8 PCL Font Selection

Introduction

Several characteristics identify a font (as described in **Chapter 7**, *Fonts*). Font characteristic selection commands, described in this chapter, are used to specify the desired font characteristics for printing. Commands are included for the following characteristics: symbol set, spacing, pitch, height, style, stroke weight, and typeface family.

The printer maintains a **font select table** in its operating code that contains the characteristic values of the current font. Whenever the printer receives a font select command (escape sequence) specifying a new characteristic value, the printer records that characteristic in the table. After the table is updated (receives new characteristic values), and text is ready to be printed, the printer performs a **font select**. The printer searches the available fonts and scalable typefaces to select one that matches (or most closely matches) the characteristics as listed in the font select table.

Note **A font must be in the printer to be selected for printing!**

Font Selection Priority

The printer selects a font based on a prioritization of its design characteristics, then its resolution, then its physical location in the printer, and finally, its orientation. Font selection priority considerations are shown in the following list:

Font Priority Considerations	
Symbol Set	highest
Spacing	|
Pitch	|
Height	|
Style	|
Stroke Weight	|
Typeface Family	|
Resolution[1]	|
Location[2]	|
Orientation	lowest

1. Bitmap fonts designed at 600 dpi are not available for selection at 300 dpi. In 600 dpi mode, font priority is as follows: 600 dpi bitmap, scalable, 300 dpi bitmap.
2. Although location is not a font characteristic, it is a font selection consideration.

When selecting a font, the printer compares the highest priority characteristic in the font select table to the corresponding characteristic of the available fonts. If only one font is available that matches, that font is selected. If several fonts match, the printer compares the next highest priority characteristic to the corresponding characteristic of the available fonts and so on down the list. When only one font remains, that font is selected. However, if after comparison of all the font design characteristics, more than one font still remains, then the resolution and location are considered.

There are four locations where a font may be stored: printer ROM (Read Only Memory), SIMM module ROM, cartridge ROM, and printer RAM (random access memory; user memory). These font locations are shown below, listed from the highest to lowest priority. The font that matches the characteristics is selected from the highest priority location.

Priority of Locations	
Soft Font (Lowest ID first)	Highest
Cartridge Font[1]	|
SIMM Font	|
Internal Font	Lowest

1. In printers with two cartridge slots, one slot has priority over the other. Refer to Appendix E of the *PCL 5 Comparison Guide* for cartridge slot priority information for the different HP LaserJet printers.

Note

In 600 dpi mode: A 600 dpi font has priority over a 300 dpi font. For example, a 600 dpi bitmap soft font is highest, then a scalable soft font, followed by a 300 dpi bitmapped soft font.

Finally, for bitmap fonts, the orientation of a font is considered. If there are two fonts which are similar in all the above characteristics and which reside at the same location, the font with the orientation that matches the orientation of the page is selected. If only one font remains and its orientation is different than the current page, the printer rotates the font to the orientation of the page. (“Summary of Font Selection by Characteristic” on page 23, later in this chapter, summarizes font selection by characteristic.)

Font Select Table

The initial font specification in a job should be made using all of the font characteristics.

To select a Roman-8, fixed-spaced, 10 pitch, 12 point, upright, bold, Courier font, for the current page orientation, specify each of the characteristics using font selection escape sequences. Once the characteristics have been specified, the font select table appears as follows:

Symbol Set	Roman-8
Spacing	Fixed
Pitch	10 cpi
Height	12 point
Style	Upright
Stroke Weight	Bold
Typeface Family	Courier

To subsequently select a font with the same characteristics differing only in one aspect, only the single characteristic must be specified. For example, to select a font differing only in stroke weight (in this case, medium rather than bold), the printer's font select table could be changed as follows:

Symbol Set	Roman-8
Spacing	Fixed
Pitch	10 cpi
Height	12 point
Style	Upright
Stroke Weight	**Medium←**
Typeface Family	Courier

At a minimum, only the characteristics of the new font that differ from those of the previously designated font must be sent (the short font selection method). However, **HP recommends that all of the characteristics be sent to ensure that the correct font is selected**.

Note PCL 5 printers can print any number of distinct fonts per page, limited only by available memory.

Primary and Secondary Fonts

The printer maintains two independent font select tables for use in selecting a primary font and a secondary font. All of the characteristics previously described apply to both tables. This provides access to two distinct fonts, only one of which is selected at a given time. To alternate between the primary and the secondary font, the control codes “SI’’ (Shift In; ASCII 15) is used to designate **primary** and “SO’’ (Shift Out; ASCII 14) is used to designate **secondary.**

The factory default state is **primary** font designated.

Font Resolution

With the introduction of the LaserJet 4 printer, fonts can be printed at 600 dpi resolution. All scalable fonts automatically print at either 300 or 600 dpi resolution. A bitmapped font which was designed at 300 dots-per-inch can be printed on the LaserJet 4 printer at 600 dpi. However, a bitmapped font which was designed at 600 dpi is not available for selection at 300 dpi resolution.

Symbol Set Command

The Symbol Set command identifies the specific set of symbols in a font. “Symbols” are the alphanumeric, punctuation, or any other printable characters or symbols which may be included.

E$_{C}$ **(ID** Primary Symbol Set Command

ID = Symbol Set ID value (see Appendix C in the *PCL 5 Comparison Guide*)

E$_{C}$ **) ID** Secondary Symbol Set Command

ID = Symbol Set ID value (see Appendix C in the *PCL 5 Comparison Guide*).

**Default = ** 8U

**Range = ** N/A

If the specified symbol set does not exist, Roman-8 is selected (However, the specified symbol set is written into the font select table.)

Notes

The factory default primary and secondary symbol set is Roman-8. However, you may select a user default symbol set from the printer control panel (see the printer *User’s Manual*).

If the font is a scalable typeface, symbol set is determined from the values contained in the printer’s font selection table. To specify a different symbol set, send a symbol set selection command **prior** to the Font Selection ID command. (Also see “Font Selection by ID Command,” later in this chapter.)

A few symbol sets are listed below. For a more complete list, refer to Appendix C in the *PCL 5 Comparison Guide*.

Typical Symbol Set Values	
Symbol Set Name	**Symbol Set ID**
ISO 69: French	1F
ISO 8859-1 Latin 1 (ECMA-94)	0N
ISO 6:ASCII	0U
Legal	1U
Roman-8	8U
PC-8	10U
3 of 9 Barcode	0Y
Windows 3.1 Latin 1 (ANSI)	19U

Note User-defined symbol sets are supported in some HP LaserJet printers. To specify a user-defined symbol set, use the symbol set ID value as defined by the **Symbol Set ID Code Command**. See Chapter 10 for more information.

Example

To specify ASCII as the symbol set for the primary font, send:

$$\mathbf{E}_{\mathbf{C}}(\text{ØU}$$

To specify Roman-8 as the symbol set for the secondary font, send:

$$\mathbf{E}_{\mathbf{C}})8\text{U}$$

7-bit ISO Symbol Sets

The HP LaserJet printers provide several 7-bit ISO (International Organization for Standardization) or “keyboard” symbol sets to support European languages. Each ISO symbol set is a unique ordering of symbols contained within the Roman-8 symbol set (see Appendix B in the *PCL 5 Comparison Guide*). The printer automatically generates the requested ISO font from an HP Roman-8 font.

Spacing Command

Inter-character spacing can be specified as either proportional or fixed.

E$_{\mathbf{C}}$ (s # P - Primary spacing

E$_{\mathbf{C}}$) s # P - Secondary spacing

= 0 - Fixed spacing
1 - Proportional spacing

Default = 0

Range = 0, 1 (values outside the range are ignored)

When proportional spacing is specified and a proportionally-spaced font is not available (in the requested symbol set), a fixed pitch font with the current pitch specification is selected. If fixed spacing is specified but is not available, a proportional-spaced font is selected and the pitch characteristic is ignored.

For fixed-spaced bitmap fonts, both pitch and height (point size) are used for selection of font character size. However, for fixed-spaced scalable fonts, only pitch is used. For proportional bitmap and scalable fonts, only height is used for selection of font character size.

The user default primary and secondary spacings are implicitly set by selection of a user default font from the printer's control panel (refer to the printer *User's Manual*).

Example

To specify proportional spacing for the primary font, send:

E$_{\mathbf{C}}$**(s1P**

To specify fixed spacing for the secondary font, send:

E$_{\mathbf{C}}$**)s0P**

Pitch Command

The Pitch command designates the horizontal spacing of a fixed- spaced (bitmap or scalable) font in terms of the number of characters per inch. This characteristic is ignored when selecting a proportionally-spaced (bitmap or scalable) font, but is saved in the font select table and available when a fixed-spaced font is selected.

E$_C$ (s # H - Primary pitch

E$_C$) s # H - Secondary pitch

= # = Pitch in characters/inch

Default = 10

Range = 0.00

The value field (#) is valid to two decimal places.

If a pitch is specified that is not available, the next greater available pitch is selected. If no greater value is available, the closest available lesser value is selected.

The factory default primary and secondary pitches are ten characters per inch.

The user default primary and secondary pitches are implicitly set by selection of a users default font from the printer's control panel (refer to the printer *User's Manual*).

The range of valid pitch selections for a fixed-spaced scalable font is 576 to .10 characters/inch, however, not all valid pitches are available, since the pitch value is actually converted to a corresponding point size (height) value which is scaled by the printer. The effective pitch ranges are thus limited by height constraints.

The lower end of the pitch range is limited as a result of the font height limitation of 999.75 points. For example, the smallest available pitch for the internal Courier typeface would be about 0.12.

The upper end of the pitch range is similarly limited by the minimum recommended font height of 4 points. For Courier, this translates to a maximum recommended pitch of 30 (30 cpi), while for Letter Gothic the maximum recommended pitch is 36. When requested pitch values are outside of HP's recommended limits, unsatisfactory results can occur.

The following formula can be used to as a rule of thumb for computing a maximum recommended pitch:

$$\frac{1}{\text{Contour Width (percent of Em)} \times 4 \text{ (points)} \div 72 \text{ (points/inch)}}$$

The character (“contour”) width in the above formula is expressed as a percentage of an Em. For example, the width of characters in Courier is very close to 60% of an Em, and $30 = 1 \div (0.64 \div 72)$. (The width of characters in Letter Gothic is approximately 50% of an Em. For other fonts, refer to the font metric data supplied by the font vendor.)

Note

If a scalable fixed-space font is selected using an ID number, send the Pitch command to specify the size; otherwise, the size is determined by the pitch characteristic value of the former font (as listed in the font select table) See “Font Selection by ID Command” later in this chapter for more information.

Example

To specify 10 pitch for the primary font, send:

E$_C$(s10H

To specify 16.66 pitch for the secondary font, send:

E$_C$)s16.66H

Height Command

The Height command specifies the height of the font in points. This characteristic is ignored when selecting a fixed-spaced scalable font; however, the value is saved and available when a bitmap font or a proportionally-spaced scalable font is selected.

E$_C$ (s # V - Primary Height

E$_C$) s # V - Secondary Height

\# = Height in points

Default = 12

Range = 0.25 - 999.75

The value field (#) is valid to two decimal places. If the requested height is unavailable, the closest height is selected. All bitmap fonts whose heights are within a quarter point of the specified height are considered to have the specified height. For scalable fonts the value field is from .25 to 999.75 points in increments of 0.25 point (values are rounded to the nearest quarter point).

The factory default primary and secondary heights are 12 point. In PCL bitmap fonts, a point is 1/172 (0.01389) inch. For scalable fonts, the definition of a point varies in TrueType a point is 1/172 inch, while Intellifont fonts have 72.307 points to the inch.

The user default primary and secondary heights are implicitly set by selection of a user default font from the printer's control panel (refer to the printer *User's Manual*).

Note If a proportional-spaced scalable font is selected using an ID number, send the Height command to specify the point size otherwise, the size is determined by the height characteristic value of the former font (as listed in the font select table) See “Font Selection by ID Command” later in this chapter for more information.

Example

To specify a height of 12 points for the primary font, send:

$^{E}_{C}$(s12V

To specify a height of 14.4 points for the secondary font, send:

$^{E}_{C}$)s14.4V

If the above sequence was used for selection of a scalable font, the actual font would be scaled to 14.5 points.

Style Command

The Style command identifies the posture of a character, its width, and structure of the font symbols.

$^{E}_{C}$ **(s # S -** Primary Style

$^{E}_{C}$ **) s # S -** Secondary Style

Default = 0

Range = 0 - 32767 (values greater than 32767 are set to 32767)

Style values for the most common typefaces are listed in Table 8-1. Additional style values may also be obtained from the related font documentation provided with HP's font products.

Table 8-1 Common Font Styles

Value	Font Styles
0	(upright, solid)
1	italic
4	condensed
5	condensed italic
8	compressed, or extra condensed
24	expanded
32	outline
64	inline
128	shadowed
160	outline shadowed

Notes

With the introduction of the HP LaserJet IID printer, Hewlett-Packard expanded the style values (in the Font Header style value field) from a one-byte to a two-byte value field, expanding the style range from 0-255 to 0-32767. This expansion allows for additional styles.

Style values can be obtained by calculating the “Style Word” as described under “Style MSB” in Chapter 11.

For selecting style, an exact match is required. If there is no match, this characteristic is ignored, but stored in the font select table, available for the next selection.

Example

To specify an upright style for the primary font, send:

E_C(s0S

To specify an italic style for the secondary font, send:

E_C)s1S

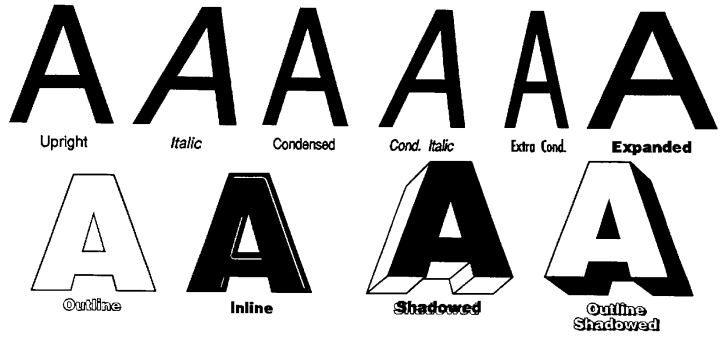

Figure 8-1 Common Font Styles

Stroke Weight Command

The Stroke Weight command designates the thickness of the strokes that compose the characters of a font.

$^{E}{}_{C}$ **(s # B -** Primary stroke weight

$^{E}{}_{C}$ **) s # B -** Secondary stroke weight

Default = 0

Range = - 7 to 7 (less than -7 maps to -7; greater than 7 maps to 7)

The value field (#) specifies the thickness of the strokes used in the design of the font. The supported stroke weight values are –7 through 7. The thinnest font available is –7; the thickest font available is +7. The standard stroke weight for a medium font is 0; the standard stroke weight for a bold font is 3; the standard stroke weight for a light font is –3.

Table 8-2 Stroke Weights

Value (#)	Typeface
-7	Ultra Thin
-6	Extra Thin
-5	Thin
-4	Extra Light
-3	**Light**
-2	Demi Light
-1	Semi Light
0	**Medium, Book, or Text**
1	Semi Bold
2	Demi Bold
3	**Bold**
4	Extra Bold
5	Black
6	Extra Black
7	Ultra Black

If the specified stroke weight is greater than or equal to 0 and is not available, the next thicker available stroke weight is selected. If no thicker stroke weight is available, the closest available thinner stroke weight is selected.

If the specified stroke weight is less than zero and is not available, the next thinner available stroke weight is selected. If no thinner stroke weight is available, the closest available thicker stroke weight is selected.

The factory default primary and secondary stroke weights are zero (medium).

The user default primary and secondary stroke weights are implicitly set by selection of a user default font from the printer's control panel (refer to the printer *User's Manual*).

Example

To specify a bold stroke weight for the primary font, send:

E$_{C}$(s3B

To specify a medium stroke weight for the secondary font, send:

E$_{C}$)s0B

Note Many typefaces were designed for advertising use, and a "medium" was used to describe the standard treatment. Later, additional treatments were designed for text use. Therefore, the typeface treatment designation "medium" may not always take a PCL value of 0. This weight value may be assigned to "book" or "text" treatment instead.

Typeface Family Command

The Typeface Family command designates the design of the font.

$^{E}_{C}$ (s # T - Primary typeface family

$^{E}_{C}$) s # T - Secondary typeface family

\# = Typeface family value (see Appendix C in the *PCL 5 Comparison Guide* for typeface values).

Default = [1]4099, Body Text

Range = [1]0 - 65535 (values greater than 65535 are set to 65535)

If the value field (#) specifies a typeface that is unavailable, this characteristic is ignored during font selection.

The factory default primary and secondary typefaces are Courier.

The user default primary and secondary typefaces are implicitly set by selection of a user default font from the printer's control panel (refer to the printer *User's Manual*).

There is some variation in how font selection occurs between HP LaserJet models. The typeface selection compatibility for two types of values is identified for various HP LaserJet printers in Chapter 2 of the *PCL 5 Comparison Guide*.

Note Use the typeface family values, listed in Appendix C in the *PCL 5 Comparison Guide*, for future typeface selection.

1. These values are not applicable to all HP LaserJet family printers. See the *PCL 5 Comparison Guide* for specifics.

Some typeface (two-byte) family values are listed below. For a complete listing of typeface family and base values, refer to Appendix C in the *PCL 5 Comparison Guide*.

Sample Typeface Values	
FamilyValue	**Typeface Family**
0	Line Printer
16602	Arial
4168	Antique Olive
4127	ITC Avant Garde
4119	CG Century Schoolbook
4101	CG Times
4148	Univers

Example

To specify CG Times as the typeface family for the primary font, send:

$^{E}_{C}$)s4101T

To specify Line Printer as the typeface family for the secondary font, send:

$^{E}_{C}$)s0T

Orientation

The Orientation command (**$^{E}_{C}$&l#O**) designates the position of the logical page with respect to the physical page. Earlier printers could only print bitmap fonts and raster graphics in the orientation for which they were designed. However, the HP LaserJet IID, IIP, 2000, and all PCL 5 HP LaserJet printers have the capability to automatically rotate bitmap fonts and raster graphics to match the page orientation; therefore, all fonts are available in all four page orientations and print directions. Whenever a scalable font is selected, it is created in the current orientation for printing. Refer to “Logical Page Orientation Command” and “Print Direction Command” in Chapter 5 for more information.

Font Selection Examples

Bitmap, Fixed-Spaced Font

This example illustrates how to select a primary, bitmap, Line Printer, fixed-spaced font with the following characteristics (note that all of the font characteristics are specified):

Table 8-3

CHARACTERISTIC	VALUE	ESCAPE SEQUENCE
Symbol set	ASCII	$^{E}_{C}$(0U
Spacing	Fixed	$^{E}_{C}$(s0P
Pitch	16.66 cpi	$^{E}_{C}$(s16.66H
Height	8.5 point	$^{E}_{C}$(s8.5V
Style	Upright	$^{E}_{C}$(s0S
Stroke weight	Medium	$^{E}_{C}$(s0B
Typeface family	Line Printer	$^{E}_{C}$(s0T

The following escape sequences can be sent to the printer to select a primary font with the above characteristics:

$$^{E}_{C}(0U\,^{E}_{C}(s0P\,^{E}_{C}(s16.66H\,^{E}_{C}(s8.5V\,^{E}_{C}(s0S\,^{E}_{C}(s0B\,^{E}_{C}(s0T$$

The previous sequence can be shortened by combining sequences that have the same two characters following the $^{E}_{C}$ character:

$$^{E}_{C}(0U\,^{E}_{C}(s0p16.66h8.5v0s0b0T$$

Scalable, Proportional-Spaced Font

This example illustrates how to select a primary, scalable, CG Times, proportional-spaced font with the following characteristics (note that all of the font characteristics are specified except pitch which is not required for a proportional font):

CHARACTERISTIC	VALUE	ESCAPE SEQUENCE
Symbol set	ASCII	**E_C(0U**
Spacing	Proportional	**E_C(s1P**
Height	14.25 point	**E_C(s14.25V**
Style	Upright	**E_C(s0S**
Stroke weight	Bold	**E_C(s3B**
Typeface family	CG Times	**E_C(s4101T**

The following escape sequences can be sent to the printer to select a primary font with the above characteristics:

E_C(0UE_C(s1PE_C(s14.25VE_C(s0SE_C(s3BE_C(s4101T

Combining the above sequences results in:

E_C(0UE_C(s1p14.25v0s3b4101T

Notes

If an escape sequence does not contain a value field, the printer assumes a value of zero; therefore, the command **E_C(sB** can be sent to the printer instead of **E_C(s0B**.

Sending shortened font selection commands can result in selection of an unexpected font. This is due to failure to track previously specified characteristics and their selection priority in relation to the current font selection. Thus, **it is recommended that all of the characteristics be sent** to ensure that the correct font is selected.

Summary of Font Selection by Characteristic

The following summarizes the procedure the printer uses to select a font. Selection by characteristic is an elimination process. The nine steps are performed in the following order:

Note When the printer is in 300 dpi mode, any 600 dpi bitmaps are eliminated before the selection process begins.

1Symbol Set - if the specified symbol set exists, that symbol set is selected; otherwise, Roman-8 is selected.

2 Spacing - if proportional spacing is specified and available, proportional spacing is selected. If proportional spacing is specified but is not available, fixed spacing is selected in the current pitch. (A proportionally-spaced font is always available in PCL 5 printers, but it may not be available in the specified symbol set.)

3 Pitch - applies only to fixed spaced fonts. If fixed spacing is specified and available, fixed spacing in the specified pitch is selected.

Bitmap Fonts: For a fixed-space bitmap font, if the specified pitch is not available, the next greater available pitch is selected. If no greater pitch is available, the closest available lesser pitch is selected. If fixed spacing is specified but is not available, a proportional-spaced font is selected and the pitch characteristic is ignored.

Scalable Fonts: For a fixed-spaced scalable font, the pitch is used to calculate the appropriate height. The Height selection command is not required. The printer calculates the appropriate height to correspond to the pitch. The user's height request is recorded in the printer's font select table for later font selections, but is ignored for this selection.

4 Height - the closest height available from the remaining fonts is selected. The closest height is in terms of absolute difference. All bitmap fonts whose heights are within a quarter point of the specified height are considered to have the specified height.

Note For proportionally-spaced scalable fonts, any specified height is available to the nearest quarter point. For fixed-spaced scalable fonts, the designated height is recorded, and the height is calculated from the requested pitch.

5 **Style** - if the specified style is available in the remaining fonts, that style is selected; otherwise, this characteristic is ignored.

6 **Stroke Weight** - if the specified stroke weight is available in the remaining fonts, that stroke weight is selected.

If the specified stroke weight is greater than or equal to 0 and is not available, the next thicker available stroke weight is selected. If no thicker stroke weight is available, the closest available thinner stroke weight is selected.

If the specified stroke weight is less than 0 and is not available, the next thinner available stroke weight is selected. If no thinner stroke weight is available, the closest available thicker stroke weight is selected.

7 **Typeface Family** - if the requested typeface is available in the remaining fonts, that typeface is selected; otherwise, this characteristic is ignored.

8 **Location** - if after performing all the preceding steps, more than one font remains, the available font from the highest priority font location is selected. The priority of the font locations are:

Priority of Locations	
Soft Font (Lowest ID first)	Highest
Cartridge Font[1]	|
SIMM Font	|
Internal Font	Lowest

1. In printers with two cartridge slots, one slot has priority over the other. Refer to Appendix E of the *PCL 5 Comparison Guide* for cartridge slot priority information for the different HP LaserJet printers.

9 **Orientation** - for bitmap fonts the last criteria considered for the selection is its orientation. If two fonts still remain and match in all the above characteristics except orientation, that font which matches the current page orientation is selected.

If there is a soft font (highest priority location) available that matches all selection characteristics, but is not in the current orientation, and there is an identical font available in a cartridge or internal font (lower priority location) that is in the current orientation, the soft font is selected and rotated.

Font Selectionby ID Command

Soft fonts can be specified using their associated ID numbers. (ID numbers are assigned to soft fonts using the Font ID command described in Chapter 9, *Font Management*).

E_C **(# X -** Designates soft font # as primary

E_C **) # X -** Designates soft font # as secondary

\# = font ID number

Default = 0

Range = 0 - 32767

If the designated font is present, the font is selected as the primary/secondary font and all primary/secondary font characteristics in the printer's Font Select Table are set to those of the selected font. However, if the selected font is proportionally spaced, the pitch characteristic is not changed.

If the designated font is not present, the current font is retained.

Notes

If a scalable font is selected using an ID number, send the Height or Pitch command (Height for proportional, Pitch for fixed) to specify the height or pitch; otherwise, the characteristic is determined by the value of the former font (as listed in the font select table).

If the font is a scalable typeface, symbol set is determined from the values contained in the printer's font selection table. To specify a different symbol set, send a symbol set selection command **prior** to the Font Selection ID command.

For shared or multi-user environments, Hewlett-Packard recommends that soft fonts be selected by characteristics rather than ID number.

Examples

To specify the font associated with ID number 7 as the primary font, send:

$^{E}_{C}$(7X

To specify the font associated with ID number 5 as the secondary font, send:

$^{E}_{C}$)5X

Select Default Font Command

The Default Font command sets all of the font characteristics to those of the user (control panel selected) default font.

$^{E}_{C}$ (3 @ - Default primary font characteristics

$^{E}_{C}$) 3 @ - Default secondary font characteristics

Note If the user default font is a proportionally-spaced font, the pitch characteristic is not affected by the default font command.

HP-GL/2 Font Selection

In addition to selecting fonts using the PCL font selection commands, fonts can also be selected and printed in HP-GL/2 mode using the HP-GL/2 label commands (refer to Chapter 23, *Character Group*). The HP-GL/2 font selection commands allow you to label vector graphic images and to create some special effects with fonts not otherwise available. These special effects include printing outline fonts from fonts which are not outline style, printing mirror-images of fonts, and printing fonts on any angle on the logical page. Fonts can also be scaled using HP-GL/2 vector graphics, however this font scaling method is rather program intensive and not the recommended method (refer to “HP-GL/2 Vector Graphics” in Chapter 25 for additional information).

Transparent Print Data Command

The Transparent Print Data command provides printing access to those characters which the printer normally defines as unprintable. These characters include decimal character codes 0, 7-15, and 27.

$^{E}_{C}$ **& p # X** [Transparent Print Data]

=Number of bytes of transparent print data.

Default = N/A

Range = 0 - 32767

Each transparent print data byte is interpreted as a single character code. The appropriate character is printed if one exists; otherwise, a Space is processed. For example, control codes such as LF, CR, FF are treated as print data while in Transparent Print Data mode.

Example

Assuming the currently selected symbol set is PC-8, send the following to print musical notes (decimal code 14):

$^{E}_{C}$**&p1X** *[ASCII 14]*

The brackets "*[ ]*" are provided for clarity and are not part of the command sequence.

Note In the ASCII symbol set, decimal 14 is the Shift Out control code (no printable character exists), however, in the PC-8 symbol set, decimal code 14 is also the musical notes character (printable from transparency mode). Refer to Appendix A for character codes for the various symbol sets.

Underline Command

The Underline command controls automatic text underlining.

$^{E}_{C}$ & d # D - Enable underline

\# = 0 - Fixed position
3 - Floating position

Default = 0

Range = 0, 3 (values outside range are ignored)

$^{E}_{C}$ & d @ - Disable underline

Once underlining is enabled, any positive horizontal movement causes an underline to be drawn. Positive horizontal movement includes the printing of text and positive horizontal cursor motion.

When fixed position underlining is enabled, the underline is drawn five dots below the baseline and is three dots thick. (The baseline is the dot row on which all of the characters in a given line appear to stand, see Chapter 11.) When floating position underline is enabled, the underline position is determined by the greatest underline distance below the baseline of all of the fonts printed on the current line. (The underline distance for a font is defined in the font header, see Chapter 11.)

Note The underline and the underscore character may not necessarily be aligned or be the same thickness.