DDP Digital Document Publisher 70e/92

PCL Programming Guide

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NOTICE TO USER

In an effort to meet the demands of a rapidly changing technology, the manufacturer is continually developing new features and functions to meet your changing printing or printer needs. Please be sure to consult all manual updates or addenda when using this product's documentation.

Revision Table

Manual Rev.	Machine Rev.	Page No.	Date
00	-	First Edition	May.2005
01	-	1-2(01): Deleted “(e.g., C:\Mercury\Fonts\PCL)” and “(i.e., C:\Mercury\Fonts\PCL)” and “Mercury”.	Nov.2005
		1-4(01): Changed PCL Fonts screen shot.	
		1-6(01): Changed Edit Installed Font screen shot.	
		1-7(01): Deleted “Mercury”.	
		1-11(01): Changed Missing Font Information screen shot. Changed PCL Macros screen shot.	
		1-14(01): Deleted “Mercury”. Changed Edit Installed Macro screen shot.	
		2-40(01): Deleted “Note: All other corner and edge staple positions provided by the Controller are for Mercury driver use only”.	
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		2-5: Deleted #1 for PCL Image Offset.	
		2-10: Changed Finisher name to Standard Finisher. Removed Booklet Finisher from Output Bin.	
		2-15: Modified misprint in Font Selection table.	
		2-33, 2-34: Removed NOTES from Environment Variables Summary.	
		2-40: Removed Booklet Finisher and INSERT1/2/3 from MEDIASOURCE Environment Variable.	
		2-41: Removed Booklet Finisher from OUTBIN Environment Variable.	
		Made change of all page number due to above changes.	

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Chapter 1
Fonts and Forms Installer

Overview

Through the Fonts and Forms Installer you can download, edit, and delete fonts and macros. The Fonts and Form Installer is accessed from the Windows printer driver: Fonts folder for fonts or Forms and Watermarks folder for macros.

In order to use a font or a macro (form), it must first be installed on either the host or on the printer's hard disk. The accessibility of the fonts/macros depends on their installed location. Host installed fonts/macros are visible only to a user on that host. Printer disk fonts/macros are visible to all network users that have the Fonts and Forms Installer on their system and have access to the Global Printer Information File.

Additionally, once fonts/macros have been installed on the host, they can be downloaded to the printer's RAM to improve performance.

Installed PCL fonts appear as printer-resident fonts in applications. Windows may substitute an appropriate screen font for the selected printer font, but the printed document will contain the real font.

Installed macros appear in the printer driver's Forms and Watermarks folder and can be selected as overlay macros.

When selecting a font or macro for use in an application, be aware that its location has an impact on performance. A font or macro can reside in three different locations:

- Host
- Printer hard disk
- Printer RAM

Host - Host based fonts and macros are downloaded to the printer along with each print job that requests the use of that font or form. Print time may increase because of the extra overhead of having to download the font or form in addition to the print job itself. However, you are guaranteed that this font is available to your print job because it is essentially part of your print job.

Printer Hard Disk - Fonts and forms installed on the printer's hard disk provide the advantage of being visible to all users in a network environment. Eliminating the need to download also helps printing speed, but there is still some overhead as fonts and forms must be uploaded to printer RAM.

Printer RAM - Printer memory based fonts and forms provide the best performance. However, they are subject to deletion if the printer's power is turned off, and, therefore, there is a possibility that they may not be available when requested. Fonts and forms must first be installed on the host or the printer's hard disk in order to download them to printer memory. Printer memory-resident fonts and forms are visible only to the host that performed the download. In a network environment, they are not be visible to other users.

Supported Font Formats

PCL Bitmap Fonts - The Fonts and Forms Installer recognizes PCL bitmap font files.

Supported Macro Formats

Any file containing a valid PCL macro definition is supported. PCL macros can be created from any document by selecting the "PCL Macro" output in the Job Options folder of the Windows printer driver (Page Description Language must be set to PCL5e in the Advanced folder).

Files Created During Installation

The Fonts and Forms Installer creates a Printer Font Metric (PFM) file for each font installed. For host installed fonts, the PFM is created in the directory where the font is installed.

For printer disk fonts installed from your system, the PFM is created in your PCL fonts directory and then copied to the same directory in which the selected Printer Information File resides (so there are two copies of this file).

When an Update is performed, PFM files for printer disk fonts not installed from your system are copied from the directory in which the selected Printer Information File resides to your PCL fonts directory. All copies of a PFM file for a given font are deleted when the font is deleted.

When you select a Printer Information File that was created by the system administrator, a copy of this file is created in your PCL fonts directory with the same name but with a .LOC extension. The Fonts and Forms Installer does not provide any means for deleting this local copy of the Printer Information File.

NOTE:
No additional files are created for macros.

PFM File - Windows printer drivers rely on Printer Font Metric (PFM) files for a description of printer fonts.

Overlay Macro

An overlay macro is a PCL macro that is called at the end of each page of a print job. It can be used to place a logo on the page or to print forms.

Network Issues

Downloading, Editing, and Deleting Printer Disk Fonts and Macros - If you have the appropriate access rights and you attempt to download, edit, or delete a printer disk font or macro, and the Fonts and Forms Installer determines that the Printer Information File and its local copy are different, a message informs you that the action has been denied and an update is performed automatically. You can then attempt the download, edit, or delete again.

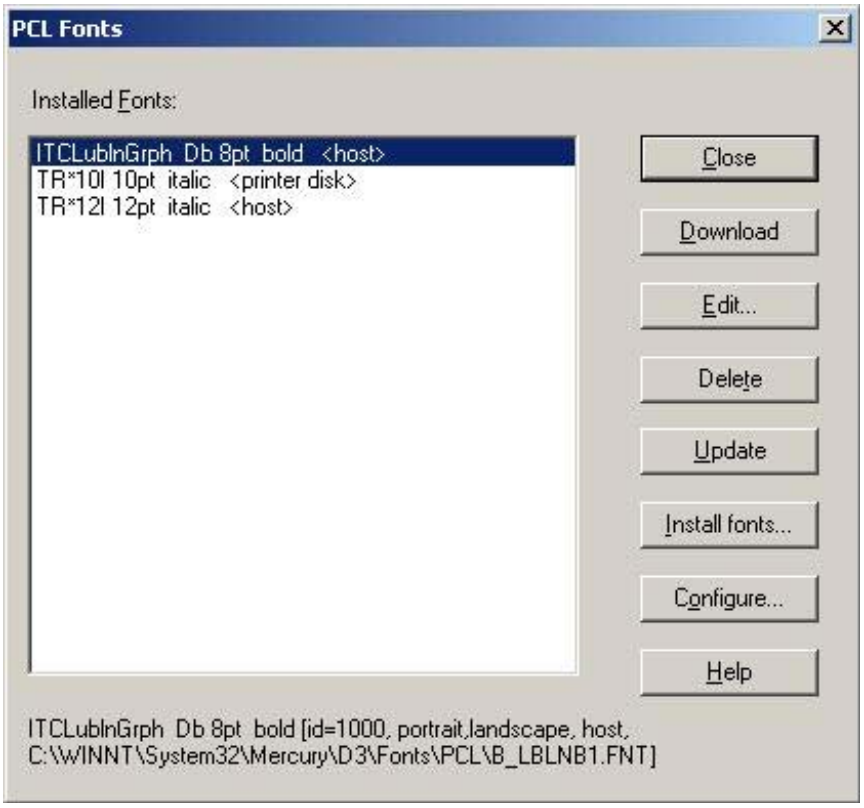
Printer Information File - Be sure to use Universal Naming Convention (UNC) names when selecting the Printer Information File. (For example: \\myfileserver\public\filename.)

Access Rights

Access rights are implemented to limit the operations that can be performed on printer disk fonts and macros that many users may rely upon. To attain access rights, use the Hidden Key (Ctrl > Shift) when clicking Install on the Install PCL Fonts Dialog box. Contact your system administrator for additional information.

PCL Fonts Dialog

The PCL Fonts dialog includes the basic tools for the installation and management of printer fonts. In addition to displaying the names and locations of fonts installed using the Fonts and Forms Installer, it provides functions for downloading, editing, deleting, updating, and installing fonts.



Installed Fonts - The Installed Fonts lists the names and locations of all fonts installed using the Fonts and Forms Installer (if no Printer Information File has been selected via the Configure dialog, only host installed fonts appear in this list). You can download, edit, or delete any font in this list by selecting the entry and clicking on the appropriate button. The download, edit, and delete buttons are disabled for printer disk fonts unless you have the appropriate access rights.

Additional information about a particular font appears in a status line below the list box when that font is selected.

The fonts listed in this window appear in the list of available fonts in your application.

Font Status Line - This line displays additional information about the font currently selected in the Installed Fonts list. This information consists of the font name, the ID assigned by the Fonts and Forms Installer, orientation, the installed location (either host or printer disk), and the file name of the installed font (host installed fonts include a path). The font name and ID can be modified by editing the font.

Download - Copies the selected font to printer memory (RAM) and makes it permanent. Once downloaded, the selected font is denoted with the word *memory*, and the Memory resident checkbox in the Edit Installed Font window is enabled (checked).

> ***NOTE:***
> *Fonts that you download from your system appear as memory-resident on your system only.*

All fonts have an identification number (ID) associated with them that is automatically generated by the Fonts and Forms Installer at the time of installation. In assigning IDs, the system will not introduce conflicts by assigning an ID that is already used by a host-installed font on your system or a printer disk-installed font.

However, it is possible to install a font on your system which has the same ID as a font installed on another user's system. The Fonts and Forms Installer does not know which IDs are used by host-installed fonts on other systems and therefore cannot prevent duplicates at installation time. This allows for the possibility of ID conflicts when multiple users download host-installed fonts to RAM. If you download a host font that has the same ID as a host font previously downloaded by another user, your font will still be downloaded but it will overwrite the other user's font.

To avoid such conflicts, it is advised that the system administrator allocate a unique range of ID values for each user. Then, before downloading a host font or macro, edit it and change the Font ID to one of the IDs allocated to you.

Note that fonts residing in printer memory are deleted when the printer's power is cycled. If you suspect that a font you downloaded is no longer in printer memory, you should edit it and uncheck the Memory resident checkbox. Failure to do so will result in a different printer font being selected when the font is used in your document.

NOTE:
The Download button will be disabled for printer disk fonts.

Edit - Enters the Edit Installed Font dialog.

NOTE:
The Edit button will be disabled for printer disk fonts unless you have the appropriate access rights.

Delete - Removes the highlighted, installed item. The printer driver, Fonts and Forms Installer, and your applications will no longer be aware of deleted items. In addition to deleting the reference, delete provides the option to delete the actual font (and PFM file) file from its installed location. Answering YES to the prompt will delete the reference and the file, NO will delete only the reference, and CANCEL will not delete anything.

NOTE:
The Delete button will be disabled for printer disk fonts unless you have the appropriate access rights.

Update - Causes your local system to be updated with information from the Printer Information File. An update is performed automatically each time you enter the Fonts and Forms Installer, and when a Printer Information File is selected via the Configure button. However, while in the Fonts and Forms Installer, you will not be aware of any fonts or macros installed on the printer disk by another user unless you perform an update by pressing the Update button. The Installed Fonts (or Installed Macros) list box will reflect any changes resulting from the update.

The **Update** button is only enabled if a Printer Information File has been selected via the Configure button in either the PCL Fonts dialog or the PCL Macros dialog.

Update is only necessary in a network environment.

NOTE:
In addition to explicitly selecting the Update button, automatic (and sometimes transparent) updates occur under the following conditions:

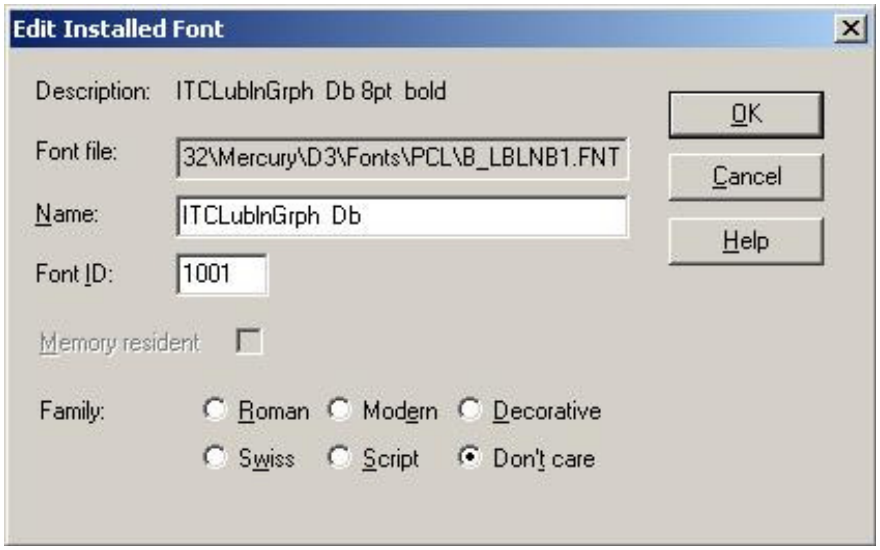
- *When a Printer Information File is selected.*
- *Each time the Fonts and Forms Installer is entered when a Printer Information File is selected.*
- *When you attempt to download, edit, or delete a printer disk font and the local copy of the Printer Information File is out of date.*

Install fonts - Enters the Install PCL Fonts dialog.

Configure - Enters the Configure dialog. See *Configure Dialog* on page 1-18.

Edit Installed Font Dialog

The Edit Installed Font window allows modification of some basic attributes of installed fonts.



Description - Identifies the font as described in the Installed Fonts list box of the PCL Fonts dialog. The description is made up of the fonts face name and attributes such as point size, style, and weight.

Font File - Identifies the file name of the installed font as it appears on the hard disk (host or printer). The file name of a host installed font will include the path. Printer disk-installed fonts are identified by name only.

Name - The face name of the font (maximum of 16 characters)-If the font file contained a face name then this name is used by default at installation time. If the font file did not contain a face name, then the name is the one chosen at installation. This name appears in the Font Description field of this dialog, the Installed Fonts list box and status line of the PCL Fonts dialog, and in the fonts list box of your application. Editing this field effectively edits the face name field of the fonts PFM file.

Font ID - This field contains the ID automatically generated and assigned to the font by the Fonts and Forms Installer during installation. Editing of this field should only be necessary to avoid or eliminate ID conflicts among fonts downloaded to printer RAM. If you select an ID that is already in use, a message will inform you that the ID is in use and cannot be used, and the ID will revert to the previous value. (Range 0 - 32767)

NOTE:

Automatically generated font IDs are in the range of 1000-1999 for fonts installed to the host and 3000-3999 for fonts installed to the printer disk.

When a font is installed the Fonts and Forms Installer determines which IDs are used by looking in the HOSTINFO.INI file (located in the dBase directory) for all IDs assigned to host installed fonts on your system and the Printer Information File (if one is selected) for all IDs assigned to printer disk installed fonts. It then selects the lowest numerical value in the range that is not used and assigns this as the default ID.

If a font is memory resident (as the result of a download performed on your system) and its ID changes, whether explicitly or as the result of an Update, the memory resident reference in the HOSTINFO.INI file will be removed and the font will no longer appear as memory resident.

NOTE:

In addition to explicitly selecting the Update button, automatic (and sometimes transparent) updates occur under the following conditions:

- *When a Printer Information File is selected.*
- *Each time the Fonts and Forms Installer is entered when a Printer Information File is selected.*
- *When you attempt to download, edit, or delete a printer disk font and the local copy of the Printer Information File is out of date.*

Memory resident - If checked, this indicates that the font was previously downloaded to printer RAM. However, it does not guarantee that the font is in printer RAM, as the printer's power may have been cycled, nor may it be used to make a font memory resident. It is only enabled if the box is checked. Unchecking this checkbox will remove the information from the Windows HOSTINFO.INI file indicating that this font is memory resident and the checkbox will become disabled.

This checkbox is intended to allow the user to remove the memory resident status of a font if they know or suspect that the font is no longer present in printer RAM.

Family - Allows selection of the family name of the font being edited. This selection may influence the accuracy of the Windows screen font substitution mechanism. Editing this field effectively edits the family field of the fonts PFM file.

Windows groups typefaces into five "families," based on the general appearance of the type. These families are called Modern, Swiss, Roman, Script and Decorative. The most common typefaces are categorized as Modern, Swiss, or Roman, depending on two characteristics.

The first characteristic involves “stroke width” -- the width of the lines that make up the characters -- which can be constant or variable. Typefaces in the Modern family have constant stroke widths. Typefaces in the Swiss and Roman families have variable stroke widths. (Most typefaces with constant stroke widths are also of “fixed pitch,” which means that all the characters in the font are the same width. Typefaces with variable stroke widths are generally of “variable pitch,” which means that the characters have variable widths. However, it is the stroke width rather than the use of fixed or variable pitch that determines the family of a particular typeface.)

The second characteristic involves “serifs,” which are small lines that finish off the character strokes. The Swiss family comprises “sans serif” typefaces (typefaces with no serifs); the Roman family comprises serif typefaces.

The Script family comprises typefaces that resemble cursive handwriting. The Decorative family includes typefaces of elaborate design (such as Old English). At one time, symbol fonts were considered to be in the Decorative family, but they are now generally identified as symbol fonts by a character-set attribute of the font -- the character set is Symbol rather than ANSI or OEM.

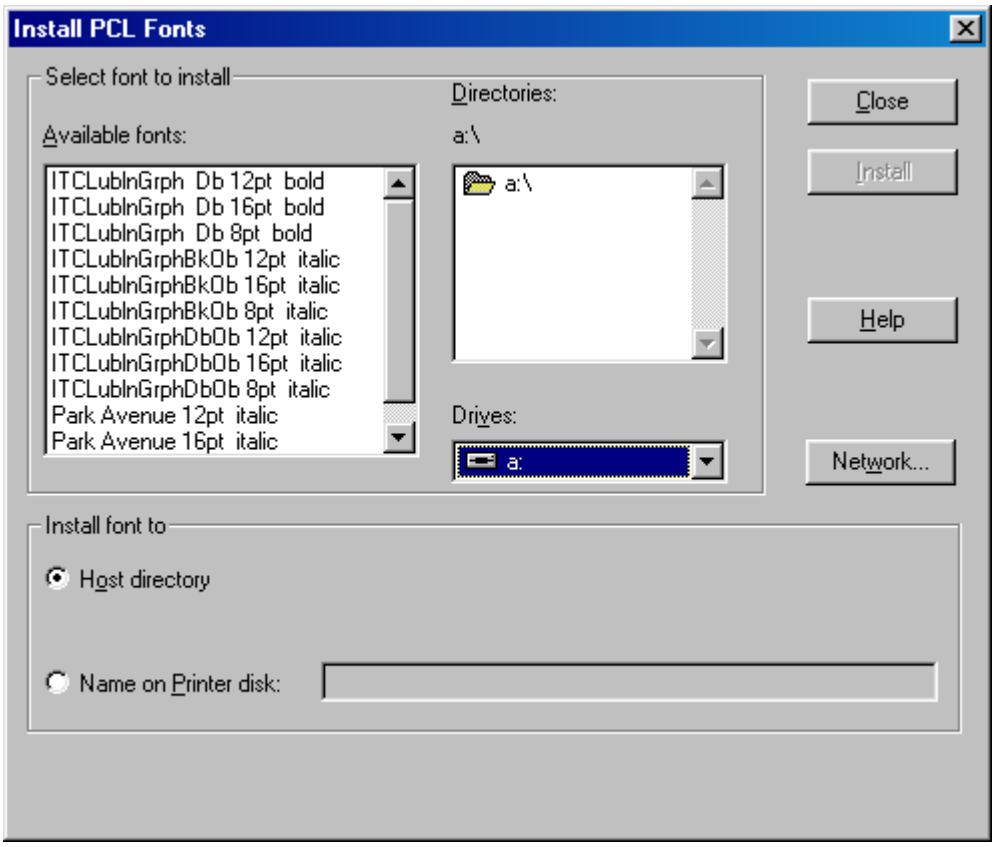
The following table summarizes the grouping of typefaces into families and shows the identifiers (defined in WINDOWS.H) that programs can use to specify the font family.

Font Family	Stroke	Usual Pitch	Serifs	Typical Typefaces
FF_MODERN	Fixed	Fixed	--	Courier, Elite, Pica
FF_SWISS	Variable	Variable	No	Helvetica, Avant Garde
FF_ROMAN	Variable	Variable	Yes	Times Roman, Palatino, New Century Schoolbook Cursive, Zapf Chancery, Old English
FF_SCRIPT	--	--	--	Cursive, Zapf Chancery, Old English
FF_DECORATIVE	--	--	--	Old English

WINDOWS.H also includes a sixth font-family identifier, FF_DONTCARE, which a program can use when it wants to select a font but doesn’t care which family it comes from.

PCL Fonts Install Dialog

The Install PCL Fonts dialog allows for the selection and installation of fonts.



Select font to install - The Available Fonts list contains the names of all valid fonts residing in the currently specified directory. If a valid file font does not contain a face name for the font, the file name of the font is used and will appear in the Available Fonts list enclosed in parentheses. The user will be prompted to enter a face name if the user attempts to install a font whose name is enclosed in parentheses. If installing a font requires entering a face name, the face name entered will appear in the Installed Fonts list when the installation is complete.

Install font to - Install Font To indicates the destination for the font installation. There are two possible destinations:

Host directory - This radio button is the default setting and indicates that the font selected in the Available Fonts list is to be installed on the host system.

Name on Printer disk - This radio button indicates that the font selected in the Available Fonts list is to be installed on the printer's hard disk with the name specified in this field. By default, the field contains the font's name as it appears in the Available Fonts list plus the font's file name. The Printer disk option is disabled unless you have the appropriate access rights *and* a Printer Information File is currently selected (maximum 16 characters).

Install - Performs the actual installation of the selected font. If the font selected for installation does not have a valid face name (e.g., it is enclosed in parentheses), the user will be prompted to enter a face name.

If installing to the host, the font file is copied to the location specified in the Host directory field. The user will be prompted if the host directory field is blank or contains a directory that does not exist. The Installed Fonts list in the PCL Fonts window will now show that this font is installed on the host.

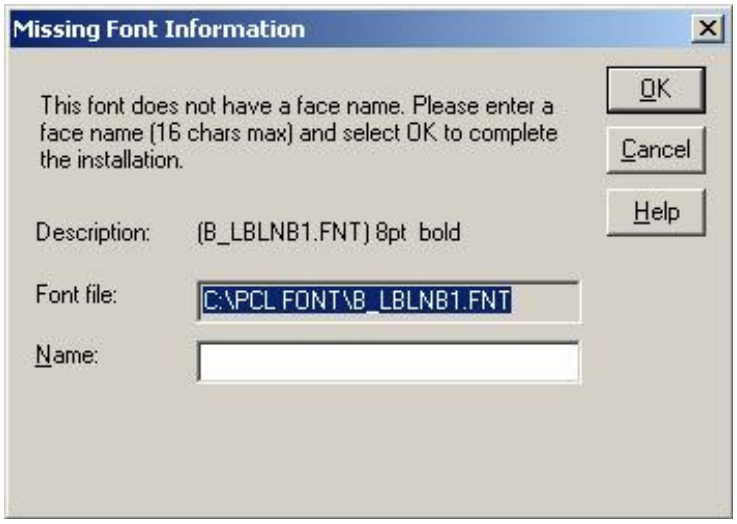
If installing to printer disk, the font file is copied to the printer's hard disk and given the name specified in the **Name on Printer disk** field. The Installed Fonts list in the PCL Fonts window will now show that the font is installed on the printer's hard disk.

NOTE:
This button is enabled only if a font is selected.

Only one font may be installed at a time.

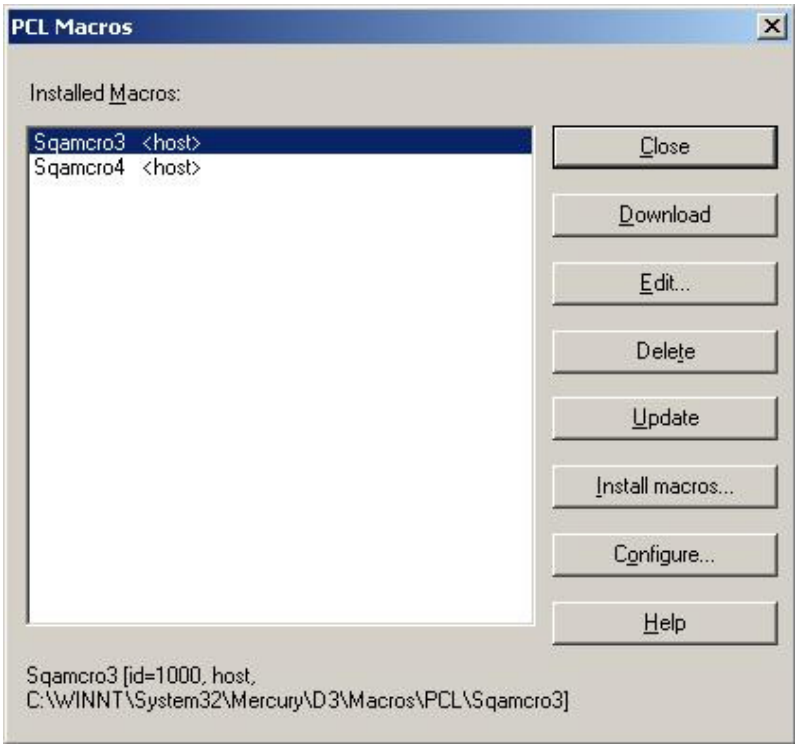
Missing Font Information Dialog

This dialog is presented when attempting to install a font which has no face name. To complete the installation, a face name must be entered in the Name field of this dialog. The face name entered in this field, which may be anything, is stored in the PFM file created for this font during installation.



PCL Macros Dialog

The PCL Macros dialog includes basic tools for the installation and management of printer macros. In addition to displaying installed macros, it provides functions for downloading, editing, deleting, updating, and installing macros.



The Installed Macros box lists the names and locations of all macros installed using the Fonts and Forms Installer. You may download, edit, or delete any macro in this list by selecting the entry and clicking on the appropriate button. The download, edit, and delete buttons will be disabled for printer disk macros unless you have the appropriate access rights.

Additional information about a particular macro will appear in a status line below the list box when that macro is selected.

The macros listed in this window will appear in the list of available Forms in the printer driver's Job Options folder.

Macro Status Line - This line displays additional information about the macro currently selected in the Installed Macros list. This information consists of the macro's name, the ID assigned by the Fonts and Forms Installer, the installed location (either host or printer disk), and the file name of the installed macro (host-installed macros will include a path). The macros name and ID may be modified by editing the macro.

Download - Copies the selected macro to print memory (RAM) and makes it permanent. Only host-installed macros may be downloaded to printer memory. Once downloaded, the selected macro will be denoted with the word 'memory' and the Memory resident checkbox in the Edit Installed Macro window will become enabled and checked.

NOTE:
Macros that you download from your system appear as memory resident only on your system.

All macros have an identification number (ID) associated with them that is automatically generated by the Fonts and Forms Installer at the time of installation. In assigning IDs, the system will not introduce conflicts by assigning an ID that is already used by a host- installed macro on your system or a printer disk installed macro.

However, it is possible to install a macro on your system which has the same ID as a macro installed on another user's system. The Fonts and Forms Installer does not know which IDs are used by host-installed macros on other systems and therefore cannot prevent duplicates at installation time. This allows for the possibility of ID conflicts when multiple users download host-installed macros to RAM.

If you download a host macro that has the same ID as a host macro previously downloaded by another user, your macro will still be downloaded but it will overwrite the other user's macro. To avoid such conflicts, it is advised that your system administrator allocate a unique range of ID values for each user. Then, before downloading a host font or macro, edit it and change the Font ID to one of the IDs allocated to you.

Note that macros residing in printer memory are deleted when the printer's power is cycled. If you suspect a macro you downloaded is no longer in printer memory, you should edit it and uncheck the Memory resident checkbox. The overlay will not occur if Memory resident is checked and the macro is not in RAM.

NOTE:
The Download button will be disabled for printer disk macros.

Edit - Enters the Edit Installed Macro dialog.

> ***NOTE:***
> *The Edit button will be disabled for printer disk macros unless you have the appropriate access rights.*

Delete - Removes the installed item from the Installed list. The printer driver, Fonts and Forms Installer, and your applications will no longer be aware of deleted items. In addition to deleting the reference, Delete provides the option to delete the actual macro file from its installed location. Answering YES to the prompt will delete the reference and the file; NO will delete only the reference; and CANCEL will not delete anything.

> ***NOTE:***
> *The Delete button will be disabled for printer disk macros unless you have the appropriate access rights.*

Update - Causes your local system to be updated with information from the Printer Information File. An update is performed automatically each time you enter the Fonts and Forms Installer, and when a Printer Information File is selected via the Configure button. However, while in the Fonts and Forms Installer, you will not be aware of any fonts or macros installed on the printer disk by another user unless you perform an update by pressing the Update button. The Installed Fonts (or Installed Macros) list box will reflect any changes resulting from the update.

The Update button is only enabled if a Printer Information File has been selected via the Configure button in either the PCL Fonts dialog or the PCL Macros dialog.

Update is only necessary in a network environment.

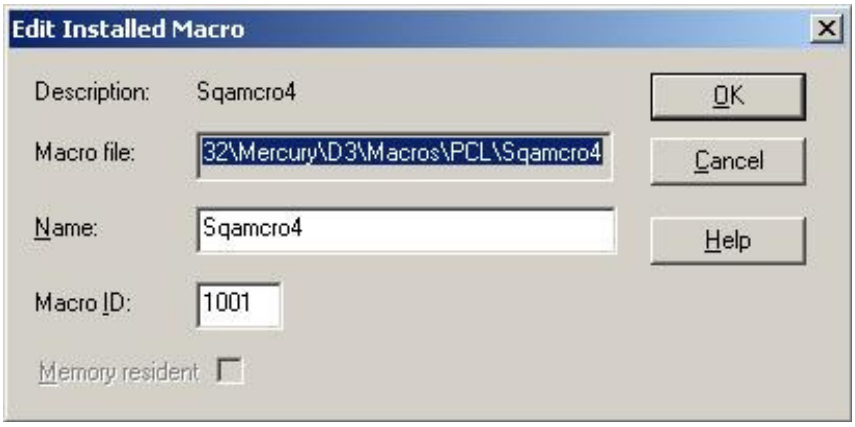
> ***NOTE:***
> *In addition to explicitly selecting the Update button, automatic (and sometimes transparent) updates occur under the following conditions:*
> - *When a Printer Information File is selected.*
> - *Each time the Fonts and Forms Installer is entered when a Printer Information File is selected.*
> - *When you attempt to download, edit, or delete a printer disk font and the local copy of the Printer Information File is out of date.*

Install macros - Enters the Install PCL Macros dialog.

Configure - Enters the Configure dialog. See *Configure Dialog* on page 1-18.

Edit Installed Macro Dialog

The Edit Installed Macro window allows modification of some basic attributes of installed macros.



Description - Identifies the macro as it is described in the Installed Macro list box of the PCL Macros dialog. The description is made up of the macro's name as chosen during installation.

Macro file - The file name of the macro as it appears on the disk where it was installed.

Name - The name of the macro as chosen during installation. Unless the user selects another name, the file name of the macro is used by default at installation time. This name appears in the Macro Description field of this dialog, the Installed Macros list box and status line of the PCL Macros dialog, and in the Overlay Macros list in the driver's Options dialog. (Maximum length for a Macro Name is 16 characters)

Macro ID - This field contains the ID automatically generated and assigned to the macro by the Fonts and Forms Installer during installation. Editing of this field should only be necessary to avoid or eliminate ID conflicts among macros downloaded to printer RAM. If you select an ID that is already in use, a message will inform you that the ID is in use and may not be used, and the ID will revert to the previous value (range 0 - 32767).

NOTE:

Automatically generated macro IDs are in the range of 1000-1999 for macros installed to the host and 3000-3999 for macros installed to the printer disk.

When a macro is installed the Fonts and Forms Installer determines which IDs are used by looking in the Windows HOSTINFO.INI file (located in the dBase directory) for all IDs assigned to host-installed macros on your system and the Printer Information File (if one is selected) for all IDs assigned to printer disk installed macros. It then selects the lowest numerical value in the range that is not used and assigns this as the default ID.

If a macro is memory resident (as the result of a download performed on your system) and its ID changes, whether explicitly or as the result of an Update, the memory resident reference in the HOSTINFO.INI file will be removed and the macro will no longer appear as memory resident.

NOTE:

In addition to explicitly selecting the Update button, automatic (and sometimes transparent) updates occur under the following conditions:

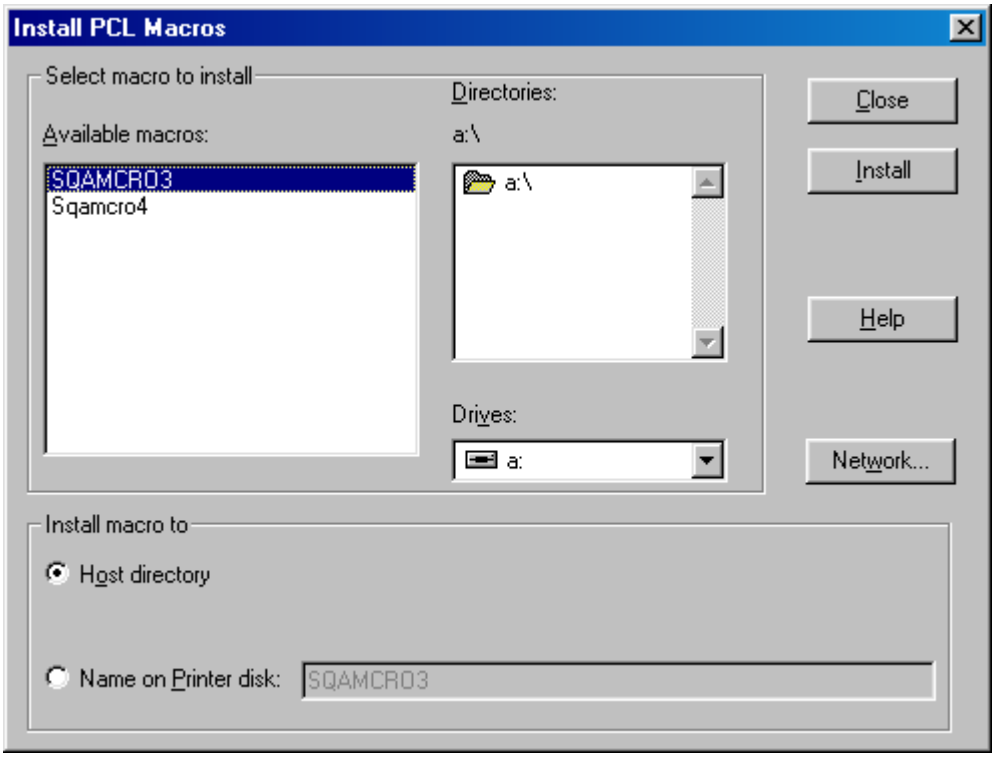
- *When a Printer Information File is selected.*
- *Each time the Fonts and Forms Installer is entered when a Printer Information File is selected.*
- *When you attempt to download, edit, or delete a printer disk font and the local copy of the Printer Information File is out of date.*

Memory resident - If checked, this indicates that the macro was previously downloaded to printer RAM. However, it does not guarantee that the macro is in printer RAM, as the printer's power may have been cycled, nor may it be used to make a macro memory resident. It is only enabled if the box is checked. Unchecking this checkbox will remove the information from the HOSTINFO.INI file that was designating the macro as memory resident, and the checkbox will become disabled.

This checkbox is intended to allow the user to remove the memory resident status of a macro if the user knows or suspects that the macro is no longer present in printer RAM.

Install PCL Macros Dialog

The Install PCL Macros dialog allows for the selection and installation of macros.



Select macro to install - The Available Macros list contains the file names of the all files residing in the currently specified directory. By default the macro's name is its file name. The user will be prompted to accept or change the macro name when installing a macro.

> ***NOTE:***
> *It is the user's responsibility to make sure the file selected for installation contains a valid PCL macro definition. The Fonts and Forms Installer will accept any file and assume it contains a macro definition.*

Install macro to - Install Macro To indicates the destination for the macro installation (Maximum 16 characters). There are two possible destinations:

Host directory - This radio button is the default setting and indicates that the macro selected in the Available Macros list is to be installed on the host system.

Name on Printer disk - This radio button indicates that the macro selected in the Available Macros list is to be installed on the printer's hard disk with the name specified in this field. By default this field contains the macro's name as it appears in the Available Macros list. The Printer disk option is disabled unless you have the appropriate access rights and a Printer Information File is currently selected.

Install - Performs the actual installation of the selected macro. The user will be prompted to accept or change the macro name. If installing to the host, the macro file is copied to the location specified in the Host directory field. The user will be prompted if the host directory field is blank or contains a directory that does not exist.

The Installed Macros list in the PCL Macros window now shows that this macro is installed on the host. If installing to printer disk, the macro file is copied to the printer's hard disk and given the name specified in the **Name on Printer disk** field. The Installed Macros list in the PCL Macros window will now show that the macro is installed on the printer's hard disk.

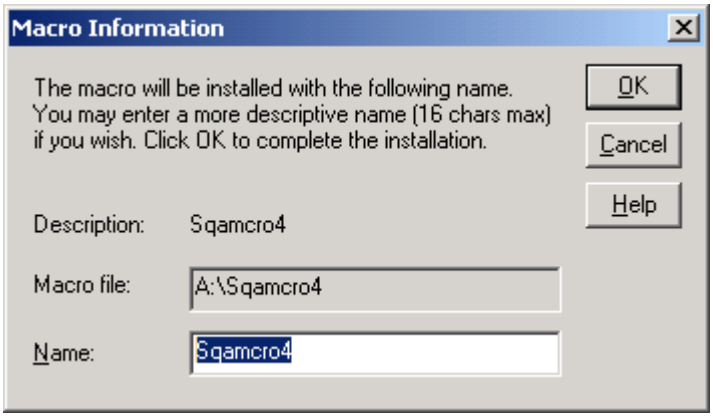
NOTE:
This button is enabled only if a file is selected.

Only one macro may be installed at a time.

Network - Opens the standard Connect Network Drive dialog if the system is connected to a network.

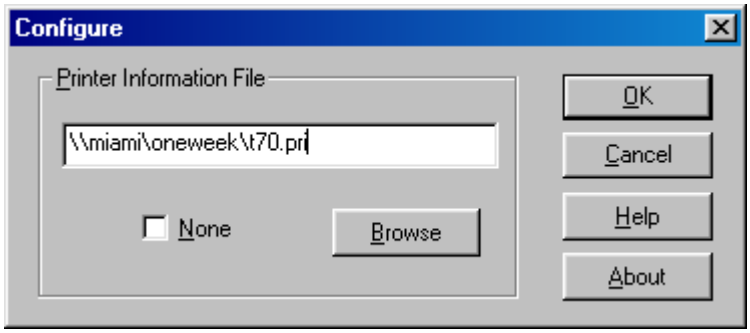
Macro Information Dialog

This dialog is presented when installing a macro to allow modification of the default name given to the macro. The user may change the name in the Name field or choose to accept the default name presented. Selecting OK will complete the installation.



Configure Dialog

The Configure dialog allows selection of a Printer Information File that describes which fonts and/or macros are installed on the printer.



Printer Information File - The Printer Information File contains information about fonts and macros installed on the printer's hard disk. This file must be created by your system administrator and is intended to reside on a network drive that is accessible to all users.

You may select a Printer Information File via the Configure button in either the PCL Fonts or PCL Macros dialog. Each time anyone installs a font or macro on the printer's hard disk, information about that font or macro is recorded in the currently selected Printer Information File.

When a user selects a Printer Information File or an update occurs, this file is copied to the user's Windows directory (and given the extension .LOC). This local copy of the Printer Information File is maintained to improve performance.

Upon selection of a Printer Information File, the Installed Fonts list (or Installed Macros list) will automatically be updated to reflect any fonts (or macros) installed on the printer's hard disk.

Contact your system administrator for the name and location of this file.

This field and the **Browse** button are only enabled if the **None** checkbox is unchecked.

> ***NOTE:***
> *Universal Naming Convention (UNC) names should be used, not specific drive letters as these may change. UNC example: \\fileserver\public\myfile.*

None - If checked, this indicates that no Printer Information File is specified. With no Printer Information File selected, you may not install fonts or macros on the printer's hard disk, and you will not see any fonts or macros that are installed on the printer's hard disk.

Checking this box clears the Printer Information File field above and disables the **Browse** button.

Browse - Opens the standard Browse dialog.

Chapter 2
HP PCL5e Language Printer Commands

Additional PCL5e printer codes and commands needed to use the unique features of the printer are included in this section.

NOTE:
HP 4000 Series printers use the HP Printer Command Language, Level 5e. This language, usually referred to as PCL5e, includes both the PCL and HP-GL/2 command structures.

For a detailed description of HP PCL 5, see *HP PCL5 Comparison Guide Edition 1, E1097.*

About PCL5e

PCL5e is Hewlett Packard's Printer Command Language. PCL5e adds scalable fonts and GL/2 vector graphics to the basic text and raster graphics capabilities of earlier levels of HP's printer emulations.

PCL5e printer language commands can be divided into three different groups: printer control codes, PCL commands, and HP-GL/2 commands.

Within the PCL5e context, there are two types of commands: control codes and escape code sequences. Escape codes are described in detail in the following pages. Unprintable control codes cause the printer to do some function such as eject a sheet of paper. These codes and their functions are listed below.

Code	ASCII	Description
Backspace	BS	Move one column left or take no action if already at left margin.
Carriage Return	CR	Move to the left margin on the current print line. May be modified by an escape sequence code.
Escape	ESC	Begin a special control sequence.
Form Feed	FF	Move to the same column in first line at the top of the next page. May be modified by an escape sequence.
Line Feed	LF	Move to the same column in the next line. May be modified by an escape sequence.
Horizontal Tab	HT	Move to the next horizontal tab stop.
Shift In	SI	Select the current primary font for the printable characters that follow. Use this font until SO is received.
Shift Out	SO	Select the current secondary font for the printable characters that follow. Use this font until SI is received.

PC-DOS Application Escape Character Commands

The following lists the escape character commands for some of the more familiar MS-DOS applications. Escape characters can be entered from the application.

DOS Application	Keys To Enter	What You See
Lotus 1-2-3 and Symphony	Type \027	027
Microsoft Word for DOS	Hold down **ALT** key and type 027 on the numeric keypad	‥
WordPerfect for DOS	Type 027	<27>
MS-DOS Editor	Hold down **CTRL P** then **ESC**	¨
MS-DOS Edlin	Hold down **CRTL V** then [	^[
dBase	??CHR(27)+“command”	//CHR(27)+“ ”

Using PCL5e Printer Escape Sequences

A printer command escape sequence always begins with the escape character (ESC). The escape sequence is a command that tells the printer to perform a certain function. It consists of an ESC code (27 decimal or 1B hexadecimal) followed by one or more printable characters (48 through 126 decimal, 30 through 7E hexadecimal).

Most escape sequence printer commands consist of the ESC code followed by a character (within the range of 33 through 47 decimal, 21 through 2F hexadecimal), a group character (within the range of 96 through 126 decimal, 60 through 7E hexadecimal), a value field, and a terminating character.

The value field specifies a number whose interpretation depends on the command. A value field is indicated by [#] in the escape sequences. In general, numbers can start with a plus (+) or minus (-) sign indicating a positive or negative value.

NOTE:

In this manual, a value field is indicated by [#] in the escape sequence. When sending data for a value field, do not include the brackets ([ ])*.*

The + or - sign is followed by one or more ASCII numerals followed by a decimal point (ASCII period) and more numerals. The sign and decimal point can be omitted if not needed.

Value fields without a sign are treated as positive numbers. Value fields without decimal points are treated as integers. If an integer value is required, fractions are truncated. Spaces within the value field are ignored.

The terminating characters indicate that the escape sequence command is complete. The emulation uses characters within the range of 64 through 94 decimal (40 through 5E hexadecimal) as terminators. When escape sequences are combined, group characters are used instead of terminating characters.

Some escape sequences must be followed by binary data. Usually the number of bytes of binary data is specified within the command.

Combining Escape Sequence Commands

The amount of data sent to the printer can be reduced by combining related escape sequence commands. To combine the escape sequence commands, omit the ESC character, group character, and character from all but the first command. Change the terminating character to lower case for all but the last command.

For example, ESC * c 12.34 H, ESC * c 56.78 V, ESC * c 75 G, and ESC * c 2 P can be combined into ESC * c 12.34 h 56.78 v 75 g 2 P.

NOTE:
In this manual, escape code sequences are printed with spaces between the individual characters for clarity. Do not include these spaces when using the commands.

Escape Sequences Syntax

The escape sequence syntax includes the lower case letters “l” and “o” that are easily confused with the numbers one (1) and zero (0). For clarity, the lower case “l” is italicized (*l*) in the escape sequence descriptions and listings.

If escape sequence does not work correctly, make sure that you did not use a “0" (zero) or “1" (one) where a letter “o” or “l” is needed.

Note that the spaces shown in the escape sequences should not be included when a command is sent to the printer. The brackets ([and]) used to show value fields or data are also not part of the escape sequences.

When you see [#] in an escape code sequence, you must supply a parameter value. Replace the [#] with a decimal or hexadecimal value. When using a quoted string in BASIC, replace the [#] with an ASCII decimal value or character. In both cases, do not include the brackets.

HP PCL5e Escape Code Sequences

Job Controls

ESC % -12345X Universal exit/start of PJL.

ESC E Reset printer to user defaults. All temporary fonts and macros are deleted. Any remaining data is printed using the user default values.

ESC & *l* [#]X Select [#] of copies (1 to 32,767).

ESC & *l* [#]U Set left (long edge) offset registration in decipoints (1/720") to adjust the logical page position on the width of the physical page. Both positive and negative values are accepted.

ESC & *l* [#] Z Set top (short edge) offset registration in decipoints (1/720") to adjust the logical page position on the length of the page. Both positive and negative values are accepted.

ESC & *l* [#] S Select simplex or duplex printing mode.

#	Printing Mode
0	Simplex.
1	Duplex, Long-Edge Binding.
2	Duplex, Short-Edge Binding.

ESC & a [#] G Select page side [#] for printing. If duplex printing is not supported, a page eject is performed.

#	Page Side
0	Next side is selected.
1	Front side is selected.
2	Back side is selected.

ESC | x [#] J This command can modify several different job control settings.

- PCL image offset*
- Page mode jog*
- Input tray selection mode*
- Output tray mask

* *These settings are persistent, meaning they stay in effect after a power cycle. To change all of these settings back to Standard, execute a "Restore to Factory Defaults" via the OCP or Web. To change a specific setting back to Standard, reenter the command with the Standard value field.*

#	PCL Image Offset
0	Standard (default).

#	Page Mode Jog
20	Standard (default).
21	Enable page mode jog.

When Page Mode Jog is enabled, Job Offset (Jog) enabled, multiple copies selected, and collation is disabled, a jog operation occurs between the printing of pages. For example, if a job prints 10 pages (simplex), 3 copies, with collation off and Page Mode Jog disabled, the output is offset at the end of the job. That is, if two such jobs are printed, the second job is offset from the first. If Page Mode Jog is enabled for this same job, sheet 11 is offset from sheet 10, sheet 21 is offset from sheet 20, and the first sheet of the next job is offset from sheet 30 (the last sheet of this job).

#	Input Tray Selection Mode	
100	Standard (default).	Setting the tray selection mode with a 10X code makes the mode persistent. The selected mode will be active immediately and it will be reestablished whenever PJL environment values are set to their default values. This happens when: - PJL mode is entered with a Universal Exit Language (UEL) command. - a PJL End of Job (EOJ) command is processed. - a PJL initialize command is processed. - the printer is reset to the Factory default from the OCP or SNMP.
101	Option 1.	
102	Option 2.	
103	Option 3.	
104	Option 4.	
105	Option 5.	
106	Custom Mapping 6	
107	Custom Mapping 7	
200	Standard (default).	Setting the tray selection mode with a 20X code makes the selected mode active immediately, but it is not persistent. The tray selection mode will revert to the last persistent selection whenever PJL environment values are set to their default values. See the comments above.
201	Option 1	
202	Option 2	
203	Option 3	
204	Option 4	
205	Option 5	
206	Custom Mapping 6	
207	Custom Mapping 7	
NOTE: Refer to "Paper Source" on page 2-11 for input tray option definitions.		

#	Output Tray Mask
15	Disable auto cascading for Stacker 5
16	Disable auto cascading for Stacker 6
17	Disable auto cascading for Stacker 7
18	Disable auto cascading for Stacker 8
25	Enable auto cascading for Stacker 5 (default)
26	Enable auto cascading for Stacker 6 (default)
27	Enable auto cascading for Stacker 7 (default)
28	Enable auto cascading for Stacker 8 (default)
Refer to "Output Bin" on page 2-10 for output tray selections. These settings stay in effect until they are changed or the printer is reset.	

Alphanumeric ID

ESC & n # W <operation> <string>

- Maximum length of <string> data is 99 bytes.
- Range of # value is 1 to 100 inclusive (length of <string> data + one operation byte).

The following are supported values for the <operation> byte.

Value	Description
^@	(0 Dec, 0x00 Hex, \000 Oct) Sets the current Font ID to <string>.
^A	(1 Dec, 0x01 Hex, \001 Oct) Associates the current Font ID to the font referred to by <string>.
^B	(2 Dec, 0x02 Hex, \002 Oct) Selects the font referred to by <string> as primary.
^C	(3 Dec, 0x03 Hex, \003 Oct) Selects the font referred to by <string> as secondary.
^D	(4 Dec, 0x04 Hex, \004 Oct) Sets the current Macro ID to <string>.
^E	(5 Dec, 0x05 Hex, \005 Oct) Associates the current Macro ID to the macro referred to by <string>.
^T	(20 Dec, 0x14 Hex, \024 Oct) Deletes the font association named by the current Font ID.
^U	(21 Dec, 0x15 Hex, \025 Oct) Deletes the macro association named by the current Macro ID.
d	(1100 Dec, 0x64 Hex, \144 Oct) Selects the media type.

Valid media type names are:

`Plain, Prepunched, Transparency, Transparency-pp, Preprinted, Letterhead, Label, Bond, Recycled, Color, Special,` and `Other.`

For example, the media called *Letterhead*, can be selected by the PCL5e Alphanumeric ID command in the following form:

<esc>&n11WdLetterhead

Page Controls

Paper Size

ESC & *l* [#] A Set physical page size to [#]. A tray with the selected paper size must be installed and selected as a paper source.

#	Paper Size
1	Executive (7.25” x 10.5”)
2	Letter (8.5" x 11")
3	Legal (8.5" x 14")
6	Ledger (11" x 17")
7	Statement (8.5” x 5.5”)
26	A4 (297mm x 210mm)
27	A3 (297mm x 420mm)
40	Folio (216mm x 330mm)
45	JIS B5 (182mm x 257mm)
46	JIS B4 (257mm x 364mm)
101	Universal or Custom. Media size must be set to Custom and physical media dimensions must be entered through the operator control panel or SNMP.
102	Letter SEF (8.5” x 11”)
115	A5 SEF (149mm x 210mm)
126	A4 SEF (210mm x 297mm)
202	LetterTab Stock (9” x 11”)
226	A4 Tab Stock (297mm x 225mm)
2006	SuperB (12” x 18”)

Page Length

ESC & *l* [#] P Set logical page length to [#] lines. This is an alternate, but not recommended, method for selecting a page length. The page length selected is the smallest logical page length that is greater than the specified number of lines multiplied by the current VMI.

Orientation

ESC & *l* [#] O Select print orientation (#).

#	Print Orientation
0	Portrait.
1	Landscape.
2	Reverse portrait.
3	Reverse landscape.

ESC & a [#] P Select print direction [#]. Rotate the logical page coordinates counterclockwise in 90 degree increments from the current logical page orientation.

#	Rotation
0	Do not rotate.
90	Rotate 90 degrees.
180	Rotate 180 degrees.
270	Rotate 270 degrees.

Output Bin

ESC & *l* [#] G Select Output Bin [#]. For Auto cascade, when the Stacker 5, 6, 7 and 8 of Container Stacker is full, the output bin can be switched to another output bin and the Stacker 5, 6, 7 and 8 can be individually enabled or disabled auto cascading. (Refer to "Output Tray Mask" on page 2-6.) This command is ignored for any selection that is not installed or supported.

#	No Finisher	Standard Finisher	Container Stacker
0	-	-	Auto cascade* Face down
1	Engine Output Tray Face Down	-	-
2	-	Elevator Tray Face down	-
3	-	Upper Tray Face down	-
4	-	-	-
5	-	-	Stacker 5 Face down
6	-	-	Stacker 6 Face down
7	-	-	Stacker 7 Face down
8	-	-	Stacker 8 Face down
9	-	-	Sample Tray Face down
10	-	-	Auto cascade* Face up
11	Engine Output Tray Face Up	-	-
12	-	Elevator Tray Face up	-
13	-	Upper Tray Face up	-
14	-	-	-
15	-	-	Stacker 5 Face up
16	-	-	Stacker 6 Face up
17	-	-	Stacker 7 Face up
18	-	-	Stacker 8 Face up
19	-	-	Sample Tray Face up
* Autocascade can be enabled/disabled for each stacker individually. Refer to "Output Tray Mask" on page 2-5.			

Paper Source

ESC & *l* [#] H Select Paper (Media) Source Input Tray [#]. This command is ignored for any selection that is not installed or supported.

.

#	Input Tray Selection Mode*							
	Standard Mode (default)	**Option 1**	**Option 2**	**Option 3**	**Option 4**	**Option 5**	**Custom Mapping 6**	**Custom Mapping 7**
0	1235	1235	3215	2	1	0	0	0
1	1	3	1	1	1	2	1	1
2	2	4	2	2	2	4	4	4
3	3	4	3	3	3	4	4	4
4	4	2	4	3	3	1	5	5
5	5	1	5	5	5	3	2	2
6	1235	5	3215	2	1	4	4	4
7	1235	1235	3215	2	1	1235	1235	1235
8	1235	1235	3215	2	1	1235	3	3
9	1235	1235	3215	2	1	1235	0	0
10	6	6	3215	2	1	1235	0	0
11	7	7	3215	2	1	1235	0	0
12	1235	1235	3215	2	1	1235	0	0
-	-	-	-	-	-	-	-	-
19	1235	1235	3215	2	1	1235	0	0
20	8	8	3215	2	1	4	4	4
21	1235	1235	3215	2	1	5	5	5
22	1235	1235	3215	2	1	1235	0	0
-	-	-	-	-	-	-	-	-
69	1235	1235	3215	2	1	1235	0	0

NOTES:

Refer to Valid Tray Group Codes on page 2-12.

Refer to the escape sequences on page 2-5 to modify the input tray selection mode.

All other values default to 0.

Custom Mapping 6 & 7 are displayed on the status page in the printer general information section. The mappings are reported as a comma separated list of tray group codes.

Input Tray Mapping and Grouping

Input Tray Mapping and Grouping provides a method for the PCL Paper Source control sequence to select any paper tray or any valid group of paper trays. It allows the printer administrator to define and manage two sets of mappings, and provides the administrator the ability to select and set one of the mappings from the paper source control sequence to paper trays or groups of trays as the default mapping. It allows the printer user to select different mappings for the duration of the user's print job.

Tray Group Code

Decimal digits 1-8 are used to represent the input trays of the printer as shown in the table below. Groups of trays are selected using the code numbers. The number of trays in a group is limited to four and the priority order is from left to right. For example, a tray group consisting of the HCF and Tray 3 with the HCF having the highest priority is represented by the number 53. Any combination of trays is valid with the following exceptions:

- The MBT (4) cannot be used in any group.
- Inserter trays 8 cannot be grouped with printer trays (1, 2, 3, or 5).

Valid Tray Group Codes

Code	Trays Listed in Priority Order
0	Special code indicating Eject Page. The existing tray group selection is retained
1	Tray 1 only (lower tray)
2	Tray 2 only (middle tray)
3	Tray 3 only (upper tray)
4	MBT only
5	HCF only
8	HBM Tray only

NOTE:

If the group being specified is in numeric ascending order, the input trays will be used in the order specified and each tray will be used until the tray is empty. At that time the next tray in sequence that contains the same paper definition will be selected. At any time where a higher priority tray is filled with the same paper, that tray will be selected after the current tray becomes empty.

If the group being specified is in a non-ascending order, then where a tray of higher order priority becomes empty the next lower priority tray will be selected. In this case if a higher priority tray is filled and the tray goes "Ready" before the current tray becomes empty, the printer will automatically switch back to the higher priority tray.

Character Text Path Direction

ESC & *c* [#] T Vertically rotate text for use in vertical writing applications.

#	Print Direction
0	Horizontal.
1	Vertical.

Margin Controls

ESC & a [#] L Set left margin at the left edge of column [#].

ESC & a [#] M Set right margin at the right edge of column [#].

ESC 9 Clear left and right margins.

ESC & *l* [#] E Set top margin to [#] lines. Top margin is the number of lines between the top of the logical page and the text area.

ESC & *l* [#] F Set text length to [#] lines.

Perforation Skip

ESC & *l* [#] L Perforation skip is enabled or disabled. Printing skips from the end of the text area to the top of the text area on the next page.

#	Perforation Skip Mode
0	Disable perforation skip.
1	Enable perforation skip.

Horizontal Column Spacing

ESC & k [#] H Set the Horizontal Motion Index (HMI) to [#]/120th inch. The value of [#] is valid to four decimal places.

Vertical Line Spacing

ESC & *l* [#] C Set Vertical Motion Index (VMI) to [#]/48th inch. The value of [#] is valid to four decimal places.

ESC & *l* [#] D Set line spacing to [#] lines-per-inch. The values for [#] can be 1, 2, 3, 4, 6, 8, 12, 16, 24 or 48. This is an alternate method for setting VMI.

Cursor Controls

Cursor control commands are used for relative or absolute cursor positioning. To make a relative cursor move, insert a plus (+) or minus (-) sign before the value of [#] in the escape sequence. The cursor is moved relative to the current cursor position.

To make an absolute cursor move, do not insert a plus (+) or minus (-) sign in front [#]. An absolute horizontal position is referenced from the left edge of the logical page. An absolute vertical position is referenced from the top margin.

Vertical and Horizontal Movement

ESC & a [#] C Move the cursor to column [#]. Column width is determined by the current HMI value.

ESC & a [#] H Move the cursor horizontally [#] decipoints (a decipoint = 1/720th inch). The value of [#] is valid to two decimal places.

ESC & a [#] R Move the cursor [#] lines within the same column. The actual distance is determined by the current VMI value.

ESC & a [#] V Move the cursor vertically [#] decipoints (a decipoint = 1/720th inch). The value of [#] is valid to four decimal places.

ESC * p [#] X Move the cursor horizontally [#] dots (a dot = 1/300th inch).

ESC * p [#]Y Move the cursor vertically [#] dots (a dot = 1/300th inch).

ESC = Stay in the same character position and move the cursor down a half-line feed. The actual distance depends on the current VMI value.

Push/Pop Position

ESC & f [#] S ESC & f 0 S pushes a cursor position on the stack. ESC & f 1 S pops the last saved cursor position from the stack. Up to 20 cursor positions can be saved.

End-of-Line Termination

ESC & k [#] G Define line termination code mode as shown in the table below.

Mode	Code Functions
0	CR=CR, LF=LF, FF=FF
1	CR=CR+LF,LF=LF, FF=FF
2	CR=CR, LF=CR+LF,FF=CR+FF
3	CR=CR+LF, LF=CR+LF, FF=CR+FF
CR = Carriage Return LF = Line Feed FF = Form Feed	

Font Selection

Fonts can be selected by their attributes. The printer then chooses the resident or downloaded font that most closely matches the desired attributes according to established search priority.

When changing from one font to another, the attributes that are the same as the current font do not have to be specified again. However, it is recommended that all attributes be specified to make sure that the correct font is selected. Font attributes are ranked according to the following priorities:

Attribute	Description
Font ID	Number assigned to the font.
Symbol set	Roman-8, Math-8, etc.
Spacing type	Fixed or proportional.
Pitch	CPI (fixed spacing only).
Height	Point size.
Style	Upright or italic.
Stroke weight	Light through bold.
Typeface	Courier, Lineprinter, etc.
Source	Soft or resident.
Orientation	Portrait or landscape.

NOTE:
The printer can print resident and downloaded fonts in portrait, landscape, reverse portrait or reverse landscape orientation. Scalable fonts from any source can be oriented to any angle.

Symbol Set Selection

The following lists the symbol set table. The selected symbol set must be supported by a resident or downloaded font.

ESC ([##] Select the primary font symbol set according to the value of [##] from column one in the table below.

ESC) [##] Select the secondary font symbol set according to the value of [##]. Use the primary font symbol set list for selections (see the *HP PCL5 Comparison Guide Edition 1, E1097*).

ID #	Symbol Set
0D	ISO 60 Norwegian v1
1E	ISO 4 United Kingdom
9E	Windows Latin 2
1F	ISO 69 French
1G	ISO 21 German
0I	ISO 15 Italian
6J	Microsoft Publishing
7J	Desktop
10J	PostScript Text
13J	Ventura International
14J	Ventura US
5M	PostScript Math
6M	Ventura Math
8M	Math-8
0N	ECMA-94 Latin 1
2N	ECMA-94 Latin 2
5N	ECMA-94 Latin 5
0S	ISO 11 Sweden: names
2S	ISO 17 Spanish
5T	Windows Latin 5
9T	PC-8 Turkish
0U	USASCII
1U	US Legal
8U	Roman-8
9U	Windows
10U	PC-8 US
11U	PC-8 Danish/Norwegian
12U	PC-850
15U	PiFont
17U	PC-852
19U	Windows Latin 1

Font Spacing and Pitch

ESC (s [#] P Select proportional or fixed spacing.

#	Spacing
0	Fixed spacing
1	Proportional spacing

ESC (s [#] H Select character pitch (Characters Per Inch) for a monospaced font.

Font Character Size and Style

ESC (s [#] V Set primary point size to [#]/72nd inch.

ESC (s [#] S Select character style [#]:

#	Character Style
0	Upright font
1	Italic font
4	Condensed
5	Condensed Italic
8	Compressed
24	Expanded, extra condensed
32	Outline
64	Inline
128	Shadowed
160	Outline shadowed

As per the *HP PCL5 Comparison Guide Edition 1, E1097*.

NOTE:
The selected character style must be supported by a resident or downloaded font.

Font Character Stroke Weight

ESC (s [#] B Select stroke weight [#]:

#	Stroke Weight
-7	Ultra thin
-6	Extra thin
-5	Thin
-4	Extra light
-3	Light
-2	Demi light
-1	Semi light
0	Medium
1	Semi bold
2	Demi bold
3	Bold
4	Extra bold
5	Black
6	Extra black
7	Ultra black

As per the *HP PCL5 Comparison Guide Edition 1, E1097*.

NOTE:
The selected stroke weight must be supported by a resident or downloaded font.

Secondary Font Character Size and Style

To select the font character size and style for a secondary font, replace the open parenthesis "(" in a primary font sequence with a close parenthesis ")".

Typeface Selection

ESC (s [#] T Select primary font typeface [#]. The table below lists the code numbers of internal typefaces that are available.

#	Typeface
0	Line Printer-Bitmap
4099	Courier
4101	CG Times
4102	Letter Gothic
4113	CGn Omega
4116	Coronet
4140	Clarendon
4148	Univers
4168	Antique Olive
4197	Garamond Antiqua
4297	Marigold
4362	Albertus
4822	Wingdings
16602	Arial
16686	Symbol
16901	Times New Roman

ESC) s[#]T Select secondary font typeface [#]. Use the primary font typeface values to select [#}.

Primary/Secondary Font Selection

ESC (3 @ Select default primary font.

ESC) 3 @ Select default secondary font.

ESC & k [#] S Select print pitch mode by the alternate method.

#	Pitch
0	10.0 characters per inch.
2	16.67 characters per inch.
4	12.0 characters per inch.

Auto Underline

ESC & d [#] D Enable auto underline mode [#].

#	Underline Mode
0	Enable fixed underline.
3	Enable floating underline.

ESC & d @ Disable auto underline mode.

Transparent Print

ESC &p[#]X[data] Transparent print [#] bytes of character data. This command allows access to all characters in a font including those defined as unprintable.

Text Parsing

ESC &t[#] P This command informs the PCL parser whether character codes should be interpreted as 1-byte or 2-byte character codes as described below.

#	Parsing Method
0, 1	All character codes are processed as 1-byte characters.
21	Character codes in the range 0x21-0xFF are processed as the first byte of a 2-byte character. The following byte is processed as the second byte of the 2-byte character. All character codes outside this range are processed as 1-byte values.
31	Character codes in the range 0x81-0x9F and 0xE0-0xFC are processed as the first byte of a 2-byte character. The following byte is processed as the second byte of the 2-byte character. All character codes outside this range are processed as 1-byte values.
38	Character codes in the range 0x80-0xFF are processed as the first byte of a 2-byte character. The following byte is processed as the second byte of the 2-byte character. All character codes outside this range are processed as 1-byte values.

Font Management

ESC * c [#] D Assign font ID number [#] (0 to 32,767) to a font to be downloaded. The font with this ID number will be used for the next font management command.

ESC ([#] X Assign downloaded font with identification [#] as primary font (0-32,767).

ESC) [#] X Assign downloaded font with identification [#] as secondary font (0-32,767).

ESC * c [#] F Select a font or character management operation [#] from the following list:

#	Operation
0	Delete all soft fonts.
1	Delete all temporary soft fonts.
2	Delete soft font specified by the last ID#.
3	Delete character code specified by the last ID# and character code.
4	Make the soft font specified by the last ID# temporary.
5	Make the soft font specified by the last ID# permanent.
6	Copy or assign the current font as temporary.

Soft Font Creation

ESC) s[#]W [data] Create font header for a soft font. There are [#] bytes of data in the header. The data follows the command.

ESC *c [#] E Assign decimal value to a character to be downloaded (0 to 32,767).

ESC (s[#]W [data] Download [#] bytes of binary character data.

PCL Vector Graphics Switching/Set-up

ESC * c [#] X Set horizontal size of picture frame to [#] decipoints (1/720th inch).

ESC * c [#] Y Set vertical size of picture frame to [#] decipoints (1/720th inch).

ESC * c 0 T Set picture frame anchor point to the PCL cursor position.

ESC * c [#] K Set HP-GL/2 horizontal plot size to [#] inches.

ESC * c [#] L Set HP-GL/2 vertical plot size to [#] inches.

ESC % [#] B Enter HP-GL/2 mode and position pen according to the value of [#]. If [#] equals:

#	Pen Position
0	Place pen to previous HP-GL/2 pen position.
1	Place pen to current PCL cursor position.

ESC % [#] A Enter PCL mode and position cursor according to the value of [#]. If [#] equals:

#	Cursor Position
0	Position cursor to previous PCL cursor position.
1	Position cursor to current HP-GL/2 pen position.

Raster Graphics

ESC *t [#] R Select graphics resolution [#]:

75 dots-per-inch
100 dots-per-inch
150 dots-per-inch
300 dots-per-inch
600 dots-per-inch

ESC * r [#] F Set graphics presentation position. ESC * r 0 F prints image in the current print direction. ESC * r 3 F prints along the width of the physical page.

ESC * r [#] T Set raster height to [#] raster rows.

ESC * r [#] S Set raster width to [#] pixels.

ESC *r [#]A Start graphics mode. If [#] equals:

#	Starting Point
0	Start at the left graphics margin.
1	Start at the current cursor position.

ESC * b [#] Y Move [#] raster lines vertically from the current line of the picture area.

ESC * b [#] M Set compression mode (method) for the transfer of binary raster data. The value of [#] is one of the following:

#	Compression Mode
0	Unencoded.
1	Run length encoded.
2	TIFF (Tag Image File Format V4.0) encoded.
3	Delta row encoded.
5	Adaptive compression.
6	CCITT Group 3 one-dimensional (modified Huffman).
7	CCITT Group 3 two-dimensional (modified READ).
8	CCITT Group 4 two-dimensional (modified modified READ).
97	TIFF CCITT Group 3 and 4.
98	CCITT Group 3 one- and two-dimensional.
99	TIFF CCITT Group 4.

ESC *b [#]W [data] Transfer the [#] bytes of graphics data that follow this command.

NOTE:
The printer recognizes and acts upon both "end of graphics" commands.

ESC *r B End graphics mode (B version).

ESC *r C End graphics mode (C version-Unique to HP IIISi). Resets left margin and compression mode to zero (0).

Print Model

Imaging

ESC * v [#] N Set source transparency mode to transparent ([#] = 0) or opaque ([#] = 1).

ESC * v [#] O Set pattern transparency mode to transparent ([#] = 0) or opaque ([#] = 1).

ESC * v [#] T Select current pattern [#].

#	Pattern
0	Solid black.
1	Solid white.
2	HP shading pattern.
3	HP cross hatch pattern.

Logical Operation

ESC * *l* [#] O Specifies the logical operation to be performed in RGB color space on the destination, source and texture to produce new destination data.

#	Logical Operation
0 - 255	Boolean function to be performed.
252	TSo (default).

Pixel Placement

ESC *l* [#] R This command determines how pixels are rendered in images.

#	Grid
0	Grid intersection. Default.
1	Grid centered.

Two models are used for rendering pixels when an image is placed on paper:

- Grid Intersection Model
- Grid Centered Model

This command can be invoked multiple times during a page. It has no effect except to switch the model being used for imaging.

Rectangle Dimensions

ESC *c [#] A Horizontal rule/pattern size in dots (300 dots = 1 inch).

ESC *c [#] H Horizontal rule/pattern size in decipoints (a decipoint = 1/720th inch).

ESC *c [#] B Vertical rule/pattern size in dots (300 dots = 1 inch).

ESC *c [#]V Vertical rule/pattern size in decipoints (a decipoint = 1/720th inch).

Rectangle Area Fill

ESC *c [#]G Define pattern ID or area fill ID. Use 1 to 6 for [#] to select predefined cross-hatched pattern or 1 to 100 to select grey scale.

ESC *c [#] P Print rule/pattern [#]:

#	Rule/Pattern
0	Black (solid).
1	White (erase).
2	Gray scale shading.
3	HP cross-hatch.
4	User-defined pattern.
5	Current pattern.

Macro Controls

ESC & f [#] Y Assign Macro ID [#] from 0 to 32,767 to be used in a macro control operation.

ESC & f [#] X Select Macro Control Operation [#]:

#	Macro Operation
0	Start macro definition for last specified ID.
1	Stop macro definition for last specified ID.
2	Execute macro for last specified ID.
3	Call macro for last specified ID.
4	Enable auto macro overlay.
5	Disable auto macro overlay.
6	Delete all macros.
7	Delete all temporary macros.
8	Delete macro for last specified ID.
9	Make the macro with last specified ID temporary.
10	Make the macro with the last specified ID permanent.

Miscellaneous Controls

ESC Y Display function ON.

ESC Z Display function OFF.

ESC & s [#] C Enable/disable end-of-line wrap.

#	End-of-line Wrap Mode
0	Enables end-of-line wrap.
1	Disables end-of-line wrap.

HP 4000 Series Emulation PCL5e Command Summary

Command Summary

Function	Variable	Command	Hexidecimal	Decimal
JOB CONTROL				
Left offset registration	decipoints (1/720")	ESC & *l* [#] U	1B 26 6C [#] 55	27 38 108 [#] 85
Top offset registration	decipoints (1/720")	ESC & *l* [#] Z	1B 26 6C [#] 5A	27 38 108 [#] 90
Job separation	jog collator	ESC & *l* 1 T	1B 26 6C 31 54	27 38 108 49 84
Image offset	Standard Modified	ESC | x 0 J ESC | x 1 J	1B 7C 78 0 4C 1B 7C 78 1 4C	27 124 120 0 74 27 124 120 1 74
Page mode jog	Standard Modified	ESC | x 20 J ESC | x 21 J	1B 7C 78 20 4C 1B 7C 78 21 4C	27 124 120 20 74 27 124 120 21 74
Input tray selection	Standard mode Modified mode	ESC | x 100 J ESC | x 101 J	1B 7C 78 100 4C 1B 7C 78 101 4C	27 124 120 100 74 27 124 120 101 74
PAGE CONTROL				
Page size	Executive (7.25" x 10.5") Letter (8.5" x 11") Legal (8.5" x 14") Ledger (11" x 17") Statement (8.5' x 5.5') A4 (210mm x 297mm) A3 (297mm x 420mm) Folio (216 x 330) JIS B5 (182mm x 257mm) JIS B4 (257mm x 364mm) Universal or Custom Letter SEF (8.5" x 11") A5 SEF (149mm x 210mm) A4 SEF (210mm x 297mm) Letter Tab Stock (9" x 11") A4 Tab Stock SuperB (12" x 18")	ESC & *l* 1 A ESC & *l* 2 A ESC & *l* 3 A ESC & *l* 6 A ESC & *l* 7 A ESC & *l* 26 A ESC & *l* 27 A ESC & *l* 40 A ESC & *l* 45 A ESC & *l* 46 A ESC & *l* 101 A ESC & *l* 102 A ESC & *l* 115 A ESC & *l* 126 A ESC & *l* 202 A ESC & *l* 226 A ESC & *l* 2006 A	1B 26 6C 31 41 1B 26 6C 32 41 1B 26 6C 33 41 1B 26 6C 36 41 1B 26 6C 37 41 1B 26 6C 32 36 41 1B 26 6C 32 37 41 1B 26 6C 34 30 41 1B 26 6C 34 35 41 1B 26 6C 34 36 41 1B 26 6C 31 30 31 41 1B 26 6C 31 30 32 41 1B 26 6C 31 32 35 41 1B 26 6C 31 32 36 41 1B 26 6C 32 30 32 41 1B 26 6C 32 32 36 41 1B 26 6C 32 30 30 36 41	27 38 108 49 65 27 38 108 50 65 27 38 108 51 65 27 38 108 54 65 27 38 108 55 65 27 38 108 50 54 65 27 38 108 50 55 65 1B 26 6C 52 48 41 27 38 108 52 53 65 27 38 108 52 54 65 27 38 108 49 49 49 65 27 38 108 49 48 50 65 27 38 108 49 50 53 65 27 38 108 49 50 54 65 27 38 108 50 48 50 65 27 38 108 50 50 54 65 27 38 108 50 48 48 54 65
Paper length	Number of lines	ESC & *l* [#] P	1B 26 6C [#] 50	27 38 108 [#] 80
Page orientation	Portrait Landscape Reverse portrait Reverse landscape	ESC & *l* 0 O ESC & *l* 1 O ESC & *l* 2 O ESC & *l* 3 O	1B 26 6C 30 4F 1B 26 6C 31 4F 1B 26 6C 32 4F 1B 26 6C 33 4F	27 38 108 48 79 27 38 108 49 79 27 38 108 50 79 27 38 108 51 79
Page side selection	Next side Front side Back side	ESC & a 0 G ESC & a 1 G ESC & a 2 G	1B 26 61 30 47 1B 26 61 31 47 1B 26 61 32 47	27 38 97 48 71 27 38 97 49 71 27 38 97 50 71
Paper (media) source* (without High Capacity Feeder)	Auto Select and Auto Cascade Tray 1 (Lower) Tray 2 (Middle) Tray 3 (Upper) Multi Bypass Tray	ESC & *l* 0 H ESC & *l* 1 H ESC & *l 2* H ESC & *l* 3 H ESC & *l* 4 H	1B 26 6C 30 48 1B 26 6C 31 48 1B 26 6C 32 48 1B 26 6C 33 48 1B 26 6C 34 48	27 38 108 48 72 27 38 108 49 72 27 38 108 50 72 27 38 108 51 72 27 38 108 52 72
Paper (media) source* (with High Capacity Feeder; selected tray must be installed)	Auto Select and Auto Cascade Tray 1 (Lower) Tray 2 (Middle) Tray 3 (Upper) Multi Bypass Tray High Capacity Feeder	ESC & *l* 0 H ESC & *l* 1 H ESC & *l 2* H ESC & *l* 3 H ESC & *l* 4 H ESC & *l* 5 H	1B 26 6C 30 48 1B 26 6C 31 48 1B 26 6C 32 48 1B 26 6C 33 48 1B 26 6C 34 48 1B 26 6C 35 48	27 38 108 48 72 27 38 108 49 72 27 38 108 50 72 27 38 108 51 72 27 38 108 52 72 27 38 108 53 72

* Standard mode input tray selection is shown here. Refer to "Paper Source" on page 2-11 for information on additional mode selections.

Command Summary (Continued)

Function	Variable	Command	Hexidecimal	Decimal
Media type	Plain	ESC &n6WdPlain	1B 26 6E 36 57 64 50 6C 61 69 6E	27 38 110 54 87 100 80 108 97 105 110
	Bond	ESC &n5WdBond	1B 26 6E 35 57 64 42 6F 6E 64	27 38 110 53 87 100 66 111 110 100
	Recycled	ESC &n9WdRecycled	1B 26 6E 39 57 64 52 65 79 63 6C 65 64	27 38 110 57 87 100 82 101 99 121 99 108 101 100
	Color	ESC &n6WdColor	1B 26 6E 36 57 64 43 6F 6C 6F 72	27 38 110 54 87 100 67 111 108 111 114
	Prepunched	ESC &n11WdPrepunched	1B 26 6E 31 31 57 64 50 72 65 70 75 6E 63 68 65 64	27 38 110 54 87 100 80 114 101 112 118 110 99 104 101 100
	Letterhead	ESC &n11WdLetterhead	1B 26 6E 31 31 57 64 4C 65 7474 65 72 68 65 61 64	27 38 110 49 49 87 100 76 101 116 116 101 114 104 101 100
	Preprinted	ESC &n11WdPreprinted	1B 26 6E 31 31 57 64 50 72 65 70 72 69 6E 74 65 64	27 38 110 49 49 87 100 80 114 101 112 114 105 110 101 100
	Special	ESC &n8WdSpecial	1B 26 6E 38 57 64 53 70 65 63 96 61 72	27 38 110 49 49 87 100 83 112 101 99 105 108
	Other	ESC &n6WdOther	1B 26 6E 36 57 64 4F 74 68 65 72	27 38 110 54 87 100 79 116 104 101 114
	Transparency	ESC &n13WdTransparency	1B 26 6E 31 33 57 6454 72 61 6E 73 70 61 72 65 6E 63 79	27 38 110 49 51 87 100 84 114 97 110 115 112 97 110 99 121
	Transparency-pp	ESC &n16WdTransparency-pp	1B 26 6E 31 36 57 64 54 72 61 6E 73 70 61 72 65 6E 63 79 2D 70 70	27 38 110 49 54 87 100 84 114 97 110 115 112 97 110 99 121 45 112 112
	Label	ESC &n6WdLabel	1B 26 6E 36 57 64 4C 61 62 65 6C	27 38 110 54 87 100 76 97 98 101 108
Paper (media) destination (with Advanced Finisher)	Elevator Tray Face down Upper Tray Face down Elevator Tray Face up Upper Tray Face up	ESC & *l* 2 G ESC & *l* 3 G ESC & *l* 12 G ESC & *l* 13 G	1B 26 6C 32 47 1B 26 6C 33 47 1B 26 6C 31 32 47 1B 26 6C 31 33 47	27 38 108 50 71 27 38 108 51 71 27 38 108 49 50 71 27 38 108 49 51 71
Paper (media) destination engine output tray (without Finisher)	Engine Output Tray Face down Engine Output Tray Face up	ESC & *l* 1 G ESC & *l* 11 G	1B 26 6C 31 47 1B 26 6C 31 31 47	27 38 108 49 71 27 38 108 49 49 71
Extensions or Variations to the HP Emulation				
Print direction (rotation)	0 degrees 90 degrees 180 degrees 270 degrees	ESC & a 0 P ESC & a 90 P ESC & a 180 P ESC & a 270 P	1B 26 61 30 50 1B 26 61 39 30 50 1B 26 61 31 38 30 50 1B 26 61 32 37 30 50	27 38 97 48 80 27 38 97 57 48 80 27 38 97 49 56 48 80 27 38 97 50 55 48 80
Perforation skip	Disable Enable	ESC & *l* 0 L ESC & *l* 1 L	1B 26 6C 30 4C 1B 26 6C 31 4C	27 38 108 48 76 27 38 108 49 76
Left margin	Left column [#]	ESC & a [#] L	1B 26 61 [#] 4C	27 38 97 [#] 76
Right margin	Right column [#]	ESC & a [#] M	1B 26 61 [#] 4D	27 38 97 [#] 77
Clear side margins		ESC 9	1B 39	27 57
Top margin	Number of lines	ESC & *l* [#] E	1B 26 6C [#] 45	27 38 108 [#] 69
Text length	Number of lines	ESC & *l* [#] F	1B 26 6C [#] 46	27 38 108 [#] 70

Command Summary (Continued)

Function	Variable	Command	Hexidecimal	Decimal
CURSOR CONTROL				
HMI	# of 1/120" increments	ESC & k [#] H	1B 26 6B [#] 48	27 38 107 [#] 72
VMI	# of 1/48" increments	ESC & *l* [#] C	1B 26 6C [#] 43	27 38 108 [#] 67
Set lines per inch	1 line per inch 2 lines per inch 3 lines per inch 4 lines per inch 6 lines per inch 8 lines per inch 12 lines per inch 16 lines per inch 24 lines per inch 48 lines per inch	ESC & *l* 1 D ESC & *l* 2 D ESC & *l* 3 D ESC & *l* 4 D ESC & *l* 6 D ESC & *l* 8 D ESC & *l* 12 D ESC & *l* 16 D ESC & *l* 24 D ESC & *l* 48 D	1B 26 6C 31 44 1B 26 6C 32 44 1B 26 6C 33 44 1B 26 6C 34 44 1B 26 6C 36 44 1B 26 6C 38 44 1B 26 6C 31 32 44 1B 26 6C 31 36 44 1B 26 6C 32 34 44 1B 26 6C 34 38 44	27 38 108 49 68 27 38 108 50 68 27 38 108 51 68 27 38 108 52 68 27 38 108 54 68 27 38 108 56 68 27 38 108 49 50 68 27 38 108 49 54 68 27 38 108 50 52 68 27 38 108 52 56 68
Horizontal movement	Column Dots Decipoints	ESC & a [#] C ESC * p [#] X ESC & a [#] H	1B 26 61 [#] 43 1B 2A 70 [#] 58 1B 26 61 [#] 48	27 38 97 [#] 67 27 42 112 [#] 88 27 38 97 [#] 72
Carriage return		CR	0D	13
Horizontal tab		HT	09	09
Space		SP	20	32
Back space		BS	08	08
Vertical movement	Lines Dots Decipoints Half line feed	ESC & a [#] R ESC * p [#] Y ESC & a [#] V ESC =	1B 26 61 [#] 52 1B 2A 70 [#] 59 1B 26 61 [#] 56 1B 3D	27 38 97 [#] 82 27 42 112 [#] 89 27 38 97 [#] 86 27 61
Line feed		LF	0A	10
Form feed		FF	0C	12
Print line termination	CR=CR, LF=LF, FF=FF	ESC & k 0 G	1B 26 6B 30 47	27 38 107 48 71
	CR=CR+LF, LF=LF, FF=FF	ESC & k 1 G	1B 26 6B 30 47	27 38 107 49 71
	CR=CR, LF=CR+LF, FF=CR+FF	ESC & k 2 G	1B 26 6B 30 47	27 38 107 50 71
	CR=CR+LF, LF=CR+LF, FF=CR+FF	ESC & k 3 G	1B 26 6B 30 47	27 38 107 51 71
Stack push/pop position	Push (up to 20 positions)	ESC & f 0 S	1B 26 66 30 53	27 38 102 48 83
	Pop	ESC & f 1 S	1B 26 66 31 53	27 38 102 49 83

Command Summary (Continued)

Function	Variable	Command	Hexidecimal	Decimal
FONT SELECTION				
Primary font symbol set	ISO 60 Norwegian Ver. 1	ESC (0D	1B 28 30 44	27 40 48 68
	ISO 4 United Kingdom	ESC (1E	1B 28 31 45	27 40 49 69
	Windows Latin 2	ESC (9E	1B 28 39 45	27 40 57 69
	ISO 69 French	ESC (1F	1B 28 31 46	27 40 49 70
	ISO 21 German	ESC (1G	1B 28 31 47	27 40 49 71
	ISO 15 Italian	ESC (0I	1B 28 30 49	27 40 48 73
	Microsoft Publishing	ESC (6J	1B 28 36 4A	27 40 54 74
	Desktop	ESC (7J	1B 28 37 4A	27 40 55 74
	PS Text	ESC (10J	1B 28 31 30 4A	27 40 49 48 74
	Ventura International	ESC (13J	1B 28 31 33 4A	27 40 49 51 74
	Ventura US	ESC (14J	1B 28 31 34 4A	27 40 49 52 74
	PS Math	ESC (5M	1B 28 35 4D	27 40 53 77
	Ventura Math	ESC (6M	1B 28 36 4D	27 40 54 77
	Math-8	ESC (8M	1B 28 38 4D	27 40 56 77
	ECMA-94 (Latin 1)	ESC (0N	1B 28 38 4E	27 40 48 78
	ECMA-94 (Latin 2)	ESC (2N	1B 28 32 4E	27 40 50 78
	ECMA-94 (Latin 5)	ESC (5N	1B 28 35 4E	27 40 53 78
	ISO 11 Sweden names	ESC (0S	1B 28 30 53	27 40 48 83
	ISO 17 Spanish	ESC (2S	1B 28 32 53	27 40 50 83
	Windows Latin 5	ESC (5T	1B 28 35 54	27 40 53 84
	PC-8 TK	ESC (9T	1B 28 39 54	27 40 57 84
	ISO 6 ASCII	ESC (0U	1B 28 30 55	27 40 48 85
	US Legal	ESC (1U	1B 28 31 55	27 40 49 85
	Roman-8	ESC (8U	1B 28 38 55	27 40 56 85
	Windows	ESC (9U	1B 28 39 55	27 40 57 85
	PC-8	ESC (10U	1B 28 31 30 55	27 40 49 48 85
	PC-8 (D/N)	ESC (11U	1B 28 31 31 55	27 40 49 49 85
	PC-850	ESC (12U	1B 28 31 32 55	27 40 49 50 85
	Pi Font	ESC (15U	1B 28 31 35 55	27 40 49 53 85
	PC-852	ESC (17U	1B 28 31 37 55	27 40 49 55 85
	Windows Latin 2	ESC (19U	1B 28 31 39 55	27 40 49 57 85
Secondary font symbol set	See primary font for [##].	ESC) [##]	1B 29 [##]	27 41 [##]
Primary font character spacing	Proportional	ESC (s 1 P	1B 28 73 31 50	27 40 115 49 80
	Fixed	ESC (s 0 P	1B 28 73 30 50	27 40 115 48 80
Secondary font character spacing	Proportional	ESC) s 1 P	1B 28 73 31 50	27 40 115 49 80
	Fixed	ESC) s 0 P	1B 28 73 30 50	27 40 115 48 80
Primary font pitch	# = font pitch.	ESC (s [#] H	1B 28 73 [#] 48	27 40 115 [#] 72
Secondary font pitch	# = font pitch.	ESC) s [#] H	1B 28 73 [#] 48	27 40 115 [#] 72
Primary font point size		ESC (s [#] V	1B 28 73 [#] 56	27 40 115 [#] 86
Secondary font point size		ESC (s [#] V	1B 28 73 [#] 56	27 40 115 [#] 86
Primary font style	Upright	ESC (s 0 S	1B 28 73 30 53	27 40 115 48 83
	Italic	ESC (s 1 S	1B 28 73 31 53	27 40 115 49 83
	Condensed	ESC (s 4 S	1B 28 73 34 53	27 40 115 52 83
	Condensed Italic	ESC (s 5 S	1B 28 73 35 53	27 40 115 53 83
	Compressed	ESC (s 8 S	1B 28 73 38 53	27 40 115 56 83
	Expanded, extra condensed	ESC (s 24 S	1B 28 73 32 34 53	27 40 115 50 54 83
	Outline	ESC (s 32 S	1B 28 73 33 32 53	27 40 115 51 50 83
	Inline	ESC (s 64 S	1B 28 73 36 34 53	27 40 115 54 52 83
	Shadowed	ESC (s 128 S	1B 28 73 31 32 38 53	27 40 115 49 50 56 83
	Outline Shadowed	ESC (s 160 S	1B 28 73 31 36 30 53	27 40 115 49 54 48 83
Secondary font style	See primary font for [#].	ESC) s [#] S	1B 28 73 [#] 53	27 40 115 [#] 83

Command Summary (Continued)

Function	Variable	Command	Hexidecimal	Decimal
Primary font weight	Ultra thin	ESC (s - 7 B	1B 28 73 2D 37 42	27 40 115 45 55 66
	Extra thin	ESC (s - 6 B	1B 28 73 2D 36 42	27 40 115 45 54 66
	Thin	ESC (s - 5 B	1B 28 73 2D 35 42	27 40 115 45 53 66
	Extra light	ESC (s - 4 B	1B 28 73 2D 34 42	27 40 115 45 52 66
	Light	ESC (s - 3 B	1B 28 73 2D 33 42	27 40 115 45 51 66
	Demi light	ESC (s - 2 B	1B 28 73 2D 32 42	27 40 115 45 50 66
	Semi light	ESC (s - 1 B	1B 28 73 2D 31 42	27 40 115 45 49 66
	Medium	ESC (s 0 B	1B 28 73 30 42	27 40 115 48 66
	Semi bold	ESC (s + 1 B	1B 28 73 2B 31 42	27 40 115 43 49 66
	Demi bold	ESC (s + 2 B	1B 28 73 2B 32 42	27 40 115 43 50 66
	Bold	ESC (s + 3 B	1B 28 73 2B 33 42	27 40 115 43 51 66
	Extra bold	ESC (s + 4 B	1B 28 73 2B 34 42	27 40 115 43 52 66
	Black	ESC (s + 5 B	1B 28 73 2B 35 42	27 40 115 43 53 66
	Extra black	ESC (s + 6 B	1B 28 73 2B 36 42	27 40 115 43 54 66
	Ultra black	ESC (s + 7 B	1B 28 73 2B 37 42	27 40 115 43 55 66
Secondary font weight	See primary font for [#].	ESC) s [#] B	1B 29 73 [#] 42	27 41 115 [#] 66
Primary font typeface values [#] for all installed fonts are listed on the Font List printout	Line Printer	ESC (s 0 T	1B 28 73 30 54	27 40 115 48 84
	Courier	ESC (s 4099 T	1B 28 73 34 30 39 39 54	27 40 115 52 48 57 57 84
	CG Times	ESC (s 4101 T	1B 28 73 34 31 31 31 54	27 40 115 52 49 48 49 84
	Letter Gothic	ESC (s 4102 T	1B 28 73 34 31 30 32 54	27 40 115 52 49 48 50 84
	CGn Omega	ESC (s 4113 T	1B 28 73 34 31 31 33 54	27 40 115 52 49 49 51 84
	Coronet	ESC (s 4116 T	1B 28 73 34 31 31 36 54	27 40 115 52 49 49 54 84
	Clarendon	ESC (s 4140 T	1B 28 73 34 31 34 30 54	27 40 115 52 49 52 48 84
	Univers	ESC (s 4148 T	1B 28 73 34 31 34 38 54	27 40 115 52 49 52 56 84
	Antique Olive	ESC (s 4168 T	1B 28 73 34 31 36 38 54	27 40 115 52 49 54 56 84
	Garamond Antiqua	ESC (s 4197 T	1B 28 73 34 31 39 37 54	27 40 115 52 49 57 55 84
	Marigold	ESC (s 4297 T	1B 28 73 34 32 39 37 54	27 40 115 52 50 57 55 84
	Albertus	ESC (s 4363 T	1B 28 73 34 33 36 33 54	27 40 115 52 51 54 51 84
	Arial	ESC (s 16602 T	1B 28 73 31 36 36 30 32 54	27 40 115 49 54 54 48 50 84
	Symbol	ESC (s 16686 T	1B 28 73 31 36 36 38 36 54	27 40 115 49 54 54 56 54 84
	Times New Roman	ESC (s 16901 T	1B 28 73 31 36 39 30 31 54	27 40 115 49 54 57 48 49 84
	Wingdings	ESC (s 4822 T	1B 28 73 34 38 32 32 54	27 40 115 52 56 50 50 84
Secondary font typeface	See primary font typeface list.	ESC) s [#] T	1B 29 73 [#] 54	27 41 115 [#] 84
Select font by ID #	Primary font	ESC ([#] X	1B 28 [#] 58	27 40 [#] 88
	Secondary font	ESC) [#] X	1B 29 [#] 58	27 41 [#] 88
Primary font selected		SI	0F	15
Secondary font selected		SO	0E	14
Font default	Primary font	ESC (3 @	1B 28 33 40	27 40 51 64
	Secondary font	ESC) 3 @	1B 29 33 40	27 41 51 64
Primary & secondary font pitch (alternate method)	10.00 pitch	ESC & k 0 S	1B 26 6B 30 53	27 38 107 48 83
	16.67 pitch	ESC & k 2 S	1B 26 6B 32 53	27 38 107 50 83
	12.00 pitch	ESC & k 4 S	1B 26 6B 34 53	27 38 107 52 83
FONT MANAGEMENT				
Assign Font ID	# = font ID number (0- 32767)	ESC * c [#] D	1B 2A 63 [#] 44	27 42 99 [#] 68
Character and font control	Delete all fonts	ESC * c 0 F	1B 2A 63 30 46	27 42 99 48 70
	Delete all temporary fonts	ESC * c 1 F	1B 2A 63 31 46	27 42 99 49 70
	Delete font with last ID #	ESC * c 2 F	1B 2A 63 32 46	27 42 99 50 70
	Delete character with last ID #	ESC * c 3 F	1B 2A 63 33 46	27 42 99 51 70
	Make font temporary	ESC * c 4 F	1B 2A 63 34 46	27 42 99 52 70
	Make font permanent	ESC * c 5 F	1B 2A 63 35 46	27 42 99 53 70
	Copy/assign font as temporary	ESC * c 6 F	1B 2A 63 36 46	27 42 99 54 70

Command Summary (Continued)

Function	Variable	Command	Hexidecimal	Decimal
Soft Font Creation				
Download font descriptor	#=no. of bytes in descriptor	ESC) s [#] W[data]	1B 29 73 [#] 57 [data]	27 41 115 [#] 87 {data]
Download character descriptor	#=no. of bytes in descriptor	ESC (s [#] W[data]	1B 28 73 [#] 57 [data]	27 40 115 [#] 87 {data]
Character code	#= Decimal ASCII number	ESC * c [#] E	1B 2A 63 [#] 45	27 42 99 [#] 69
GRAPHICS CONTROL				
PCL Vector Graphics Setup				
Picture frame horizontal size	# of decipoints	ESC * c [#] X	1B 2A 63 [#] 58	27 42 99 [#] 88
Picture frame vertical size	# of decipoints	ESC * c [#] Y	1B 2A 63 [#] 59	27 42 99 [#] 89
Set picture frame anchor point	PCL cursor position	ESC * c [#] T	1B 2A 63 [#] 54	27 42 99 [#] 84
HP-GL/2 horizontal plot size	# = inches horizontally	ESC * c [#] K	1B 2A 63 [#] 4B	27 42 99 [#] 75
HP-GL/2 vertical plot size	# = inches vertically	ESC * c [#] L	1B 2A 63 [#] 4C	27 42 99 [#] 76
Enter HP-GL/2 mode	Pen to previous HP-GL/2 position	ESC % 0 B	1B 25 30 42	27 37 48 66
	Pen to current PCL cursor	ESC % 1 B	1B 25 31 42	27 37 49 66
Enter PCL mode	Cursor to previous PCL cursor position	ESC % 0 A	1B 25 30 41	27 37 48 65
	Cursor to current HP-GL/ 2 pen position	ESC % 1 B	1B 25 31 41	27 37 49 65
Raster Graphics				
Resolution	75 dots per inch 100 dots per inch 150 dots per inch 300 dots per inch 600 dots per inch	ESC * t 75 R ESC * t 100 R ESC * t 150 R ESC * t 300 R ESC * t 600 R	1B 2A 74 37 35 52 1B 2A 74 31 30 30 52 1B 2A 74 31 35 30 52 1B 2A 74 33 30 30 52 1B 2A 74 36 30 30 52	27 42 116 55 53 82 27 42 116 49 48 48 82 27 42 116 49 53 48 82 27 42 116 51 48 48 82 27 42 116 54 48 48 82
Graphics presentation	Logical page orientation Width of physical page	ESC * r 0 F ESC * r 3 F	1B 2A 72 30 46 1B 2A 72 33 46	27 42 114 48 70 27 42 114 51 70
Raster height	# = raster rows	ESC * r [#] T	1B 2A 72 [#] 54	27 42 114 [#] 84
Raster width	# = pixels	ESC * r [#] S	1B 2A 72 [#] 53	27 42 114 48 83
Start raster graphics	Left graphics margin Current cursor position	ESC * r 0 A ESC * r 1 A	1B 2A 72 30 41 1B 2A 72 31 41	27 42 114 48 65 27 42 114 48 65
Y offset	# = number of raster lines	ESC * b [#] Y	1B 2A 62 [#] 59	27 42 98 [#] 89
Compression mode	Unencoded Run-length encoded TIFF encoded Delta row encoded Adaptive	ESC * b 0 M ESC * b 1 M ESC * b 2 M ESC * b 3 M ESC * b 4 M	1B 2A 62 30 4D 1B 2A 62 31 4D 1B 2A 62 32 4D 1B 2A 62 33 4D 1B 2A 62 34 4D	27 42 98 48 77 27 42 98 49 77 27 42 98 50 77 27 42 98 51 77 27 42 98 52 77
Xsfer raster graphics	# of bytes	ESC * b [#] W[data]	1B 2A 62 [#] 57[data]	27 42 98 [#] 87[data]
End raster graphics	Version B Version C	ESC * r B ESC * r C	1B 2A 72 42 1B 2A 72 43	27 42 114 66 27 42 114 67

Command Summary (Continued)

Function	Variable	Command	Hexidecimal	Decimal
Print Model Imaging				
Source transparency mode	Transparent Opaque	ESC * v 0 N ESC * v 1 N	1B 2A 76 30 4E 1B 2A 76 31 4E	27 42 118 48 78 27 42 118 49 78
Pattern transparency mode	Transparent Opaque	ESC * v 0 O ESC * v 1 O	1B 2A 76 30 4F 1B 2A 76 31 4F	27 42 118 48 79 27 42 118 49 79
Area fill ID (Pattern ID)	# = shade/pattern number	ESC * c [#] G	1B 2A 63 [#] 45	27 42 99 [#] 71
Select current pattern	Solid black Solid white Shading pattern	ESC * v 0 T ESC * v 1 T ESC * v 2 T	1B 2A 76 30 54 1B 2A 76 31 54 1B 2A 76 32 54	27 42 118 48 84 27 42 118 49 84 27 42 118 50 84
Rectangle Dimensions				
Area fill ID (Pattern ID)	# = shade/pattern number	ESC * c [#] G	1B 2A 63 [#] 47	27 42 99 [#] 71
	1-100 for shading			
	1-6 for cross hatch			
Rectangle width	Number of dots Number of decipoints	ESC * c [#] A ESC * c [#] H	1B 2A 63 [#] 41 1B 2A 63 [#] 48	27 42 99 [#] 65 27 42 99 [#] 72
Rectangle height	Number of dots Number of decipoints	ESC * c [#] B ESC * c [#] V	1B 2A 63 [#] 42 1B 2A 63 [#] 56	27 42 99 [#] 66 27 42 99 [#] 86
Fill rectangle area	Solid area fill Solid white area fill Shading fill Cross hatch pattern fill	ESC * c 0 P ESC * c 1 P ESC * c 2 P ESC * c 3 P	1B 2A 63 30 50 1B 2A 63 31 50 1B 2A 63 32 50 1B 2A 63 33 50	27 42 99 48 80 27 42 99 49 80 27 42 99 50 80 27 42 99 51 80
Rectangle Area Fill				
Gray scale pattern	2% shading Current pattern	ESC * c 2 G ESC * c 5 P	1B 2A 63 [#] 47 1B 2A 63 35 50	27 42 99 [#] 71 27 42 99 53 80
Defined pattern	Horizontal lines Vertical lines Diagonal lines Diagonal lines Square grid Diagonal grid	ESC * c 1 G ESC * c 2 G ESC * c 3 G ESC * c 4 G ESC * c 5 G ESC * c 6 G	1B 2A 63 31 47 1B 2A 63 32 47 1B 2A 63 33 47 1B 2A 63 34 47 1B 2A 63 35 47 1B 2A 63 36 47	27 42 99 49 71 27 42 99 50 71 27 42 99 51 71 27 42 99 52 71 27 42 99 53 71 27 42 99 54 71
MACRO CONTROL				
Macro ID	#=ID number (0-32767)	ESC & f [#] Y	1B 26 66 [#] 59	27 38 102 [#] 89
Macro control definition	Start macro definition Stop macro definition Execute macro Call macro Enable auto macro overlay Disable auto macro overlay Delete all macros Delete all temporary macros Delete last specified macro Make last macro temporary Make last macro permanent	ESC & f 0 X ESC & f 1 X ESC & f 2 X ESC & f 3 X ESC & f 4 X ESC & f 5 X ESC & f 6 X ESC & f 7 X ESC & f 8 X ESC & f 9 X ESC & f 10 X	1B 26 66 30 58 1B 26 66 31 58 1B 26 66 32 58 1B 26 66 33 58 1B 26 66 34 58 1B 26 66 35 58 1B 26 66 36 58 1B 26 66 37 58 1B 26 66 38 58 1B 26 66 39 58 1B 26 66 30 31 58	27 38 102 48 88 27 38 102 49 88 27 38 102 50 88 27 38 102 51 88 27 38 102 52 88 27 38 102 53 88 27 38 102 54 88 27 38 102 55 88 27 38 102 56 88 27 38 102 57 88 27 38 102 48 49 88
MISCELLANEOUS CONTROLS				
Display function	Enable Disable	ESC Y ESC Z	1B 59 1B 5A	27 89 27 90
End-of-line wrap	Enable Disable	ESC & s 0 C ESC & s 1 C	1B 26 73 30 43 1B 26 73 31 43	27 38 115 48 67 27 38 115 49 67

HP 4000 Series Emulation PJL Environment Variables Summary

The following table lists the PJL environment variables supported by the printer.

NOTE:

Factory defaults for the variable values are listed first where applicable.

Environment Variables Summary

Variable	Values	Supported?
AUTOCONT	OFF	No
BINDING	LONGEDGE (SHORTEDGE)	Yes
CLEARABLE-WARNINGS		No
CLIP	ON (OFF)	Yes
CMAPTBL	0 - 69	Yes
COPIES	1 to (65535)	Yes
CPLOCK	OFF	No
DENSITY	3 (1 to 5)	No
DOCPASSWORD		Yes
DUPLEX	OFF (ON)	Yes
ECONOMODE	OFF (ON)	No
FINISH	NONE (STAPLE0, STAPLE1, STAPLE2, STAPLE3)	Yes
FITTOMEDIA	OFF (ON, FORCE)	Yes
FOLD	NONE (FOLDH)	Yes
FONTNUMBER	0 (to N; maximum value depends on currently set font source)	Yes
FONTSOURCE	1 (2 - 6)	Internal font cartridge = default or downloaded font
FORMLINES	6 (5 TO 128) (Default = 6 LPI=VMI Index of 1200)	Yes
IMAGEADAPT	OFF	No
INTRAY1	UNLOCKED (LOCKED)	No
INTRAY2	UNLOCKED (LOCKED)	No
INTRAY3	UNLOCKED (LOCKED)	No
INTRAY1SIZE	LETTER (LETTERSEF, LETTERTAB, LEDGER, LEGAL, A3, A4, A4SEF, A4TAB, FOLIO, A5SEF, STATEMENT, EXECUTIVE, SUPERB, CUSTOM)	All trays supported and page sizes as dictated by the engine.
INTRAY2SIZE	LETTER (LETTERSEF, LETTERTAB, LEDGER, LEGAL, A3, A4, A4SEF, A4TAB, FOLIO, A5SEF, STATEMENT, EXECUTIVE, SUPERB, CUSTOM)	
INTRAY3SIZE	LETTER (LETTERSEF, LETTERTAB, LEDGER, LEGAL, A3, A4, A4SEF, A4TAB, FOLIO, A5SEF, STATEMENT, EXECUTIVE, SUPERB, CUSTOM)	

Environment Variables Summary (Continued)

Variable	Values	Supported?
JAMRECOVERY	ON (OFF)	Yes
JOBOFFSET	ON (OFF)	Yes
LANG		No
LOWTONER	CONTINUE (STOP)	No
MANUALFEED	OFF (ON)	Yes
MEDIASOURCE	AUTO (TRAY1, TRAY2, TRAY3, TRAY4, MPTRAY, TRAY5, INSERT1, INSERT2)	Yes
MEDIATYPE	PLAIN (BOND, RECYCLED, COLOR, PREPUNCHED, LETTERHEAD, PREPRINTED, SPECIAL, OTHER, TRANSPARENCY, LABEL, TRANSPARENCYPREPUNCHED)	Yes
ORIENTATION	PORTRAIT (LANDSCAPE)	Yes
OUTBIN	LOWER (AUTO, UPPER, OPTIONALOUTPUTBIN1, OPTIONALOUTPUTBIN4, OPTIONALOUTPUTBIN5, OPTIONALOUTPUTBIN6, OPTIONALOUTPUTBIN7, OPTIONALOUTPUTBIN8 OPTIONALOUTPUTBIN0, AUTOFACEUP, LOWERFACEUP, UPPERFACEUP, OPTIONALOUTPUTBIN1FACEUP, OPTIONALOUTPUTBIN4FACEUP, OPTIONALOUTPUTBIN5FACEUP, OPTIONALOUTPUTBIN6FACEUP, OPTIONALOUTPUTBIN7FACEUP, OPTIONALOUTPUTBIN8FACEUP, OPTIONALOUTPUTBIN0FACEUP)	Yes
PAGEPROTECT		No
PAPER	LETTER (LETTERSEF, LETTERTAB, LEDGER, LEGAL, A3, A4, A4SEF, A4TAB, FOLIO, A5SEF, STATEMENT, EXECUTIVE, SUPERB, CUSTOM)	All engine page sizes.
PASSWORD*	0 (0 - 65535)	Yes
PDFORIENTATION	PORTRAIT (LANDSCAPE, RPORTRAIT, RLANDSCAPE)	Yes
PERSONALITY	PCL	No
PITCH	10 (0.44 to 99.99)	Yes
PRTPSERRS		No
PTSIZE	12 (4.00 to 999.75)	Yes
QTY	1 - 65535	Yes
RESOLUTION	600	Yes
RET	ON (OFF)	No

Environment Variables Summary (Continued)

Variable	Values	Supported?
SYMSET	PC8 (DESKTOP, ISO4, ISO6, ISO11, ISO15, ISO17, ISO21, ISO60, ISO69, ISOL1, ISOL2, ISOL5, LEGAL, MATH8, MSPUBL, ROMAN 8, PC850, PC852, PC8DN, PC8TK, PIFONT, PSMATH, PSTEXT, VNINTL, VNMATH, VNUS, WIN30, WINL1, WINL2, WINL5)	Yes
TIMEOUT	300	Yes
TRIM	OFF (ON)	Yes
* INQUIRE PASSWORD is not supported.		

HP 4000 Series Emulation PJL Differences

To ensure that PJL commands are properly recognized and processed, insert the following command immediately before the first of a series of PJL commands:

<esc>%-12345X@PJL<CR><LF>

For example:

```
<esc>%-12345X@PJL
@PJL JOB NAME = "JOB1"
@PJL SET PAPER = LETTER
@PJL SET OUTBIN = UPPER
@PJL ENTER LANGUAGE = PCL
PCL Data<esc>E<esc>%-12345X@PJL
@PJL EOJ
<esc>%-12345X@PJL
@PJL JOB NAME = "JOB2"
@PJL SET PAPER = LEGAL
@PJL SET OUTBIN = LOWER
@PJL ENTER LANGUAGE = PostScript
%!PostScript Data^D<esc>%-12345X@PJL
@PJL EOJ
<esc>%-12345X
```

(If last entry, no <CR> <LF> following.)

JOB Command and Parameters

The JOB command informs the printer of the insert page information. The JOB command parameter INSERT provides an insert status that directs the sheet to be blank. The command parameter INSERTMEDIA can designate the insert media size, source, and/or type for the following INSERT option, that would otherwise depend on the PDL without this option.

The INSERTMEDIA and INSERT parameters can be set multiple times in the JOB commands, but the total number of parameters in each PJL JOB command must be less than seven (7). Refer to page 2-44 for the command syntax.

Parameter	Variables/Functional Range
INSERTMEDIA="*media size, media source, media type*"	*media size* (LETTER, LETTERSEF, LETTERTAB, LEDGER, LEGAL, A3, A4, A4SEF, A4TAB, FOLIO, A5SEF, SUPERB, CUSTOM*) *media source* (TRAY1, TRAY2, TRAY3, MPTRAY, TRAY5, INSERT1, INSERT2) *media type* (PLAIN, RECYCLED, COLOR, PREPUNCHED, LETTERHEAD, PREPRINTED, SPECIAL, OTHER, TRANSPARENCY, LABEL, TRANSPARENCYPREPUNCHED)
INSERT="*sheet #1, sheet #2,,,*"	Maximum 32 numeric characters, comma (,), and space ( ) enclosed in double quotation marks. Maximum 4 digit page number parts divided by comma.
* When CUSTOM is used, two numbers must indicate the paper dimensions, expressed in units of 1/72 inch. For example: @PJL JOB NAME-"sample" INSERTMEDIA="CUSTOM,612,792,INSERT1" INSERT="1"	

PJL Environment Variable Differences

The following describes the PJL environmental variable differences.

COPIES Environment Variable

The COPIES environment variable sets the number of uncollated copies for each page of a job. The range of valid values is 1 to 65535 inclusive.

CLIP Environment Variable

Value	Edge to Edge Printing
ON	Disable.
OFF	Enable.

CMAPTBL Environment Variable

PJL environment vairables CMAPTBL 6 and CMAPTBL 7 hold the custom tray mapping definition.

A custom tray mapping definition consists of a comma separated list of Tray Group Codes. A Tray Group Code may optionally be proceeded by a repeat count and a colon to define a sequence of identical mapping entries. The first value in the list corresponds to the Paper Source control sequence with a parameter of 0. The next item in the list corresponds to the Paper Source control sequence with a parameter of 1 and so on up to 69. If an item in the list is empty or contains an invalid Tray Group Code it will be replaced with a Tray Group Code of 0. The list may have a maximum of 70 entries and a length of no longer than 72 characters. Excess entries will be discarded and undefined entries will have a Tray Group Code of 0.

DOCPASSWORD Environment Variable

NOTE:
Available in S/W v3.0 and above.

The DOCPASSWORD command is a PDF-specific PJL Variable. There are two passwords available for PDF files:

User password - controls opening and/or printing of the file.
Owner password - controls printing/editing/annotating of the file.

When an encrypted PDF is presented to the printer, the "DOCPASSWORD" is processed. The Owner password is checked first. If there is a match, then the document will be printed. If the Owner password is not matched, the User password is checked. If there is a match, the printing permissions are checked. The following table shows the password combination printing results:

	USER PASSWORD	OWNER PASSWORD	PRINT PERMISSION	DOCPASSWORD	PRINT?
1	Y	N	---	User	Yes
2	Y	Y	HR	User	Yes
3	N	Y	HR	Owner	Yes
4	N	N	---	Owner	Yes
5	N	N	---	User	Yes
6	Y	Y	HR	User	Yes
7	Y	Y	None	User	No
8	Y	Y	None	Owner	Yes
9	Y	N	---	---	No
10	N	Y	HR	---	Yes
11	N	Y	None	---	No
12	N	Y	None	Owner	Yes
---	*No printing permissions set*				
HR	*High Resolution printing allowed*				
None	*No printing allowed*				

FINISH Environment Variable

Value	Finisher Option	
	Staple Mode	Staple Position
NONE	Disabled	None
STAPLE0	Enabled	Front
STAPLE1	Enabled	Rear
STAPLE2	Enabled	Center

FITTOMEDIA Environment Variable

FITTOMEDIA is a PDF-specific PJL variable. Use the following syntax to make sure the command is recognized by the PJL:

```
@PJL SET LPARM:PDF FITTOMEDIA=OFF
@PJL SET LPARM:PDF FITTOMEDIA=ON
@PJL SET LPARM:PDF FITTOMEDIA=FORCE
```

VALUE	PDF/TIFF Printing
OFF	Select the next larger paper size; do not scale the page to fit.
ON	Select the nearest available paper size; scale the page to fit.
FORCE	Follow PJL PAPER command; scale page to fit the selected media.

JOBOFFSET Environment Variable

Value	Jogging Offset Mode
OFF	Disabled.
ON	Enabled.
All other values default to OFF.	

MEDIASOURCE Environment Variable

Value	Input Tray		
	Without HCF	With HCF	Standard Finisher
AUTO	Auto Cascade	Auto Cascade	Auto Cascade
TRAY1	Tray 1	Tray 1	Tray 1
TRAY2	Tray 2	Tray 2	Tray 2
TRAY3	Tray 3	Tray 3	Tray 3
TRAY5	Tray 1	HCF	HCF
MPTRAY	Multi Bypass Tray	Multi Bypass Tray	Multi Bypass Tray

OUTBIN Environment Variable

Value	No Finisher	Standard Finisher
AUTO	Not designated	Not designated
LOWER		Elevator TrayFace down
UPPER		Upper Tray Face down
OPTIONALOUTPUTBIN1	Engine Output Tray Face down	
OPTIONALOUTPUTBIN4		
LOWERFACEUP		Elevator Tray Face up
UPPERFACEUP		Upper Tray Face up
OPTIONALOUTPUTBIN1FACEUP	Engine Output Tray Face up	
OPTIONALOUTPUTBIN4FACEUP		

Value	Container Stacker
AUTO	Auto cascade Face down
OPTIONALOUTPUTBIN4	
OPTIONALOUTPUTBIN5	Stacker 5 Face down
OPTIONALOUTPUTBIN6	Stacker 6 Face down
OPTIONALOUTPUTBIN7	Stacker 7 Face down
OPTIONALOUTPUTBIN8	Stacker 8 Face down
OPTIONALOUTPUTBIN0	Sample Tray Face down
AUTOFACEUP	Auto cascade Face up
OPTIONALOUTPUTBIN4FACEUP	
OPTIONALOUTPUTBIN5FACEUP	Stacker 5 Face up
OPTIONALOUTPUTBIN6FACEUP	Stacker 6 Face up
OPTIONALOUTPUTBIN7FACEUP	Stacker 7 Face up
OPTIONALOUTPUTBIN8FACEUP	Stacker 8 Face up
OPTIONALOUTPUTBIN0FACEUP	Sample Tray Face up

NOTE: All other values default to Auto.

PAPER Environment Variable

Value	Physical Media Size
LETTER	Letter (8.5" x 11")
LEGAL	Legal (8.5" x 14")
A4	A4 (210mm x 297mm)
LEDGER	Ledger (11" x 17")
A3	A3 (297mm x 420mm)
EXECUTIVE	Executive (7.25'' x 10.5'')
A5	A5 (149mm x 210mm)
STATEMENT	Statement (8.5" x 5.5")
FOLIO	Folio (8.5" x 13")
SUPERB	SuperB (12" x 18")
CUSTOM	Universal or Custom. Media Size must be set to Custom and physical media dimensions must be entered through the operator panel or SNMP.
LETTER SEF	Letter SEF (8.5" 11")
A5SEF	A5SEF (149mm x 210mm)
A4SEF	A4SEF (210mm x 297mm)
LETTERTAB	Letter Tab Stock (9" x 11")
A4TAB	A4 Tab Stock (225mm x 297mm)

PDFORIENTATION Environment Variable

This environment variable is used in PDF printing. It accepts the same values as PJL ORIENTATION (PORTRAIT, LANDSCAPE, RPORTRAIT, RLANDSCAPE). Setting PDFORIENTATION to either PORTRAIT or LANDSCAPE has the same effect on the printed output. Similarly RPORTRAIT and RLANDSCAPE are treated the same and are printed 180 degrees from PORTRAIT and LANDSCAPE. This feature can be used to control which edge of the printed sheets is stapled.

Use the following Syntax:

```
@PJL SET LPARM:PDF PDFORIENTATION=PORTRAIT
@PJL SET LPARM:PDF PDFORIENTATION=LANDSCAPE
@PJL SET LPARM:PDF PDFORIENTATION=RPORTRAIT
@PJL SET LPARM:PDF PDFORIENTATION=RLANDSCAPE
```

QTY Environment Variable

The QTY environment variable sets the number of collated copies of a job. The range of valid values is 1 to 65535 inclusive.

File System Command

Value	Description

FSAPPEND	Appends data to an existing file on the printer's hard disk; if the file does not exist, it is created with the data provided.
	Syntax:
	`@PJL FSAPPEND FORMAT:BINARY SIZE =`
	`integer NAME = "filename" <CR><LF>`
	`<binary data><esc>%-12345X`

FSDOWNLOAD	Downloads data to a file on the printer's hard disk; if a file with the same name exists, it is overwritten with the data provided.
	Syntax:
	`@PJL FSDOWNLOAD FORMAT:BINARY SIZE =`
	`integer NAME = "filename" <CR><LF>`
	`<binary data><esc>%-12345X`

FSDELETE	Deletes a file from the printer's hard disk. Syntax: `@PJL FSDELETE NAME = "filename" <CR><LF>`
FSDIRLIST	Displalys a directory listing.
FSMKDIR	Creates a directory.
FSQUERY	Determines if a file exists.
FSUPLOAD	Uploads data from a file on the printer's hard disk.

Maximum length of string value to the NAME option is 40 characters.

Valid values to the NAME option are strings containing ASCII printable characters (0x20 0x7E hex, inclusive).

Trailing white spaces in string value to the NAME option are discarded.

FORMAT modifier is ignored and not required; all file transfers are executed in binary mode.

The integer value specifies the number of data bytes in <binary data>.
The range is 0 to (2^{31}-1)

HP 4000 Series Emulation PJL Command Summary

The following table lists the PJL commands supported by the printer.

Command	PJL Command	Support ?
COMMENT	@PJL COMMENT <words> [<CR>] <LF>	Yes
DEFAULT	@PJL DEFAULT [LPARM : *personality*] *variable* = *value* [<CR>] <LF>	Yes
DINQUIRE	@PJL DINQUIRE [LPARM : *personality*] *variable* [<CR>] <LF> *Response* @PJL DINQUIRE [LPARM : *personality*] *variable* [<CR>] <LF> *value* <FF>	Yes
ECHO	@PJL ECHO [<words>] [<CR>] <LF> *Response* @PJL ECHO [<words>] [<CR>] <LF> <FF>	Yes
ENTER	@PJL ENTER LANGUAGE = *personality*] [<CR>] <LF>	Yes
EOJ	@PJL EOJ [NAME = "*job name*"] [<CR>] <LF>	Yes
INFO*	@PJL INFO *category* [<CR>] <LF> *Response* @PJL INFO *category* [1 or more lines of printable characters or <*WS*> followed by [<CR>] <LF>] <FF>	Yes
INITIALIZE	@PJL INITIALIZE [<CR>] <LF>	Yes
INQUIRE*	@PJL INQUIRE [LPARM : *personality*] *variable* [<CR>] <LF> *Response* @PJL INQUIRE [LPARM : *personality*] *variable* [<CR>] <LF> *value* <FF>	Yes
JOB	@PJL JOB [NAME = "*job name*"] [START = *first page*] [END = *last page*] [INSERTMEDIA = "[*media size, media source, media type*]"] [INSERT = "*sheet #n, sheet #m,,,*"][PASSWORD = *number*] [<CR>] <LF>	Yes
PJL	@PJL [<CR>] <LF>	Yes
RESET	@PJL RESET [<CR>] <LF>	Yes
SET	@PJL SET [LPARM : *personality*] *variable = value* [<CR>] <LF>	Yes
UEL	<ESC>%-12345x	Yes
USTATUS	@PJL USTATUS *variable = value* [<CR>] <LF> *Unsolicited Status Message returned when printer events occur.* @PJL USTATUS *variable* [<CR>] <LF> [1 or more lines of printable characters or <*WS*> followed by [<*CR*>] <*LF*>] <FF>	Yes
USTATUSOFF	@PJL USTATUSOFF [<CR>] <LF>	Yes
* INQUIRE PASSWORD is not supported.		

HP-GL/2 Differences

The following HP-GL/2 commands are not supported.

Command	Description
MC [mode [, opcode]] ;	Merge control.
PP [mode] ;	Pixel placement.

Disk Storage and Management of PCL Fonts and Macros

Disk storage and management of PCL resources such as fonts and macros require the use of the new PJL file system commands defined in the LaserJet 5si PJL implementation. These commands and their features related to supporting PCL fonts and macros downloaded to the printer's hard disk are briefly described below. Consult the *Printer Job Language Technical Reference Manual* for more information.

The PJL File System Interface

- The maximum number of characters in a file name is 40 characters; the minimum number of characters is 1.
- Only those printable ASCII characters in the range 0x20 and 0x7E (inclusive) may be used in a file name.

The following subsections briefly describe each file system command.

FSAPPEND

This command appends incoming data to an existing named file. If the named file does not exist on the printer's hard disk, a file is created with the name provided and the given data is stored in it.

FSDELETE

This command is used to delete a named file from the printer's hard disk.

FSDOWNLOAD

This command creates a file in the printer's hard disk with the name provided and stores in it the given data. If a file with the name provided already exists on the printer's hard disk, this file is overwritten by the new one.

FSINIT

This command is used to initialize the printer's hard disk. All user accessible files will be erased.

Naming Disk Fonts and Forms

The PCL interpreter expects disk fonts and forms to be named in a certain fashion. That is, each disk font should have "/fonts/" as the first part of its filename and each disk form should have "/pcl/macros/" as the first part of its filename. Refer to the next section "Example: Using the File System Commands" for examples.

Format of Disk Fonts and Forms

Disk fonts created using the Font and Forms Installer are the correct format for storing on the printer's hard disk drive. See Chapter 1 for information on the Font and Forms Installer.

Disk forms must be stored in PCL macro format without the `ESC&f0X` (Start Macro Definition) and `ESC&f1X` (Stop Macro Definition) commands.

Consult the *PCL 5 Printer Language Technical Reference Manual* for more information on the structure PCL soft fonts and macros.

Example: Using the File System Commands

Storing a Font on the Printer's Hard Disk

The following PJL job stores a font in a file called "/fonts/myDiskFont" on the printer's hard disk:

```
ESC%-12345X@PJL
@PJL FSDOWNLOAD FORMAT:BINARY NAME =
"0:/fonts/myDiskFont" SIZE = 51200
<<< 50K of soft font data >>>ESC%-12345X
```

Storing a Form on the Printer's Hard Disk

The following PJL job stores a simple form in a file called "/macros/myDiskForm" on the printer's hard disk:

```
ESC%-12345X@PJL
@PJL FSDOWNLOAD FORMAT:BINARY NAME =
"0:/pcl/macros/myDiskForm" SIZE = 33
ESC*p900x1500YThis is my Disk Form.ESC%-12345X
```

Removing Files from the Printer's Hard Disk

Files can be removed from the printer's hard disk by sending the PJL FSDELETE command:

```
ESC%-12345X@PJL
@PJL FSDELETE NAME = "0:/fonts/myDiskFont"
@PJL FSDELETE NAME = "0:/pcl/macros/myDiskForm"
ESC%-12345X
```

Using PCL Fonts and Macros Stored on Disk

The primary interface to using PCL fonts and macros downloaded to the printer's hard disk is the new Alphanumeric ID command defined in the LaserJet 5si PCL5e implementation. This command and its features related to supporting PCL fonts and macros downloaded to the printer's hard disk are described below. Consult the *PCL 5 Comparison Guide* for more information.

The Alphanumeric ID Command

In general, the Alphanumeric ID command is used to manage, select and/or use PCL fonts, macros and various media types by referring to these objects with a specified string ID.

Command Syntax

`ESC&n#W[operation byte][string data]`

The maximum number of characters in a string data parameter is 99. This maximum length plus 1 for the operation byte sets the maximum value (100) for the # parameter which specifies the number of data bytes following the command.

The Alphanumeric ID command supports a number of different operations that determine how to handle the string ID supplied to the command.

Set Current Font ID

The current font ID can be set to the given string data by specifying an operation byte value of ^@ (control-@ or 0x00 hex). This is analogous to the Font ID [ESC * c # D] command. Whereas the Font ID command sets the current font ID to a specified numeric value, the Alphanumeric ID ^@ operation sets the current font ID to a specified string value.

Associate Current Font ID

The current font ID can be associated to the font identified by the given string data by specifying an operation byte value of ^A (control-A or 0x01 hex). The font ID currently in effect could be a numeric value (as specified by the Font ID command) or a string value (as specified by the Alphanumeric ID ^@ operation). An association is made between the current font ID to the given string ID (the string data parameter) such that selection operations on the current font ID refer to the font identified by the string ID and management operations refer to the original font identified by the current font ID.

Select Primary Font

The font associated to the given string ID (the string data parameter) can be selected as the primary font by specifying an operation byte value of ^B (control-B or 0x02 hex). This is analogous to the Primary Font Selection by ID [ESC (# X] command. Whereas the Primary Font Selection by ID command selects a primary font by specifying its numeric ID, the Alphanumeric ID ^B operation selects a primary font by specifying its string ID.

Select Secondary Font

The font associated to the given string ID (the string data parameter) can be selected as the secondary font by specifying an operation byte value of ^C (control-C or 0x03 hex). This is analogous to the Secondary Font Selection by ID [ESC) # X] command. Whereas the Secondary Font Selection by ID command selects a secondary font by specifying its numeric ID, the Alphanumeric ID ^C operation selects a secondary font by specifying its string ID.

Set Current Macro ID

The current macro ID can be set to the given string data by specifying an operation byte value of ^D (control-D or 0x04 hex). This is analogous to the Macro ID [ESC & f # Y] command. Whereas the Macro ID command sets the current macro ID to a specified numeric value, the Alphanumeric ID ^D operation sets the current macro ID to a specified string value.

Associate Current Macro ID

The current macro ID can be associated to the macro identified by the given string data by specifying an operation byte value of ^E (control-E or 0x05 hex). The macro ID currently in effect could be a numeric value (as specified by the Macro ID command) or a string value (as specified by the Alphanumeric ID ^D operation). An association is made between the current macro ID to the given string ID (the string data parameter) such that usage operations on the current macro ID refer to the macro identified by the string ID and management operations refer to the original macro identified by the current font ID.

Delete Font Association

The font association identified by the current font ID can be deleted by specifying an operation byte value of ^T (control-T or 0x14 hex). Again, the font ID currently in effect could be a numeric value (as specified by the Font ID command) or a string value (as specified by the Alphanumeric ID ^@ operation). This command merely removes the information associating the current font ID to a particular font. The font itself, either in RAM or on disk, is not removed.

Delete Macro Association

The macro association identified by the current macro ID can be deleted by specifying an operation byte value of ^U (control-U or 0x15 hex). Again, the macro ID currently in effect could be a numeric value (as specified by the Macro ID command) or a string value (as specified by the Alphanumeric ID ^D operation). This command merely removes the information associating the current macro ID to a particular macro. The macro itself, either in RAM or on disk, is not removed.

Example: Using a Disk Font or Macro

The role of the Alphanumeric ID command in the disk based PCL fonts and macros feature centers on its ability to identify PCL resources by means of alphanumeric string IDs. Although this is just another way of referring to some fonts and macros downloaded to RAM, it provides a means by which fonts and macros downloaded to the printer's hard disk can be selected and/or used in subsequent PCL operations. This is done with the Alphanumeric ID command by using the font or macro association operation on the current font or macro ID to a disk font or macro resource and specifying the disk resource's file name as the command's string ID parameter.

Selecting Disk Fonts

For example, when a user wants to use a font which has already been downloaded to the printer's hard disk (assume it is saved in a file named "/fonts/myDiskFont"), the user must first associate that font with a new font ID.

Set the current font ID to a new font ID called “myNewFontID”.

```
ESC&n12W^@myNewFontID
```

Associate the disk font contained in the file “/fonts/myDiskFont” to the current font ID (in this case, it is “myNewFontID”)

```
ESC&n11W^AmyDiskFont
```

Select the disk font as the primary font by setting its associated name as the primary font ID.

```
ESC&n12W^BmyNewFontID
```

All printable characters following this command should print in the disk font selected.

Selecting Disk Macros

Suppose then that a user wants to use a form which has already been downloaded to the printer’s hard disk (assume it is saved in a file named “/macros/myDiskForm”). As in using disk fonts, the user must first associate this disk form with a new macro ID.

Set the current macro ID to a new macro ID called “myNewMacroID”.

```
ESC&n13W^DmyNewMacroID
```

Associate the disk form contained in the file “/macros/myDiskForm” to the current macro ID (in this case, it is “myNewMacroID”)

ESC&n11W^EmyDiskForm

At this point, whenever the current macro ID “myNewMacroID” is referenced, the disk form contained in the file “/macros/myDiskForm” is invoked.

`ESC&f2X(execute macro)` or

`ESC&f3X(call macro)` or

`ESC&f4X`(enable macro for automatic overlay)

Removing Font and Macro Associations

Disk font and macro associations can be explicitly removed by sending the Alphanumeric ID `^T` and `^U` (Delete Font Association and Delete Macro Association) operations.

```
ESC&n12W^@myNewFontID
ESC&n1W^T
ESC&n13W^DmyNewMacroID
ESC&n1W^U
```

Disk font and macro associations are automatically removed upon receipt of the Printer Reset command (`ESCE`).

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Chapter 3
Using the Startup File

Overview

The Startup File increases the overall capability of the printer by allowing you to place any required PCL soft fonts and/or macros in a single file to be processed each time the printer starts the PCL Page Description Language. The file is stored on the printer's hard disk drive with a filename of /pcl/startup.

When the printer controller encounters a PCL data stream for the first time, it processes the Startup File as if it were coming from a normal printer input port. The PCL Page Description Language processes the PCL data stream contained in the Startup File in the normal manner.

The data stream contains soft fonts and/or macros to be processed. During the processing of the data stream, the soft fonts and/or macros are stored in the printer's RAM. These soft fonts and macros are then available to all PCL data streams sent to the printer.

By using the Startup File, the host is no longer required to transmit any special data streams to the printer in order to make soft fonts or macros available.

PCL requires all soft fonts (*.sfp or *.sfs) to be used by a print data stream to reside in RAM. From a user perspective, the application being run on the host assumes the required internal and soft fonts are in RAM.

Soft fonts have an associated Font ID as well as the normal font attributes. Once installed in RAM, you can select a soft font for use by ID or by attribute. For example, to select a soft font by ID, use:

`<esc>(`*`n`*`X`

where *n* is the assigned soft font ID .

The following example selects the Postnet Bar Code soft font by attribute:

```
<esc>(15Y<esc>(s1p12.00v0s0b0T
```

Refer to "Startup File Examples" on page 3-3 for a sample of how the Postnet Bar Code font can be stored in the Startup File, as well as the sample test job to be sent after a power cycle.

Procedure to Install and Test a Soft Font

1. Order the font(s) in HP Soft Font format from a font vendor. (File type .sfp or .sfs.)
2. Build a job stream to load the soft font(s) in memory as permanent fonts. (Refer to Example 1.)

   Send the job stream to load the font in memory.
3. Build a job stream to test the font after being loaded into memory. (Refer to Example 2.)

   Send the test file.
4. Once the soft fonts are proved to print correctly, build the Startup File. (Refer to Example 3.)
5. Send the Startup File to the printer.
6. Power cycle the printer.
7. To print a list of all printer fonts, make the following selections from the OCP:

   Reports / Fonts

   Page 7 of the Font List Report contains the soft fonts loaded via the Startup File.
8. Send the test file (from Step 3) to the printer and verify the output.

Procedure to Install and Test a Macro

1. Build a job stream to load the macro(s) in memory as permanent. (Refer to Example 4.)

   Send the job stream to load the macro in memory.
2. Build a job stream to test the macro after being loaded into memory. (Refer to Example 5.)

   Send the test file.
3. Once the macros are proved to process correctly, build the Startup File. (Refer to Example 6.)
4. Send the Startup File (from Step 3) to the printer.
5. Power cycle the printer.
6. Send the test file (from Step 2) to the printer and verify the output.

Startup File Examples

NOTE:
In the following examples, <esc> represents 0x1B.

Example 1: Loading a Single Font into RAM

The following command loads a single font into RAM.

<esc>E<esc>*c*fontID*D<esc>)s100W...*more font data*...<esc>*c5F<esc>E

Where:

<esc>*c*fontID*D	assigns a *unique* font ID to the soft font.
<esc>)s100W	is the beginning of the actual HP standard soft font.
<esc>*c5F	informs PCL to make the soft font permanent in RAM until a reset or power cycle.

To load multiple fonts into RAM, concatenate the individual files created (per the example above) into a single file.

Example 2: Testing the Postnet Font

The following job tests the Postnet font after it has been loaded into memory.

<esc>%-12345X@PJL
<esc>(15Y<esc>(s1p12.00v0s0b0T 01234567890
<esc>E<esc>%-12345X

Where:

<esc>(15Y<esc>(s1p12.00v0s0b0T	is the soft font call out by attribute.

Example 3: The Startup File

A sample Startup File that loads a single font into RAM is shown below.

<esc>%-12345X@PJL
@PJL FSDOWNLOAD FORMAT:BINARY NAME ="0:/pcl/startup" SIZE=*ssss*
...*file*...<esc>%-12345X

Where:

ssss	is the DOS file size of the file created in Example 1.
file	is the file created in Example 1.

Changing the Startup File

To change the Startup File, first delete the file, then send the newly created file.

Deleting the Startup File

```
<esc>%-12345X@PJL
@PJL FSDELETE NAME = "0:/pcl/startup"
@PJL FSDELETE NAME = "0:/pcl/macros/StartUpFile"
<esc>E<esc>%-12345X
```

> ***NOTE:***
> *Do not modify this set of commands; use exactly as shown.*

Example 4: Loading a Single Macro into RAM

```
<esc>E<esc>&fmacroIDY<esc>&f0X<esc>&l1E...more data...
<esc>*c0P<esc>&f1x10X<esc>E
```

Where:

`<esc>&fmacroIDY`	assigns a *unique* macro ID to the macro.
`<esc>&f0X`	is the start macro PCL command.
`<esc>&f1x10X`	is the end macro definition command, followed by the command to make the macro permanent in RAM until a reset or power cycle.

To load multiple macros into RAM, concatenate the individual files created (per the example above) into a single file.

Example 5: Testing the Graybar Macro

```
<esc>E<esc>&l1O<esc>&f21y4XPage 1 graybar macro test.
<FF>Page 2 graybar macro test.<FF>Page 1 graybar macro
test. <FF><esc>E
```

Where:

`<esc>&f21y4X`	is the macro call out by ID # 21, followed by the command to use the macro as an overlay.

Example 6: The Startup File

A sample Startup File that loads a single macro into RAM is shown below.

```
<esc>%-12345X@PJL
@PJL FSDOWNLOAD FORMAT:BINARY NAME ="0:/pcl/startup" SIZE=ssss
...file...<esc>%-12345X
```

Where:

ssss	is the DOS file size of the file created in Example 4.
file	is the file created in Example 5.

Example 3 explains how to change or delete a Startup File.

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