample of a standard PJL/PCL sequence:

<ESC>%-12345X@PJL JOB

@PJL SET PAPERLENGTH = 4320

@PJL ENTER LANGUAGE = PCL

<ESC>*t300R<ESC>*p230x1100Y<ESC>$b2050c10n0j1o36WThis is a test, this is only a test. <ESC>E<ESC>%-12345X@PJL EOJ

<ESC>%-12345X

Hex transfer version:

&%1B$%-12345X@PJL JOB

@PJL SET PAPERLENGTH = 4320

@PJL ENTER LANGUAGE = PCL

&%1B$*t300R&%1B$*p230x1100Y&%1B$$b2050c10n0j1o36WThis is a test, this is only a test. &%1B$E

&%1B$%-12345X@PJL EOJ

&%1B$%-12345X

Note that all the data from above sample can be in hexadecimal format as:

&%1B252D31323334355840504A4C204A4F420D0A40504A4C2053455420504150455
24C454E475448203D20343332300D0A40504A4C20454E544552204C414E47554147
45203D2050434C0D0A1B2A74333030521B2A703233307831313030591B2462323035
306331306E306A316F33365754686973206973206120746573742C207468697320697
3206F6E6C7920612074657374 2E1B451B252D31323334355840504A4C20454F4A0D
0A1B252D3132333435580D0A$

2 Appendix A

Printer Model Printable Print Widths

The table below lists the available printable print widths for the different printer models.

Table 1: Printable Print Widths

Printer Model	Minimum	Default	Maximum
p1115	.1 inches 2.54 mm 72 decipoints	4 inches 108 mm 2880 decipoints	4.16 inches 105.7 mm 2995.2 decipoints
p1120n	.1 inches 2.54 mm 72 decipoints	4 inches 108 mm 2880 decipoints	4.27 inches 108.4 mm 3074.4 decipoints
p1125	.1 inches 2.54 mm 72 decipoints	4 inches 108 mm 2880 decipoints	4.16 inches 105.7 mm 2995 decipoints
p1115s	.1 inches 2.54 mm 72 decipoints	4 inches 152.4 mm 2880 decipoints	4.16 inches 105.7 mm 2995 decipoints
p1725	.1 inches 2.54 mm 72 decipoints	6 inches 108 mm 4320 decipoints	6.83 inches 173.5 mm 4917.6 decipoints
w1110	.1 inches 2.54 mm 72 decipoints	4 inches 152.4 mm 2880 decipoints	4.16 inches 105.7 mm 2995 decipoints
H-8308p	.1 inches 2.54 mm 72 decipoints	8 inches 203 mm 5760 decipoints	8.53 inches 217 mm 6141 decipoints

3 Appendix B

Printer Model Speed

Table 1: Print Speed (Inches Per Second)

Printer Model	Minimum	Default	Maximum
p1115	2	4	6
p1120n	2	6	8
p1125	2	8	10
p1115s	2	4	6
p1725	2	8	10
w1110	2	4	4
H-8308p	2	6	8

Table 2: Feed Speed (Inches Per Second)

Printer Model	Minimum	Default	Maximum
p1115	2	4	8
p1120n	2	6	10
p1125	2	8	12
p1115s	2	6	8
p1725	2	8	12
w1110	2	4	4
H-8308p	2	6	10

Table 3: Reverse Speed (Inches Per Second)

Printer Model	Minimum	Default	Maximum
p1115	2	3	5
p1120n	2	4	5
p1125	2	5	5
p1115s	2	3	5
p1725	2	5	5
w1110	2	3	4
H-8308p	2	4	5