PrintServer 20 and turbo PrintServer 20 Service Guide

Order Number EK–TPS20–SG–001

Digital Equipment Corporation
Maynard, Massachusetts

First Printing, May 1991

Printed in U.S.A.

The Reader's Comments form at the end of this document requests your critical evaluation to assist in preparing future documentation.

FCC NOTICE: The equipment described in this manual generates, uses, and may emit radio frequency energy. The equipment has been type tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such radio frequency interference when operated in a commercial environment. Operation of this equipment in a residential area may cause interference, in which case the user at his own expense may be required to take measures to correct the interference.

S1561

This document was prepared using VAX DOCUMENT, Version 1.2.

Contents

Chapter 4 Field Test Mode

Chapter 5 Query Mode

Chapter 6 Messages

Chapter 7 Fault Isolation Procedures

Chapter 8 Print Quality

Chapter 9 FRU Removal and Replacement

Chapter 10 300K Maintenance

Appendix A Recommended Spares List

Appendix B Total Call Concept Procedures

Index

Figures

Tables

Preface

This guide covers the repair and maintenance of the PrintServer 20 and turbo PrintServer 20 systems.

This guide does not cover the maintenance procedures that customers handle, such as replacing the main charger or cleaning the quenching lamp. Customer maintenance information can be found in the respective maintenance kit guides.

Intended Audience

This guide helps Customer Services engineers repair and maintain the PrintServer 20 and turbo PrintServer 20. The repair information is restricted to the printer hardware only. The troubleshooting procedures note the corrective action to take for a software or network problem; the organization to contact is also noted.

Conventions

The following terms and conventions are used in this manual:

Term/Convention	Meaning
PrintServer	In this document, the term PrintServer refers to PrintServer 20 and turbo PrintServer 20.
NOTE	Provides additional information.
CAUTION	Provides information for preventing equipment damage.
WARNING	Provides information for preventing personal injury.
OPC	The organic photo conductor is the type of drum the printer uses. OPC drums can be disposed of without taking any special precautions.

Term/Convention	Meaning
Bullet (•)	A bulleted statement describes a result after performing a step. For example: 1. Press the Pause key to place the printer off line. • The off-line indicator lights.
Arrow (→)	Indicates a special instruction. For example: 1. Remove the toner cartridge from the drawer by lifting it straight up. → Discard the toner cartridge.
Bold	Text in boldface designates messages that appear on the operator panel.

Chapter 1

Theory of Operation

1.1 Description of the PrintServer Printers

The PrintServer printers are nonimpact high-quality printers that use laser electrophotographic printing techniques. They can print up to 20 images per minute in simplex mode (one-sided printing) or up to 16 images per minute in duplex mode (two-sided printing). The printers interpret data encoded in the PostScript page description language, which integrates text and graphics. The PrintServer software allows shared use by Ethernet connected computers.

1.2 Maintenance Philosophy

The maintenance philosophy for both printers is to isolate a problem to a failing field replaceable unit (FRU) and then swap and replace that FRU. This philosophy is made possible by the modular design of the hardware and by the diagnostics resident in the controller board's read-only memory (ROM).

1.3 Maintenance Prerequisites

This guide works with the theory of operation and experience learned in the approved Educational Services Customer Services training course. You must have proper training before attempting to fix the PrintServer.

To repair the PrintServer, you need to understand the following tools and processes:

- Power-up, self-test, and bootstrap processes
- Call Field Service messages, which are displayed when a fatal error occurs during normal on-line operation
- Operator panel field mode commands
- Query mode Nth status bytes
- Operation and error reporting of the controller board diagnostics

- Fault isolation procedures (FIPs), which are a collection of yes/no flow charts and tables

WARNING: *This guide is to be used by trained service personnel only. Do not service the PrintServer unless you have completed the following courses:*

- *Laser Concepts and Safety (EY–2423E–IV)*
- *Laser Printer Concepts (EY–2424E–IV)*
- *PrintServer 20 Operation and Servicing (EY–9878E–LO–001)*

1.4 Safety Considerations

The PrintServer includes components that may harm individuals and equipment. Use the following guidelines when performing maintenance.

1.4.1 Laser Safety

The PrintServer printers comply with laser product performance standards set by government agencies as a Class 1 Laser Product. The PrintServer printers do not emit hazardous light, since the beam is enclosed during all modes of operation and maintenance.

WARNING: *Use of controls or adjustment procedures other than those specified in this manual may result in hazardous laser light exposure.*

1.4.2 Ozone Safety

The PrintServer printers use an ozone filter to remove the ozone generated by the printer. Replace the ozone filter each time you maintain the printer.

WARNING: *Do not operate the printer without the ozone filter installed. The filter removes ozone that may cause eye or respiratory irritation.*

1.4.3 Tools

Use the standard Customer Services tool kit to service the printers. No special tools are required to troubleshoot, repair, or install FRUs.

A special vacuum cleaner and filter kit (Table 1–1) are required for cleaning toner spills.

CAUTION: *Do not use a home-type vacuum cleaner to clean toner spills. Without the special filter, toner powder goes through the vacuum and into*

the air. Other equipment in the vicinity can ingest the airborne toner and be damaged.

Table 1–1: LN01 Tool Kit Items

Tool	Part Number
Vacuum and attachments, 220V	29–26259
Vacuum and attachments, 110V	29–25526
Filter kit (bags and shell)	29–26017

1.5 Field Replaceable Units

Figure 1–1 through Figure 1–3 show the FRU locations. Table 1–2 through Table 1–4 list the part numbers and ordering names of the FRUs. See Appendix A for a complete list of all parts and part numbers.

Figure 1–1: FRU Locations 1 to 11

MLO–003049 24 PICAS

Table 1–2: FRU Names and Part Numbers 1 to 11

Item	FRU	Part Number	Ordering Name
1	LCOT	29–27393–01	LCOT
2	Operator Panel	29–27359–01	Op Pnl Unit
3	Development Unit	29–27354–01	Devl Unit
4	Development Drawer	29–27570–01	Devel Drawer Unit
5	Registration Roller	29–27355–01	Reg Rlr Unit
6	Main Fan	29–27368–01	Process Fan Unit
7	Transport Unit	29–27386–01	Trans Unit
8	Duplexer Unit	29–27357–01	Duplex Unit
9	Fusing Unit (100V)	29–27387–01	Fusing Unit:100V
	Fusing Unit (200V)	29–27388–01	Fusing Unit:200V
10	Fork Gate Unit	29–27385–01	Ppr Fk Gate Unit
11	Optical Unit	29–27384–01	Optical Unit

Figure 1–2: FRU Locations 12 to 20

MLO–003050 25 PICAS

Table 1–3: FRU Names and Part Numbers 12 to 20

Item	FRU	Part Number	Ordering Name
12	Cassette Paper Feed Unit	29–27352–01	Ppr Fd Unit
13	Prefeed Rollers (3)	29–25103–00	Pick-Up Roller
14	Feed Rollers (3)	29–25102–00	Paper Feed Roller
15	Separation Rollers (3)	29–27933–01	Sep Roller Assy
16	LCIT Feed Unit	29–27353–01	LCIT Fd Unit
17	Cabinet Paper Feed Unit	29–27358–01	Table Feed Unit
18	Memory Board (option)	54–18988–01	Mem Bd Option
19	turbo PrintServer 20 Controller Board	54–20830–02	Controller Board
	PrintServer 20 Controller Board	54–17449–01	Controller Board
20	Engine Drive Board	29–27360–01	Eng Drv Bd

Figure 1–3: FRU Locations 21 to 35

MLO–003051 24.6 PICAS

Table 1–4: FRU Names and and Part Numbers 21 to 35

Item	FRU	Part Number	Ordering Name
21	Mother Board	29–27361–01	Mother Bd
22	Mother Board Fuse	12–31762–01	Fuse–3.5A, 125V
23	Ozone Filter Fans (2)	29–27366–01	Fan, Mn:FAA06A24HC
24	Main Fuse (120V)	12–31518–01	Fuse–15A, 125V
	Main Fuse (220V)	12–31668–01	Fuse–200V/240V
25	Low-Voltage Power Supply (100V)	29–27404–01	P.S. Unit:110V
	Low-Voltage Power Supply (200V)	29–27405–01	P.S. Unit:220V
26	Main Drive Unit	29–27377–01	Main Drv Unit
27	Duplexer/LCIT Drive Board	29–27356–01	Tbl Drv Bd
28	LCIT	29–27399–01	LCIT
29	Main Motor	29–27376–01	Main Motor Unit
30	Registration Clutch	29–27378–01	Clutch, Reg
31	High-Voltage Power Supply	29–27364–01	Power Pack
32	OPC Drum Timing Belt (166XL)	29–27374–01	Tmng Belt:166XL
33	Development Motor Unit	29–27372–01	Dev Drv Unit
34	Card Cage Fan	29–27484–01	Controller Fan
35	Main Drive Unit Timing Belt (3M633)	29–27375–01	Tmng Belt:3M633

Chapter 2

System Power-Up and Bootstrap

2.1 Overview

The PrintServer printers are automatic self-starting printing systems. When the ac power is turned on, the self-test diagnostic runs and completely tests the following electronic control boards:

- Controller
- Print engine
- Duplexer/LCIT

If the self-test is successful, the bootstrap program down-line loads the operating system files from the supporting host into the memory of the controller. The operating system then brings the printer to the on-line or Ready state.

2.2 Power-Up Process

When you power up the PrintServer, all the indicators on the operator panel blink.

If this display does not occur, see Section 7.2.

2.2.1 Step 1: Running the Self-Test

The self-test displays the following message on the LCD display of the operator panel:

9,8,7,6,5,4,3,2,1,0

The progress countdown numbers are similar to the MicroVAX console terminal power-up display. Do not confuse the countdown numbers with self-test subtest numbers.

Nonfatal errors, jams, interlocks, supplies, and tray errors do not affect the boot progress. However, if the self-test finds a fatal error, the following occurs:

1. The normal boot process stops. The self-test will not proceed beyond the point of the failing fatal error.
2. The Field Test Mode is automatically entered.
3. A detailed operator panel error message appears on the LCD display. See Chapter 7 for more self-test information.

   NOTE: *A primitive self-test message is displayed on the controller board display. See Table 3–2 for more information.*

2.2.2 Step 2: Running the Boot Program

After the self-test has successfully passed or has counted down past zero, the following Ethernet address is displayed while the boot program runs. The Ethernet address display is 12 hexadecimal digits. The system manager needs the Ethernet address to configure the host software.

XX-XX-XX-XX-XX-XX

Then, the message display shows the firmware version numbers for the controller board, print engine drive board, and duplexer/LCIT drive board.

C.C E.E l.l

The boot program continually broadcasts boot requests until a supporting host replies. The error message 1501.0001 or ?54 is displayed if a reply is not received after a number of attempts. See Chapter 7 for an explanation of this problem.

- The host is not on line.
- An incorrect Ethernet address was entered at installation time.
- The software was installed incorrectly.

Examine and fix the supporting host or call software support to diagnose the installed PrintServer software.

2.2.3 Step 3: Down-Line Loading Software

The supporting host that is physically closest, enabled, and configured will reply to the boot request by down-line loading the three boot files to the printer. Down-line loading consists of copying the file from the supporting host directory, across the Ethernet medium, and into the controller board's memory. Control is passed to the down-line loaded file, which prints one of the following messages on the operator panel:

VAX ELN V4.2 LPS20
. . .

or

LOADING PrintServer
. . . . .

The dots are sequentially displayed after the printer down-line loads each of the files, one dot per file. All files must successfully load.

2.2.4 Step 4: Initializing Software

After successfully completing the down-line load, the following message is displayed on the operator panel for approximately 15 seconds. This display indicates that software initialization has started.

Copyright 1991
Digital Equipment Corp.

Then, the operator panel display shows the following message for approximately 65 to 80 seconds:

Please Wait...
Initializing...

2.2.5 Step 5: Printing a Start-Up Page

If configured to do so, the host sends the start-up page to the printer (Figure 2–1). The system manager can disable printing the start-up page from the Remote Server Management menu, which is explained in the *PrintServer Supporting Host for VMS Management/User's Guide* or the *PrintServer Supporting Host for ULTRIX Management/User's Guide*.

Figure 2–1: Start-Up Page

MLO–003024 21.6 PICAS

2.2.6 Step 6: Displaying the Ready Status

Finally, the operator panel displays one of the following messages:

Ready
or
Single Job Mode-
Press Resume To Continue

Chapter 3
Switches and Indicators

This chapter lists and describes the switches and indicators on the following components of the PrintServer:

- Operator panel
- Power supply
- Controller board
- Print engine drive board
- Duplexer/LCIT drive board

3.1 Operator Panel Switches and Indicators

The operator panel is used to display information and enter commands. The operator panel is a microcomputer system that uses a data communication protocol to operate as a peripheral device to the print engine drive board. The liquid crystal display (LCD) shows power-up and boot status.

In operational mode, the operator panel displays print job status and tells the user to clear jams, close panels, attend to the input/output trays, or call the operator or Customer Services. In Field Test Mode, the operator panel is used to run the controller self-test and input field test commands, such as print test sheet. Figure 3–1 shows the operator panel elements. Table 3–1 details the functions of each key of each display.

Figure 3–1: Operator Panel

MLO–003021 10.6

Table 3–1: Operator Panel Keys and Indicators

Key or Indicator	Function
1. Keypad	In operational and test set-up modes, the keys perform functions, such as Pause or Resume. In Field Test Mode, the keys translate to numbers; for example, Pause = 1.
2. Contrast Switch	Changes the contrast of the LCD message display.
3. LCD Display	Displays the status of the printer.
4. Error Indicator	The printer requires attention. The LCD and graphic displays show the error message and location.
5. Graphic Display	The graphic display indicators show the following: • Green input/output tray indicators show the selected tray. • Red input/output tray indicators show an error condition, an empty input tray, or a full output tray. • The red paper path indicators show the location of a jam or interlock. • The red error indicator signals that attention is needed. **Note:** In the Ready state, the red indicators flash to attract attention. In Field Test Mode, the indicators do not flash.

Table 3–1 (Cont.): Operator Panel Keys and Indicators

Key or Indicator	Function
Pause [1]	Places the printer in the paused (off-line) state to stop printing functions. When the Pause key is pressed, the following two lines are displayed: • **Please wait...** • **Paused — Press Resume to Continue**
Active Jobs [2]	Displays the current node, user name, server job number, and time the job began.
Supplies Needed [3]	When the amber indicator lights, the toner supply is low, the cleaning unit is full, or scheduled maintenance is needed. Press the Supplies Needed key to display the required supply. If there is more than one message, the LCD display alternately blinks each message for 5 seconds.
Resume [4]	In operational mode, the Resume key toggles the printer from the off-line (Pause) state to the on-line (Ready) state. In Single Job Mode, the Resume key processes the next print job.
Test [5]	Prints a single-sided test page. The printer must be paused (off line) to perform this function.
Test Set-Up [6]	When the printer is in the Ready state, the key does nothing. When the printer is paused, the key invokes the test set-up mode, so you can select test parameters.
Rear panel T	The T switch is not used during the operational mode or the Field Test Mode.

3.2 Power Supply Indicators

Four LED indicators are mounted on the circuit board of the low-voltage power supply unit (PSU). The LEDs are wired to the power supply output terminals and turn on when the supply voltage is present.

To see the LEDs, open the front cover of the print engine and look through the slots of the PSU's metal cabinet. If you see four glowing LEDs, the low-voltage PSU is working correctly. From the front to the rear of the print engine, the LEDs correspond to the following voltages:

+24 Volts
–12 Volts
+12 Volts
+5 Volts

3.3 Controller Board Indicators

After removing the board cage cover, you can see five LEDs mounted on the edge of the controller board. Four LEDs are yellow; one LED is green.

The green LED indicates the low-voltage PSU is supplying +5 volts dc.

The four yellow LED indicators on the controller board display a binary coded subtest number. The same number is displayed on the operator panel when an error occurs. The operator panel messages are discussed in Section 6.2.

During error-free operation, the LEDs quickly display a changing countdown as the subtests run. If a fatal error is detected, the subtest loops, causing the displayed subtest number to flash.

Table 3–2 lets you decode the controller board LED display. The subtests run in the order listed.

Table 3–2: Controller Board Indicators

LEDs Display	LCD Display	Note
[2]1111[1]	00	The restart (RST) test is invoked at power-up or by a Field Test Mode command.
0001[3]	01	Controller board ROM checksum test.
0010	02	MicroVAX system support chip (SSC) test(s). This display indicates a bad controller board.
0011	03	Controller board CPU test.
0100	04	Controller board floating point unit (FPU) test.
0101	05	Memory sizing test.
0110	06	Memory parity test.
0111	07	Memory data addressing.
1000	08	Memory OR function tests.
1001	09	Print engine data interface (PDI) tests.
1010	0A	Memory scan mode tests.
1011	0B	Local area network controller exerciser (LANCE) tests.
1100	0C	Electrically erasable programmable read only memory (EEPROM) tests.
1101	0D	The print control status interface external test (PCSI_EXT) invokes the print engine self-test and obtains status during normal and Field Test Modes of operation.
1110	0E	Engine status tests.
1111[3]	BLANK	Operator panel external loopback tests. No display at the operator panel.
0001[3]	11	Field mode functions.

[1] LED display of 1 means the LED is illuminated.
[2] The left LED is the most significant digit (MSD).
[3] The 1111 (F) and 001 (1) controller board displays are used twice.

3.4 Controller Board Switches

NOTE: *The following section applies to the PrintServer 20 only. For the turbo PrintServer 20, switch 1 is down and switches 2 through 4 are up.*

Switch 4 of the controller board switchpack determines which bootstrap protocol is used. Switch 4 is the rightmost switch of the switchpack.

NOTE: *Switch 1 is down and switches 2 and 3 are up.*

- To boot the printer from an ULTRIX supporting host, switch 4 must be on, down, or closed. This setting causes the controller board to boot using the Internet protocols.
- To boot the printer from a VMS supporting host, switch 4 must be off, up, or open. This setting causes the controller board to boot using the maintenance operations protocol (MOP).

3.5 Print Engine Drive Board LED

The print engine drive board uses the one red LED mounted on the printed circuit board to indicate several levels of status. The LED blinks and you have to time the blinks; then look up the condition in Table 3–3. This is considered a primitive method of status display. It is recommended that you use the operator panel diagnostic displays instead. See Table 3–2.

Table 3–3: Print Engine Drive Board LED Blink Rate

In Seconds	Condition
On 3 to off 3	Byte[1] 02
On 2 to off 2	Byte[1] 03
On 0.25 to off 0.25	Byte[1] 13 or bit 5 of byte[1] 14
On 0.5 to off 0.5	Byte[1] 07
On 1.0 to off 1.0	Jam or media in printer
On 0.4 to off 0.4	Hardware is in the warm-up state
On 0.2 to off 0.2	Tray is busy
On steady	Printer is in the ready state

[1] See Table 5–1 to interpret this condition. Nth status is the series of bytes sent to the controller board from the print engine drive board. You can find this information easier by using the Query Mode.

3.6 Print Engine Drive Board Switches

For the most part, the drive board switches should not be used in the field. You can use the onboard diagnostics and Field Test Mode to service the printer.

You must set the drive board switches to the normal operational configuration, as shown in Table 3–4, for protocol communication with the controller board.

Table 3–4: Print Drive Board Switches

1	2	3	4	5	6	7	8	Action
Off	Off	Off	Off	Off	Off	Off	Off	**Normal operational position.** All switches must be down or off for normal operation.

CAUTION: *The PrintServer system can be damaged by the misuse of the switches on the engine and duplexer/LCIT drive boards. Use of the switches in the field is not advised. When replacing the drive boards, make sure you set the switches to the normal operational position shown in Tables 3–4 and 3–5.*

3.7 Duplexer/LCIT Drive Board Switches

Two switchpacks are mounted on the duplexer/LCIT drive board. DPS100 has four switches and is used to set the self-test mode of operation. DPS101 has eight switches and is factory configured to adjust the position of the image on paper fed from the cabinet.

CAUTION: *The PrintServer system can be damaged by the misuse of the switches on the engine and duplexer/LCIT drive boards. Use of the switches in the field is not advised. When replacing the drive boards, make sure you set the switches to the normal operational position shown in Tables 3–4 and 3–5.*

3.7.1 DPS100

The duplexer/LCIT drive board switches are used to test the cabinet in standalone mode, without a print engine. The print engine should not be removed from the cabinet in the field. Misuse of the DPS100 switches can damage the print engine or cabinet.

You must set DPS100 switches to the normal operational configuration, as shown in Table 3–5, for protocol communication with the engine drive board.

Table 3–5: DPS100 Switches

1	2	3	4	Action
Off	Off	Off	Off	Normal operational setting

3.7.2 DPS101

Switchpack DPS101 contains eight switches, which compensate for mechanical tolerances. In most instances, you do not need to adjust the switches. Record the settings of the eight dip switches before adjusting them. If you replace the duplexer/LCIT drive board, make sure the old board and the new board have the same switch settings.

Switches 1 through 4 adjust the image position of the paper fed from the duplex unit. Switch 4 is the most significant digit and has the greatest effect on registration. The switches are adjusted at the factory to ensure that side 2 is within 1.5 mm of side 1.

Switches 5 through 8 adjust the image position of the paper fed from the large capacity input tray (LCIT). Switch 8 is the most significant digit and has the greatest effect on registration.

You can adjust registration only in the scan direction, which is between the front and back of the print engine. You cannot adjust the registration in the subscan direction, which is from the leading and trailing edge.

The laser scans the OPC drum in the scan direction. The subscan direction is perpendicular to the scan direction and is related to the drum rotation. The scan and subscan rates determine the resolution (300 DPI) of the printer and are synchronized with the system video controller.

Each 4-bit bank of switches allows you to make 16 adjustments. Each adjustment moves the print registration aproximately 0.68 mm.

Chapter 4

Field Test Mode

4.1 Description

Field Test Mode allows you to set up the printer and manually operate the controller board self-tests. Under manual operation, you can perform the following tasks:

- Invoke controller board and Ethernet tests
- Test and exercise the print engine drive board
- Print test patterns
- Boot the system
- Select input and output trays

4.2 Invoking

To invoke the Field Test Mode, press the Pause key while the self-test is running and after the numbers 9, 8, appear on the panel. You cannot invoke the Field Test Mode after the self-test numbers count down past zero. The appearance of the field test prompt, Figure 4–1, tells you that the Field Test Mode is invoked. Once the Field Test Mode is invoked, you must wait for the self-test to end before you can enter commands.

Figure 4–1: Field Test Prompt

MLO–003025 12.6 PICAS

If the self-test finds an error, it displays a self-test error message. If the self-test is successful, the countdown numbers are cleared and you can enter commands.

4.3 Entering Commands

You use the six operator panel keys to enter commands in Field Test Mode. You enter commands, using keys 1, 2, 3, 4, and 5, then execute the command by pressing the 6 key. You may find the 6 key referred to as the Return key in other documentation.

The following prompts may appear next to the Field Test Mode prompt:

Prompt	Meaning
<	Field test mode is ready to accept commands.
?	You entered a command incorrectly.
::	The command successfully executed.

4.3.1 Invoking Controller Board and Ethernet Tests

Table 4–1 explains how to invoke controller board and Ethernet tests.

Table 4–1: Invoking Controller Board and Ethernet Tests

To Run This Test	Press Keys	Note
Complete self-test (once)	1, 1, 6	The normal self-test countdown is displayed along with the Field Test Mode prompt.
Complete self-test (continuous)	1, 6	The countdown numbers appear on the display. Press Pause to stop.
Processor self-test (once)	1, 2, 6	Displays the 9, 8, :: countdown numbers.
Memory subtest (once)	1, 3, 6	Displays the amount of memory and countdown numbers. For example, 12M 7, 6, 5, 4, 3, 2, ::.
LANCE[1] (once)	1, 4, 6	Displays the countdown number 1. The DESTA must be correctly terminated. An Ethernet loopback must be installed if the DESTA is not used. An active Ethernet is not necessary.
NIE[2]	1, 5, 6	Sends and retrieves packets to other nodes on the Ethernet. If an active Ethernet is not connected, the program hangs and shows a blank display.

[1] LANCE, local area network controller exerciser.
[2] NIE, network interface exerciser.

4.3.2 Testing and Running the Print Engine Drive Board

Table 4–2 explains how to test and run the print engine drive board.

Table 4–2: Testing and Running the Print Engine Drive Board

To Run This Test	Press Keys	Note
Printer interface test	2, 6	Displays the 3, 2, :: countdown numbers and tests the communication between the controller and print engine drive boards.
Operator panel test	2, 1, 6	The operator panel and graphic displays show test patterns. Displays the 0:: countdown number when complete.

To Perform This Action	Press Keys	Note
Initialize the print engine	2, 2, 6	Resets the printer to a default status. If the printer is in the ready state, you hear the motors cycle on and off, and you see and hear the LCOT offset motors jog left and right.
Invoke Query Mode	2, 3, 6	See Chapter 5.
Update the operator panel	2, 4, 6	Use to obtain and display up-to-date engine status on the operator panel and graphic display of the operator panel. Old status is erased.
Clear maintenance requests	2, 5, 6	After performing the scheduled Customer Services maintenance, after approximately 300K images, you enter this command to clear the operator panel and reset the controller board counters.

4.3.3 Printing Test Patterns

Table 4–3 explains how to print test patterns.

Table 4–3: Printing Test Patterns

To Print This Pattern	Press Keys	Note
Controller board	3, 6	One/simplex.
Engine drive board	3, 1, 6	One/duplex print.
Engine drive board	3, 3, 6	Continuous/simplex (Press Pause to stop).
Engine drive board	3, 4, 6	Continuous/duplex (Press Pause to stop).
Controller board	3, 5, 6	Continuous/simplex (Press Pause to stop).

Figure 4–2 shows the engine drive board test pattern, which resides on the print engine drive board.

Figure 4–2: Engine Drive Board Test Pattern

MLO-003022 23 picas

Figure 4–3 shows the controller board test pattern, which resides on the controller board ROM memory.

Figure 4–3: Controller Board Test Pattern

MLO-003023 21.6 picas

Figure 4–4 shows a second controller board pattern, which only prints on the turbo PrintServer 20. See Chapter 8 to use this pattern as a test for print quality.

Figure 4–4: Controller Board Test Pattern for turbo PrintServer 20

mlo-005740 24.5 picas

4.3.4 Booting

You can boot the system in Field Test Mode by pressing keys 4 and 6. This command clears the Field Test Mode prompt and starts the boot process, which is described in Chapter 2.

4.3.5 Selecting Input and Output Trays

Table 4–4 explains how to select input and output trays for testing purposes. The graphic panel shows the new selection.

Table 4–4: Selecting Input and Output Trays

To Select This Tray	Press Keys
Upper cassette	4, 1, 6
Lower cassette	4, 2, 6
LCIT	4, 3, 6
Upper LCOT	5, 1, 6
Lower LCOT	5, 2, 6
Side tray	5, 3, 6

4.4 Exiting

To leave Field Test Mode, do one of the following:

- Power the printer off then on.
- Press the 1 key as the countdown is displayed. The Field Test Mode prompt disappears.
- Press keys 4 and 6 sequentially.

Chapter 5
Query Mode

5.1 Description

Query Mode allows you to obtain and display the Nth status bytes, a series of data bytes sent to the controller board from the print engine drive board. The bytes are hexadecimally numbered and are displayed in sequential order starting with byte N00 and ending with byte N0F.

NOTE: *The single light emitting diode (LED) mounted on the print engine drive board displays the Nth status in a primitive fashion. See Section 3.5 for information.*

5.2 Invoking

To examine Nth status bytes, you must first enter Query Mode from Field Test Mode. Press keys 2, 3, and 6 to invoke the Query Mode and obtain and display N00. Press any key to obtain and display the next byte. The graphic panel status is updated after the N0F byte is displayed.

The status display appears as follows:

N00 bbbbbbbb
BIT #76543210

Where:

N is the Nth byte designator.
00 is the hexadecimal byte number.
b is the 1/0 setting.
7 to 0 represent the bit weights.

5.3 Reading the Query Byte Bits

You can spot a problem by viewing the Nth status bytes. Each of a byte's eight bits is a set state conditional display.

If the bit is set to 0, the condition is normal, operational, or not significant. If the bit is set to 1, that bit needs attending to.

For example, if bit 1 of byte 4 is set to 1, the LCIT tray motor error signal is asserted and the motor will not turn on.

Table 5–1 lists the conditions that set bits to 0. Some bits, however, are always set to 0. Those bits are marked NA in the table.

Table 5–1: Query Mode Status

Byte 0	General Status	
Bit	**If This Bit Is Set to 1...**	**Refer To...**
7	NA	
6	NA	
5	NA	
4	NA	
3	NA	
2	NA	
1	The printer is in the nonready or busy state.	NA—Information
0	The engine drive board test pattern video generator is on.	NA—Information

Byte 1	Warm-up Status	
Bit	**If This Bit Is Set to 1...**	**Refer To...**
7	NA	
6	NA	
5	NA	
4	NA	
3	NA	
2	The printer is rounding, an operational mode where all the motors and fans are run and tested. You can hear the printer clicking and whirring.	NA—Information
1	The printer is warming up.	NA—Information
0	The main motor is running.	NA—Information

Table 5–1 (Cont.): Query Mode Status

Byte 2	Fault Status	
Bit	**If This Bit Is Set to 1...**	**Refer To...**
7	NA	
6	NA	
5	NA	
4	An interlock error has occurred.	Section 7.5.6
3	The low-voltage PSU error signal is set.	Section 7.5.5
2	The main motor will not operate.	Section 7.5.4
1	The development motor will not operate.	Section 7.5.3
0	A print engine drive board error is detected.	Section 7.5.2

Byte 3	Engine Fault Status	
Bit	**If This Bit Is Set to 1...**	**Refer To...**
7	NA	
6	The fusing unit thermistor is broken.	Section 7.5.12
5	The fusing temperature is too high.	Section 7.5.11
4	The fusing temperature is too low.	Section 7.5.10
3	NA	
2	The detector pulse is missing.	Section 7.5.9
1	The polygon motor error is set.	Section 7.5.8
0	The laser diode power error is set.	Section 7.5.7

Table 5–1 (Cont.): Query Mode Status

Byte 4	LCIT Fault Status	
Bit	**If This Bit Is Set to 1...**	**Refer To...**
7	NA	
6	NA	
5	NA	
4	NA	
3	NA	
2	The controller board cannot communicate with the LCIT CPU.	Section 7.5.15
1	The LCIT tray motor error is set.	Section 7.5.14
0	An LCIT CPU error has occurred.	Section 7.5.13

Byte 5	Duplexer Unit Status	
Bit	**If This Bit Is Set to 1...**	**Refer To...**
7	NA	
6	NA	
5	NA	
4	NA	
3	NA	
2	The controller board cannot communicate with the duplexer unit CPU.	Section 7.5.15
1	NA	
0	An error occurred in the duplexer/LCIT drive board.	Section 7.5.13

Table 5–1 (Cont.): Query Mode Status

Byte 6	Unused Option	
Bit	**If This Bit Is Set to 1...**	**Refer To...**
7	NA	
6	NA	
5	NA	
4	NA	
3	NA	
2	NA	
1	NA	
0	NA	

Byte 7	Open Cover Status	
Bit	**If This Bit Is Set to 1...**	**Refer To...**
7	NA	
6	NA	
5	The duplex transport is open.	Section 7.5.20
4	One of the LCIT covers is open.	Section 7.5.19
3	NA	
2	The engine's left side cover is open.	Section 7.5.18
1	The LCOT's left side cover is open.	Section 7.5.17
0	The engine's front cover is open.	Section 7.5.16

Table 5–1 (Cont.): Query Mode Status

Byte 8	Motor Status	
Bit	**If This Bit Is Set to 1...**	**Refer To...**
7	NA	
6	NA	
5	NA	
4	NA	
3	The LCOT upper offset motor error is set.	Section 7.5.24
2	The LCOT lower offset motor error is set.	Section 7.5.23
1	The lower cassette motor error is set.	Section 7.5.22
0	The upper cassette motor error is set.	Section 7.5.21

Byte 9	Input Tray Status	
Bit	**If This Bit Is Set to 1...**	**Refer To...**
7	NA	
6	Paper is detected in the duplexer unit.	NA—Information
5	The LCIT is busy.	NA—Information
4	The LCIT is out of paper.	Section 7.5.27
3	The lower cassette is out of paper.	Section 7.5.26
2	The upper cassette is out of paper.	Section 7.5.26
1	The lower cassette is missing or not installed correctly.	Section 7.5.25
0	The upper cassette is missing or not installed correctly.	Section 7.5.25

Table 5–1 (Cont.): Query Mode Status

Byte A	Paper Output Tray Error	
Bit	**If This Bit Is Set to 1...**	**Refer To...**
7	NA	
6	NA	
5	NA	
4	NA	
3	The left side tray is full.	Section 7.5.30
2	The LCOT upper tray is full.	Section 7.5.29
1	The LCOT lower tray is full.	Section 7.5.29
0	The left side tray is not lowered.	Section 7.5.28

Byte B and Byte C Are Unused Options		
Bit	**If This Bit Is Set to 1...**	**Refer To...**
7	NA	
6	NA	
5	NA	
4	NA	
3	NA	
2	NA	
1	NA	
0	NA	

Table 5–1 (Cont.): Query Mode Status

Byte D	Assemblies Missing	
Bit	**If This Bit Is Set to 1...**	**Refer To...**
7	NA	
6	NA	
5	NA	
4	NA	
3	The fusing unit is missing or not fully seated.	Section 7.5.34
2	The cleaning unit is missing or not fully seated.	Section 7.5.33
1	The OPC drum unit is missing or incorrectly mounted.	Section 7.5.32
0	The development unit is missing or not fully seated.	Section 7.5.31

Byte E	User Maintenance Status	
Bit	**If This Bit Is Set to 1...**	**Refer To...**
7	NA	
6	The development unit is out of toner.	NA—Information
5	The cleaning unit is full.	Section 7.5.37
4	The OPC drum needs to be replaced.	Section 7.5.36
3	NA	
2	Customer Services maintenance is needed.	Section 7.5.35
1	NA	
0	User maintenance is needed.	Section 7.5.35

Table 5–1 (Cont.): Query Mode Status

Byte F	Paper Mismatch or Buffer Status	
Bit	**If This Bit Is Set to 1...**	**Refer To...**
7	NA	
6	An incorrect paper path is selected.	NA—Information
5	The LCIT size dial has changed during printing.	Section 7.5.40
4	The lower cassette paper size key changed during printing.	Section 7.5.39
3	The upper cassette paper size key changed during printing.	Section 7.5.39
2	The LCIT paper size dial is in the detent position.	Section 7.5.41
1	The LCIT is incorrectly loaded.	Section 7.5.42
0	The engine drive board command buffer is nearly full. The command buffer holds data used in routine status and handshaking functions between the controller board and engine drive board.	NA

Chapter 6
Messages

The operator panel displays informational and error messages. This chapter defines the following messages:

- Operational messages
- Diagnostic error messages
- Interlock error messages
- Tray error messages
- Miscellaneous messages
- Call Field Service messages

Refer to Chapter 7 for fault isolation procedures.

6.1 Operational Messages

The following messages appear on the operator panel during normal operation:

Message	Explanation
Print engine is in warm-up state	The printer is warming up and cannot be used. This process takes approximately 2.5 minutes from a cold start. This occurs when you power up close a door or cover.
Ready	The printer is functioning correctly and is waiting for a job to process.
Processing	The printer is processing one or more jobs.
Printing	The printer is printing a page.
Paused	The printer is in the off-line state caused when the Pause key was pressed. In the paused state, you can print test sheets and perform the operator functions listed in the operator's manual.

Message	Explanation
Single Job Mode — Press Resume To Continue	Single Job Mode is set by the remote server management utility on the supporting host. When the mode is invoked, press the Resume key to process each print job. Consult the *PrintServer Supporting Host for VMS Management/User's Guide* or *PrintServer Supporting Host for ULTRIX Management/User's Guide* for additional information about using Single Job Mode.
Deleting Current Job	The printer is deleting the current job from processing.
Perform User Maintenance	The printer needs various components cleaned or replaced to maintain print quality. See the individual kit guides for user maintenance procedures.
Field Service Maintenance Required Call Field Service	The printer needs various components cleaned or replaced to maintain print quality. See Chapter 10 for maintenance procedures.

6.2 Diagnostic Error Messages

During an automatic self-test or in Field Test Mode, the operator panel may display diagnostic error messages.

6.2.1 Format

The following format is used in the diagnostic error messages:

TTFF.EEEE

Where:

TT is the number of the failing subtest.
FF identifies the problem area.
EEEE is the unique error code for that subtest.

When you see a diagnostic error message, refer to Chapter 7 to find the appropriate fault isolation procedure. Table 6–1 shows how to find the problem area from reading the diagnostic error message. Chapter 7 explains how to fix the errors.

Table 6–1: Diagnostic Error Messages

If FF Is This Number...	This Is the Problem Area...
01	Controller or network connections
02	Optional memory board
08	Front panel display
09	Print engine—general
10	Paper feeder
11	Fuser
12	LCOT
13	OPC drum
14	Development unit
15	Toner cartridge
16	Cleaning unit
17	Print engine—general
18	Low-voltage power supply
19	Main motor
1A	Development motor
1B	Optical housing unit
1C	LCIT paper feeder
1D	Duplexer/LCIT unit PCB
1E	Maintenance

6.3 Interlock Error Messages

The following interlock messages appear on the operator panel:

- **Close Cover**
- **Close Upper Side Door**
- **Close Lower Side Door**
- **Close Paper Tray Door**
- **Raise Duplex Transport Guide**
- **Interlock 1**
- **Interlock 2**
- **Interlock 3**
- **Interlock 4**

To troubleshoot these messages, refer to Chapter 7.

6.3.1 Definition

An interlock error occurs when a cover is open or an internal assembly is not fully closed or latched. When an interlock is sensed, the controller board stops specific motors, takes the printer off line, and displays status on the operator panel. The LCD display informs the operator to close the cover or to look up a course of action in the operator's guide. When the cover or drawer is fully closed, the interlock clears and, after a brief warm-up period, the printer returns to the Ready state.

6.3.2 How Interlocks Are Sensed

Interlocks are sensed by photointerruptor type sensors, mechanically actuated switches, or in the case of the fusing unit, a hardwire connection that is made when the fusing unit is fully installed. Dual-pole switches usually serve two different interlock circuits. One pole shorts the controller board signal to ground. The second pole is wired in series with the +24-volt power supply that feeds the print engine motors. This dual-pole safety device ensures that people cannot put their hands into a running printer.

The interlock switch for the fusing unit will not produce an interlock error. The fusing heater switch uses both poles to break the 120 Vac power source for the fusing heater. If this switch malfunctions, the following message is displayed:

Hardware Error 34, Call Field Service

6.4 Tray Error Messages

Tray errors are normal operator panel messages that tell the user to empty, fill, or attend to an input or output tray. When a tray error exists, the following occurs:

1. The error indicator lights to signal attention.
2. The LCD display prints a text message.
3. The graphic panel shows the tray that caused the error.

For example, the LCD message displays **Output Tray Full**, and the upper LCOT tray indicator lights. Under normal operations, a user empties the tray and the error disappears.

The following tray errors appear on the operator panel:

- **Reinsert cassette**
- **Insert paper cassette**
- **Wrong size paper in cassette**
- **Add paper**
- **Set paper size dial**
- **Align paper flush against back of tray**
- **Open side tray**
- **Output tray full**
- **Wrong size paper in path**

To troubleshoot tray errors, refer to Chapter 7.

6.5 Miscellaneous Messages

Miscellaneous messages are normal operational or status messages and do not have a diagnostic error pointing to a failing FRU.

The following miscellaneous messages appear on the operator panel:

- **Replace toner cartridge**
- **Replace OPC drum**
- **Cleaning unit full**
- **Perform user maintenance**

- **Field Service Maintenance Required**
  Call Field Service.

If the message does not clear, refer to Chapter 7.

Chapter 7
Fault Isolation Procedures

7.1 Definition

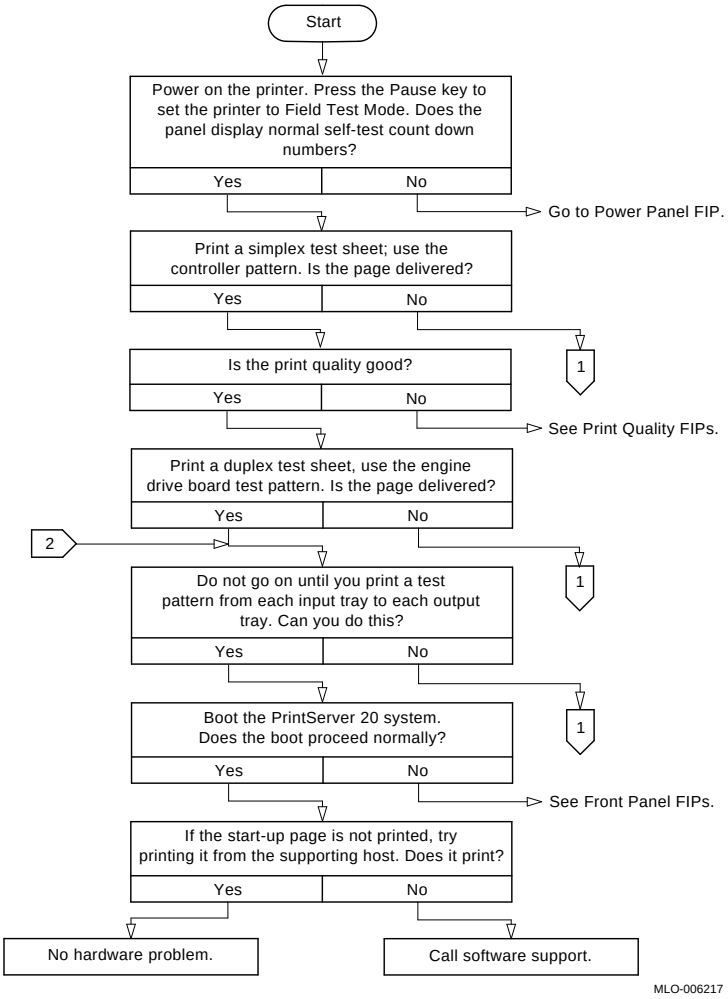
Fault isolation procedures (FIPs) are a collection of yes/no flow charts and tables. The FIPs provide a way to fix or ensure the correct operation of the hardware.

Table 7–1 explains the organization of this chapter.

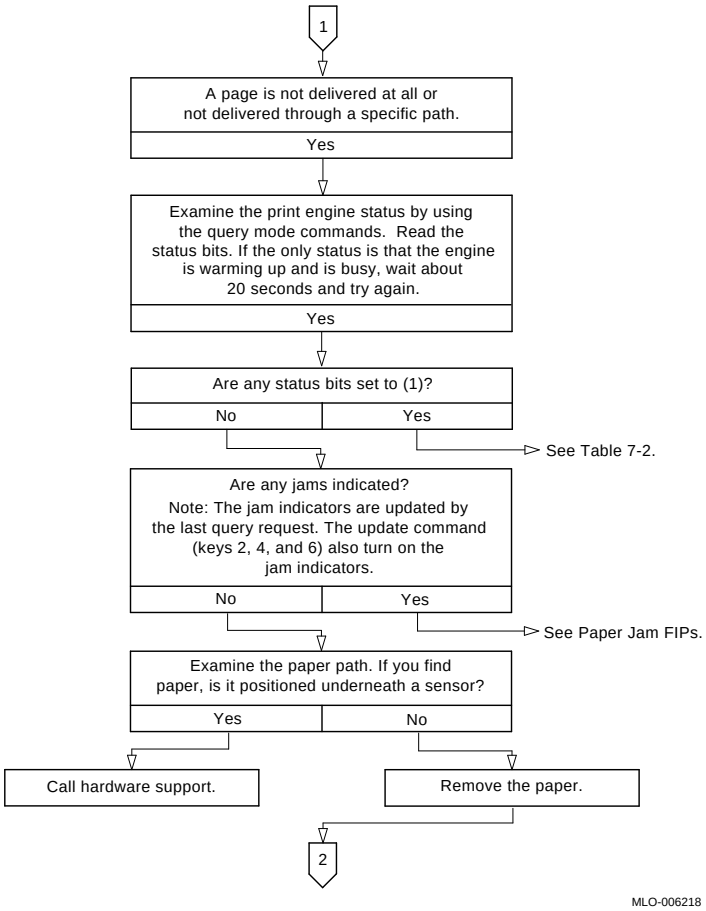
Table 7–1: FIP Directory

This Section...	Explains How to Fix...
Section 7.2	The PrintServer when you are not sure of the problem
Section 7.3	Power problems
Section 7.4	Front panel error messages
Section 7.5	Front panel FIPs
Section 7.6	Paper jams

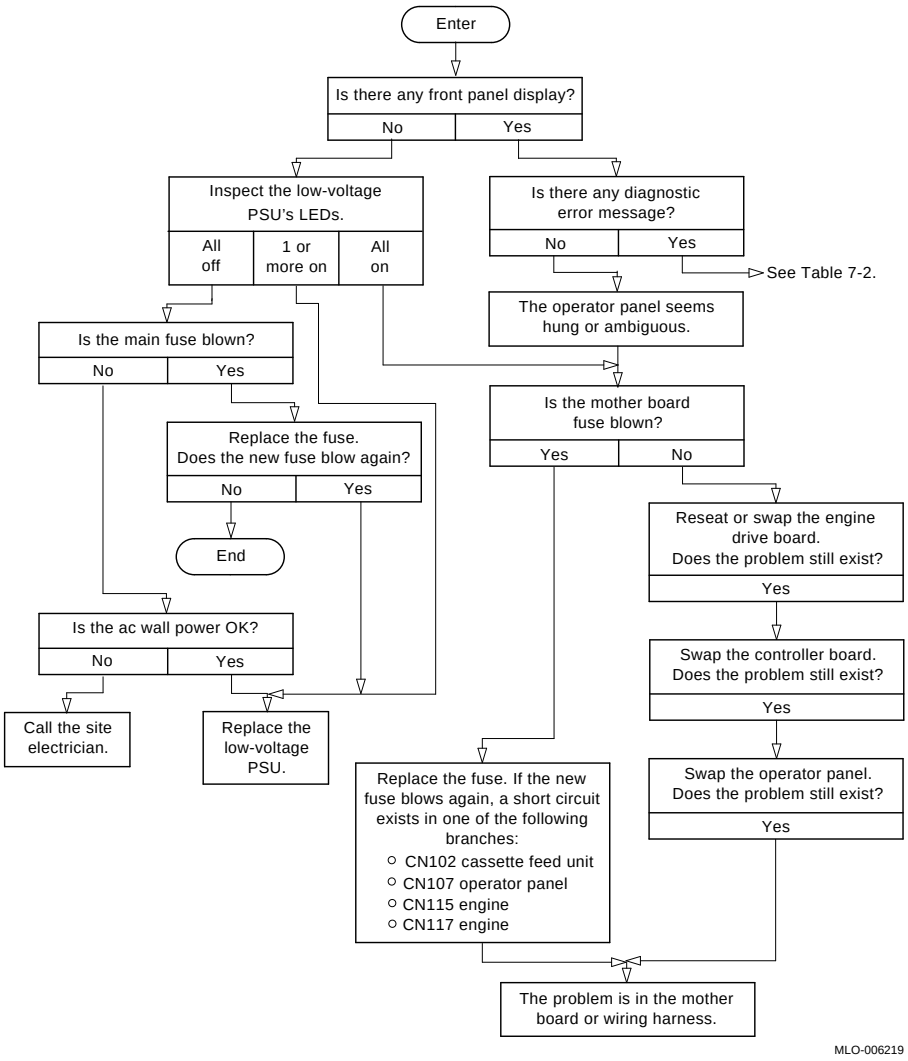
7.2 Start FIP


Start
Power on the printer. Press the Pause key to set the printer to Field Test Mode. Does the panel display normal self-test count down numbers?
Yes
No
Go to Power Panel FIP.
Print a simplex test sheet; use the controller pattern. Is the page delivered?
Yes
No
Is the print quality good?
Yes
No
1
See Print Quality FIPs.
Print a duplex test sheet, use the engine drive board test pattern. Is the page delivered?
Yes
No
2
Do not go on until you print a test pattern from each input tray to each output tray. Can you do this?
Yes
No
1
Boot the PrintServer 20 system. Does the boot proceed normally?
Yes
No
1
See Front Panel FIPs.
If the start-up page is not printed, try printing it from the supporting host. Does it print?
Yes
No
No hardware problem.
Call software support.
MLO-006217

Start FIP Continued (2 of 2)



7.3 Power/Panel FIP



7.4 Front Panel Error Messages

Table 7–2 lists the messages that appear on the front panel, the associated diagnostic messages, the query bits, and descriptions of the problems. The last column of the table directs you to the appropriate FIP.

NOTES:

If the diagnostic error code begins with 0F, refer to diagnostic error codes that begin with 11. For example, 0F09.0070 is the same as 1109.0070.

If diagnostic error codes begin with 0B, check the following for bad connections or faulty components:

Ethernet connections	DESTA
Network configuration	Controller board
Harness from the mother board to the transceiver connector	

Typical errors for this are:

- *0101.1002—The Ethernet address ROM is not installed properly or is missing from the controller board.*
- *0B01.7004—The ThinWire is not connected at the DESTA's BNC connector.*
- *0B01.7008—ThinWire connections are not terminated properly.*
- *0B01.7010—The Ethernet is not connected at the D-sub transceiver connector.*

The following format is used in diagnostic error codes:

TTFF.EEEE

TT	Is the number of the failing subset.
FF	Identifies the problem area.
EEEE	Is the unique error code for the subset.

If diagnostic error codes begin with numbers from 00 to 0A or 0C to 0E, look at the FRU designation.

- *If FF = 01, replace the controller board.*
- *If FF = 02, replace the memory option board.*
- *If FF = 03, replace the controller board or a memory option board.*

Table 7–2: Front Panel Messages Directory

Message	Diag Error	Query Bit	Description	Refer to
NA	10xx.0002[1]	—	DIS_DTR or TRM_OUT not set	Section 7.5.1
NA	10xx.0004[1]	—	DIS_CTS not set	Section 7.5.1
NA	10xx.0006[1]	—	No ID response from panel	Section 7.5.1
NA	10xx.0008[1]	—	Incorrect device ID response	Section 7.4
NA	10xx.000A[1]	—	Panel test response time-out	Section 7.5.1
NA	10xx.000C[1]	—	Front panel self-test fails	Section 7.5.1
NA	10xx.000E[1]	—	Incorrect response from panel	Section 7.5.1
NA	10xx.0010[1]	—	Device ID response time-out	Section 7.5.1
NA	10xx.0012[1]	—	Multibyte response time-out	Section 7.5.1
—	—	N0–0	Self video generation mode	NA—Information [2]
—	—	N0–1	Print engine is not ready	Use Query Mode.
—	—	N1–0	Main motor is running	NA—Information
Print Engine is in warmup state	—	N1–1	Engine is in warmup state	NA—Information
—	—	N1–2	Engine is rounding	NA—Information
Hardware Error 20 Call Field Service	11xx.0020	N2–0	Print engine CPU error	Section 7.5.2
Hardware Error 21 Call Field Service	11xx.0021	N2–1	Development motor error	Section 7.5.3
Hardware Error 22 Call Field Service	11xx.0022	N2–2	Main motor error	Section 7.5.4
Hardware Error 23 Call Field Service	11xx.0023	N2–3	Low-voltage power supply error	Section 7.5.5
NA	11xx.0024	N2–4	Cover interlock error	Section 7.5.6
Hardware Error 30 Call Field Service	11xx.0030	N2–0	Laser diode power error	Section 7.5.7

[1]All diagnostic codes begin with 10. If xx = 08, a front panel error is detected.

[2]NA means no action is required.

Table 7–2 (Cont.): Front Panel Messages Directory

Message	Diag Error	Query Bit	Description	Refer to
Hardware Error 31 Call Field Service	11xx.0031	N3–1	Polygon motor error	Section 7.5.8
Hardware Error 32 Call Field Service	11xx.0032	N3–2	Detector pulse missing	Section 7.5.9
Hardware Error 34 Call Field Service	11xx.0034	N3–4	Fuser temperature too low	Section 7.5.10
Temperature too high POWER DOWN IMMEDIATELY!	11xx.0035	N3–5	Fuser temperature too high	Section 7.5.11
Hardware Error 36 Call Field Service	11xx.0036	N3–6	Fuser thermistor broken	Section 7.5.12
Hardware Error 40 Call Field Service	11xx.0040	N4–0	LCIT CPU error	Section 7.5.13
Hardware Error 41 Call Field Service	11xx.0041	N4–1	LCIT tray motor error	Section 7.5.14
Hardware Error 42 Call Field Service	11xx.0042	N4–2	LCIT communication error	Section 7.5.15
Hardware Error 50 Call Field Service	11xx.0050	N5–0	Duplexer CPU error	Section 7.5.13
Hardware Error 52 Call Field Service	11xx.0052	N5–2	Duplexer communication error	Section 7.5.15
Close front cover	11xx.0070	N7–0	Print engine front cover open	Section 7.5.16
Close upper side door	11xx.0071	N7–1	LCOT cover open	Section 7.5.17
Close lower side door	11xx.0072	N7–2	Print engine side cover open	Section 7.5.18
Close paper tray door	11xx.0074	N7–4	LCIT cover(s) open	Section 7.5.19
Open cabinet door, raise duplex transport guide	11xx.0075	N7–5	Duplex guide unlatched	Section 7.5.20
Reinsert upper cassette	11xx.0080	N8–0	Upper cassette motor error	Section 7.5.21
Reinsert lower cassette	11xx.0081	N8–1	Lower cassette motor error	Section 7.5.22
Hardware Error 82 Call Field Service	11xx.0082	N8–2	LCOT lower offset motor error	Section 7.5.23
Hardware Error 83 Call Field Service	11xx.0083	N8–3	LCOT upper offset motor error	Section 7.5.24
Insert paper cassette	—	N9–0	Upper cassette missing	Section 7.5.25

Table 7–2 (Cont.): Front Panel Messages Directory

Message	Diag Error	Query Bit	Description	Refer to
Insert paper cassette	—	N9–1	Lower cassette missing	Section 7.5.25
Add paper	—	N9–2	Upper cassette empty	Section 7.5.26
Add paper	—	N9–3	Lower cassette empty	Section 7.5.26
Add paper	—	N9–4	LCIT is empty or not raised	Section 7.5.27
NA	—	N9–5	LCIT is not ready	Use Query Mode.
NA	—	N9–6	Duplexer paper registered	NA—Information
Open Side Tray	—	NA–0	Side output tray is not set	Section 7.5.28
Output Tray Full	—	NA–1	Lower output tray full	Section 7.5.29
Output Tray Full	—	NA–2	Upper output tray full	Section 7.5.29
Output Tray Full	—	NA–3	Side output tray full	Section 7.5.30
Interlock Error 3 See Operator Guide	11xx.00D0	ND–0	Developer unit absent	Section 7.5.31
Interlock Error 2 See Operator Guide	11xx.00D1	ND–1	OPC drum absent	Section 7.5.32
Interlock Error 1 See Operator Guide	11xx.00D2	ND–2	Cleaning unit absent	Section 7.5.33
Interlock Error 4 See Operator Guide	11xx.00D3	ND–3	Fusing unit absent	Section 7.5.34
Perform User Maintenance	11xx.00E0	NE–0	User maintenance is needed	Section 7.5.35
Field Service Maintenance Required Call Field Service	11xx.00E2	NE–2	300K maintenance is needed	Section 7.5.35
Replace OPC drum	11xx.00E4	NE–4	OPC drum needs to be replaced	Section 7.5.36
Cleaning Unit Full See Operator Guide	11xx.00E5	NE–5	Cleaning unit is full	Section 7.5.37
Replace toner cartridges	11xx.00E6	NE–6	Toner level is low	NA—Information
NA	11xx.1002	—	Protocol timeout	Section 7.5.38
NA	11xx.1004	—	Init error—PE fault	Use Query Mode.
NA	11xx.1006	—	Init error—LCIT fault	Use Query Mode.

Table 7–2 (Cont.): Front Panel Messages Directory

Message	Diag Error	Query Bit	Description	Refer to
NA	11xx.1008	—	Init error—DPX fault	Use Query Mode.
NA	11xx.100C	—	Init error—LCIT Comm error	Section 7.5.15
NA	11xx.100E	—	Init error—DPX Comm error	Section 7.5.15
NA	11xx.2002	—	Set input tray failed	See footnote [3].
NA	11xx.2004	—	Set output tray failed	See footnote [2].
NA	11xx.2006	—	Feed command not accepted	See footnote [3].
NA	11xx.2008	—	Printer busy during feed	See footnote [3].
NA	11xx.200A	—	Print command not accepted	See footnote [3].
NA	11xx.200C	—	Early page eject	See footnote [3].
NA	11xx.200E	—	Set test mode failed	See footnote [3].
NA	11xx.2010	—	Unexpected reply from engine	See footnote [3].
NA	11xx.2012	—	Error during printing	See footnote [3].
NA	11xx.2014	—	Set duplex mode failed	See footnote [3].
NA	11xx.2016	—	DPX print not accepted	See footnote [3].
NA	11xx.2018	—	Timeout waiting for page eject	See footnote [3].
NA	11xx.2020	—	Failed to reset test mode	See footnote [3].
NA	11xx.2022	—	Failed to reset duplex mode	See footnote [3].
NA (See Section 7.5.35.)	11xx.2024	—	Failed to reset 300K request	See footnote [3].
NA	11xx.2026	—	Not enough memory	See footnote [3].
NA	11xx.8083	N2–x, N3–x	Engine unit fault received	Use Query Mode.

[2]NA means no action is required.

[3]Key sequence functions in Field Service Mode cannot be performed because the engine is busy or has errors or faults. Use Query Mode and monitor paper paths to identify the FRU. If paper jams, see the Paper Jam FIPs.

Table 7–2 (Cont.): Front Panel Messages Directory

Message	Diag Error	Query Bit	Description	Refer to
NA	11xx.8085	N4–x	LCIT unit fault received	Use Query Mode.
NA	11xx.8087	N5–x	Duplex unit fault received	Use Query Mode.
Close front cover	11xx.808B	N7–0	Front cover open event received	Use Query Mode.
Close upper side door	11xx.808D	N7–1	LCOT cover open event received	Use Query Mode.
Close lower side door	11xx.808F	N7–2	Side cover open event received	Use Query Mode.
Close paper tray door	11xx.8091	N7–4	LCIT cover(s) open event received	Use Query Mode.
Open cabinet door, raise duplex transport guide	11xx.8093	N7–5	Duplex transport unlatched event	Use Query Mode.
Reinsert Upper cassette	11xx.8097	N8–0	Upper cassette motor error	Use Query Mode.
Reinsert Lower cassette	11xx.8099	N8–1	Lower cassette motor error	Use Query Mode.
Hardware Error 82 Call Field Service	11xx.809B	N8–2	LCOT lower offset motor error	Use Query Mode.
Hardware Error 83 Call Field Service	11xx.809D	N8–3	LCOT upper offset motor error	Use Query Mode.
NA	11xx.80A1	—	Undefined event sent from engine	Use Query Mode.
NA	11xx.80A3	—	Jam just occurred event received	Jam FIPs
Jam locations and instructions	11xx.80A5	—	Jam location just fixed event	Jam FIPs
NA	11xx.80C1	NF–6	Inappropriate paper path is selected	NA—Information
Jam locations and instructions	11xx.80C3	—	Paper remains in system event	Jam FIPs
Wrong size paper in upper cassette	11xx.80C5	NF–3	Upper cassette	Section 7.5.39
Wrong size paper in lower cassette	11xx.80C7	NF–4	Lower cassette	Section 7.5.40
Wrong size paper in paper tray	11xx.80C9	NF–5	LCIT paper size error event	Section 7.5.40

Table 7–2 (Cont.): Front Panel Messages Directory

Message	Diag Error	Query Bit	Description	Refer to
Set paper size dial	11xx.80CD	NF–2	LCIT selection dial incorrectly set	Section 7.5.41
Align paper flush against back of tray	11xx.80CF	NF–1	LCIT paper loading position incorrect	Section 7.5.42
—	—	NF–1	Print engine nearly full	NA—Information
NA	11xx.80D7	ND–x	Any component in the drawer missing	Use Query Mode.
NA	11xx.80E3	N9–5	LCIT is not ready	NA—Information
Output Tray Full	11xx.80E5	NA–3	Side eject tray is full	Section 7.5.30
Fatal software error Reboot or cycle power	NA	—	PostScript is in "hung" state	Reboot system
NA	15xx.0001 or ?54	—	Timeout error—Boot failures retry ...	Section 7.5.43
NA	15xx.0002	—	Fatal error, boot failure	Section 7.5.44

7.5 Front Panel FIPs

Before using the FIPs, use the following checklist:

- Record the symptoms and recycle/reboot the printer to see if the problem goes away first. Refer to Section 7.2.
- Follow the procedures in order.
- Check that voltage levels at the checkpoints are ±5%, unless otherwise stated.
  - — Voltage level “low” means 0 to .5V.
  - — Voltage level “high” means +5V ±.5V.

  (Reference GND is chassis ground.)
- The front panel does not update to the engine status automatically. Therefore, after each corrective step, recycle the power or initialize the engine by pressing keys 2, 1, and 6 and update the front panel by pressing keys 2, 4, and 6 in Field Test Mode.

7.5.1 Front Panel Unit Error

Explanation: The front panel fails during a power-up self-test or fails the controller/front panel interface power-up self-test.

Action:

1. Replace the front panel unit.
2. Replace the controller board.
3. Replace the mother board (not likely).

7.5.2 Print Engine CPU Error

Explanation: The print engine drive board self-test fails during power up or while executing the INITIALIZE command. The print engine drive board detects an error during memory tests or I/O loopback tests.

Action:

1. Recycle power from the main switch.
2. If the problem still exists, replace the print engine drive board.

7.5.3 Development Motor Error

Explanation: The development motor is not up to speed .5 second after being turned on by /DMTR signal. (Signal /DMLOK remains high for more than .5 second after the motor is on. This signal should go low when the motor is up to speed.) After the motor runs for 2 seconds, the motor error is not detected.

Action:

1. Check connector CN108 on the mother board.
2. Check for any binding drive mechanism.
3. Replace the development motor assembly.
4. Replace the print engine drive board (not likely).
5. Replace the mother board (not likely).

7.5.4 Main Motor Error

Explanation: The development motor is not up to speed .5 second after being turned on by the /TMTR signal. (Signal /TMLOK remains high for more than .5 second after the motor is on. This signal should go low when the motor is up to speed.) After the motor runs for 2 seconds, the motor error is not detected.

Action:

1. Check connector CN109 on the mother board.
2. Check for any binding drive mechanism.
3. Replace the main motor assembly.
4. Replace the print engine drive board (not likely).
5. Replace the mother board (not likely).

7.5.5 Low-Voltage Power Supply Error

Explanation: One of the DC outputs (+12V, -12V, or +24V), except +5V, is abnormally low for more than 400 milliseconds.

Action:

1. Check the cable harness at connector CN111 from the mother board to the power supply unit.
2. Replace the low-voltage power supply.
3. Replace the print engine drive board (not likely).
4. Replace the mother board (not likely).

7.5.6 Cover Interlock Error

Explanation: The +24 volts from the mother board go serially through three interlocks: side cover, front cover, and LCOT cover. The engine covers have satisfied the engine interlock circuit, but the +24V circuit is open.

Action:

1. Check for a bowed front cover; push in the front cover. If the problem goes away, replace the bowed cover.
2. Close all three doors and check the following on the mother board:
   - If CN113–1 is not at +24V, check the power supply cable harness to connector CN111. Replace the low-voltage power supply.
   - If CN113–2 is not at +24V, open the front cover and remove inner-left cover.
     — If the top pin of the side cover interlock switch is not at +24V while the side cover is closed, replace the side cover interlock switch.
     — If the front cover +24V jumper interlock and its receptacle on the total counter assembly are damaged, replace them.
   - If CN118–2 is not at +24V while all three covers are closed, replace the LCOT for a bad interlock switch.
   - Replace the print engine drive board (not likely).
   - Replace the mother board (not likely).

7.5.7 Laser Diode Power Error

Explanation: During power up or printing, the print engine drive board detects low or high laser power from laser diode unit.

Action:

1. Check the cable harness from CN117 to the optical unit.
2. Replace the optical unit.
3. Replace the print engine drive board.
4. Replace the mother board (not likely).

7.5.8 Polygon Motor Error

Explanation: The polygon motor is not up to speed .5 second after power up. (Signal PMLOK remains high for more than .5 second after the motor is on. This signal should go low when the motor is up to speed.) After the motor runs for 15 seconds, the motor error is not detected.

Action:

1. Check the cable harness from CN117 to the optical unit.
2. Replace the optical unit.
3. Replace the print engine drive board.
4. Replace the mother board (not likely).

7.5.9 Detector Pulse Missing

Explanation: The print engine drive board cannot find a line sync pulse from the scan line sync signal PDDEPT after 30 milliseconds of printing. The pulse is checked during the printing cycle, at power up, and during a cover close reset cycle.

Action:

1. Check the optical cable connection from CN121 to the optical unit.
2. Clean the optical cable's ends.
3. Replace the optical unit.
4. Replace the print engine drive board.
5. Replace the mother board (not likely).

7.5.10 Fuser Temperature Too Low

Explanation: The thermistor analog signal THERM indicates that the surface of the fusing roller did not reach the operating temperature of 175°C after the /HEAT signal was active for 150 seconds.

Action:

1. Use the ohmmeter and check if the thermal fuse is blown. If the fuse is open, refer to the corrective actions in Section 7.5.11.
2. Perform the following steps:
   a. Power off the printer.
   b. Keep the front cover closed.
   c. Remove the back cover.
   d. Use the ohmmeter to check the continuity through the two outer pins (pins 1, 2) and through the two inner pins (pins 3, 4) of the fusing interlock switch. Replace the fusing unit interlock switch if necessary.
3. Check the lamp's terminals, the cable harness from CN115 to the fuser connector, and the harness from CN1 of the power supply to the fuser connector.
4. Replace the fusing unit.
5. Replace the low-voltage power supply.
6. Replace the print engine drive board (not likely).
7. Replace the mother board (not likely).

7.5.11 Fuser Temperature Too High

Explanation: The thermistor analog signal THERM indicates that the surface of the fusing roller keeps rising too high over the desired setting temperature after the /HEAT signal was inactive.

NOTE: *The fusing unit has a thermal fuse that cuts off the AC supply to the heater if the temperature reaches approximately 320°C. Normal temperature should be 170°C ± 10°C. If the thermistor senses correctly, the print engine drive board will turn off the heater (/HEAT = high) as soon as the temperature of the roller reaches 210°C.*

Action:

1. Inspect the fusing unit rollers.

   If the rollers are not damaged by heat and the thermal fuse is still intact, replace the low-voltage power supply unit.

   If the roller is damaged by heat, replace the low-voltage power supply unit and the fusing unit.

2. Replace the print engine drive board (not likely).
3. Replace the mother board (not likely).

7.5.12 Fuser Thermistor Broken

Explanation: The voltage level of the THERM signal is too low (close to 0V) after the /HEAT signal was active for more than 2 seconds.

Action:

1. Remove the fusing unit and use the ohmmeter to check the resistance across the thermistor (upper two white wires).

   If it is open, replace the thermistor assembly in the fusing unit.

   If it is not open, check the cable harness for continuity of signal CN115–B13 to the fusing connector and the THERM signal from the fusing connector to CN115–B12.

2. Replace the fusing interlock switch assembly.
3. Replace the print engine drive board (not likely).
4. Replace the mother board (not likely).

7.5.13 LCIT/Duplexer CPU Error

Explanation: The print engine drive board received a self-test failure message from the duplexer/LCIT drive board during an initialization ROM checksum and the RAM read/write tests.

Action:

Replace the duplexer/LCIT drive board.

7.5.14 LCIT Tray Motor Error

Explanation: The LCIT motor drive signal ELVMU or ELVMD is active and the paper-height signal UPLMT does not go low within 12 seconds, or the lower limit signal LWLMT does not go high within 12 seconds. If the user loads paper under the LCIT tray, the LCIT and the duplexer/LCIT drive board will be damaged.

ELVMU CN407–1	ELVMD CN407–2	Tray Direction
0V*	0V*	Does not move
+24V	0V*	Moves up
0V*	+24V	Moves down
+24V	+24V	Duplexer/LCIT drive board is bad

* Note: The low level for these two signals ranges from 0 to +6V.

Action:

1. Check the cable harness from the LCIT to the duplexer/LCIT drive board.
2. Close the LCIT covers and check the following:
   - If CN407–4 is low (less than +24V), replace the duplexer/LCIT drive board.
   - If CN407–3 is low, the interlock switch that disconnects the +24V is faulty. Replace the LCIT.
3. Keep the LCIT covers closed and wait 15 seconds. If ELVMU or ELVMD is +24V, replace the duplexer/LCIT drive board.

   Normally, when this problem occurs, the tray cannot move up or down. If the tray is up, recycle power and press the tray down key. If signal ELVMD (CN407–2) does not reach +24V within 12 seconds, replace the duplexer/LCIT drive board. Otherwise, replace the LCIT.

   If the tray is not up, recycle power and check signal ELVMU (CN407–1). If the signal does not reach +24V within 12 seconds, replace the duplexer/LCIT drive board. Otherwise, replace the LCIT.

7.5.15 LCIT/Duplexer Communication Error

Explanation: The duplexer/LCIT drive board does not send a reply to the print engine drive board commands.

Action:

1. Check the connection of the optical cable from the mother board to the duplexer/LCIT drive board.
2. Make sure the silver squares of the connector face out.

   If the power is not present at CN401 of the duplexer/LCIT drive board (CN401–1 is GND, CN401–2 is +5V, and CN401–3 is +24V), check the cable harness from the low-voltage power supply unit to the duplexer/LCIT drive board.

   If DC power is not present at the power supply, replace the low-voltage power supply.
3. Replace the duplexer/LCIT drive board.
4. Replace the print engine drive board (not likely).
5. Replace the mother board (not likely).

7.5.16 Print Engine Front Cover Is Open

Explanation: Signal CCLSE1 is high (+5V) at the engine drive board.

Action:

1. Keep the front door closed and check the signal CCLSE1 at CN115–A7 on the mother board.

   If the signal is +5V, replace the total counter assembly, which includes the bad optical sensor.

   If the CN115–A7 is 0V, replace the print engine drive board.
2. Replace the mother board (not likely).

7.5.17 LCOT Cover Is Open

Explanation: Signal CCLSE3 is high (+5V) at the engine drive board.

Action:

1. Close the LCOT cover and check the signal CCLSE3 at CN118–5 on the mother board.

   If the signal is +5V, the interlock switch is faulty. Replace the LCOT.

   If the signal is 0V, replace the print engine drive board.

2. Replace the mother board (not likely).

7.5.18 Print Engine Side Cover Is Open

Explanation: Signal CCLSE2 is high (+5V) at the engine drive board.

Action:

1. Close the side cover and check the signal CCLSE2 at CN113–4 on the mother board.

   If the signal is +5V, replace the side cover interlock assembly.

   If the signal is 0V, replace the print engine drive board.

2. Replace the mother board (not likely).

7.5.19 LCIT Cover Is Open

Explanation: Signal LCOPN is high (+5V) at the duplexer/LCIT drive board.

Action:

1. Check the two LCIT covers' interlock tabs and replace the LCIT main cover if the tab is broken.
2. Check the cable harness from the duplexer/LCIT drive board to the LCIT.
3. Replace the LCIT.
4. Replace the duplexer/LCIT drive board.

7.5.20 Duplexer Transport Guide Unlatch

Explanation: Signal DXOPN is high (+5V) at the duplexer/LCIT drive board.

Action: Latch the duplexer transport guide and check the signal DXOPN at CN408–7 on the duplexer/LCIT drive board.

If the signal is +5V, remove the duplexer and check for any damage at the optical interlock sensor. Replace the duplexer unit if necessary.

If the signal is 0V, replace the print engine drive board.

7.5.21 Upper Cassette Motor Error

Explanation: Signal UPRIS at CN562–10 is high and signal UPPHT does not go high within 4 seconds, or signal UPFAL at CN562–9 is high and signal UPPHT does not go low within 4 seconds. CN562 is located on the paper feed assembly distribution board.

Action:

1. Check for damaged tabs on the cassette and replace the cassette if necessary.
2. Check the cable harness from CN102 of the mother board to the distribution board of the paper feed unit.
3. Replace the cassette feed unit.
4. Replace the print engine drive board.
5. Replace the duplexer/LCIT drive board (not likely).

7.5.22 Lower Cassette Motor Error

Explanation: Signal LWRIS at CN562–7 is high and signal LWPHT does not go high within 4 seconds, or signal LWFAL at CN562–8 is high and signal LWPHT does not go low within 4 seconds. CN562 is located on the paper feed assembly distribution board.

Action:

1. Check for damaged tabs on the cassette and replace the cassette if necessary.
2. Check cable harness from CN102 of the mother board to the distribution board of the paper feed unit.
3. Replace the cassette feed unit.
4. Replace the print engine drive board.
5. Replace the duplexer/LCIT drive board (not likely).

7.5.23 LCOT Lower Offset Motor Error

Explanation: The signal LJSHM/LJSOS does not go high after signal LJSRT/LJSLT turns the lower offset motor on. This is not a fatal error. The printer still works if you select the other output tray or disable the offset feature.

Action:

1. Check for any obstruction, such as a binding cam, jammed paper, and so on, at the exit rollers.
2. Replace the LCOT.
3. Replace the engine drive board (not likely).
4. Replace the mother board (not likely).

7.5.24 LCOT Upper Offset Motor Error

Explanation: The signal UJSHM/UJSOS does not go high after signal LJSRT/LJSLT turns the upper offset motor on. This is not a fatal error. The printer still works if you select the other output tray or disable the offset feature.

Action:

1. Check for any obstruction, such as a binding cam, jammed paper, and so on, at the exit rollers.
2. Replace the LCOT.
3. Replace the engine drive board (not likely).
4. Replace the mother board (not likely).

7.5.25 Upper/Lower Paper Cassette Missing

Explanation: The paper size key is not seen by the upper/lower cassette paper size optical sensor.

Action:

1. Make sure the paper size key is properly installed on the cassette.
2. Make sure the cassette seats properly in the slot.
3. If the same problem exists on both cassettes' slots, check the cable harness from CN102 of the mother board to the cassette feed assembly. Replace cassette paper feed unit.
4. If there is clicking noise, the tray is rising and dropping repeatedly because the paper-height sensor is not activated. Replace the paper-height sensor at the end of the pickup roller.
5. Replace the cassette paper feed unit.
6. Replace the print engine drive board.
7. Replace the mother board (not likely).

7.5.26 Upper/Lower Paper Cassette Empty

Explanation: The upper/lower cassette paper-height signal UPPHT/LWPHT is low and the paper-end signal UPEND/LWEND is high.

Action:

1. Loosen two screws to slide the high-voltage power supply to the right to gain access to the paper feed unit distribution board.
2. Insert a paper cassette with some paper in it and wait until it rises and stops at the operating position:

   Check signal UPEND (CN562–4) and LWEND (CN563–10) of the paper feed unit distribution board.

   - If the signal is 0V, check the cable harness to CN102 of the mother board. Replace the print engine drive board.
   - If the signal is 5V, the paper-end sensor is faulty. Replace the cassette paper feed assembly.
3. If the paper cassette does not rise after being inserted, check for an obstruction caused by the paper pickup roller being stuck at the upper position.

   If the pickup roller moves up and down freely, but the cassette does not rise, the paper-height sensor is faulty. Replace the paper feed assembly.
4. Replace the mother board (not likely).

7.5.27 LCIT Empty or Paper Stack Is Not at Operating Height

Explanation: The paper-height signal UPLMT is low and the paper-end signal LCEND is high, or the paper stack is not at the sufficient height.

NOTE: *When the LCIT button is pressed without opening or closing the LCIT door, the engine will lower the LCIT tray and the front panel will display an* ***Add paper*** *message.*

Action:

1. Open the LCIT door, load some paper, and close the LCIT door.

   If the tray reaches the top and then lowers right away, check for a faulty paper-out sensor. Replace the LCIT feed unit if necessary.

   If the tray does not rise, see if the pickup roller is stuck at the upper position.

   If the pickup roller can move up and down freely, check signal UPLMT at CN405–4.

   If the signal is low, the paper-height sensor is faulty. Replace the LCIT feed unit.

   If the signal UPLMT is high, the tray lower switch may be stuck on the LCIT panel. Replace the LCIT.

2. Replace the duplexer/LCIT controller board.

7.5.28 Side Output Tray Is Not Set Error

Explanation: The side output tray is folded up, not ready to be used. Signal STCLS is high at the print engine drive board.

Action:

1. If the side output tray is open and the error remains, check signal STCLS at CN115–B4 of the mother board.

   If the signal is high, the optical sensor is faulty. Replace the transport unit exit (also known as the fork gate unit).

   If the signal is low, replace the print engine drive board.

2. Replace the mother board (not likely).

7.5.29 Upper/Lower Output Tray Full

Explanation: Signal UPOVF or LWOVF is low for more than 8 seconds.

Action:

1. See if the sensor is stuck at the upper position.
2. Make sure no paper is in the output tray and the actuator is at the lower position.
3. Check signals UPOVF (CN114–B3) and LWOVF (CN114–A1).

   If the signals are low, the optical sensor is faulty. Replace the LCOT.

   If the signals are high, replace the print engine drive board.
4. Replace the mother board (not likely).

7.5.30 Side Output Tray Full

Explanation: Signal SDOVF is low for more than 8 seconds.

Action:

1. See if the sensor is stuck in the upper position.
2. Make sure no paper is in the output tray and the actuator is at the lower position.
3. Check signal SDOVF at CN115–B1.

   If the signal is low, the optical sensor is faulty. Replace the transport exit unit (also known as the fork gate unit).

   If the signal is high, replace the print engine drive board.
4. Replace the mother board (not likely).

7.5.31 Development Unit Absent

Explanation: Signal TNCST is low at the engine drive board.

Action:

1. Make sure the development unit cover is seated properly on the development unit.
2. Make sure the development unit is seated properly in the drawer and the drawer is latched properly.
3. Check the alignment between the developer cover's tab and the optical sensor on the chassis.
4. Push the drawer in and check signal TNCST at CN107–B3.

   If the signal is low, replace the optical sensor.

   If the signal is high, replace the print engine drive board.

7.5.32 OPC Drum Unit Absent

Explanation: Signal DRST is low at the print engine drive board.

Action:

1. Make sure the OPC drum is seated properly in the drawer and the drawer is latched properly.
2. Push the drawer in and check signal DRST at CN107–A2.

   If the signal is low, replace the optical drum sensor.

   If the signal is high, replace the print engine drive board.

7.5.33 Cleaning Unit Absent

Explanation: Signal CLNST is low at the print engine drive board.

Action:

1. Check the cleaning unit for a tab that is broken, bent, or not aligned with the sensor on the chassis.
2. Make sure the cleaning unit is seated properly in the drawer and the drawer is latched properly.
3. Push the drawer in and check signal CLNST at CN107–A7.

   If the signal is low, replace the optical cleaning unit sensor.

   If the signal is high, replace the print engine drive board.

7.5.34 Fusing Unit Absent

Explanation: Signal FUSST is high at the print engine drive board.

Action:

1. Make sure the fusing unit is latched properly.
2. Inspect the blue loopback jumper wire on the fusing unit for continuity.
3. Check the cable harness from CN115 of the mother board to the fuser socket adapter.
4. Check signal FUSST at CN115–B14 on the mother board.

   If the signal is low, replace the print engine drive board.

   If the signal is high, the connector on the fuser is faulty. Replace the fusing interlock switch assembly.

7.5.35 Failed to Reset Maintenance Counter

Explanation: The electronic counter indicates maintenance is required.

Action:

1. If this message cannot be cleared, reset the counter one more time and enter the key code sequence correctly.

   To clear (reset) the user maintenance counter:

   a. Boot the system.

   b. Press the Pause key to place the printer off line.

   c. Press the Test Set-Up key.

   d. Using the keypad, enter the code 3, 2, 1, 5, 5, 2.

   To clear (reset) service maintenance (300K) counter, invoke Field Service Mode and press keys 2, 5, and 6.

2. If the maintenance message does not clear, replace the following components:

   - Mother board
   - Print engine drive board
   - Controller board (not likely)

7.5.36 Fail to Clear "Replace OPC Drum" Message

Explanation: The electronic counter indicates that the OPC drum needs to be replaced. Signal DRCHG goes low, resets the counter, and clears the request.

Action:

1. Install a new OPC drum. (This is a customer task.)
2. Remove the back cover and manually activate the drum change sensor by pushing the metal actuator bracket to the left.

   Clear the center of the optical drum sensor. Hold it still and check signal DRCHG at CN107–A4.

   If the signal is high, replace the drum change sensor.

   If the signal is low, replace the mother board.
3. Replace the print engine drive board.

7.5.37 Cleaning Unit Is Full

Explanation: The toner overflow signal TNOVR is low at the print engine drive board.

Action:

1. Replace the cleaning unit.
2. Inspect the magnet on top of the new cleaning unit. The magnet should stay lower than the top of the cleaning unit.
3. Install an empty cleaning unit, latch the drawer, and check signal TNOVR at CN115–B7.

   If the signal is low, replace the toner overflow sensor.

   If the signal is high, replace the print engine drive board.

7.5.38 Protocol Timeout Error

Explanation: The controller fails the interface test with the print engine drive board.

Action:

1. Replace the print engine drive board.
2. Replace the controller board.
3. Replace the mother board (not likely).

7.5.39 Upper/Lower Cassette Paper-Size Error

Explanation: While printing a job, the engine detects a paper-size key changed in the current selected cassette.

The paper-size key cannot be changed during a print job from the selected cassette because the prebuilt image pages in the buffer do not match the physical size. The user should not insert a cassette with a different key to the active slot during a print job in response to an **Add paper** message.

Action: If this problem happened by itself (not by operator error), perform the following:

1. Check if cassette is seated properly.
2. Check for damage to the tabs on the cassette.
3. Check if the key was installed properly.
4. Replace the cassette paper feed unit for a possible bad optical paper-size sensor.

7.5.40 LCIT Paper-Size Error

Explanation: While printing, the engine detects that the paper-size dial changed.

The paper-size dial cannot be changed within a print job from the selected input tray because those prebuilt image pages in the buffer do not match the physical size. The user should not change the dial setting within a print job in response to an **Add paper** message.

Action: If this problem happened by itself (not by operator error), replace the LCIT unit because of a possible bad optical paper-size sensor.

7.5.41 LCIT Dial Wheel Incorrectly Set

Explanation: Signal DIALE is low. The duplexer/LCIT drive board lowers the tray to the bottom position and activates the Paper Mis-set indicator.

Action:

1. Open the LCIT door and turn the dial wheel slowly. When you hear a clicking sound, the dial is set correctly. Close the LCIT.
2. Replace the LCIT.
3. Replace the duplexer/LCIT drive board.

7.5.42 LCIT Paper Misplaced

Explanation: The PPSER signal is detected. The duplexer/LCIT drive board lowers the tray to the bottom position and activates the paper jam indicator. Normally the paper-height sensor stops the tray from going too high and activates the over-travel protection sensor.

Action:

1. Make sure the paper is flush against the far wall of the LCIT tray.
2. Open the LCIT, load some paper, and close the cover. If the tray does not rise, perform the following:
   - Remove the rear cover of the LCIT and check if the over-travel bar is stuck at the upper position.
   - Check signal PPSER at pin 3 (top pin) of the over-travel protection sensor:
     — If the signal is high, replace the duplexer/LCIT drive board.
     — If the signal is low, replace the LCIT.
   - If the tray rises and immediately lowers and the Paper Mis-set indicator illuminates, check signal UPLMT at CN405–4 of the duplexer/LCIT drive board.
     — If the signal is high, replace the LCIT feed unit sensor.
     — If the signal drops from high to low when the tray reaches the upper limit and then rises again when the tray moves down, replace the duplexer/LCIT drive board.

7.5.43 Time Out Error—Boot Failure... Retry...

Explanation: The controller and network hardware are set up correctly, but no host system is available. The printer keeps trying to boot.

Action: Have a privileged user check the following:

- A host system is available in the network.
- The correct version of host software is installed.
- No LAN bridge boot-request-filter is on between the host and the printer.
- The proxy setup is correct in the authorization file (VMS only).
- For VMS, Versions 3.2 to 4.0, the logical LPS$SUPPORT points to SYS$SYSDEVICE:[LPS$SERVER].
- For VMS, Version 4.0 and higher, LPS$ROOT is defined as SYS$SYSDEVICE:[LPS$SERVER]. The down-line loaded image files point to SYS$SYSDEVICE:[LPS$SERVER].
- Issue the REPLY/ENABLE command at the operator console terminal and check for load requests from the printer. Check the OPCOM reports for details about the requests (VMS only).
- The network devices are configured correctly. If OPCOM messages recognize the boot request, but the host system aborts from a line communication error/device time out, check the following devices:

  DELNI DEMPR

  H4000 H4005

  DESTA

  Check heart-beat enable/disable setting as well.
- Correct data is in the network data base. Issue the following command from NCP:

  ```
  NCP> SHOW NODE printer_node_name CHARACTERISTICS
  ```

  — Verify the Ethernet hardware address.

  — Verify the load-file name and location.

  — Verify the host circuit.

7.5.44 Fatal Error—Boot Failure

Explanation: The controller detected a fatal error when it tried to boot. This problem should never appear if the controller diagnostics have passed.

Action:

1. Check the network devices and connections.
2. Recycle the power.
3. Replace the controller board.

7.6 Paper Jam FIPs

When a jam occurs, the print engine:

1. Stops the print engine.
2. Sets the printer to a busy state.
3. Sends a byte of status information to the controller board.

The controller board:

1. Determines the location and jam path of each sheet of paper in the paper path.
2. Prints a message on the LCD display instructing the operator to go to the jam clearance labels and clear the jam.
3. Indicates the location and path of the jam on the operator panel.
4. Transmits the jam information to the supporting host event log file.

The operator panel paper path indicators identify the location of paper stalled in the paper path and the feed path. One or more of the indicators light for a single sheet of paper. Multiple indicators light if several sheets are stalled in the printer at a time.

The operator panel indicators do not directly correspond to a paper path sensor. The sensors dynamically track and detect the paper traveling through the printer. The sensors also detect stalled paper if the sheet is directly underneath the sensor. Figure 7–1 shows the location and gives a name to each indicator. Figure 7–2 shows the location and names each paper path sensor.

Figure 7–1: Paper and Jam Path Indicators

MLO-003029 PICAS 14.6

Figure 7–2: Paper Path Sensors

MLO–003030 16 PICAS

Normally, an operator must remove all paper from the printer to clear the jam indication and restore the printer to the Ready state.

7.6.1 Jam FIP Director List

Table 7–3 describes the paper path and section and directs you to a FIP. Using the indicators and the table, you must first isolate the paper path and see the recommended FIP.

Table 7–3: Paper Jam FIPs

If These Indicators Light	The Following Occurred	Go to This Section
Registration and upper or lower cassette	Paper fed from the upper or lower cassette did not reach the registration sensor or roller in time.	Section 7.6.3
Feed exit and LCIT or duplexer transport	Paper from the LCIT or duplexer unit did not reach or leave the exit sensor of the feed unit.	Section 7.6.4
Registration and engine transport	Paper fed from the registration roller did not clear the registration sensor or arrive at the engine exit sensor in time.	Section 7.6.5
Engine exit and LCOT	Paper did not arrive at the LCOT entrance sensor.	Section 7.6.6
Engine exit and duplex transport	Paper failed to clear the exit sensor or arrive at the duplex entrance sensor in time.	Section 7.6.6
Duplex transport	The paper is fed to the duplex exit sensor but did not arrive at the duplex exit sensor in time.	Section 7.6.7

7.6.2 Using the Remote Error Logging Facility

For random or intermittent jams, ask the customer to enable the remote error logging facility for an extended period of time to capture an adequate number of events.

NOTE: *Instructions for enabling and disabling the error logging facility and the location of the event log file are in the PrintServer Supporting Host for VMS Management / User's Guide or PrintServer Supporting Host for ULTRIX Management / User's Guide.*

Check for the following messages:

Paper Jam First Occurred in Upper Feedpath

Location of the Error: The upper cassette feed unit—between the upper cassette and registration

Explanation:

- The paper from the upper cassette did not reach the registration sensor on time after the feed clutch turned on.
- The registration sensor detected a piece of paper when it powered on or during the warm-up cycle.

Action: See Section 7.6.3.

Paper Jam First Occurred in Lower Feedpath

Location of the Error: The lower cassette feed unit—between the lower cassette and registration

Explanation:

- The paper from the lower cassette did not reach the registration sensor on time after the feed clutch turned on.
- The registration sensor detected a piece of paper when it powered on or during the warm-up cycle.

Action: See Section 7.6.3.

Paper Jam First Occurred in LCIT Feedpath

Location of the Error: The LCIT feed unit—between the LCIT and the registration path

Explanation:

- The paper did not reach the feed exit sensor on time after the LCIT feed solenoid turned on.
- The paper did not leave the feed exit sensor on time.
- The paper from the LCIT did not reach the registration sensor on time.

Action: See Section 7.6.4.

Paper Jam First Occurred in Duplex Feedpath

Location of the Error: The duplex feed unit—between the duplex exit sensor and the registration unit

Explanation:

- The paper did not reach the feed exit sensor on time after the duplex feed motor turned on.
- The paper did not leave the duplex exit sensor on time after it reached the feed exit sensor.
- The paper did not leave the feed exit sensor on time after it left the duplex exit sensor.
- The paper from the duplexer did not reach the registration sensor on time after it reached the feed exit sensor.
- The feed exit sensor detected a piece of paper when it powered on or during the warm-up cycle.

Action: See Section 7.6.4.

Paper Jam First Occurred in Duplex Transport Station

Location of the Error: The duplex transport station—in the duplexer unit

Explanation:

- The paper did not reach the duplex exit sensor on time after it reached the duplex entrance sensor.
- The duplex entrance sensor or the duplex exit sensor detected a piece of paper at power up or during the warm-up cycle.

Action: See Section 7.6.7.

Paper Jam First Occurred in Main Transport Area

Location of the Error: The engine transport area—between the registration unit and the fork gate unit

Explanation:

- The paper did not reach the engine exit sensor on time after the registration clutch turned on.
- The registration sensor detected a piece of paper when it powered on or during the warm-up cycle.

Action: See Section 7.6.5.

Paper Jam First Occurred in Upper Transport Area

Location of the Error: The fork gate unit—between the fork gate unit and the lower LCOT sensor path

Explanation: The paper did not reach the lower LCOT sensor on time after it reached the engine exit sensor.

Action: See Section 7.6.6.

Paper Jam First Occurred in Eject Area

Location of the Error: In the LCOT

Explanation:

- The paper did not leave the lower LCOT sensor on time.
- The paper did not reach the upper LCOT sensor on time after it reached the lower LCOT sensor.
- The paper did not leave the upper LCOT sensor on time.
- The upper/lower LCOT sensor detected a piece of paper at power up or during the warm-up cycle.

Action: See Section 7.6.6.

Paper Jam First Occurred in Lower Transport Area

Location of the Error: The duplex unit entrance—between the fork gate unit and the duplex entrance path

Explanation:

- The paper did not reach the duplex entrance sensor on time after the duplex feed motor turned on.
- The paper did not leave the duplex entrance sensor on time.

Action: See Section 7.6.6.

Paper Jam First Occurred in Fuser Area

Location of the Error: The engine exit—between the fusing unit and the fork gate unit

Explanation:

- The paper did not leave the engine exit sensor on time.
- The engine exit sensor detected a piece of paper at power up or during the warm-up cycle.

Action: See Section 7.6.6.

Paper Jam First Occurred in Cabinet

Location of the Error: The cabinet

Explanation: The printer detected a paper jam in the cabinet.

Action: If the error occurs during simplex printing from the LCIT, see Section 7.6.4. If the error occurs during duplex printing, see Section 7.6.6 and Section 7.6.7.

Paper Jam First Occurred due to Cover Open

Location of the Error: Any location

Explanation: The printer shut down and indicated a paper jam because it detected a cover interlock error.

Action: See Sections 7.5.16, 7.5.17, 7.5.18, and 7.5.19.

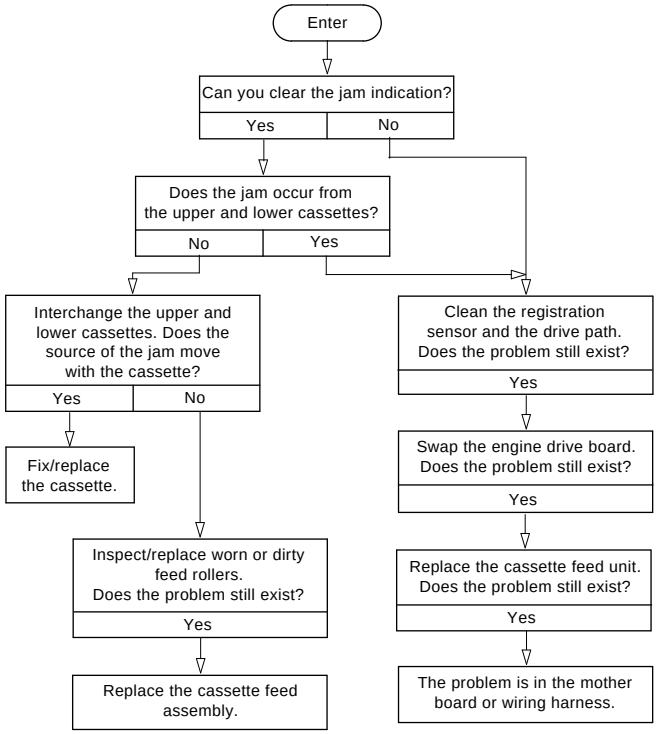
Paper Jam First Occurred due to Engine Fault

Location of the Error: Any location.

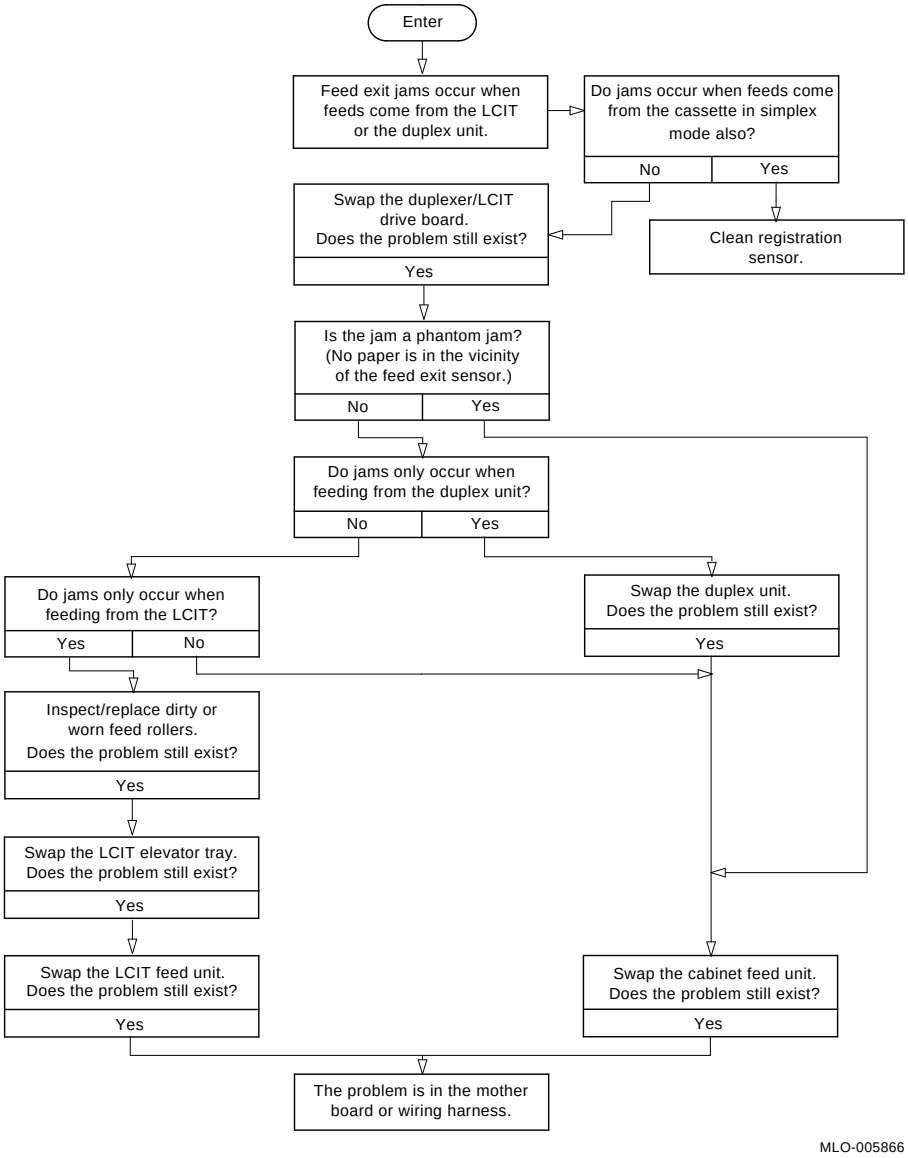
Explanation: The printer shut down and indicated a paper jam because it detected a fatal engine error.

Action: The fatal error message should be on the front panel. See Table 7–2 for the appropriate FIP.

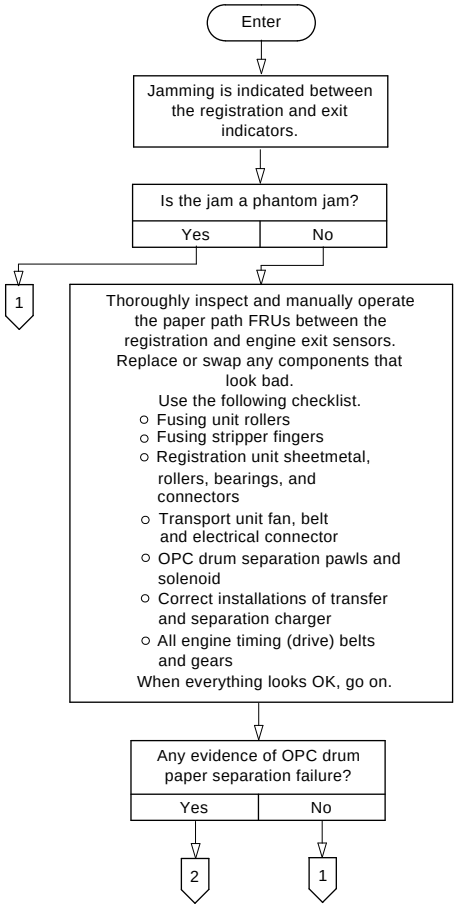
7.6.3 Registration and Cassette Feed Path Jam FIP



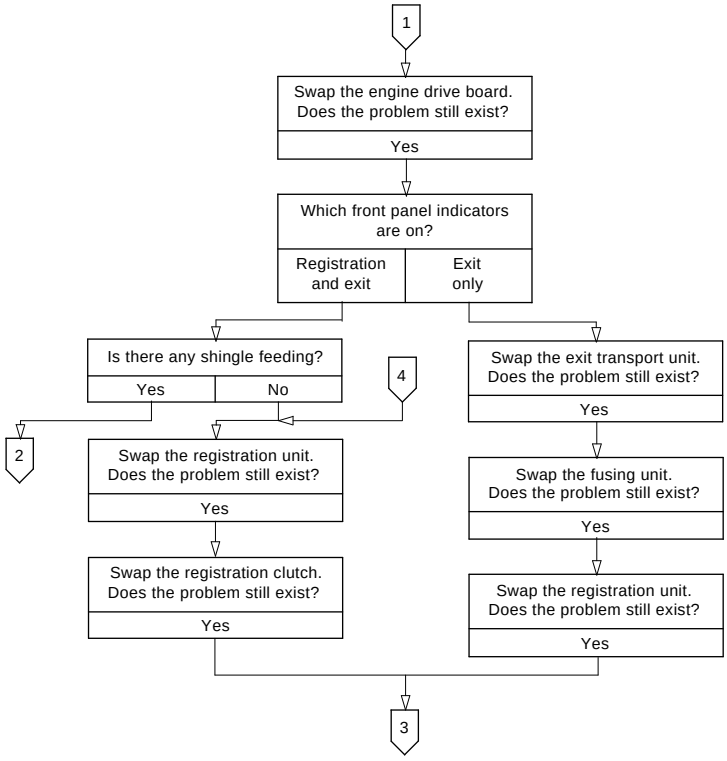
7.6.4 Cabinet Exit Jam FIP



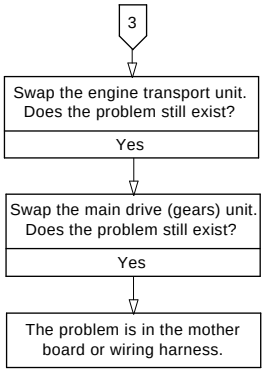
7.6.5 Drum and Transport Area Jam FIP



Drum and Transport Area Jam FIP Continued (2 of 4)

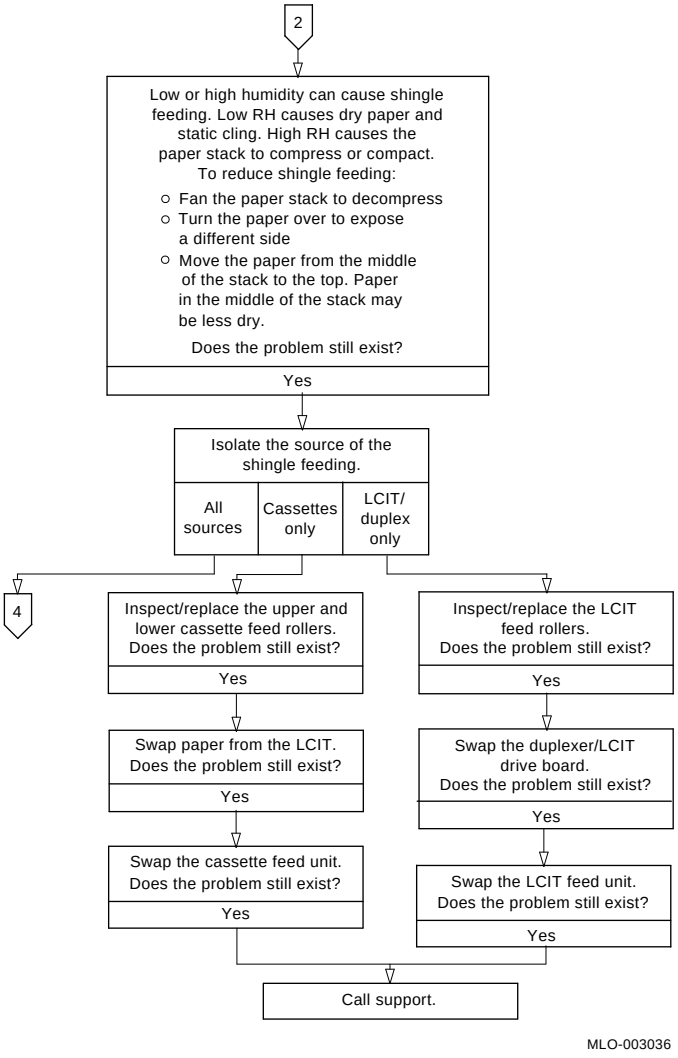


Drum and Transport Area Jam FIP Continued (3 of 4)



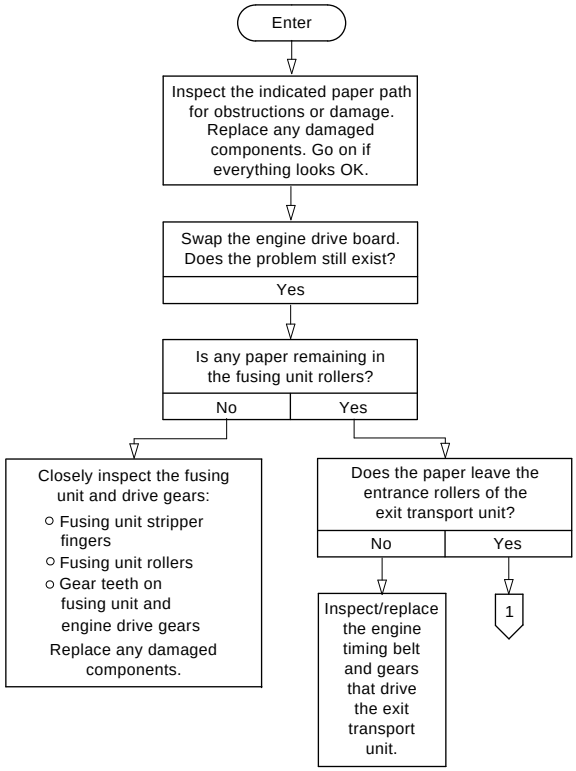
MLO-003035

Drum and Transport Area Jam FIP Continued (4 of 4)

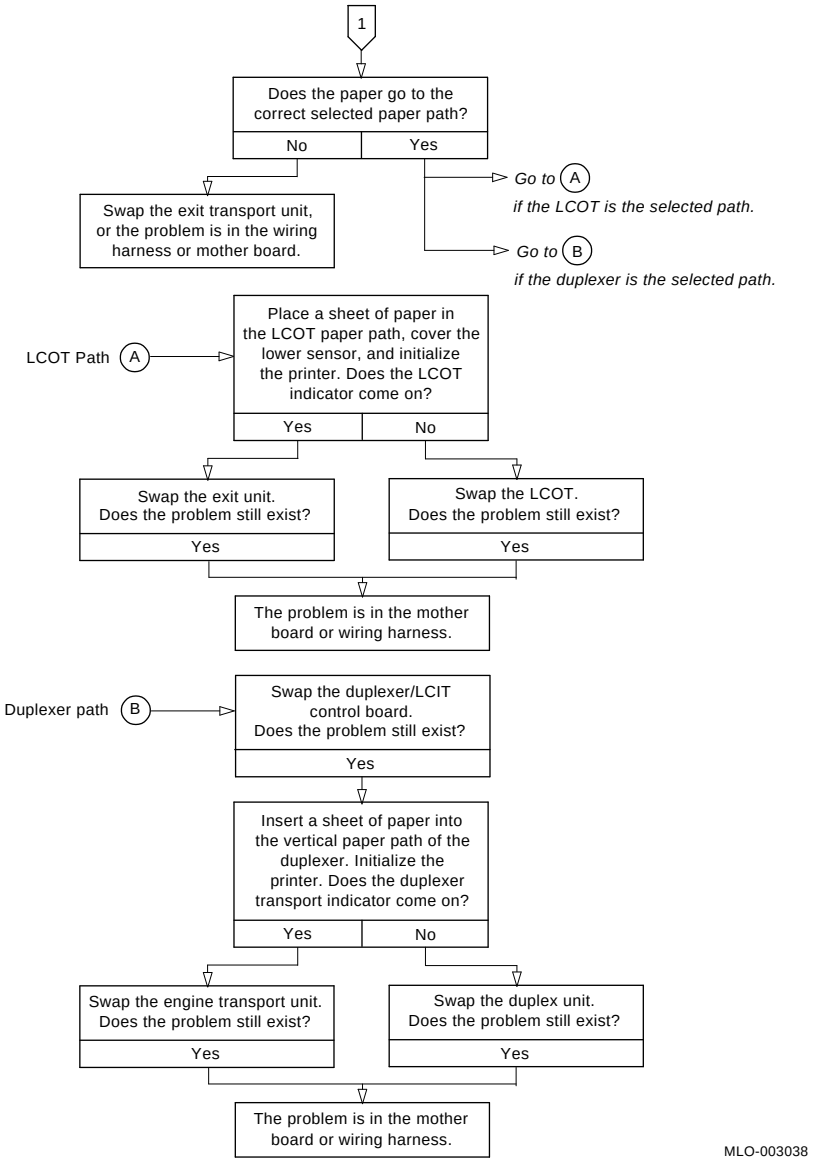


MLO-003036

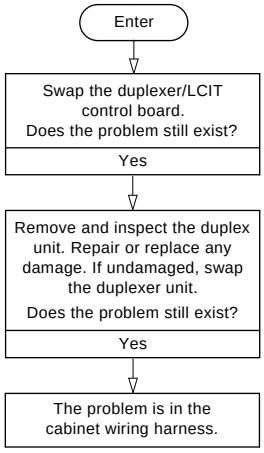
7.6.6 Engine Exit Jam FIP



Engine Exit Jam FIP, Continued (2 of 2)



7.6.7 Duplex Transport Jam FIP



MLO-003039

Chapter 8
Print Quality

This chapter provides the symptoms of poor print quality and the solutions. Table 8–1 explains the organization of this chapter.

Table 8–1: Print Quality Directory

This Section...	Explains...
Section 8.1	How to assess print quality
Section 8.2	How to fix print quality problems

8.1 Checking Print Quality

As a preventive measure, follow the total call concepts in Appendix B to maintain customer satisfaction.

To check print quality, perform the following steps:

1. Check that the printer is clean and level. Make sure the trays are approximately half filled with undamaged, clean, dry, good quality, white paper. High rag content, colored, extra light, or heavy paper may give misleading results.
2. Print a test page:
   a. **For the PrintServer 20**, issue the following command to print the 0103 test page (see Figure 8–15):

      ```
      $ PRINT/QUE=quename/PARA=DATA=post -
        SYS$SYSDEVICE:[LPS$SERVER]LPS_20_0103.;
      ```

      NOTE: *The file name of the test page may be different. Check the LPS$SUPPORT directory for the file name or contact the system manager.*

   b. **For the turbo PrintServer 20**, print the 0103 test page and the controller board test pattern B. Press keys 3 and 6 in Field Test Mode to generate test pattern B. (See Figure 8–14.)

NOTE: *Controller board test pattern B is available only on the turbo PrintServer 20.*

3. Check the test pattern for signs of poor print quality. More than one print quality symptom may exist for each problem. Two or three FIPS may apply. See the following sections for solutions.

4. If the customer is not satisfied with the performance of the printer after you have examined the test pattern and corrected the problem, print five simplex copies and five duplex copies of test pattern 0103. Mail them with sample customer prints to:

   Digital Equipment Corporation
   CSCMA SHR3
   334 South Street
   Shrewsbury MA 01545–4112
   Attn: PrintServer team

   1–800–272–2001

8.2 Print Quality FIPs

The following sections specify the symptoms of poor print quality. Each symptom is accompanied by an analysis and solution. Refer to the associated figures for examples of print quality.

8.2.1 Image Density Evenness FIP

Symptom:

The print density (darkness) varies across the sheet. Light patches appear in dark areas. Light areas are faded out.

Analysis:

Image density problems are caused by any of the following:

Toner transfers unevenly between the development unit and the OPC drum.
The OPC drum charges unevenly.
The OPC drum surface is deteriorated due to light or contamination.
The OPC drum unevenly transfers images to the paper.

Solution:

Check the following:

1. Check for adequate toner in the development unit. Toner should be level. Perform the leveling procedure and run 50 sheets. Try fresh paper. Paper in trays could be damp.
2. Examine and clean the main charger. Check the contacts between the charger and the high-voltage supply socket. Replace components if necessary.
3. Examine and clean the transfer/separation charger. Check the contacts between the charger and the high-voltage supply socket. Replace components if necessary. Replace the OPC drum.
4. Make sure the development unit is tight against the OPC drum—check springs and camming action of development unit and interface of drive gear as the drawer is closed.
5. Replace the high-voltage power supply.

8.2.2 Blank Image FIP

Symptom:

The image is very light or completely missing.

Analysis:

The image is not being written on the OPC drum or no toner transfers to or from the OPC drum.

Solution:

Check the following:

1. Check for toner.
2. Check for a developed image on the OPC drum.

   If **an image appears on the OPC drum** but does not transfer to the paper, check the following:

   1. Check the transfer/separation charger and connections. Replace if necessary.
   2. Replace the high-voltage power supply.

   If **no image appears on the OPC drum**, a problem exists with a main charger, developer, or laser. Check the following:

   1. Make sure the development unit is tight against the OPC drum.
   2. The development roller not turning. Remove the developer unit and rotate the development roller gear clockwise. Check that the toner coats evenly. Replace components if necessary.
   3. Check and clean the OPC drum ground contact.
   4. Replace the print engine drive board.
   5. Replace the high-voltage power supply.
   6. Replace the zener diode and capacitor unit on the underside of the main charger guide or replace the main fan unit.
   7. Replace the optical unit.

8.2.3 Black Image FIP

Symptom:

The OPC drum is not being charged or the laser is always writing.

Analysis:

Cover portion of the shield glass and run a test sheet.

If the sheet does not show a blank area, the printer has a **charging problem.**

If the sheet has a blank area, the printer has a **laser problem.**

Solution:

Charging Problem

1. Check and clean the main charger. Check the contacts between the high-voltage socket and the charger. Replace as necessary.
2. Replace the high-voltage power supply.
3. Replace the print engine drive board.

Laser Problem

Run the engine drive board test.

1. If the test sheet is correct, replace the controller board.
2. If the test sheet is black, replace the print engine drive board or the optical unit.

8.2.4 White Lines or Bands (Faded Areas) FIP

Symptom:

White lines or bands appear.

Analysis:

The problem could be one of the following:

The laser is not discharging the drum correctly.
Toner is not transferring correctly from the development unit to OPC drum.
The OPC drum is contaminated or streaked by light.
Toner is not correctly transferring from the OPC drum to the paper.
The fusing unit is dirty.

Solution:

Check the following:

1. Check the toner level.
2. Examine the development unit and its connections. Replace if necessary.
3. Check and clean the transfer/separation charger. Replace if necessary.
4. Examine the OPC drum. Replace if necessary.
5. Examine the shield glass. Replace if necessary.

8.2.5 Repetitive Marks FIP

Symptom:

Marks repeat parallel to paper movement.

Analysis:

This problem is normally caused by damage to rollers that are part of the printing process. The distance between marks depends on the diameter of the damaged roller.

Solution:

Measure the distance between the marks to determine the solution the problem.

1.5 inches (38 mm)	Examine the development roller. Remove contamination if possible and run 20 or more sheets. If the roller is physically damaged, replace the development unit.
7.40 inches (188 mm)	Examine the OPC drum and replace if necessary.

NOTE: *The fusing unit may be hot. Allow it to cool before handling.*

3.7 inches (94 mm)	Examine the fusing unit rollers for defects. If the red lower roller contains rips or gouges, find and remove the cause and replace the fusing unit.

8.2.6 Blurred or Smudged Image FIP

Symptom 1:

The image is smudged or blurred and can be rubbed off the page.

Analysis 1:

The image is unfused; the toner is not fusing on the page. This problem should also cause a message on the front panel. There may be a fault in one of the following components:

Fusing unit
Power supply
Print engine drive board
Controller board

Solution 1:

Replace the fusing unit.

Symptom 2:

The image is smudged or blurred but does not rub off the page.

Analysis 2:

There may be a difference in the speed between these pairs of components:

OPC drum and developer roller
Paper and OPC drum
Paper and fusing rollers

Solution 2:

Examine the image on the OPC drum.

If the image is **blurred**, check the developer drive and the OPC drive.

1. Replace the developer drive.
2. Replace the development unit.

If the image is **not blurred**, perform the following:

1. Examine the registration roller and clutch. Replace if necessary.
2. Examine, clean, or replace the transfer/separation charger.
3. Examine the paper feed rollers for wear or contamination that could cause paper to slip.

4. Examine the fuser drive, fuser spring pressure, and entrance paper guides. Replace them if necessary.
5. Look for loose items rubbing on the paper or other interference that disturbs the image before entering the fusing unit.

8.2.7 Distorted or Wavy Image FIP

Symptom:

The image twists in a wavelike pattern between the leading and trailing edges.

Analysis:

The scan line is not in sync.

Solution:

Check the following components. Clean and tighten as necessary.

1. High-voltage terminal contacts
   - Main charger wire
   - Main charger grid terminal
2. Grounding contacts
   - Development unit
   - OPC grounding terminal

Replace the following, in order:

1. Print engine drive board
2. Optical unit
3. Main processor fan
4. High-voltage power supply

8.2.8 Random Toner Spots or Clusters FIP

Symptom:

Random toner spots or clusters appear on the paper.

Analysis 1:

Toner is leaking from the development unit or cleaning unit. The cleaning unit could be full and the warning circuit is not working.

Shaking the cleaning unit or excessively closing the drawer can trap the cleaning unit full flag in the empty position (toward the OPC drum).

Solution 1:

Perform the following:

1. Inspect the area around the developer roller. If there is evidence of leaking, replace development unit.
2. Examine the area around the cleaning unit. If the unit is full, replace it.

Solution 2:

If the flag is in the full position and the Cleaning Unit Full message does not appear, check the sensor on the main fan unit.

NOTE: *Vacuum all loose toner from the development unit drawer.*

8.2.9 Paper Damage FIP

Symptom	Analysis
The paper has creases and/or wrinkles and dog ears. The image printed over the defects.	The damage occurred before the paper reached the transfer/separation charger.
On a duplex page, the image printed over the defect on both sides.	Damage occurred before the paper reached the transfer/separation charger.
The paper has wrinkles, creases, and folds along the leading or trailing edges. The image is skewed.	Before reaching the transfer/separation charger, the paper is skewed, causing the paper damage. Check the following components for wear or damage: • Feed rollers • Paper cassettes • LCIT side rails Check the paper path for objects that may block the paper.
The paper has creases, wrinkles, or folds over the printing and the printing is distorted.	The damage occurred after the paper left the transfer/separation charger.
On a duplex page, both sides show a distorted image.	Damage occurred during the second pass, after the paper left the transfer/separation charger.
On a duplex page, the front side is printed over the defect but the back side image is distorted.	Damage occurred during the first pass, after the paper left the transfer/separation charger. Check for: • Defective pressure roller • Uneven contact between heat and pressure rollers • Interference • Defective or binding rollers in the paper path

NOTE: *Folds, creases, wrinkles, or dog ears that occur from the feed area to the fusing unit are pressed flat by the fusing unit or registration rollers. Defects that occur after the fusing unit are not creased or pressed flat.*

Symptom	Analysis
The paper has tears or other damage to its leading edge.	If damage occurs only when the paper is sent to a certain output tray, check from the fusing unit to that output tray. If damage occurs when paper is sent to any output tray, check from the fusing unit to the feed unit.

8.2.10 Solid Area Density FIP

Symptom:

The area is not completely black and has voids or fading. The edges and corners are not sharp and straight. The area is not a consistent matte black.

Reference:

Figure 8–14 or Figure 8–15
Area 1

Allowable Level:

Compare with Figure 8–1.
Allowable level: 1.25

Analysis:

Toner is not being distributed adequately.

Solution:

Perform the following:

See Section 8.2.1 and/or use the TCC procedures.
Check/replace the charging units.
Check/replace development unit.
Check/replace the OPC drum.
Check/replace the high-voltage power supply.

8.2.11 Density Evenness FIP

Symptom:

One or more of the five locations are not similar; their appearance differs more than 20%. (A 20% difference is just perceptible.)

Reference:

Figure 8–14 or Figure 8–15
Area 1

Analysis:

Examine several prints. If the uneven density appears at the same distance from the side of the page, but varies in the direction of the print, the OPC drum is contaminated or deteriorated. If the uneven density appears in random spots, suspect the development unit and connections, detach, and transfer charge units.

Solution:

Perform the following:

Replace the OPC drum.
Replace the charge units.
Replace the development unit.

8.2.12 Background Density FIP

Symptom:

The white background of the page is graying.

Reference:

Figure 8–14
Any unprinted area

Allowable Level:

Compare with Figure 8–2.
Allowable level: 4.0

Analysis:

The OPC drum is picking up toner on blank areas or is not being completely cleaned.

Solution:

Perform the following:

Use the TCC procedures.
Examine/replace the cleaning unit.
Examine/replace the quenching lamp.
Clean/replace the charging units.
Replace the OPC drum if it is deteriorated or dirty.
Replace the high-voltage power supply.
If the laser power is low, replace the optical unit.

8.2.13 Resolution Filling FIP

Symptom:

The pattern consists of two black lines with a white line on either side.

The lines are unclear and may have voids. Blackening appears between the lines.

Reference:

Figure 8–14 or Figure 8–15
Areas 2 and 3

Allowable Level:

Compare with Figure 8–3.
Allowable level: 4.0

Analysis:

Toner is being distributed unevenly.

Solution:

Perform the following:

Use TCC procedures.
See Section 8.2.1.

8.2.14 Resolution FIP

Symptom:

The large (C) and (R) symbols are unclear with broken lines and some degree of filling.

Reference:

Figure 8–15

Allowable Level:

Compare with Figure 8–4.
Allowable level: 4.5

Analysis:

The toner is being distributed too lightly or too heavily.

The print may show other symptoms, such as dirty background, voids, or character edge fade.

Solution:

Perform the following:

See Section 8.2.1.
Use the TCC procedures.
Check/replace the quenching lamp.

8.2.15 Magnification FIP

Symptom:

Dimensional lines are shorter than normal and text appears cramped.

Reference:

Figure 8–14

Allowable Level:

This is intended as a check for dimensional accuracy of the printer. Pattern B is generated from a ROM bitmap with no programming involved. Pattern B may be used as a reference against the customer's print size problems.

The size of perimeter box is 9 3/4 inches +/- 1/8 inch (247 mm +/- 2.50 mm wide) x 7 3/4 inches +/- 3/32 inch (195 mm +/- 2.00 mm). Accuracy is based on common markings available on rules.

Analysis 1:

Along the scan line, the optical unit is responsible for the dimensions.

Analysis 2:

Across the scan line, the paper speed is responsible for the dimensions.

Solution 1:

Replace the optical unit.

Solution 2:

Examine the following components:

Main motor
Registration roller unit
OPC drum
Transport unit belt
Fusing unit, including pulleys, drive belts, gears, and so on.

Examine the continuity of the line in Figure 8–14 for further clues.

8.2.16 Skew FIP

Symptom:

The image is correct, but skewed with reference to the edge of the paper.

Reference:

Figure 8–14 or Figure 8–15

Analysis:

The paper does not align with the OPC drum.

Solution:

Mark an 8-inch (200-mm) section of perimeter line. Measure both points on the line to the adjacent edge of the paper. Subtract the smaller distance from the larger distance. The result should be less than 3/32 inch (2 mm). This amount of skew is noticeable with the naked eye and may be objectionable, even though it is within specification.

Check the input trays for correct adjustment.
Check the input and registration rollers for wear.
Check the quality of the paper.

8.2.17 Legible Character FIP

Symptom:

The characters in the text string “a quick brown fox . . . ” are broken or filled.

Reference:

Figure 8–15

Allowable Level:

Compare with Figure 8–5.
Allowable level: 4.5

Analysis:

The toner is being distributed too heavily or lightly. The problem may be accompanied by background voids, character edge fade, or other problems.

Solution:

See Section 8.2.1 and/or TCC procedures.

8.2.18 Character Edge Fade FIP

Symptom:

The lines are straight and square but fade at the corners.

Reference:

Figure 8–14 or Figure 8–15
Area 4

Allowable Level:

Compare with Figure 8–6.
Allowable level: 4.0

Analysis:

The following may be causing the problem:

The toner is not being distributed evenly.
The OPC drum is not being charged properly.
The toner is not transferring correctly from the OPC drum to the paper.

Solution:

See Section 8.2.1 and/or use the TCC procedures.

8.2.19 White Line Jitter FIP

Symptom:

The black/white line pattern has an uneven gray appearance. Unevenness appears in the marked area and the white lines exceed the normal width.

Reference:

Figure 8–14 or Figure 8–15

Allowable Level:

Compare with Figure 8–7.
Allowable level: 3.0.

Analysis:

This problem is caused by uneven paper or drum motion.

Solution:

Check the drive components: main motor, belts, belt tension, pulleys, dry bearings, and worn and binding gears.

8.2.20 Black Line Jitter FIP

Symptom:

The black lines thicken slightly, giving the appearance of a dark bar.

This problem may appear about 2 inches from the bottom of pattern 0103 in the right vertical bar pattern.

Reference:

Figure 8–15

Allowable Level:

Compare with Figure 8–8.
Allowable level: 4.0

Analysis:

This problem is caused by the fluttering of the paper against the drum, such as when the trailing edge of the paper is released from the registration rollers.

Solution:

Check the registration unit, transport belt, and fan.

8.2.21 White Spot FIP

Symptom:

Black or grey areas contain white spots.

Reference:

Any solid area

Allowable Level:

Compare with Figure 8–10.
Allowable level: 3.0

Analysis 1:

If the spots are random, the problem is caused by poor charging, developing, or transfer.

Analysis 2:

If the spots appear at regular intervals, the problem is caused by blemishes in the OPC drum or development unit areas.

Solution 1:

See Section 8.2.1 and/or use the TCC procedures.

Solution 2:

See Section 8.2.4.

8.2.22 Black Spot FIP

Symptom:

White areas of the page contain black spots.

Reference:

Unprinted areas

Allowable Level:

Compare with Figure 8–9.
Allowable level: 4.0

Analysis:

This problem is caused by toner spilling.

Solution:

See Section 8.2.8.

8.2.23 White Void FIP

Symptom:

Closely printed areas fade.

Reference:

Any print with solids or half tone areas.

Allowable Level:

Compare with Figure 8–10.
Allowable level: 3.0.

Analysis:

The problem may be caused by the following:

Low toner
Poor development
Dirty areas on the OPC drum
Dirty fusing unit rollers

Solution:

See Section 8.2.1 and/or use the TCC procedures.

8.2.24 Black Line FIP

Symptom:

Random lines appear in unprinted areas. This is not the same as black line jitter.

Reference:

Any print

Allowable Level:

Compare with Figure 8–11.
Allowable level: 3.0

Analysis:

The problem may result from the following:

Spurious streaks of toner from the development unit
Improperly cleaned OPC drum
Damaged transfer wires
Leaking cleaning unit

Solution:

Perform the following:

Examine the cleaning unit's mylar blade for damage.
Examine the OPC drum and fusing unit rollers.
Examine the development roller.
Clean/replace the main charger.

8.2.25 White Line FIP

Symptom:

White lines or deletions appear on a print. This is not the same as white line jitter.

Reference:

Any print

Allowable Level:

Compare with Figure 8–12.
Allowable level: 3.0

Analysis:

The problem may result from the following:

Toner is not available for transfer to or from the OPC drum.
A mechanical defect is scraping toner from the unfused page.
The laser beam is obstructed.

Solution:

Perform the following:

Clean the optical unit shield glass.
Examine the development roller for obstructions.
Examine the OPC drum and fusing unit rollers for grooves.

8.2.26 Dirty Edges FIP

Symptom:

A dark background appears around a 1/4-inch (5-mm) border.

Reference:

Duplexed page

Allowable Level:

Compare with Figure 8–13.
Allowable level: 4.0

Analysis:

The problem may result from the following:

The OPC drum is being incorrectly charged.
The OPC drum is not being cleaned adequately.

Solution:

Perform the following:

Use the TCC procedures.
Check/replace the quenching lamp.
Check/replace the cleaning unit.
Check/replace the transfer charger.
Check/replace the main charger.
Check the high-voltage connections.
Replace the high-voltage power supply.

8.2.27 Dirty Second Side FIP

Symptom:

The second side has a barely perceptible graying, compared with an unused sheet.

Reference:

Simplexed sheet

Allowable Level:

Compare with Figure 8–2. (Same as background density.)
Allowable level: 4.0

Analysis:

The problem may result from the following:

The OPC drum is not being completely charged.
The OPC drum is not being cleaned adequately.

Solution:

Perform the following:

Use the TCC procedures.
Check/replace the quenching lamp.
Check/replace the cleaning unit.
Check/replace the main and transfer/separation chargers.
Check the high-voltage contacts.
Replace the high-voltage power supply.

NOTE: *If a dirty second side occurs during the first pass of a duplex operation, the problem could be confused with background density on the second printed side.*

Figure 8–1: Image Density

mlo-006570B

Figure 8–2: Background Density

MLO-006130

Figure 8–3: Filling

MLO-006134

Figure 8–4: Letter Quality Resolution

MLO-006131

Figure 8–5: Legible Character

MLO-006136

Figure 8–6: Character Edge Fading

MLO-006135

Figure 8–7: White Line Jitter

MLO-006139

Figure 8–8: Black Line Jitter

MLO-006140

Figure 8–9: Black Spot

MLO-006143

Figure 8–10: White Void

MLO-006142

Figure 8–11: Black Line

MLO-006138

Figure 8–12: White Line

MLO-006137

Figure 8–13: Dirty Edges

MLO-006144

Figure 8–14: Pattern B

MLO-006561-B

Figure 8–15: Pattern 0103

MLO-006555-B

Chapter 9
FRU Removal and Replacement

This chapter explains how to remove and replace field replaceable units (FRUs) and associated parts in the PrintServer. Each procedure provides steps for removing the FRU. To replace the unit, perform the steps in reverse.

WARNING: *To prevent personal injury, be sure the power is off before removing or replacing any parts. Also, the metal edges on some parts are very sharp; be careful when removing or replacing parts.*

9.1 Engine Drive Board, Controller Board, and Memory Board

Remove the printed circuit board as follows:

1. Open the operator panel cover.
2. Remove the card cage cover by loosening its two screws.
3. Remove the grounding bracket by loosening its two screws.

Figure 9–1: Removing the Card Cage Cover and Grounding Bracket

MLO–003052 19 PICAS

4. Remove the circuit board by pulling open the release handles on each side of the board.

Figure 9–2: Removing Circuit Boards

MLO–003053 13 PICAS

9.2 Operator Panel

Remove the operator panel as follows:

1. Open the operator panel cover.
2. Disconnect the operator panel cable.
3. Remove the bracket by removing its two screws.
4. Lift out the operator panel.

Figure 9–3: Removing the Operator Panel

MLO–003054 21 PICAS

9.3 Rear Cover

Remove the rear cover as follows:

1. Disconnect the power cable.
2. Disconnect the Ethernet cable.
3. Remove the DESTA (if present).
4. Remove the DESTA bracket.
5. Remove the rear cover by loosening its two screws.

Figure 9–4: Removing the Rear Cover

MLO–003055 22 PICAS

9.4 Large Capacity Output Tray (LCOT)

Remove the LCOT as follows:

1. Remove the top output paper tray.
2. Remove the rear cover (Section 9.3).
3. Disconnect the two LCOT cables from the mother board (CN114 and CN118).

Figure 9–5: Disconnecting the LCOT Cables

MLO–003056 16.5 PICAS

4. Open the LCOT side door and loosen the four screws.
5. Remove the LCOT by sliding it out the side of the printer.

Figure 9–6: Removing the LCOT

MLO–003057 21 PICAS

9.5 Cassette Paper Feed Unit

Remove the cassette paper feed unit as follows:

1. Remove the paper cassettes.
2. Remove the rear cover (Section 9.3).
3. Remove the top output paper tray.
4. Open the operator panel cover.
5. Remove the top cover by loosening its four screws.

Figure 9–7: Removing the Top Cover

MLO–003058 24 PICAS

6. Remove the right side cover by loosening its two screws.

Figure 9–8: Removing the Right Side Cover

MLO–003059 20 PICAS

7. Loosen the four paper feed unit screws.
8. Pull the paper feed unit out a few inches and disconnect the top cable from the feed unit circuit board.
9. Remove the feed unit by pulling it out of the printer.

Figure 9–9: Removing the Cassette Paper Feed Unit

MLO–003060 25 PICAS

9.6 Large Capacity Input Tray (LCIT)

Remove any paper in the LCIT and remove the tray as follows:

1. Remove the top and bottom paper cassettes.
2. Open the small cable door on the cabinet below the LCIT and disconnect the large and small cables.
3. Lift the LCIT up slightly and slide it out from the printer.

Figure 9–10: Removing the LCIT

MLO–003061 26.5 PICAS

9.7 LCIT Feed Unit

Remove the LCIT feed unit as follows:

1. Remove the LCIT (Section 9.6).
2. Remove the four feed unit screws.

Figure 9–11: Removing the LCIT Feed Unit Screws (Side of Cabinet)

MLO–3062 18.6 PICAS

3. Open the cabinet door and remove the two feed unit screws.

Figure 9–12: Removing the LCIT Feed Unit Screws (Front of Cabinet)

MLO–003063 24 PICAS

4. Remove the rear cabinet cover by removing its two screws.
5. Remove the two feed unit screws.
6. Disconnect the feed unit cables (CN404 and CN405) from the duplexer/LCIT drive board and remove the cables from the wiring harness retainer.

Figure 9–13: Removing the LCIT Feed Unit Screws (Rear of Cabinet)

MLO–003064 19.6 PICAS

7. Slide the feed unit out of the printer.

   CAUTION: *Be sure not to bend the grounding clip on the right side of the cabinet opening when removing or installing the feed unit.*

Figure 9–14: Removing the LCIT Feed Unit

MLO–003065 20 PICAS

9.8 Cabinet Paper Feed Unit

Remove the cabinet paper feed unit as follows:

1. Remove the LCIT (Section 9.6).
2. Remove the LCIT feed unit (Section 9.7).
3. Disconnect the feed unit cable from the duplexer/LCIT drive board (CN403).

Figure 9–15: Disconnecting the Cabinet Paper Feed Unit Cable

MLO–003066 30 PICAS

4. Lift the feed unit up from the bottom just enough to clear the alignment pins on the mounting bracket and then pull the unit out.

   NOTE: *The feed unit requires an exact position in the cabinet to feed paper properly. Because of this close tolerance, the feed unit may fit tightly in the cabinet. When installing the feed unit, insert it so that the top is in position first and then slide the bottom over the alignment pins on the mounting bracket.*

Figure 9–16: Removing the Cabinet Paper Feed Unit

MLO–003067 20.6 PICAS

9.9 Duplexer Unit

Remove the duplexer unit as follows:

1. Remove the rear cover of the cabinet by loosening its two screws.
2. Disconnect the duplexer unit cables (CN408 and CN409) from the duplexer/LCIT drive board.

Figure 9–17: Disconnecting the Duplexer Cables

MLO–003068 21 PICAS

3. Open the cabinet door.
4. Remove the duplexer unit by loosening its two screws.

Figure 9–18: Removing the Duplexer Unit

MLO–003069 22 PICAS

9.10 Fork Gate Unit

Remove the fork gate unit as follows:

1. Open the left side door and loosen the two exit transport screws.

Figure 9–19: Loosening the Fork Gate Unit Screws

MLO–003070 19.6 PICAS

2. Lower the fork gate unit and disconnect its two cables (one 6-pin and one 7-pin) from the print engine.
3. Remove the snap-ring from the stand-off on the left side of the print engine.
4. Slide the transport arm off the stand-off to remove the transport unit.

Figure 9–20: Disconnecting the Cables and Snap-Ring

MLO–003071 21.6 PICAS

9.11 Optical Unit

Remove the optical unit as follows:

1. Open the front cover and remove the shield glass.

Figure 9–21: Removing the Shield Glass

Use MLO-003072 22 PICAS.

2. Open the lower left side door and loosen the two fork gate unit screws.

Figure 9–22: Loosening the Fork Gate Unit Screws

MLO–003073 19.6 PICAS

3. Lower the fork gate unit and disconnect the three cables from the optical unit.

   CAUTION: *Be sure to carefully disconnect the optical cable by its plug and not by its cable. Disconnecting it by pulling on the cable can result in damage to the optic wire.*

Figure 9–23: Disconnecting the Cables from the Optical Unit

MLO–003074 15.6 PICAS

4. Remove the optical unit from the printer by loosening its two screws and sliding the unit out.

Figure 9–24: Removing the Optical Unit

MLO–003075 20.6 PICAS

9.12 Card Cage Fan

Remove the card cage fan as follows:

1. Remove the top output paper tray.
2. Remove the rear cover (Section 9.3).
3. Open the operator panel cover.
4. Remove the top cover by loosening its four screws.

Figure 9–25: Removing the Top Cover

MLO–003058 24 PICAS

5. Disconnect the fan cable (CN123) from the mother board and remove it from the wiring harness retainers.
6. Remove the fan (with bracket) by removing the three bracket screws.

Figure 9–26: Removing the Card Cage Fan

MLO–003076 21.6 PICAS

9.13 Mother Board

Remove the mother board as follows:

1. Remove all the circuit boards from the card cage (Section 9.1).
2. Remove the rear cover (Section 9.3).
3. Remove the top output paper tray.
4. Remove the top cover by loosening its four screws.

Figure 9–27: Removing the Top Cover

MLO–003058 24 PICAS

5. Disconnect the two interface bracket cables (CN116 and CN122) from the mother board.
6. Loosen the bottom bracket screw.
7. Remove the interface bracket by removing its three screws.

Figure 9–28: Removing the Interface Bracket

MLO–003077 16.6 PICAS

8. Disconnect the remaining cables from the mother board.

   CAUTION: *Be sure to carefully disconnect the two optical cables by their plugs and not by their cables. Disconnecting them by pulling on their cables can result in damage to the optic wire.*

9. Remove the mother board (with its bracket) by removing its five screws.

Figure 9–29: Removing the Mother Board

MLO–003079 17.6 PICAS

9.14 Fusing Unit

Remove the fusing unit as follows:

WARNING: *The fusing unit may be hot. Be sure printer has been turned off and has had sufficient time to cool down before handling the fusing unit.*

1. Open the front cover.
2. Push the fusing unit release lever to the left and pull the fusing unit out until it stops.

Figure 9–30: Pulling Out the Fusing Unit

Use MLO-003078 23 PICAS

3. While supporting the fusing unit with your hand, push the release lever to the left once again and pull the fusing unit out of the printer.

Figure 9–31: Removing the Fusing Unit

Use MLO-003084 22.6 PICAS

9.15 Transport Unit

Remove the transport unit as follows:

1. Remove the fusing unit (Section 9.14).
2. Disconnect the transport unit cable from the print engine.

Figure 9–32: Disconnecting the Transport Unit Cable

MLO–003085 21.6 PICAS

3. Lower the transfer/separation charger guide.
4. Slide the transport unit out from the printer by loosening its screw.

Figure 9–33: Removing the Transport Unit

MLO–003086 24 PICAS

9.16 Development Unit

Remove the development unit as follows:

1. Open the front cover and the development drawer.
2. Turn the development unit release lever clockwise to disengage the development unit from its operating position.
3. Remove the development unit (with the toner cartridge) by lifting it up and out of the drawer.

   CAUTION: *Be careful not to damage the OPC drum when removing or replacing the development unit.*

Figure 9–34: Removing the Development Unit

Use MLO-003087 25 PICAS

9.17 Registration Roller Unit

Remove the registration roller unit as follows:

1. Open the front cover and the development drawer.
2. Lower the transfer/separation charger guide.
3. Remove the registration roller unit by removing its two screws.

CAUTION: *When handling the registration roller unit, take care to not damage or bend the mylar strips on the roller.*

The flanges at the end of the registration roller unit are somewhat flexible and the metal roller has a certain amount of play from side to side. When reinstalling the registration roller unit, be sure the coil-spring anchors are aligned over the metal roller ball bearings and not in the roller grooves.

Figure 9–35: Removing the Registration Roller Unit

MLO–003088 25 PICAS

9.18 Development Drawer

Remove the development drawer as follows:

CAUTION: *Do not remove the development drawer without first removing the registration roller unit and charger guide as listed in this procedure. Failure to remove these components can result in bent paper guides and/or grounding contacts.*

Carefully remove and replace the transfer/separation charger, making sure the charger slides along the guides.

1. Open the front cover.
2. Remove the transfer/separation charger.

Figure 9–36: Removing the Transfer/Separation Charger

MLO–003089 18.6 PICAS

3. Remove the registration roller unit (Section 9.17).
4. Remove the plastic snap-ring at the rear (left side) of the charger guide.
5. Move the charger guide to the left to remove it from the rear bracket.

Figure 9–37: Removing the Transfer/Separation Charger Guide

MLO–003090 17 PICAS

6. Turn the development unit release lever clockwise to disengage the development unit from its operating position.
7. Remove the development unit (with the toner cartridge) by lifting it up and out of the drawer.

8. Press the top of the cleaning unit release lever to disengage the cleaning unit from its operating position.
9. Remove the cleaning unit from the drawer.
10. Remove the OPC drum from the drawer.

CAUTION: *Place the drum on a clean cloth or paper and cover it to protect the drum surface from exposure to light. When handling the drum, do not get fingerprints on the drum surface. Fingerprints damage the surface of the drum and produce print quality problems.*

Figure 9–38: Removing the Drawer Components

MLO–003091 28 PICAS

11. Loosen the drawer lock screws (left and right sides) and slide them forward.

    → Retighten the screws in the forward position.

12. Remove the drawer by sliding it straight out.

Figure 9–39: Removing the Development Drawer

MLO–003092 20 PICAS

9.19 Main Fan

Remove the main fan as follows:

1. Remove the main charger.
2. Remove the quenching lamp.

Figure 9–40: Removing the Main Charger and Quenching Lamp

MLO–003093 20.6 PICAS

3. Remove the development drawer (Section 9.18).
4. Remove the front cover chain screw (left side).
5. Remove the left inside cover by loosening its two screws.

Figure 9–41: Removing the Left Inside Cover

MLO–003094 16.5 PICAS

6. Disconnect the main fan cable and pass it through the hole in the frame.
7. Remove the fan by removing its screw.

Figure 9–42: Removing the Main Fan

MLO–003095 24 PICAS

9.20 Low-Voltage Power Supply

Remove the low-voltage power supply as follows:

1. Remove the rear cover (Section 9.3).
2. Remove the five power supply screws.

   NOTE: *When replacing the power supply, be sure to secure the grounding wire to the chassis by using one of the grounding type screws.*

3. Disconnect the 16-pin cable and the 3-pin cable (CN2 and CN3) from the power supply.
4. Pull the power supply out a few inches and disconnect the 2-pin cable (CN1) from the power supply.
5. Remove the power supply by pulling it straight out of the printer.

Figure 9–43: Removing the Low-Voltage Power Supply

MLO–003096 19 PICAS

9.21 High-Voltage Power Supply

Remove the high-voltage power supply as follows:

1. Remove the rear cover (Section 9.3).
2. Disconnect the three high-voltage cables (S, T, and C) from the power supply.
3. Disconnect the power supply cable (CN106) from the mother board and remove the cable from the wiring harness retainer.
4. Disconnect cable BA from the printer and remove the cable from its wiring harness retainers.
5. Disconnect cable BB from the printer.
6. Remove the power supply by loosening its two screws.

Figure 9–44: Removing the High-Voltage Power Supply

MLO–003097 18.6 PICAS

9.22 Development Motor Unit

Use the following procedure to remove the development motor unit:

1. Remove the cassette paper feed unit (Section 9.5).
2. Remove the high-voltage power supply (Section 9.21).
3. Remove the vertical support brace by removing its two screws.
4. Loosen the allen screw on the pulley.
5. Remove the pulley, timing belt, and bearing from the engine by sliding them off their shafts.

Figure 9–45: Removing the Support Brace, Pulley, and Belt

MLO–003098 22.6 PICAS

6. Open the front cover and pull out the development drawer.

   → Cover the OPC drum with several sheets of paper, so it will not be exposed to the light.

Figure 9–46: Covering the OPC Drum

MLO–003099 22 PICAS

7. Disconnect the development motor cable (CN108) from the mother board.
8. Disconnect the paper feed cable (CN102) from the mother board.

Figure 9–47: Connector Locations

MLO–006558B 17 PICAS

9. Disconnect the following two sensor cables from their sensors.

   NOTE: *The best way to access these sensors is from the right side of the printer through the opening where the cassette paper feed unit usually resides.*

   a. Disconnect the toner cartridge sensor cable from its sensor and run it through the hole in the chassis.

   b. Disconnect the toner low sensor cable from its sensor and run both sensor cables through the hole in the development motor unit.

Figure 9–48: Cable and Sensor Locations

MLO–003101 25 PICAS

10. Remove the OPC drum change sensor screw.
11. Remove the support bracket and development motor unit .

NOTE: *Use the hole in the frame to access the lower left screw.*

Figure 9–49: Removing the Development Motor Unit

MLO–006562B 14.5 PICAS

NOTE: *To attach the support bracket, slide the bracket downward until it contacts the pin on the side plate of the main drive unit. Then tighten the screws to secure the bracket.*

Figure 9–50: Replacing the Support Bracket

MLO-006559-B

9.23 Duplexer/LCIT Drive Board

Remove the duplexer/LCIT drive board as follows:

1. Remove the rear cabinet cover by removing its two screws.
2. Disconnect all the cables from the drive board.
3. Remove the drive board by removing its nine screws.

NOTE: *When installing a new duplexer/LCIT drive board:*

- *Set the dip-switches on the two switchpacks to match the settings on the old board. (See Chapter 3.)*
- *Place the plastic insulators between the mounting bracket and the two heat sinks on the bottom transistors.*
- *Plug the fiber optics cable correctly into the connector. The connector is keyed and the plug should fit snugly. If the cable is plugged in the wrong direction, jobs will not print.*

Figure 9–51: Removing the Duplexer/LCIT Drive Board

MLO–003102 21 PICAS

9.24 Main Drive Unit and Drive Belt

Remove the main drive unit and belt as follows:

WARNING: *Be careful when working around running machinery.*

1. Remove the rear cover (Section 9.3).
2. Remove the vertical support brace by removing its two screws.
3. Loosen the allen screw on the pulley.
4. Remove the pulley, timing belt, and bearing from the engine by sliding them off their shafts.

Figure 9–52: Removing the Support Brace, Pulley, and Belt

MLO–003098 22.6 PICAS

5. Loosen the idler arm screw.

   Reassembly Step: Dynamically adjust the main timing belt tension.

   a. Turn on the printer power and loosen the idler arm screw.

   b. After warm-up, when the main motor runs, you will see the main timing belt tighten up.

   c. Tighten the idler arm screw.

6. Remove the four screws from the main drive unit.

7. Remove the main drive unit by pulling it out while pushing down on the idler arm to relieve tension on the drive belt.

Figure 9–53: Removing the Main Drive Unit and Belt

MLO–003103 25 PICAS

9.25 Registration Clutch

Remove the registration clutch as follows:

1. Remove the main drive unit (Section 9.24).
2. Disconnect the registration clutch cable from its wiring connector.
3. Remove the registration clutch by removing its two screws.

CAUTION: *Be careful not to damage the high-voltage power supply cables that run through the cable retainer on the registration clutch. These cables should be gently pulled from the retainer when removing the clutch.*

Figure 9–54: Removing the Registration Clutch

MLO–003104 16 PICAS

9.26 Main Motor

Replace the main motor as follows:

1. Remove the main drive unit (Section 9.24).
2. Disconnect the cable (CN1) from the main motor circuit board.
3. Gently remove the high-voltage power supply cables from their retainers on the motor bracket and the engine chassis.
4. Remove the main motor by removing its three screws.

Figure 9–55: Removing the Main Motor

MLO–003105 16.6 PICAS

9.27 Ozone Filter Fans

Remove the ozone filter fans as follows:

NOTE: *This procedure explains how to remove both ozone fans. When troubleshooting, you may only have to replace one of the fans.*

1. Remove the rear cover (Section 9.3).
2. Disconnect the two fan cables.

Figure 9–56: Disconnecting the Ozone Fan Cables

MLO–003106 22 PICAS

3. Remove the ozone filter cartridge.
4. Remove the fans by removing their four screws and nuts.

Figure 9–57: Removing the Ozone Fans

MLO–003107 27 PICAS

Chapter 10
300K Maintenance

When the PrintServer requires 300K maintenance, it displays the following message:

Field Service Maintenance Required
Call Field Service

This chapter explains how to replace and clean components when 300K maintenance is required. In addition to the maintenance kit, you will need:

- A toner kit
- A toner vacuum
- A clean damp cloth

If you do not have a clean cloth, you can lay several sheets of paper around the OPC drum to protect it from light.

WARNING: *To prevent personal injury, power off the printer before performing 300K maintenance.*

The following items are *replaced* when performing 300K maintenance:

- Fusing unit
- Development unit
- Feed rollers (3)
- Prefeed rollers (3)
- Separation rollers (3)

The following items are *cleaned* when performing 300K maintenance:

- Development drawer
- Registration roller unit
- Transport unit

10.1 Cleaning the Development Drawer

Use the following procedures to clean the development drawer:

1. **Remove the development drawer components.**
   a. Open the front cover and the development drawer.
   b. Release the development unit release lever.
   c. Remove the OPC drum from the development drawer.

      CAUTION: *Place the drum on a clean cloth or paper, and cover the drum to protect it from exposure to light. The drum will be reinstalled when 300K maintenance is completed. Fingerprints will also damage the drum surface, so be sure to handle the drum by its ends.*

   d. Remove the development unit from the development drawer.

      → Discard the development unit.

Figure 10–1: Removing the Development Drawer Components

MLO–005739 28 PICAS

e. Lower the transfer/separation charger guide.

f. Remove the registration roller unit by removing its two screws.

CAUTION: *Take care not to damage or bend the mylar edge of the registration roller unit.*

Figure 10–2: Removing the Registration Roller Unit

MLO–003088 25 PICAS

2. **Clean the development drawer components.**

   a. Vacuum the inside of the development drawer thoroughly.

   b. Clean the OPC drum separation pawls with a clean damp cloth.

      WARNING: *The separation pawls are very sharp; be careful when cleaning them.*

Figure 10–3: Cleaning the Separation Pawls

MLO–003108 26 PICAS

c. Vacuum the rubber and metal rollers on the registration roller unit while turning the roller knob.

d. Clean both rollers and the mylar edge with a clean damp cloth until no toner remains.

CAUTION: *Take care not to damage or bend the mylar edge of the registration roller unit.*

Figure 10–4: Cleaning the Registration Roller Unit

MLO–003109 15.6 PICAS

3. **Replace the development drawer components.**

   a. Reinstall the registration roller unit.

      CAUTION: *The flanges at the end of the registration roller unit are somewhat flexible and the metal roller has a certain amount of play from side to side. When reinstalling the registration roller unit, be sure the coil-spring anchors are aligned over the metal roller ball bearings and not in the roller grooves.*

   b. Install the new development unit.

   c. Reinstall the OPC drum.

   d. Add toner to the development unit.

   e. Close the development drawer.

10.2 Cleaning the Transport Unit

Use the following procedure to clean the transport unit:

WARNING: *The fusing unit may be hot.*

1. Push the fusing unit release lever to the left and pull the fusing unit out until it stops.

Figure 10–5: Releasing the Fusing Unit

MLO–003078 23 PICAS

2. While supporting the fusing unit with your hand, push the release lever to the left once again and pull the fusing unit out of the printer.

   → Discard the fusing unit.

Figure 10–6: Removing the Fusing Unit

MLO–003084 22.6 PICAS

3. Disconnect the transport unit cable of the print engine.

Figure 10–7: Disconnecting the Transport Unit Cable

MLO–003110 23 PICAS

4. Lower the transfer/separation charger guide.
5. Slide the transport unit out of the printer by loosening its screw.

Figure 10–8: Removing the Transport Unit

MLO–003111 25 PICAS

6. Vacuum the transport unit thoroughly while rotating the transport unit belt.
7. Clean all surfaces of the transport unit with a clean damp cloth.

Figure 10–9: Cleaning the Transport Unit

MLO–003112 24.6 PICAS

8. Reinstall the transport unit.
9. Install a new fusing unit.
10. Vacuum any toner remaining on the engine base plate.
11. Close the front cover.

Figure 10–10: Vacuuming the Print Engine Area

MLO–003113 24.6 PICAS

10.3 Replacing the Cassette Feed, Prefeed, and Separation Rollers

Use the following procedure to replace the feed, prefeed, and separation rollers for the two cassette trays.

CAUTION: *Be sure to replace the rollers on one cassette at a time, as there are subtle differences in some parts of the upper and lower cassettes.*

1. Remove the top cassette tray.
2. Remove the snap-ring from the shield cover and remove the cover.
3. Remove the snap-ring from the prefeed roller and slide the roller off its shaft.
4. Remove the snap-ring from the feed roller and slide the roller off its shaft.
5. Remove the snap-ring from the separation roller assembly and slide the assembly off its shaft.

Figure 10–11: Replacing the Cassette Feed, Prefeed, and Separation Rollers

MLO–003114 32.6 PICAS

6. Replace all shafts with new rollers.
7. Perform the same procedure for the lower cassette tray.

   NOTE: *Do not reinstall the cassette trays until you have replaced the rollers for the LCIT (Section 10.4).*

10.4 Replacing the LCIT Prefeed, Feed, and Separation Rollers

Use the following procedure to replace the feed, prefeed, and separation rollers on the LCIT.

1. Open the small cable door on the cabinet below the LCIT and disconnect the large and small cables.
2. Lift the LCIT up slightly and slide it out of the printer.

Figure 10–12: Removing the LCIT

MLO–003061 25 PICAS

3. Remove the two snap-rings from the LCIT feed unit shield cover and remove the cover.
4. Remove the snap-ring from the prefeed roller and slide the roller off its shaft.
5. Remove the snap-ring from the feed roller and slide the roller off its shaft.

6. Remove the snap-ring from the separation roller assembly and slide the assembly off its shaft.

Figure 10–13: Replacing the LCIT Feed, Prefeed, and Separation Rollers

MLO–003114 32.6 PICAS

7. Replace all the shafts with new rollers.
8. Reinstall the LCIT.
9. Reinstall the paper cassettes.
10. Reset the maintenance counter by invoking Field Test Mode and pressing keys 2, 5, 6.

Appendix A
Recommended Spares List

This appendix lists the turbo PrintServer 20 and PrintServer 20 recommended spares, their associated part numbers, and ordering names.

Table A–1: Recommended Spares List

Description	Part Number	Ordering Name
PrintServer 20 Controller Board	54–17449–01	Controller Board
turbo PrintServer 20 Controller Board	54–20830–02	Controller Board
Optical Unit	29–27384–01	Optical Unit
Fork Gate Unit	29–27385–01	Ppr Fk Gate Unit
Transport Unit	29–27386–01	Trans Unit
Fusing Unit (100V)	29–27387–01	Fusing Unit:110V
Fusing Unit (200V)	29–27388–01	Fusing Unit:220V
Quenching Lamp	29–27403–01	Quench LED Unit
Low-Voltage Power Supply (100V)	29–27404–01	P.S. Unit:110V
Low-Voltage Power Supply (200V)	29–27405–01	P.S. Unit:220V
Cassette Paper Feed Unit	29–27352–01	Ppr Fd Unit
LCIT Feed Unit	29–27353–01	LCIT Fd Unit
Development Unit	29–27354–01	Devl Unit
Registration Roller Unit	29–27355–01	Reg Rlr Unit
Duplexer/LCIT Drive Board	29–27356–01	Tbl Drv Bd
Duplexer Unit	29–27357–01	Duplex Unit
Cabinet Paper Feed Unit	29–27358–01	Table Feed Unit
Operator Panel	29–27359–01	Op Pnl Unit
Engine Drive Board	29–27360–01	Eng Drv Bd

Table A–1 (Cont.): Recommended Spares List

Description	Part Number	Ordering Name
Mother Board	29–27361–01	Mother Bd
Cleaning Unit Sensor	29–27362–01	Sen/Set/Cln Unit
Left Cover Interlock Switch	29–27363–01	Intlk Swch, Lt Cvr
High-Voltage Power Supply	29–27364–01	Power Pack
OPC Drum Sensor	29–27365–01	Sen/Set/OPC Drm
Ozone Fan	29–27366–01	Fan, Mn:FAA06A24HC
Fusing Unit Interlock Switch	29–27367–01	Intlk Swch Fus Unt
Main Fan	29–27368–01	Process Fan Unit
Toner Overflow Switch	29–27369–01	Swch, Tnr Overflw
LCIT Right Side Cover	29–27370–01	Cover, Right LCIT
Zener Diode (Z6HV921)	29–27371–01	Znr Diode, Z6HV921
Development Drive Unit	29–27372–01	Dev Drive Unit
Photointerruptor Sensor (Toner Low and Toner Cartridge)	29–27373–01	Photointrptr
OPC Drum Timing Belt (166XL)	29–27374–01	Tmng Belt:166XL
Main Drive Unit Timing Belt (3M633)	29–27375–01	Tmng Belt:3M633
Main Motor	29–27376–01	Main Mtr Unit
Main Motor Drive Unit	29–27377–01	Main Drv Unit
Registration Clutch	29–27378–01	Clutch, Reg
Main Motor Drive Unit Pulley	29–27379–01	Pulley:21T
Development Unit Pulley	29–27380–01	Pulley:32T
Exit Unit Timing Belt (3M219)	29–27381–01	Tmng Belt:3M219
Pulley Assy/Fork Gate	29–27382–01	Plly Assy/F Gate
Fusing Unit Separation Pawl	29–27383–01	Sep Pawl/F Unit
Feed Roller	29–25102–00	Paper Feed Roller
Pick-Up Roller	29–25103–00	Pick-Up Roller
Separation Roller Assembly	29–27933–01	Sep Roller Assy

Table A–1 (Cont.): Recommended Spares List

Description	Part Number	Ordering Name
Fusing Unit Heater Lamp (100V)	29–27394–01	Fusing Lamp 100V
Fusing Unit Heater Lamp (200V)	29–27395–01	Fusing Lamp 200V
Fusing Unit Thermistor (100V)	29–27396–01	Therm Fuse Assy 100V
Fusing Unit Thermistor (200V)	29–27485–01	Therm Fuse Assy 200V
Photointerruptor Sensor (Fork Gate Unit and Paper Feed Unit)	29–27397–01	Photointrptr
Fork Gate Unit Timing Belt (80S2M600)	29–27389–01	Tmg Belt:80S2M600
Fork Gate Solenoid	29–27390–01	Solenoid, Fk Gate
Photointerruptor Sensor (Fusing Exit)	29–27391–01	Photointrptr
Upper Paper Exit Tray	29–27392–01	Tray, Up Ex, LCOT
LCOT	29–27393–01	LCOT
LCIT	29–27399–01	LCIT
Drum Separation Pawl Solenoid Assembly	29–27400–01	Solenoid, Drum Sep
Card Cage Fan	29–27484–01	Controller Fan
Development Drawer	29–27570–01	Devel Drawer Unit
Main Charger	29–28302–01	Main Charger
Transfer/Separation Charger	29–28385–01	T/S Charger
Cleaning Unit	29–28387–01	Cleaning Unit
LCIT Grippers	29–28856–01	LCIT Grippers
Development Unit Cover	29–28880–01	Devel Unit Cover
Development Drawer Side Rails	29–28992–01	Devel Drawer Rails
Main Fuse (110V)	12–31518–01	Fuse–15A, 125V
Main Fuse (220V)	12–31688–01	Fuse–220/240V
Mother Board Fuse	12–31762–01	Fuse–3.5A, 125V
300K Maintenance Kit (110V) Development Unit Fusing Unit (100V) Paper Feed Rollers (3)	29–27401–01	Maintenance Kit–D1

Table A–1 (Cont.): Recommended Spares List

Description	Part Number	Ordering Name
300K Maintenance Kit (220V) Development Unit Fusing Unit (200V) Paper Feed Rollers (3)	29–27402–01	Maintenance Kit–D2
Toner Kit: Toner Cartridges	29–27421–01	Toner Kit (Kit A)
OPC Drum Kit: OPC Drum Shield Glass	29–27398–01	OPC Drum (Kit C)

Appendix B
Total Call Concept Procedures

B.1 Theory Behind Total Call Concept

The total call concept (TCC) evolved to meet the service requirements of Digital's electrophotographic printer systems. TCC improves the printer's reliability, increases the time between service calls, and improves customer satisfaction.

TCC differs from traditional Customer Services operating philosophy. Traditionally, when a printer malfunctioned, Customer Services fixed the problem and left the site as quickly as possible to minimize the mean time to repair (MTTR).

However, electromechanical printers require preventive maintenance. With TCC, Customer Services fixes the problem and performs TCC procedures.

B.2 TCC Procedure

The following procedure outlines the TCC steps:

1. **Check the FCO and firmware.**

   Before going to the site, look up and list the current hardware field change order and firmware revision levels. You will need them later.

2. **Print a maintenance log.**

   A maintenance log sheet file is stored in the LPS$SUPPORT directory of the supporting host. Use the following procedure to print the log:

   a. Ask the system manager for assistance. The system manager can best answer system-dependent questions and give you the Field account password. The system manager may also print out the maintenance log file for you.

   b. Log in to the Field account.

      CAUTION: *Be careful when working in the Field account. It may have unlimited privileges.*

   c. Set default to the LPS$SUPPORT directory of the supporting host.

Generally, the supporting host is configured with client software, and you can log in and print the file. If the supporting host does not have client software, you must log in to a client node, copy the file to your client system, then print the file.

d. Copy the maintenance log file to a client node:

```
$ COPY NODE::LPS$SUPPORT:LPS_20MAINT_LOG.PS  []*
```

Where:

NODE	is the node name of the supporting host. Get the supporting host node name from the system manager. Type two colons (::) after the node name.

e. Print a B size maintenance log sheet:

```
$ PRINT/QUE=PSQ/PARAMETER=(DATA=POST,PAGE_SIZE=B)-
 _$ LPS$SUPPORT:LPS_20MAINT_LOG.PS
```

Where:

PSQ	is the PrintServer queue name.

3. **Inspect the hardware.**

Use the following three checklists to inspect the print engine, LCOT, and LCIT. Look for signs of wear and tear, damage, and potentially malfunctioning components. Repair or replace any faulty component(s).

Print Engine

Use the checklist below to inspect the print engine. Repair or replace any faulty component(s).

- Look for toner spills inside and outside the print engine.
  - — Find the source of the spill. Pay specific attention to the area under and around the cleaning unit and the end seals of the development unit.
  - — Clean up any toner, dust, or paper fragments.
- Remove and clean the registration roller unit.

  When you inspect rollers, look for axial shaft bearing problems and for surface or shape distortions. The shafts and the rollers on the shafts must run true and you should not feel excessive axial or radial free play or binding. Roller defects to look for are out of round rollers, surface cracks or glazing, or excessively hard rollers.
- Remove and clean the quench lamp.

- Clean the transfer and separation charger.
- Remove the OPC drum.
  - — Inspect the drum surface for nicks, scratches, or marks.
  - — Install the print drum and close and power up the system.
  - — Print a test sheet and inspect the print quality.
- Inspect the transport unit belt and vacuum fan.

  When you inspect the belts, look for wear, fraying, and tension. The turbo PrintServer 20 and PrintServer 20 use high-quality cog-type belts. The belts serve a dual purpose; they transmit motor power and maintain close mechanical timing required for precision jam detection. A loose, slipping, or worn belt can cause random jams. If you suspect a belt, hold the old belt up to a new belt to compare cog depth, size, or other physical dimensions.

  Replace any belt that is frayed, has missing or worn teeth, or is over 5 years old.
- Remove the fusing unit.
  - — Inspect the heat and pressure rollers for wear, scratches, flat spots, and other surface damage.
  - — Replace any bent, worn, or damaged fusing unit stripper fingers.
- Inspect all timing belts for wear, fraying, and correct tension.
- Manually operate the solenoids to see if they bind or hang.
- Look for frayed wire(s) that can become entangled in the moving parts.
- Inspect the card cage fan, main fan, and ozone fan for correct and noise-free operation.
- Listen to the main, development, and polygon motors. The motors should run quietly and not emit any loud or unusual noises.
- Install and clean all covers and panels.
- All hinged covers and interlocks must work smoothly and latch securely.

LCOT

After performing the print engine inspection, closely inspect the LCOT.

- The LCOT must be free of dust and dirt, which can mark the printed sheets.
- All hinged devices and interlocks must work smoothly and latch securely.
- Power up the printer and wait for the initialization sequence to jog the LCOT offset motors back and forth. Make certain both motors complete the full movement.

LCIT and Cassette

Use the following checklist to inspect the LCIT and cassettes. Repair or replace any faulty component(s).

- Inspect each cassette tray for damage and correct configuration. Advise the customer to replace any cracked or broken trays.
- Inspect the cassette and LCIT paper feed rollers. Replace any dirty, deformed, or damaged rollers.
- All hinged covers and interlocks must work smoothly and latch securely.
- Clean the trays and the LCIT of dust and paper debris.

4. **Inspect the FCO and firmware.**

   Use the following checklist to determine if you need to arrange to update the printer. If you find that revisions are needed, make an appointment to obtain and install the updated hardware and firmware devices.

   - Are all current hardware FCOs installed?
   - The control panel displays the firmware revision level of the following installed boards:
     - — Controller board
     - — Engine drive board
     - — Duplexer/LCIT drive board

   Replace any board that has outdated firmware.

5. **Update the maintenance log.**

   Fill out the maintenance log, store it in a binder, and place the binder on the bottom shelf of the printer cabinet.

Index

A

B

C

D

E

F

G

H

I

K

L

M

N

O

P

Q

R

S

T

U

V

W