

HP 5000
Cut Sheet
Printers

Enhanced Features Manual

Model D640

HP 5000 D640 Cut Sheet Printer Enhanced Features Manual

Hewlett-Packard Company

C5620-90027

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Appendix: Utilities

1

Introduction to Enhanced Features

The D640 function code (Revision E02L03, Date Code 980208 or later) includes some enhanced features that are not described in the *D640 User Manual* and *D640 Technical Reference Guide*. This manual is a supplement that explains these features plus additional changes.

Enhanced features include:

MOPY (Multiple Original Print) capability	Mopy printing enables you to print multiple, collated copies of a document. Documents are processed once and printed multiple times. This optimizes processing time, minimizes printing time, and reduces network traffic.
Tagged Image File Format (TIFF) emulation	TIFF emulation enables the printer to recognize and print bi-level, monochrome TIFF documents.
Data capture	Data capture enables the printer to save incoming data and store it on the printer's hard disk or floppy.
Disk activity indicator	An activity indicator now appears on the control panel when the printer is using the internal hard disk or floppy drive.
Improved disk filing system	The printer's filing system now supports long filenames.
Reports and Eventlog utility	A new utility that prints a Setup Report and a Maintenance Report, copies a print file of both reports to Drive A, and copies the eventlog.pcl file to Drive A.

Extended toner replacement procedure	Additional cleaning activities have been added to the toner replacement procedure.
Drum and fuser consumables	When the drum or fuser reach 100% of the rated life span, the printer displays a warning. When 115% of the rated life span is reached, the printer stops and does not resume until the consumable is replaced.
New jam and status messages	New jam messages and paper path status messages have been added.

Related documents

The information in this manual supplements the following documents.

- *Model D640 Installation Manual (C5620-90015)*
- *Model D640 User Manual (C5620-90024)*
- *Model D640 Technical Reference Guide (C5620-90002)*

Installation requirements

The *Model D640 Installation Manual* contains installation requirements for the D640 printer. This section describes additional installation requirements for enhanced features.

If you're printing from a UNIX workstation, you'll need to install a new UNIX model file for the enhanced features release. This model file is included in the Driver Diskette Package.

Installing the function code

This section describes how to install the function code that includes the enhanced features from the diskette.

Note

If you've just installed a new printer and have already loaded the function code as part of the printer installation, you can skip ahead to Chapter 2.

Recording printer configurations

When you install this version of the function code for the first time, the control panel settings on the printer may be reset to the factory defaults.

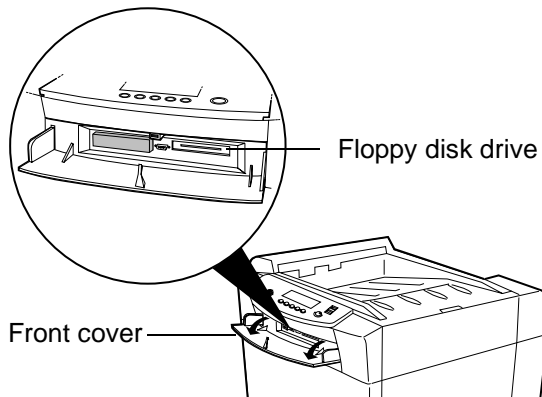
If you've created power-up or custom configurations that differ from the factory defaults, you'll need to make a record of the configuration settings and manually enter the information again after you install this update.

Installing from diskette

To install the function code:

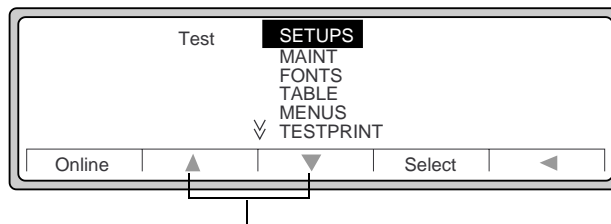
Step 1 Verify the printer is powered-on and in the Ready--free state.

Step 2 Open the front cover of the printer and insert the function code diskette into the drive.



Step 3 Press Test on the printer's control panel.

The Test menu appears.



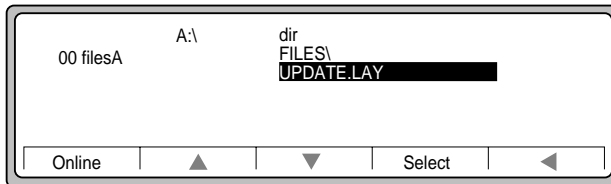
Press to scroll up or down the list of settings.

Step 4 Press ▼ until filesA is highlighted and press Select.



After about 5 seconds, a list of files on the floppy disk (filesA) appears.


Step 5 Press ▼ to highlight the UPDATE.LAY file and press Select.



The number 1 appears to the left of the filename to indicate the file has been selected.

Step 6 Press Online and follow the instructions on the control panel display.


An instruction page will print out.

**HEWLETT
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D640 function code upgrade

Please follow these printed instructions

Your printer is now updating the function code in memory to Revision E02V02L03. When the process is complete (in about one minute) the display will show "EW OK" and momentarily go blank. When "Ready -- free" appears on the display, perform the steps below.

Note  The installation of this update requires two steps. You have already completed step 1. Please follow the instructions below (after the display shows "Ready -- free") to perform step 2 and complete the installation.

- 1) Press **Test**.
- 2) Scroll down to **filesA** and press **Select**.
(There will be a slight pause while the directory on Drive A is read)
- 3) Scroll down to **FILES** and press **Select**.
- 4) Scroll down to **COMPLETE UPDATE** and press **Select**.
- 5) Press **Online**.

Informational messages appear as the new function code is installed on the printer. The total process takes about one minute.

In a few minutes, the printer initializes. When the installation is complete, a Ready--free message displays on the printer.

Step 7 Follow the instructions on the printed page.

A sheet prints describing the second step of the update process. The sheet also describes some of the enhanced features implemented by the new function code.

When the update process is finished, a Ready-free message displays on the printer

Step 8 Remove the diskette by pressing the release button located just above the diskette.

Restoring printer configurations

After you've installed the function code, you can restore any printer configurations you've created that differ from the factory defaults.

2 Using Enhanced Features

This chapter describes how to use the enhanced features installed on the D640 printer.

Multiple copies

About MOPY printing

Mopy printing enables you to print multiple, collated copies of a document. Documents are processed once and printed multiple times. This optimizes processing time, minimizes printing time, and reduces network traffic.

Mopy printing begins as soon as pages are available – you don't have to wait for the entire document to be processed. As a document is processed, the printer stores the document image on its internal hard disk.

Additional copies are printed at maximum speed because the document image is replayed to produce the number of copies specified (in the print job or on the printer's control panel).

Mopy printing is useful for complex jobs that slow down the printer when the first copy is created or take a long time to transmit over a network.

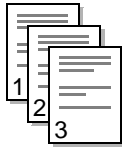
Note

The printer's internal hard disk has over 700MB of free disk space – enough to hold a document over 5,000 pages long. If you're printing multiple copies of a document over 5,000 pages long, try a test printing to make sure there is enough disk space to store the entire document. If necessary, you can break up a large print job into smaller sub-jobs.

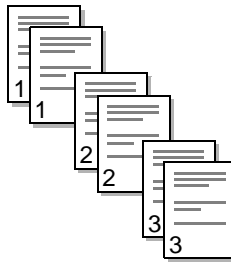
The front panel of the D640 printer includes settings you can use to make multiple-page, collated copies. These settings include:

- **Copies.** This setting specifies the number of copies for each page of a document. Copies are created on a page-by-page basis.
- **Mopies.** This setting is compatible with the multiple copy (mopy) feature in the HP Laserjet 5Si Mopier printer driver. It creates multiple collated copies on a document-by-document basis.
- **Auto-collate.** Used in combination with the Copies setting, auto-collate enables you to print multiple-page, collated copies. This setting is useful if your printer driver doesn't support mopy functions (for example, the HP Laserjet 4Si printer driver).

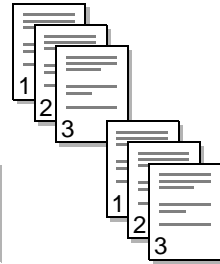
Multiple-page document



Copies
(no collate)



Mopies

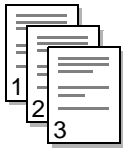


Typically, you use settings in your application or printer driver to control how multiple copies are printed and collated. However, the multiple copies settings on the front panel of the printer are useful when you want to:

- Print from an application that doesn't support multiple, collated copies
- Use the DOS copy command to print from a personal computer

Note

The copy and copy settings on the front panel of the printer will be multiplicative if auto-collate is off. (See illustration below.)



Printer's front panel:

Copies = 2

Mopies = 3

Auto-collate = Off

3 sets of documents are created.
Each set has 2 copies of each page.



This feature is useful if you're simulating a multi-part form on the printer and you want more than one copy of the form.

Working with printer drivers

Application and printer driver settings influence the multiple-copies settings on the printer. To make sure you get the desired results, Hewlett-Packard recommends you test the multiple-copy features on the printer with your specific application and printer driver.

Some things to remember about multiple, collated copies include:

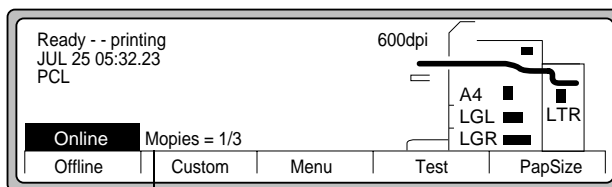
- Settings in the printer driver and application override settings on the printer's control panel.
- Commands in a print job override settings on the printer's control panel.

The table on page 10 shows some examples of how the D640 printer's auto-collate setting works with your application/printer driver.

Printer driver	Driver/application settings	Printer settings	Results
HP Laserjet 4Si, or D640 NT mini driver	copies = 3 collate = checked	auto-collate = setting is ignored copies = 1 mopies = 1	3 collated copies (job is processed three times)
	copies = 3 collate = not checked	auto-collate = On copies = 1 mopies = 1	3 collated copies (job is processed once and stored on disk for additional copies)
	copies = 3 collate = not checked	auto-collate = Off copies = 1 mopies = 1	3 copies of each page in the document
HP Laserjet 5Si Mopier	copies = 3 collate = checked	auto-collate = setting is ignored copies = 1 mopies = 1	3 collated copies (job is processed once and stored on disk for additional copies)
	copies = 3 collate = not checked	auto-collate = On copies = 1 mopies = 1	3 collated copies (job is processed once and stored on disk for additional copies)
	copies = 3 collate = not checked	auto-collate = Off copies = 1 mopies = 1	3 copies of each page in the document
General rule: If you're using the printer's auto-collate feature, leave collate Off in the Laserjet 4Si driver (or D640 NT driver) and On in the Laserjet 5Si Mopier driver. Otherwise, leave collate Off.			

Note

If you're not sure you're getting printer-efficient, multiple copies, check the printer's control panel when the job is printing. You should see a Mopies indicator.



Mopies indicator

The Mopies indicator shows the D640 printer is managing multiple, collated copies in an efficient and fast manner. If you don't see this indicator, your application and/or printer driver is controlling the multiple copies. Review the table above and make sure collate is turned off in your application or driver.

Printing multiple copies

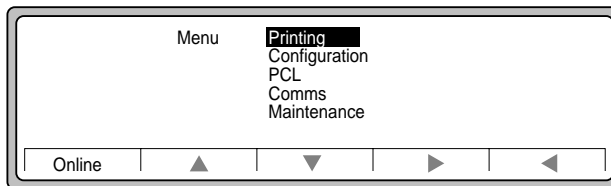
The following sections describe how to set mopies and auto-collate on the printer. For information on setting copies, see the *D640 User Manual*.

Setting mopies

To set mopies on the printer:

Step 1 Locate the control panel on the front of the printer and press Menu.

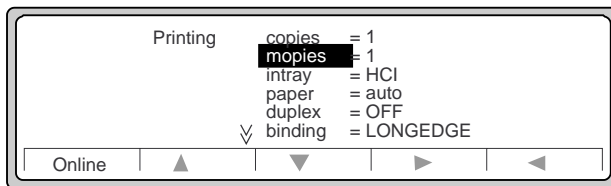
A list of menus appears with Printing highlighted.



Step 2 Press ► to open the Printing menu.

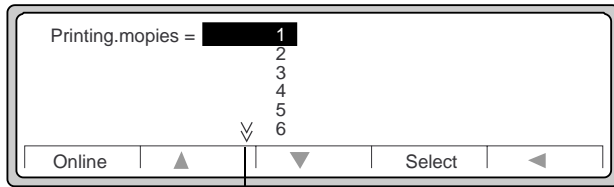
A list of Printing settings appears.

Step 3 Press ▼ to highlight mopies.



Step 4 Press ►.

The Printing.mopies settings appear. By default, mopies are set to 1.



Indicates more choices. You can select up to 32,767 mopies.

Step 5 Use the arrow keys to highlight the number of mopies you want to set.

The number you choose determines the number of document sets printed. If you select mopies = 0, the document is processed and saved on the printer's hard disk, but it isn't printed.

Step 6 Press Select; then, press Save.

The mopies setting is saved. After a few moments, the printer's main screen appears.

Note

Pressing Save stores the setting as part of the printer's power-on configuration. If you don't press Save, the setting remains active until the printer is reset or a new configuration is loaded.

Changing the auto-collate setting

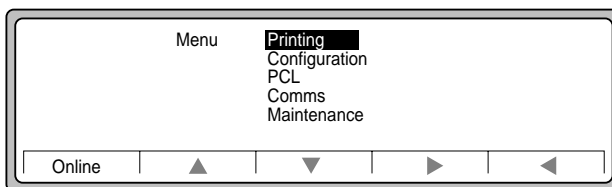
Used in combination with the Copies setting, auto-collate enables you to print multiple-page, collated copies. This setting is useful if your printer driver doesn't support mopy functions (for example, the HP Laserjet 4Si printer driver).

By default, auto-collate is off. You may want to turn auto-collate on and save it as your default setting.

To change auto-collate on the printer:

Step 1 Locate the control panel on the front of the printer and press Menu.

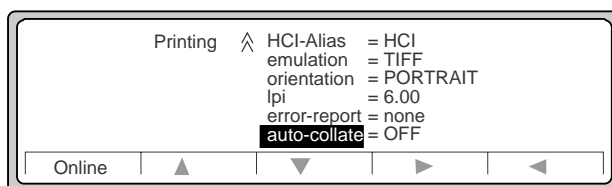
A list of menus appears with Printing highlighted.



Step 2 Press ► to open the Printing menu.

A list of Printing settings appears.

Step 3 Press ▼ to scroll down the list of choices until auto-collate is highlighted.



Step 4 Press ►.

The Printing.auto-collate settings appear. Setting choices are On and Off. Use auto-collate = Off to print uncollated copies. Use auto-collate = On to print collated copies.

Step 5 Use the arrow keys to highlight the desired setting.

Step 6 Press Select; then, press Save.

The auto-collate setting is saved. After a few moments the printer's main screen appears. The auto-collate setting applies to all documents printed until you change the setting.

Note

Pressing Save stores the setting as part of the printer's power-on configuration. If you don't press Save, the setting remains active until the printer is reset or a new configuration is loaded.

TIFF emulation

About TIFF emulation

TIFF emulation enables the printer to recognize and print bi-level monochrome TIFF documents. Previously, TIFF images had to be part of a larger PCL or PostScript (PS) document to be printed.

You can set TIFF emulation as the default printer protocol, or you can use Auto emulation to automatically select between PCL, PS, and TIFF protocols.

TIFF emulation does not support color or grayscale TIFF files. For more information about TIFF emulation, see “Working with TIFF images” on page 29.

Setting TIFF emulation

CAUTION

Setting TIFF emulation as the default printer protocol, should be done only in a controlled environment where TIFF is the only type of file printed. Hewlett-Packard highly recommends using Auto emulation instead. If the printer is set to TIFF and a PS or PCL job is sent, you get pages and pages of blank paper or unrecognizable print characters because the printer is expecting TIFF data, not PCL or PS.

To set TIFF emulation as the default printer protocol:

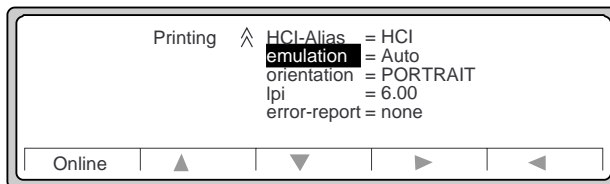
Step 1 Locate the control panel on the front of the printer and press Menu.

A list of menus appears with Printing highlighted.

Step 2 Press ► to open the Printing menu.

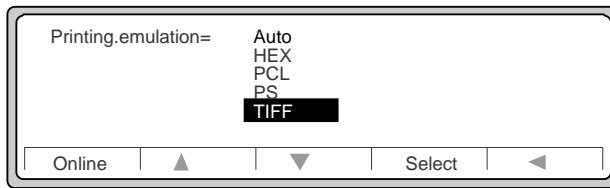
A list of Printing settings appears.

Step 3 Scroll through the list of settings until emulation is highlighted.



Step 4 Press ►.

A list of emulation settings appears.



Step 5 Highlight TIFF. Press Select; then, press Save.

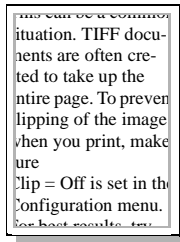
TIFF emulation is set for all documents printed.

Note

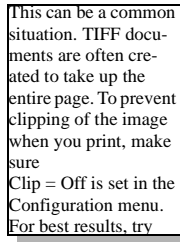
Pressing Save stores the setting as part of the printer's power-on configuration. If you don't press Save, the change remains active until the printer is reset or a new configuration is loaded.

Note

TIFF documents are typically designed to take up the entire page. To prevent clipping of the image when you print, make sure Clip = Off is set in the Configuration menu or in your print job.



Clip = On



Clip = Off

Data capture

Data capture enables the printer to save incoming data and store it in a file on the printer's hard disk or floppy. Your service representative can use this information to help troubleshoot printer problems.

Typically, you don't need to use this feature unless directed by your service representative.

To save data to a file:

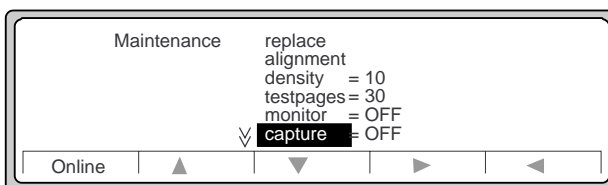
Step 1 Locate the control panel on the front of the printer and press Menu.

A list of menus appears.

Step 2 Use the arrow keys to highlight the Maintenance menu.

Step 3 Press **▶** to open the Maintenance menu.

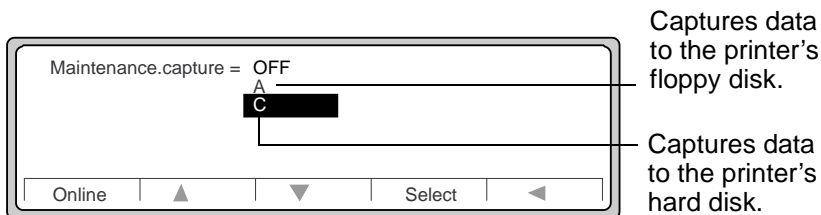
Step 4 Use the arrow keys to highlight the Capture setting.



Step 5 Press **▶**.

The Maintenance.capture settings appear.

Step 6 Highlight C (or A) and press Select.



Select C to store the data on the printer's hard disk. Select A to store the data on the printer's floppy disk.

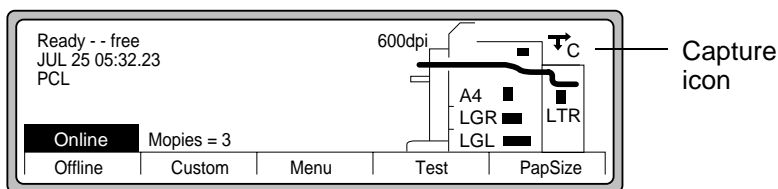
Use capture = C when you need to store a large amount of data. Capture = C can create up to a 100-Mbyte file. Use capture = A when you need to store a small amount of data. Capture = A can create up to a 1.4-Mbyte file.

When necessary, your service representative will provide a method for copying the capture file from the printer's hard disk to an external source.

Step 7 Press Online.

After a few moments the printer's main screen appears and a capture icon appears on the right side of the screen. (If the printer is in economy mode when Capture is on, the capture icon replaces the economy mode icon.)

When Capture is on, all data coming into the printer is stored in a file (CAPTURE.DAT). Capturing continues until Capture is turned off.

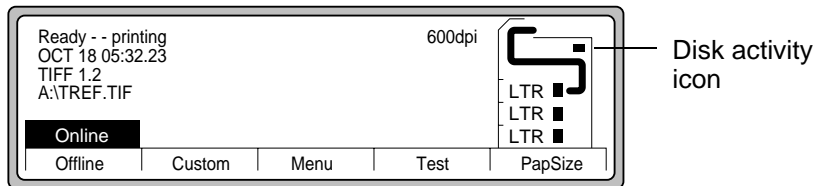


Note

Capture doesn't disable printing. Your documents still print when Capture is on, but there may be some performance degradation, especially when capturing to the floppy disk.

Disk activity icon

The function code now includes a disk activity icon that appears whenever the printer is using its floppy disk or internal hard disk.



Examples of when this icon appears include:

- When the printer is storing information on disk (for example, if the printer is storing a job for mopies or if the printer is capturing data).
- When the printer is accessing information from disk (for example, reading font data from a virtual font cartridge).

Drum and fuser consumables

When the drum or fuser reach 100% of the rated life span, the printer displays a warning. When 115% of the rated life span is reached, the printer stops and does not resume until the consumable is replaced.

Note This feature requires Engine Firmware Revision E01VxxL39 or later.

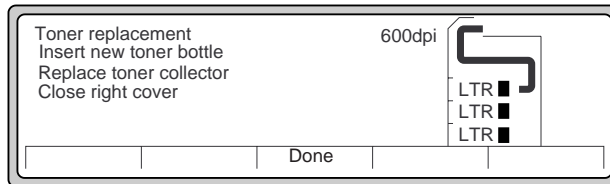
Toner replacement cleaning actions

Every other time toner is replaced, the cleaning roller must also be replaced and new cleaning actions performed. The sequence of actions starting with the toner replacement is displayed on the control panel. As you perform each action, you press Done and the next action will be displayed.

The following procedure guides you through the control panel displays and the corresponding actions. For a complete description of the toner replacement procedure and any of the cleaning actions, see the *D640 User Manual*.

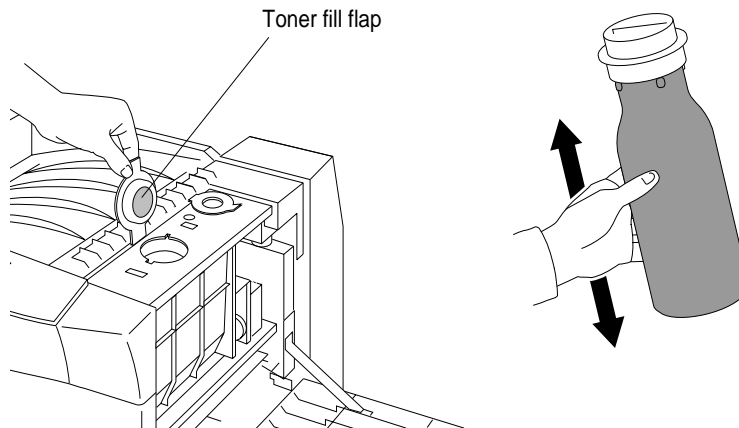
Step 1: Replace Toner and Toner Collector Bottle

The first display instructs you to replace the toner and the toner collector bottle.



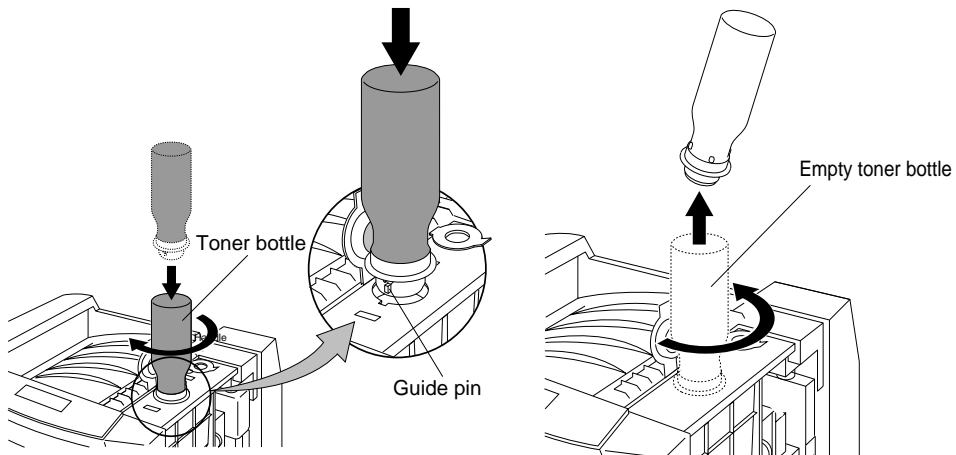
To replace the toner and the toner collection bottle:

Step 1 Open the toner fill flap (front flap).



Step 2 Check the top of the toner bottle to make sure it is closed. Shake the contents of the toner bottle to loosen any toner that has settled and packed during shipment.

Step 3 Line up the guide pins on the bottle with the guide pin openings on the toner fill opening. Insert and turn the toner bottle clockwise 180° to start filling.



Note

It will take about 30 seconds for the toner to empty into the toner hopper. Because the toner bottle is translucent, you should be able to see the toner empty out of the bottle.

Step 4 When empty, turn the toner bottle counterclockwise 180° and remove.

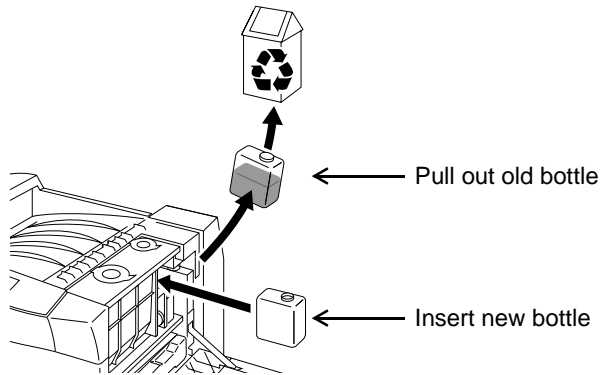
Step 5 Close the toner fill flap.

Step 6 Discard the toner bottle. The toner bottle is made of recyclable materials. Dispose of it according to local regulations.

Note

If you have toner recycling turned on, you can skip this step.

Step 7 Remove the old toner collector bottle and replace it with a new, empty one.



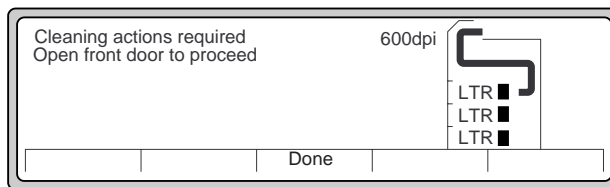
Step 8 Dispose of the old toner collector bottle in accordance with local regulations. Close the upper right cover.

Step 9 Press Done.

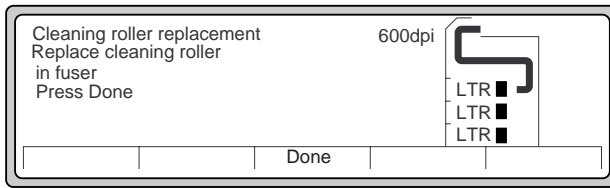
Step 2: Replace Cleaning Roller

The next display informs you that you must perform a sequence of cleaning actions.

Press Done to go to the first cleaning action.



The first action you will perform is to replace the cleaning roller.



To replace the cleaning roller:

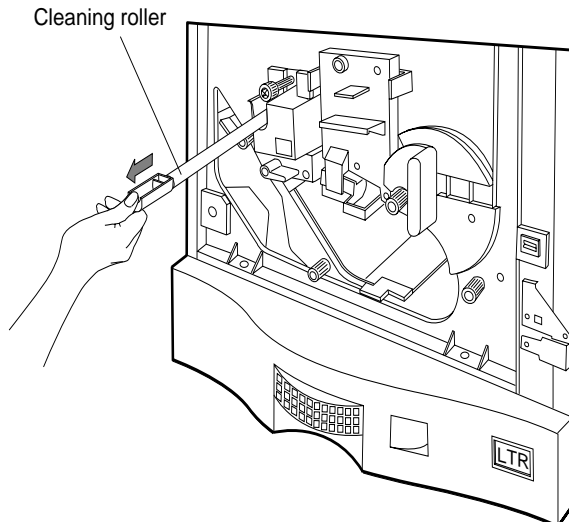
WARNING!



Handle the old cleaning roller carefully; it may be hot.

Step 1 Open the front door.

Step 2 Pull out the old cleaning roller.



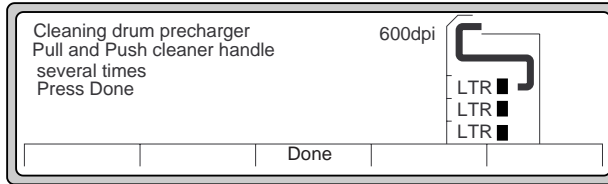
Step 3 Insert the new cleaning roller until it clicks into place.

Step 4 Close the front door.

Step 5 Press Done.

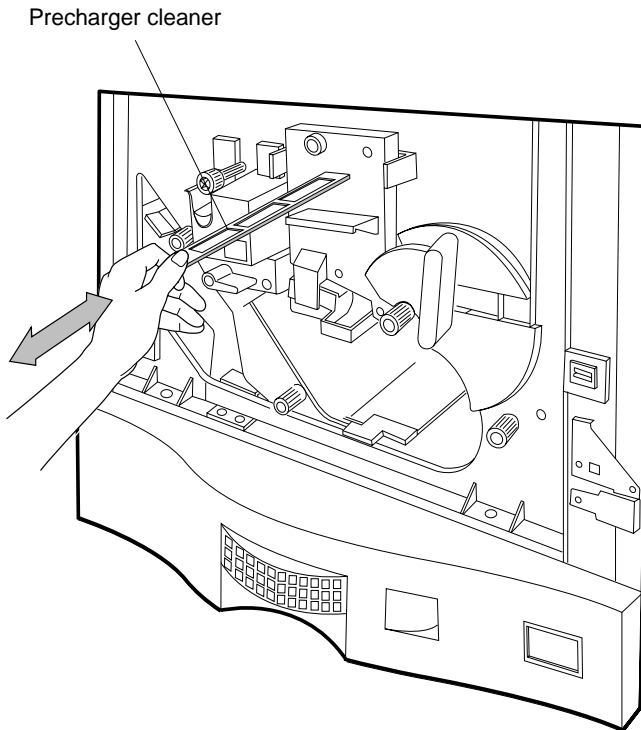
Step 3: Clean Drum Precharger

The next display instructs you to clean the drum precharger.



To clean the drum precharger:

Step 1 Pull out the precharger cleaner handle, then push it back into its original location. Repeat this “out-in” process 4 or 5 times.

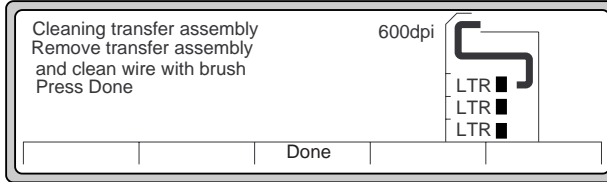


Step 2 Push the precharger cleaner in completely.

Step 3 Press Done.

Step 4: Clean Transfer Assembly

The next display instructs you to clean the transfer assembly.



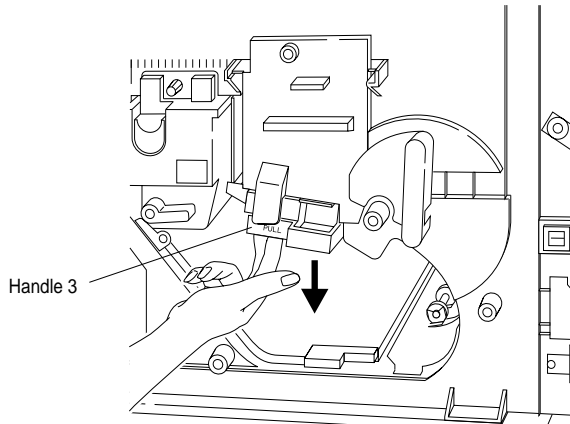
To clean the transfer assembly:

Step 1 Use the supplied cleaning cloths or the vacuum cleaner to wipe any toner or dust off the outside of the transfer guide and paper guides.

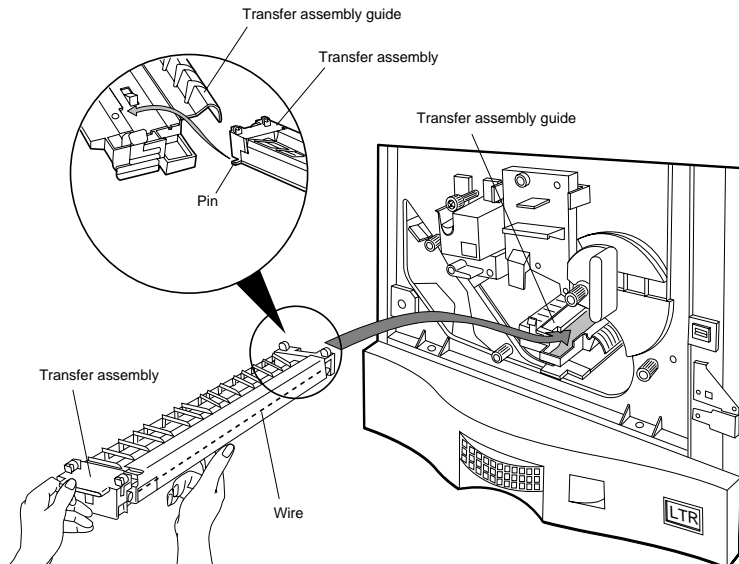
CAUTION

As you handle the transfer assembly, take care not to touch or damage the transfer wire.

Step 2 Pull out gently on Handle 3 to unlatch and release the transfer guide. Gently lower the transfer guide and let it rest on the bottom of the printer's interior.



Step 3 Push in and pull up on the transfer assembly to free it from the guide assembly.



Step 4 Use the supplied blower brush, stored in a pocket inside the front door, to clean the transfer assembly wire. Move the brush back and forth across the wires while quickly squeezing the rubber handle. This blows air to help remove toner and paper dust. Turn the transfer assembly over so the opposite side can be cleaned in the same way, and do so.



Step 5 Using the alignment pin located on the end of the cleaned transfer assembly, insert the alignment pin of the transfer assembly into the left rail of the transfer assembly guide and push in to the end of the guide.

Step 6 Secure the transfer assembly by lifting Handle 3.

Step 7 Close the front door.

Step 8 Press Done.

You have now completed the procedure and are ready to print.

Paper Jam and New Status Messages

Note The new status message feature requires Engine Firmware Revision E01VxxL39 or later.

The following table lists each paper jam and new status message that displays on the control panel and how to clear them. More detailed information on clearing paper path problems appears on the pages listed in the *D640 User Manual*. You can also refer to the illustrated paper path clearing pictures located on the inside of the printer's front door.

Note If a jam is not completely cleared by the operator, a message "Paper at xxx" is displayed. This status message does not have a jam code and is *not* logged in the event log.

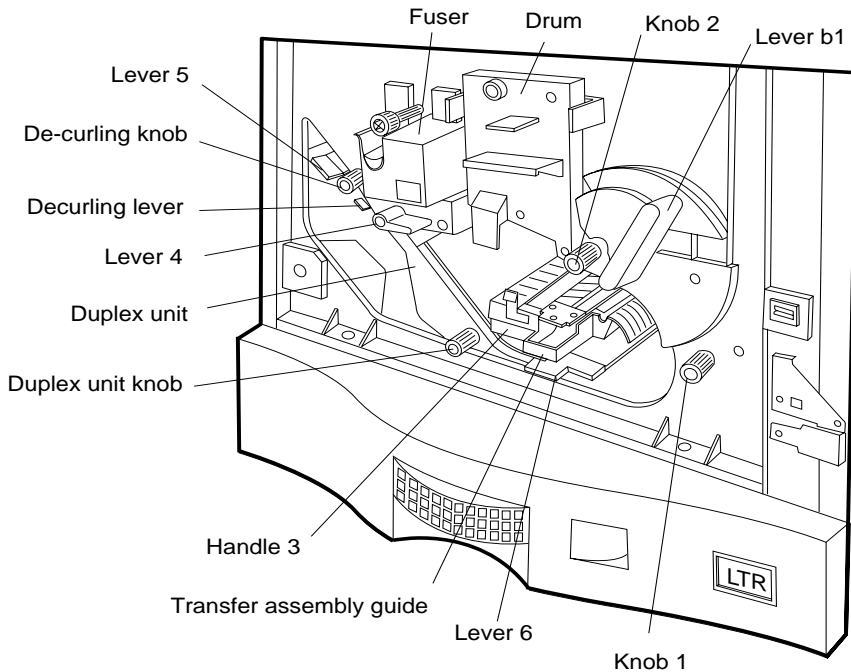
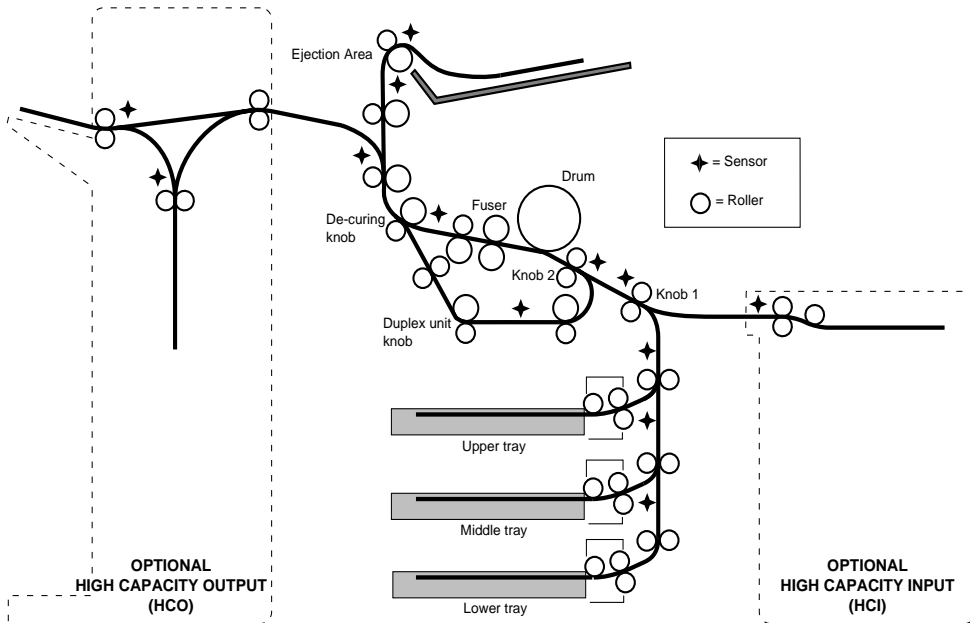
Paper Jams and Status Messages

Paper Jam Message or Status Message	Remedy	Refer to page in <i>D640 User Manual</i>
Paper Input Jams and Status Messages		
TRAY1 Pick error	Remove tray (1, 2, or 3). Remove paper jam from paper entry area and/or within tray.	3-24
TRAY2 Pick error		
TRAY3 Pick error		
Feed path jam 1	<ul style="list-style-type: none"> Open the front door, lower transfer assembly, rotate knob 1 counterclockwise and knob 2 clockwise to free paper, and remove jammed paper. Open the right-side door. Remove jammed paper. 	3-26
Feed path jam 2		
Feed path jam 3		
Paper at Tray1 area ^a		
Paper at Tray2 area ^a		
Paper at feed path Knob 1		
Feed path jam 4	Open the front door, lower transfer assembly, rotate knob 1 counterclockwise and knob 2 clockwise to free paper, and remove jammed paper.	3-26
Paper at feed path Knob 2 ^a		
HCI jam 1	Open HCI, lower paper, and remove jammed paper.	3-32

Paper Jams and Status Messages

Paper Jam Message or Status Message	Remedy	Refer to page in <i>D640 User Manual</i>
HCI jam 2	Pull HCI away from printer and remove jammed paper.	3-34
Paper at HCI area ^a		
Paper Path Jams and Status Messages		
Fusing unit jam 1	Open the front door, lower transfer assembly, open lever 4, push decurler lever down, and remove jammed paper to the right.	3-36
Fusing unit jam 2	Open the front door, open lever 4, push Lever 5 down, rotate decurler knob, remove jammed paper.	3-40
Paper at fusing area ^a		
Duplex path jam 1	Open the front door, raise lever 6, and remove jammed paper. You may need to turn duplex roller knob to release the paper.	3-38
Duplex path jam 2		
Paper at duplex area ^a		
Paper Output Jams and Status Messages		
Ejection unit jam 1	Raise the paper ejection cover, and remove jammed paper.	3-43
Ejection unit jam 2		
Paper at ejection area ^a		
HCO jam 1	Open the HCO door, rotate roller knob 1 to free paper, then lift levers to remove paper.	3-45

a. The new status message feature requires Engine Firmware Revision E01VxxL39 or later and Function Code Revision E02V02L03 or later.



3 Technical Reference

This chapter includes technical reference information for enhanced features. It is a supplement to the *D640 Technical Reference Guide*.

Related documents

This chapter is written for experienced users, such as application developers and technical support personnel. Before using this chapter, you should be familiar with the following books:

PCL/PJL Technical Reference Library, 5021-0330, which contains:

- *PCL5 Printer Language Technical Reference Manual*
- *Printer Job Language Technical Reference Manual*
- *PCL5 Comparison Guide*
- *PCL/PJL Technical Quick Reference Guide*

HP 5000 D640 manuals, including:

- *D640 Technical Reference Guide*, C5620-90002

Working with TIFF images

About TIFF images

The D640 printer supports TIFF emulation which enables your printer to recognize and print bi-level, monochrome TIFF images. Previously, TIFF images had to be part of a larger PCL or PostScript (PS) document to be printed.

TIFF support for the D640 printer conforms to the specifications described in *TIFF Revision 6.0* published by Aldus Corporation, June 1992. The information in this chapter assumes you are familiar with *TIFF Revision 6.0*.

The D640 printer supports relevant parts of Baseline TIFF and selected elements of Extended TIFF. There are no private fields or values required by the printer.

Note

The TIFF standard does not contain any elements to indicate the termination of data. Therefore, termination of a TIFF file must be indicated by PJI universal escape sequences or the printer's I/O timeout configuration.

Printing TIFF images

TIFF images can be printed using the following methods:

- setting the printer's control panel to recognize TIFF files (Emulation = TIFF or Auto). Auto is the recommended setting if you print files using more than one protocol (such as PCL or PS).
- using commands in a print job

Using the control panel

On the printer's control panel, you can explicitly select TIFF emulation. For details, see "TIFF emulation" on page 14.

When TIFF emulation is set, the following data items are valid:

- A new TIFF file, starting with a 4-byte sequence \$49492A00 or \$4D4D002A
- PJI commands

Any other type of data is treated as an error.

On the printer's control panel, you can also use the Auto emulation setting to implicitly recognize TIFF files.

If Auto emulation is set, the printer recognizes either of the following sequences as valid TIFF file headers and enters TIFF emulation mode automatically, if this sequence is at the start of the print job.

- \$49492A00 or \$4D4D002A

Using commands in a print job

In addition to control panel settings, TIFF protocol can be selected by the PJL command:

```
@PJL ENTER LANGUAGE = TIFF
```

The following is a sample print job for a TIFF file:

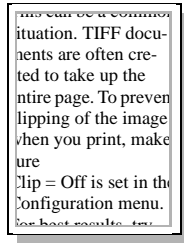
```
<Esc>%-12345X@PJL JOB NAME="Sample.tif"<LF>
<Esc>%-12345X@PJL SET CLIP=OFF<LF>
<Esc>%-12345X@PJL ENTER LANGUAGE=TIFF<LF>
< tif file goes here >
<Esc><Esc><Bel>
<Esc>%-12345X@PJL<LF>
@PJL EOJ NAME="Sample.tif"<LF>
<Esc>%-12345X
```

General rules

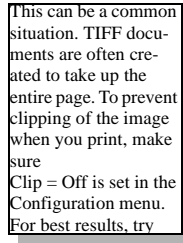
The following are some general rules to describe how the D640 printer processes TIFF data.

- Each TIFF file is a self-contained unit, made up of one or more sub-files. Each sub-file describes a single rectangular image. The image may be a complete page, or it may be a part of a page. During TIFF emulation, the printer cannot switch into any other protocol, except at the boundaries of individual TIFF files.
- If a TIFF image contains multiple sub-files, the images contained in the sub-files are placed on separate pages in the order the sub-files appear in the TIFF data stream.
- If TIFF is the selected protocol:
 - Images are placed with respect to the physical page, with zero margins.
 - If a sub-file doesn't have positioning information, the image is placed at the edge of the page.
 - If a sub-file has positioning information, the commands are interpreted as absolute displacements from the edge of the physical page.

- The Clip setting for the document determines if the image is printed to the edge of the page.



Clip = On

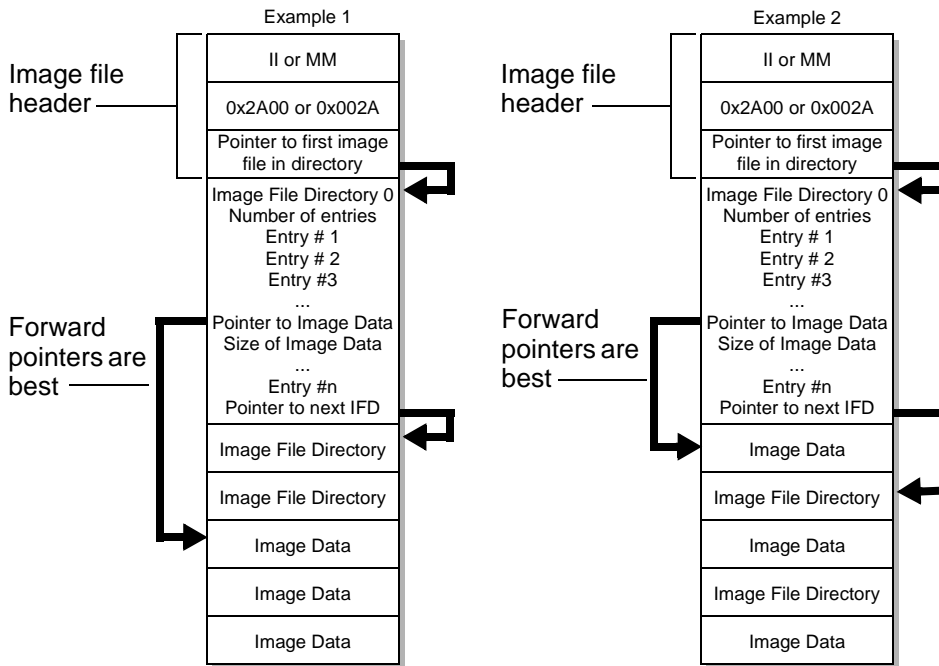


Clip = Off

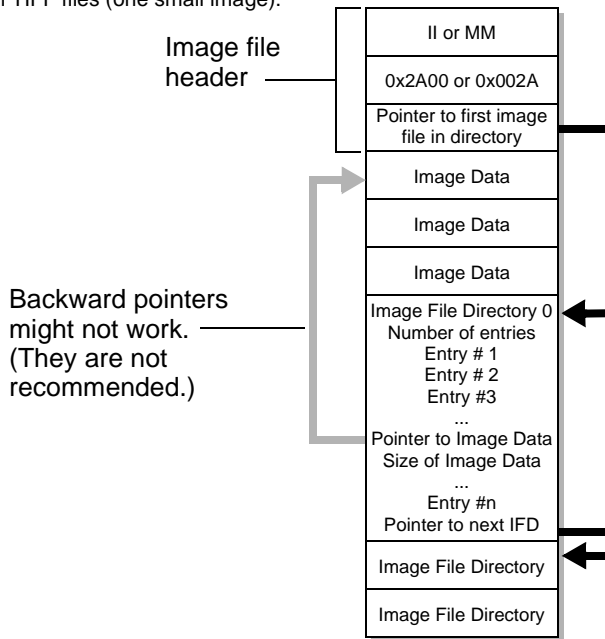
- TIFF was designed as a file structure for random-access devices. When used as a printer protocol, HP recommends the following ordering restrictions apply to allow sequential processing of the data. These include:
 - Offset values should be greater than the file position of the offset. For example, If an offset resides at file position A within the TIFF data, its value should be greater than A.
 - Within a file, all tag fields pertinent to the image should precede the image data.
 - The ordering of components within each sub-file should be:
 - Image file directory
 - Data values identified by directory entry offsets
 - Image data.

See page 33 for some example TIFF structures.

Preferred structure of a TIFF file: In Example 1 and Example 2, all the image file directories occur early in the file. This is a good structure for TIFF files sent to the D640 printer.



Alternative structure for a TIFF file: In the structure below, the image file directories appear after the image data. This file may not be printable because of the backward pointer. With this structure, the D640 printer can handle only small TIFF files (one small image).



Errors

Errors in the TIFF file header or in directory offset values are considered major errors. The remainder of the TIFF file is ignored and the print job is abandoned.

For other errors, the processing of the current sub-file continues, but no image is printed. Subsequent sub-files are processed normally.

The following are the main categories of errors:

- Absence of mandatory TIFF fields (directory entries)
- Duplicate occurrences of tags in one directory
- Wrong type for a significant TIFF field
- Wrong number of values for a significant TIFF field
- Value out of range for a significant TIFF field
- Offset values less than the file position of the offset (for a significant TIFF field)

If a TIFF field is not significant for the printer, its Type, Number, and Value are not checked for correctness.

The TIFF specifications (described in *TIFF Revision 6.0*) require TIFF fields to appear in ascending tag order. The D640 printer does not enforce this requirement.

Note

You can use the error report setting on the D640 printer to print a report of TIFF errors within a print job. See the *D640 User Manual* for more information.

TIFF structure and fields

This section includes a full list of baseline and extended TIFF fields with comments on their interpretation by the D640 printer.

The following conventions are used to describe the TIFF fields.

- Fields marked with * are significant for the processing of image data by the printer.
- Fields marked with ** have no default value. These fields are mandatory. If any of these fields are missing from the TIFF data, an error occurs.
- The first line of the TIFF definition lists the name of the field. The second line provides the tag number in hex, the type of values, and the number values for the field. For example:

Name
Tag,Type,N

- Comments about the field are listed to the right of the field name.

Baseline TIFF

The following is a list of extended TIFF fields which are accepted by the D640 printer.

Baseline TIFF definitions

Structure

Image File Header Bytes 0-1 in the file can be either \$4949 indicating little-endian data format (Intel standard) or \$4D4D indicating big-endian data format (Motorola standard).

Multiple IFDs The D640 printer can read multiple IFDs and process multiple images. Each image is printed on a separate page.

Baseline fields

Artist Person who created the image.
013B,ASCII

* *BitsPerSample* Numbers of bits for individual color components.
0102,Short,N The D640 printer is monochrome. Therefore, N=1, and the value itself must be 1.
Default = 1.

CellLength The length of the dithering or halftoning matrix used to create a dithered or halftoned bi-level file. The printer does not generate its own halftoning.
0109,Short,1

CellWidth The width of the dithering or halftoning matrix used to create a dithered or halftoned bi-level file.
0108,Short,1

ColorMap A Red-Green-Blue color map for palette color images.
*0140,Short,3*2^bps*

Baseline TIFF definitions

* *Compression* Compression scheme used for the image data. The following compression modes are supported by the D640 printer:
0103,Short,1

baseline TIFF

1 = No compression. Data packed tightly into bytes, but not spanning row boundaries. This is the default.

2 = CCCIT Group 3, 1-dimensional, modified Huffman run-length encoding.

32773 = PackBits compression. A byte-oriented, run-length encoding scheme.

extended TIFF

3 = T4-encoding (Group 3, 2-dimensional). CCITT T.4 bi-level encoding (Geneva: 1988).

4 = T6-encoding (Group 4). CCITT T.6 bi-level encoding (Geneva: 1988).

Copyright Copyright notice.
8298,ASCII

DateTime Date and time in the following format: YYYY:MM:DD HH:MM:SS
0132,ASCII,20 A null (binary zero) terminates the string.

ExtraSamples Description of extra components.
0152,Short,m

* *FillOrder* The logical order of bits within a byte.
010A,Short,1 Default =1

For value 1, pixels with low column values are stored in high-order bits of the byte. The most significant bit in a byte is the earliest in the raster line for uncompressed data as well as the earliest in compression code for compressed data.

For value 2, pixels with low column values are stored in low-order bits of the byte.

Both values are supported, but Hewlett-Packard recommends using FillOrder=1 for performance.

Baseline TIFF definitions

<i>FreeByteCounts</i> 0121,Long,1	For each string of contiguous unused bytes in a TIFF file, the number of bytes in the string. The presence of unused bytes is not recommended.
<i>FreeOffsets</i> 0120,Long,1	For each string of contiguous unused bytes in a TIFF file, the byte offset of the string.
<i>GrayResponseCurve</i> 0123,Short,2^bps	For grayscale data, the optical density of each possible pixel value.
<i>GrayResponseUnit</i> 0122,Short,1	The precision of the information contained in the <i>GrayResponseCurve</i> .
<i>HostComputer</i> 013C,ASCII	The computer and/or operating system used to create the image.
<i>ImageDescription</i> 010E,ASCII	A string that describes the subject of the image.
** <i>ImageLength</i> 0101,Short/Long,1	The number of rows of pixels in the image.
** <i>ImageWidth</i> 0100,Short/Long,1	The number of columns in the image (pixels per row).
<i>Make</i> 010F,ASCII	The scanner manufacturer.
<i>MaxSampleValue</i> 0119,Short,Sampl/Pix	The maximum component value used.
<i>MinSampleValue</i> 0118,Short,Sampl/Pix	The minimum component value used.
<i>Model</i> 0110,ASCII	The scanner model name and number.
* <i>NewSubfileType</i> 00FE,Long,1	A general indication of the kind of data contained in this sub-file.

Baseline TIFF definitions

**** PhotometricInterpretation** The color space of the image data. Only the two values below are accepted.
 0106,Short,1

- 0 WhitelsZero: 0 is imaged as white, 1 is imaged as black.
- 1 BlacklsZero: 0 is imaged as black, 1 is imaged as white.

PlanarConfiguration How the components of each pixel are stored.
 011C,Short,1

*** ResolutionUnit** The unit of measurement for XResolution and YResolution.
 0128,Short,1 Default = 2.

- 1 No absolute unit of measurement.
- 2 Inch
- 3 Centimeter

*** RowsPerStrip** The number of rows per strip. The default is the value given by
 0116,Short/Long,1 ImageLength resulting in a single-strip image.

Image data may be broken into a number of strips or bands.
However, for the D640 printer, single strips are preferable.

The value of RowsPerStrip together with the value of
ImageLength determines the number of strips in the image:

StripsPerImage = ImageLength/RowsPerStrip (rounded up)

Default = ImageLength (single strip).

***SamplesPerPixel** The number of components per pixel.
 0115,Short,1 Any value other than 1 is treated as an error.
 Default = 1.

Software Name and version number of the software package used to
 0131,ASCII create the image.

**** StripByteCounts** For each strip, the number of bytes in the strip after compression.
 0117,Short/
Long,StripsPerImage This field is mandatory, except for uncompressed data, where it
 can be computed from ImageWidth and RowsPerStrip.

Baseline TIFF definitions

** StripOffsets <i>0111, Short/ Long, StripsPerImage</i>	For each strip, the byte offset of that strip. As with other offsets, the offsets are specified with respect to the beginning of the TIFF file. For the D640 printer, HP recommends, they be in ascending sequence and do not have a value less than the file position of the offset.
SubfileType <i>00FF, Short, 1</i>	An indication of the kind of data contained in this sub-file. Recognized but not used (obsolete).
Thresholding <i>0107, Short, 1</i>	For black and white TIFF files that represent shades of gray, the technique used to convert gray to black and white pixels.
** XResolution <i>011A, Rational, 1</i>	The number of pixels per ResolutionUnit in the horizontal (ImageWidth) direction. If the resolution specified is not the same as the currently selected printer resolution (200, 300, or 600 dpi), the image data may be scaled in the horizontal direction by the ratio of printer resolution to specified resolution. For Group 3 and Group 4 compression modes (compression = 2, 3, or 4), scaling is performed for all ratios, whether scaling up (expanding the data) or scaling down (reducing the data). For uncompressed data (compression = 1) or PackBits compression (compression = 32773), scaling down is not performed, and scaling up is confined to ratios 2, 3, 4, 6 and 8. Other ratios are treated as the nearest lower ratio. Ratios less than 2 are treated as 1 (no scaling).
** YResolution <i>011B, Rational, 1</i>	The number of pixels per ResolutionUnit in the vertical (ImageLength) direction. If the resolution specified is not the same as the currently-selected printer resolution (200, 300, or 600 dpi), the image data is scaled in the vertical direction as described above for XResolution.

Extended TIFF definitions

<i>PageName</i> 011D,ASCII,1	The name of the page from which the image was scanned.
<i>PageNumber</i> 0129,Short,2	The page number of the page from which the image was scanned. PageNumber_0 is the page number, with the first page numbered 0. PageNumber_1 is the total number of pages in the document. If PageNumber_1=0, the total number of pages in the document is not available.
* <i>XPosition</i> 011E,Rational,1	X offset in ResolutionUnits of the left side of the image (with respect to the left side of the page). Honored only when within the physical page.
* <i>YPosition</i> 011F,Rational,1	Y offset in ResolutionUnits of the top of the image (with respect to the top of the page). Honored only when within the physical page.

Unsupported functions

The D640 printer does not support:

- Grayscale images
- Palette-color images
- RGB full-color images
- Tiled images
- CMYK images
- HalfTone hints
- Alpha data handling
- Data sample format
- RGB image colorimetry
- YC_bC_r images
- JPEG compression
- CIE L*a*b* images

TIFF Images as part of PCL

Introducing PCL compression method 10

The PCL Compression Method command (<ESC>*b#M) determines how raster data is interpreted for the Transfer Raster Data by Row/Block command (<ESC>*b#W). The selected compression method stays in effect until explicitly changed by another PCL Compression Method command (<ESC>*b#M) or until it is reset by an End Raster Data command (<ESC>*rC).

See table below for a list of compression methods.

List of compression methods

0	Uncompressed (row-based)
1	Run-length encoding (row-based)
2	TIFF rev 4.0 "PackBits" encoding (row-based)
3	Delta row encoding (row-based)
4	Unencoded (block-based)
5	Adaptive encoding (block-based)
6	CCITT G3 one-dimensional encoding (block-based)
7	CCITT G3 two-dimensional encoding (block-based)
8	CCITT G4 encoding (block-based)
10	Tagged Image File Format (TIFF) rev 6.0 (block-based)

PCL Compression Method 10 is useful when you have a monochrome graphic you want to include as an illustration on a page with PCL text. The actual format of accepted data is described in "Working with TIFF images" on page 29.

To include an illustration, transfer the entire TIFF file as a block, including the header. For example, if the TIFF file is 23,476 bytes in size, the raster transfer command would be `<ESC>*b23476W`.

The TIFF file can be little-endian (from a PC) or big-endian (from HP-UX).

Note

Only the first image from the TIFF data is printed, any others will be ignored.


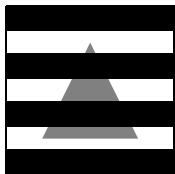

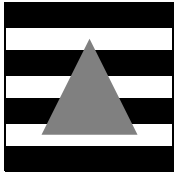
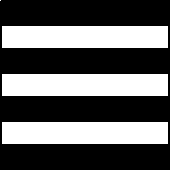
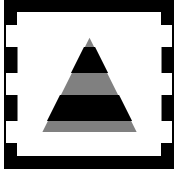
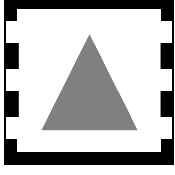
The image is rendered as the TIFF file describes it, and then the image is clipped (not scaled) to the boundaries specified by the PCL commands for raster width and height. Further, the image will be treated just as any other PCL raster image when used with the Transparency Modes.

Transparency mode with TIFF




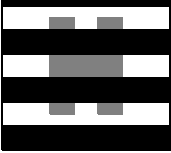
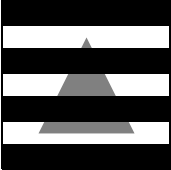

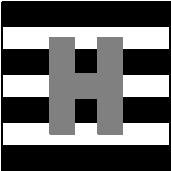
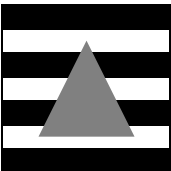
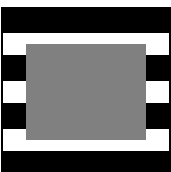
The D640 printer enables you to fill images and characters with any of the printer's predefined (or user-defined) shading or cross-hatch patterns and apply them to a destination TIFF image.

The following illustrations shows the effects of the source and pattern transparency modes on the final image.




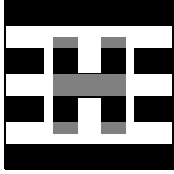
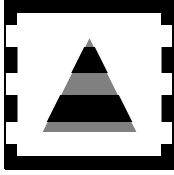

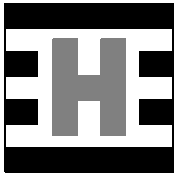
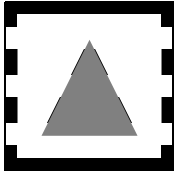

Effect of transparency mode on images

Images and patterns	Transparency mode settings	Results
 <p>Pattern</p>	Source Transparency Mode = 0 (transparent) Pattern Transparency Mode = 0 (transparent)	
 <p>Source</p>	Source Transparency Mode = 0 (transparent) Pattern Transparency Mode = 1 (opaque)	
 <p>Destination</p>	Source Transparency Mode = 1 (opaque) Pattern Transparency Mode = 0 (transparent)	
	Source Transparency Mode = 1 (opaque) Pattern Transparency Mode = 1 (opaque)	

Effect of transparency mode on text, raster images, and area fill

Source images	Transparency mode settings	Results
 <p>Scaled Text</p>  <p>Raster</p>  <p>Area fill</p>	<p>Source Transparency Mode = 0 (transparent) Pattern Transparency Mode = 0 (transparent)</p>	  
	<p>Source Transparency Mode = 0 (transparent) Pattern Transparency Mode = 1 (opaque)</p>	  

Effect of transparency mode on text, raster images, and area fill

Source images	Transparency mode settings	Results
 <p>Scaled Text</p>  <p>Raster</p>  <p>Area fill</p>	<p>Source Transparency Mode = 1 (opaque) Pattern Transparency Mode = 0 (transparent)</p>	  
	<p>Source Transparency Mode = 1 (opaque) Pattern Transparency Mode = 1 (opaque)</p>	  

Example of PCL compression method 10

Step 1 To fill an image, use the following commands to output the destination TIFF data.

<ESC>&f0S	Push cursor (optional)
<ESC>*v0T	Current pattern is black
<ESC>*r#F	Raster graphics presentation mode 0 = print direction 3 = along width of page
<ESC>*t#R	Raster graphics resolution in dots per inch (75, 100, 150, 200, 300, or 600)
<ESC>*r#T	TIFF height in raster dots. Dot size is derived from the <ESC>*r#R command. # = number of units
<ESC>*r#S	TIFF width in raster units # = number of units
<ESC>*b10M	Compression method 10 (entire TIFF data follows, TIFF header and all data)
<ESC>*r#A	Start raster graphics # = mode
<ESC>*b#W	Transfer TIFF data by block <i>Important:</i> # = the size of the TIFF file in bytes
<copy TIFF data>	Fill in with TIFF data
<ESC>*rC	Exit raster mode
<ESC>&f1S	Pop cursor (optional, use with push cursor)

Step 2 Set the source transparency mode.

<ESC>*v#N

Step 3 Output the source raster data or text.

<ESC>*v#T Sets the current pattern (optional)

<include user raster_data or text>

Step 4 Reset the cursor and pattern.

<ESC>*v0T Sets the current pattern to
Black (optional)

<ESC>&f1S Pop cursor (optional)

Working with multiple copies

You can print multiple copies of a document using the following methods:

- setting the printer's control panel (Copies, Mopies, and Auto-collate)
- using commands in a print job

For more information on setting the printer's control panel to create multiple copies, see "Printing multiple copies" on page 11.

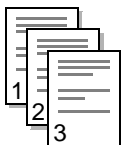
To specify multiple copies in a print job, use the following commands:

Commands for multiple copies

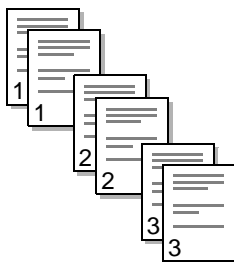
`PJL SET COPIES = n` Where n is the number of copies specified for each page of a document. Copies are created on a page-by-page basis. Each page is printed n times. See illustration below.

`PJL SET QTY = m` Where m is the number of collated copies (mopies) specified for the document. Copies are created on a document-by-document basis. A completed document is printed m times. See illustration below.

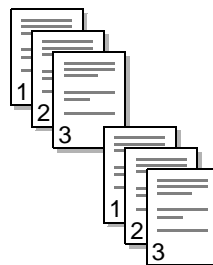
Multiple-page document



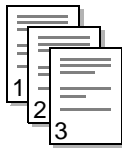
`PJL SET COPIES = 2`



`PJL SET QTY = 2`



If you combine the `PJL SET COPIES` and `PJL SET QTY` commands in the same print job (and the auto-collate setting on front of the printer is off), the result is multiplicative. See illustration below.



PJL SET COPIES = 2
PJL SET QTY = 3

3 sets of documents are created.
Each set has 2 copies of each page.



This combination of copies and mopies is useful if you're simulating a multi-part form on the printer and you want multiple copies of the form.

File system conventions

The D640 printer now includes the following file system conventions.

Long filenames

The file system for the D640 printer supports a long filename convention similar (but not identical) to long filenames in MS Windows.

Long filenames can include any combination of the following:

- name stems longer than 8 characters (for example, `longername.ext`)
- extensions longer than 3 characters (for example, `name.grp1`)
- names containing more than one extension or dot "." (for example, `name.rev21.tif`)
- names containing special characters (for example, `name:new.user` or `?name.+`)

Before you create files with long names, consider the following:

- HP strongly recommends that characters used in filenames be confined to the ASCII printing set – excluding characters used as punctuation symbols or wildcards.

The following printing characters are excluded in DOS and MS Windows:

Operating system	Excluded Characters
DOS	. " / \ [] : ; = , ? * + < >
Windows 95 or NT	" / \ : ? * < >

The D640 filing system does not enforce these restrictions. However, you may encounter problems when protocol commands refer to filenames with excluded characters.

- Files and directories with long filenames have an additional abbreviated name which is DOS-compatible (8.3 characters). In any context, files and directories may be specified by either the long name or the abbreviated name.
- The limit on a file or directory name (including all extensions) is 100 characters.
- There is an absolute upper limit of 255 characters on a complete pathname (including drive specifier).
- Other practical constraints, such as the size of fields on the printer's control panel and in directory listings, should also be considered.
- In terms of storage space and file access speed, long filenames are significantly less efficient than standard names.

Lowercase in filenames

The D640 printer supports filenames that include both lowercase and uppercase letters. Filenames are no longer converted to uppercase.

As with MS Windows, case is not significant for matching names. Two strings which differ only in case are considered to be the same name. (For example, `name.ext` and `NAME.Ext`).

This rule applies to both standard and long filenames.

Default drive

The default drive is now the printer's internal hard disk, C: (HDD), instead of the printer's floppy disk, A: (FDD).

However, this default should not be assumed. A drive specifier should always be included to indicate the internal hard drive. Otherwise, this might lead to incompatibility between printer protocol sent across the network and printer protocol executed from disk.

Documentation updates and corrections

To clarify procedures and examples, this section includes a number of updates and revisions to the *D640 Technical Reference Guide* (part number C5620-90002).

Commands to read/write to hard disk

You can read, write, and delete files on the printer's hard disk with PJL commands. Reading from mass storage is different for each emulation/personality.

Note

Currently, there are no security features built into the hard disk filing system. HP does not recommend storing sensitive files on the internal hard disk.

- Files may contain fonts, macros, symbol-sets, user-defined patterns, or ordinary print data.
- File names can contain up to 100 characters. See "File system conventions" on page 49 for a detailed description.
- Some file extensions have special meaning on the printer. These include:

.HPG	HP GL2 file
.CRT	Cartridge definition file
.PCL	PCL file
.PS	PostScript file
.SFS	PCL Softfont in Intellifont form
.SFT	PCL Softfont in True Type form

Initialize

This command initializes a floppy diskette for use with the D640. Diskettes must already be formatted on the PC in IBM-PC compatible format.

```
@PJJL FSINIT VOLUME = "volume name" <LF>
```

If a password has been set, it must have been given prior to issuing this command.

Make directory on disk

This command creates a new directory on the floppy diskette.

```
@PJJL FSMKDIR NAME="pathname" <LF>
```

where <pathname> is a fully-qualified pathname.

For example:

```
@PJJL FSMKDIR NAME= "C:\PCL5\USER\ACME" <LF>
```

- Only one subdirectory can be created at a time, starting at the highest level in the tree.
- Creating a directory doesn't make it your "current working directory".

Note

Other commands to read/write to hard disk include: `FSDOWNLOAD` and `FSDELETE`. For more information on these commands, see "Store a PCL print file on the internal hard disk" and "Delete a file from disk" in the *D640 Technical Reference Guide*.

Using a disk file in a PCL job

The Alphanumeric ID command reads a file stored on the hard disk or floppy disk. With this command, the D640 reads the file into memory and treats this information as if it was part of the original print job. The result is similar to an "include" statement in a high-level programming language.

The D640 does not do any special processing of the file, see "Recommended Contents of Binary Data" in the *D640 Technical Reference Guide*.

The format of the Alphanumeric ID command is as follows:

```
ESC & n # W [ file identification data ]
```

The number of bytes of data that follow the capital W. A value must be supplied.

[file identification data]

Byte	Content
1	Operation Byte (UB)
2 ... #	File Identifier Name (ASCxx)

Operation Byte (UB)—The Operation Byte is an unsigned byte, which may have a value 0 through 5. The LaserJet family of printers uses this byte to indicate whether the file contents are treated as a font or as a macro. The D640 does not use this byte, but requires the value to be within the range specified. (The values 0 to 5 are control codes <SOH>, <STX>, <ETX>, <EOT>, and <ENQ>.)

File Identifier Name (ASCxx)—The File Identifier Name is ASCII data. The D640 requires the full pathname of the file, including the volume name. Files and directories can contain the letters A..Z, a..z, and the numerals 0..9. For example: C:\PCL5\USER\MyFile.pcl. Do not use quotation marks around the filename.

Volume	Physical Device
c: or C:	The internal hard drive
a: or A:	The floppy drive

The PCL commands to manage fonts, macros, patterns, and symbol sets only act on objects in memory. The disk file can be removed only with the @PJL FSDELETE command.

In the examples below, <LF> is a linefeed, <CR> is carriage return, <ESC> is the Escape character, and → means that the line is continued.

Example 1: Storing a macro on disk and using it in a print job

Step 1 Write the macro to the hard disk. For example:

```
<ESC>%-12345X@PJJL JOB NAME = "Simple Macro"<LF>
<ESC>%-12345X@PJJL FSDOWNLOAD FORMAT:BINARY SIZE=30→
NAME = "C:\PCL5\USER\Macro"<LF>
<ESC>&f0XThis is a test line.<ESC>&f1X<ESC>%-12345X→
<ESC>%-12345X@PJJL EOJ NAME = "Simple Macro"<LF>
```

Step 2 Use the macro in a print job. For example:

```
<ESC>%-12345X@PJJL JOB NAME = "Use Simple Macro"<LF>
<ESC>%-12345X@PJJL ENTER LANGUAGE = PCL<LF>
<ESC>E<ESC>&f95Y<ESC>&n19W<0x04>c:\PCL5\USER\Macro→
<ESC>&f9XCall the macro:<ESC>&f95y3X:After the macro→
<ESC>E →
<ESC>%-12345X@PJJL EOJ NAME = "Use Simple Macro"<LF>
```

The printed result will be:

Call the macro:This is a test line.:After the macro

Step 3 Delete the macro from the disk. For example:

```
<ESC>%-12345X@PJJL JOB NAME = "Cleanup"<LF>
<ESC>%-12345X@PJJL FSDELETE→
NAME = "c:\PCL5\USER\Macro"<LF>
<ESC>%-12345X@PJJL EOJ NAME = "Cleanup"<LF>
```

Example 2: Creating a virtual font cartridge

Suppose you have several PCL softfonts you want to include in a virtual font cartridge on the D640 printer. The PCL softfont files are:

Filename	Size (in bytes)
bc120r04.sfp	46448
cr100i12.pcp	27136
fuj00m8o.sfs	10090
ggi00pmo.sfs	56469
lp085r16.pmp	18688

To create a virtual font cartridge:

Step 1 Create a directory on the printer's hard disk and place the font files in that directory.

Step 2 Create a cartridge definition file and place it in the C:\CRT directory on the printer's hard disk.

Step 3 Cycle power on the printer to make the new cartridge available for selection.

Example:

```
<ESC>%-12345X@PJJ<LF>
<ESC>%-12345X@PJJ JOB NAME="ACMETOOL"<LF>
<ESC>%-12345X@PJJ RDYMSG DISPLAY="Writing ACMETOOL Fonts"<LF>
<ESC>%-12345X@PJJ USTATUS DEVICE=VERBOSE<LF>
<ESC>%-12345X@PJJ FSMKDIR NAME="C:\PCL5\USER\ACME"<LF>
<ESC>%-12345X@PJJ FSDOWNLOAD FORMAT:BINARY SIZE=46448→
    NAME="C:\PCL5\USER\ACME\bc120r04.sfp"<LF>
< copy the contents of bc120r04.sfp here ><ESC>%-12345X→
<ESC>%-12345X@PJJ FSDOWNLOAD FORMAT:BINARY SIZE=27136→
    NAME="C:\PCL5\USER\ACME\cr100i12.pcp"<LF>
< copy the contents of cr100i12.pcp here ><ESC>%-12345X→
<ESC>%-12345X@PJJ FSDOWNLOAD FORMAT:BINARY SIZE=10090→
    NAME="C:\PCL5\USER\ACME\fuj00m8o.sfs"<LF>
< copy the contents of fuj00m8o.sfs here ><ESC>%-12345X→
<ESC>%-12345X@PJJ FSDOWNLOAD FORMAT:BINARY SIZE=56469→
    NAME="C:\PCL5\USER\ACME\ggi00pmo.sfs"<LF>
< copy the contents of ggi00pmo.sfs here ><ESC>%-12345X→
<ESC>%-12345X@PJJ FSDOWNLOAD FORMAT:BINARY SIZE=18688→
    NAME="C:\PCL5\USER\ACME\lp085r16.pmp."<LF>
< copy the contents of lp085r16.pmp here ><ESC>%-12345X→
<ESC>%-12345X@PJJ FSDOWNLOAD FORMAT:BINARY SIZE=215→
    NAME="C:\CRT\ACMETOOL.CRT"<LF>
<ESC>Z.FILE.FONT \PCL5\USER\ACME\bc120r04.sfp<CR><LF>
<ESC>Z.FILE.FONT \PCL5\USER\ACME\cr100i12.pcp<CR><LF>
<ESC>Z.FILE.FONT \PCL5\USER\ACME\fuj00m8o.sfs<CR><LF>
<ESC>Z.FILE.FONT \PCL5\USER\ACME\ggi00pmo.sfs<CR><LF>
<ESC>Z.FILE.FONT \PCL5\USER\ACME\lp085r16.pmp<CR><LF>
<ESC>%-12345X →
<ESC>%-12345X@PJJ RDYMSG→
    DISPLAY="Press buttons 1,3,5 for 2 seconds"<LF>
<ESC>%-12345X@PJJ EOJ NAME="ACMETOOL"<LF>
<ESC>%-12345X
```

PostScript emulation

The following example shows how to use PostScript emulation commands to specify a D640 operator. In this example, the `a4tray` operator forces the paper tray setting to `a4` and sets the imaging area size to `a4`.

```
%!PS
statusdict begin
a4tray
%the contents of the page
end
clippath
stroke
showpage
```

For a complete list of D640 operators, see the *D640 Technical Reference Guide*.

PJL environment variables and commands

The first value for the SEPARATOR environment variable is listed incorrectly in the “PJL Environment Variables and Commands” table. The correct values are shown below.

PJL Commands			Environment Variable	
Default	Set	Inquire/ Dinquire	Name	Values
Default	Set	Inq/Dinq	SEPARATOR	OFF
Default	Set	Inq/Dinq	SEPARATOR	TRAY1
Default	Set	Inq/Dinq	SEPARATOR	TRAY2
Default	Set	Inq/Dinq	SEPARATOR	TRAY3
Default	Set	Inq/Dinq	SEPARATOR	HCI

For a complete list of D640 PJL environment variables and commands, see the *D640 Technical Reference Guide*.

A Utilities

The following is a list of utilities included with the function code. These utilities are located on your printer's hard disk in the C:\Maint\Util directory. Use these utilities only when directed by your support representative.

List of utilities

Name	Description
LASERSET.xx	For support use only.
ALL_EDGE.xx	Shows edge-to-edge printing capability for the selected media source.
FILECHK.PCL	Searches the hard disk and lists any duplicate files found in the same directory. Files with names that differ only by case are considered duplicates (for example, Font2a.TIF and FONT2A.TIF). This utility is useful for locating files that cannot be recognized by the printer's new file system.
CAPTURE.100	Sets a 100-Mbyte limit for capturing files on the printer's hard disk. This is the default for a captured file. (For more information on capturing files, see "Data capture" on page 16.)
CAPTURE.1_4	Sets a 1.4-Mbyte limit for capturing files on the printer's hard disk. This utility is useful for creating small capture files to copy to the printer's floppy disk.
CAPTURE.C2A	Copies all captured files (*.dat) from the printer's hard disk to the floppy disk. No more than 1.4 Mbytes can be copied to the floppy disk. Insert a blank, formatted floppy disk before selecting.
EVENTLOG.C2A	Performs the following sequence <ul style="list-style-type: none">● prints a Maintenance Report● updates the eventlog.pcl file on the printer's hard disk● copies the file to the floppy disk. eventlog.pcl is a plain-text file located in the C:\MAINT directory. the file contains an ongoing record of printer events. Insert a blank, formatted floppy disk before selecting.
Reports & Eventlog.C2A	A utility that <ul style="list-style-type: none">● prints a Setup and Maintenance Report● copies a print file of the Setup Report and the Maintenance Report to floppy disk● copies the eventlog.pcl file to floppy disk. This utility is useful for sending complete information to your service provider. Insert a blank, formatted floppy disk before selecting.

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System Peripherals Operation
D640 Cut Sheet Printer Enhanced Features Manual
Part Number C5620-90027
March 1998

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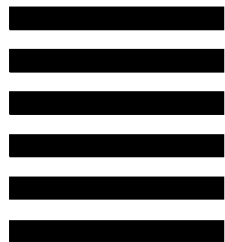
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