Fax functions and operation (fax models only)

The following sections describe the printer fax capabilities.

Computer and network security features

The printer can send and receive fax data over telephone lines that conform to public switch telephone network (PSTN) standards. The secure fax protocols make it impossible for computer viruses to be transferred from the telephone line to a computer or network.

The following printer features prevent virus transmission:

- No direct connection exists between the fax line and any devices that are connected to the USB or Ethernet ports.

- The internal firmware cannot be modified through the fax connection.

- All fax communications go through the fax subsystem, which does not use Internet data-exchange protocols.

PSTN operation

The PSTN operates through a central office (CO) that generates a constant voltage on the TIP and RING wires (48 V, usually). A device goes on-hook by connecting impedance (such as 600 ohms for the U.S.) across the TIP and RING so that a line current can flow. The CO can detect this current and can send impulses like dial tones. The printer generates more signaling tones, such as dialing digits, to tell the CO how to connect the call. The printer can also detect tones, such as a busy tone from the CO that tell it how to behave.

When the call is finally connected, the CO behaves like a piece of wire connecting the sender and receiver. This is the period during which all of the fax signaling and data transfer occurs. When a call is completed, the circuit opens again and the line-current flow ceases, removing the CO connection from both the sender and the receiver.

On most phone systems, the TIP and RING signals appear on pins 3 and 4 of the RJ-11 modular jack (the one on the fax card, as defined in the common 6 wire RJ standard). These two signals do not have to be polarized because all of the equipment works with either TIP or RING on one pin and the other signal on the other pin. This means that cables of either polarity can interconnect and still work.

These basic functions of PSTN operation are assumed in the design of the fax subsystem. The printer generates and detects the signaling tones, currents, and data signals that are required to transmit and receive faxes using the PSTN.

Receive faxes when you hear fax tones

In general, incoming faxes to the printer are automatically received. However, if other devices are connected to the same phone line, the printer might not be set to answer automatically.

If the printer is connected to a phone line that receives both fax and phone calls, and you hear fax tones when you answer the extension phone, receive the fax in one of two ways:

- If you are near the printer, press Start Fax on the control panel.

- Press 1-2-3 in sequence on the extension phone keypad, listen for fax transmission sounds, and then hang up.

NOTE: In order for the 1-2-3 sequence to work, the extension phone setting must be set to On in the Fax Setup menu.

Distinctive ring function

Distinctive ring is a service that a telephone company provides. The distinctive ring service allows three phone numbers to be assigned to one phone line. Each phone number has a distinctive ring. The first phone number has a single ring, the second phone number has a double ring, and the third phone number has a triple ring.

NOTE: The printer has not been tested with all of the distinctive-ring services that telephone companies provide in all countries/regions. HP does not guarantee that the distinctive-ring function will operate correctly in all countries/regions. Contact the local phone service provider for assistance.

Set up the distinctive ring function

1. Open the Setup menu.

2. Open the Fax Menu menu.

3. Select the Basic Setup menu.

4. Select the Distinctive Ring setting.

5. Use the arrow buttons to select one of the following options:

   - All Rings (default setting)

   - Single

   - Double

   - Triple

   - Double and Triple

Fax by using voice over IP (VOIP) services

Voice over IP (VoIP) services provide normal telephone service, including long distance service through a broadband Internet connection. These services use packets to break up the voice signal on a telephone line and transmit it digitally to the receiver, where the packets are reassembled. The VoIP services are often not compatible with fax machines. The VoIP provider must state that the service supports fax over IP services.

Because the installation process varies, the VoIP service provider will have to assist in installing the printer fax component.

Although a fax might work on a VoIP network, it can fail when the following events occur:

- Internet traffic becomes heavy and packets are lost.

- Latency (the time it takes for a packet to travel from its point of origin to its point of destination) becomes excessive.

If you experience problems using the fax feature on a VoIP network, ensure that all of the printer cables and settings are correct. Configuring the Fax Speed setting to Medium(V.17) or Slow(V.29) can also improve your ability to send a fax over a VoIP network.

If you continue to have problems faxing, contact your VoIP provider.

The fax subsystem

The formatter, fax card, firmware, and software all contribute to the fax functionality. The designs of the formatter and fax card, along with parameters in the firmware, determine the majority of the regulatory requirements for telephony on the printer.

The fax subsystem is designed to support V.34 fax transmission, low speeds (such as V.17 fax), and older fax machines.

Fax card in the fax subsystem

Two versions of the fax card are used in the printer. One is used in the North American, South American, and Asian countries/regions. The other is used primarily in European countries/regions.

The fax card contains the modem chipset (DSP and CODEC) that controls the basic fax functions of tone generation and detection, along with channel control for fax transmissions. The CODEC and its associated circuitry act as the third-generation silicon data access arrangement (DAA) to comply with worldwide regulatory requirements.

The only difference between the two versions is that each version is compliant with the 2/4-wire phone jack system from the respective country/region.

Safety isolation

The most important function of the fax card is the safety isolation between the high-voltage, transient-prone environment of the telephone network (TNV [telephone network voltage]) and the low-voltage analog and digital circuitry of the formatter (SELV [secondary extra-low voltage]). This safety isolation provides both customer safety and printer reliability in the telecom environment.

Any signals that cross the isolation barrier do so magnetically. The breakdown voltage rating of barrier-critical components is greater than 5 kV.

Safety-protection circuitry

In addition to the safety barrier, the fax card protects against over-voltage and over-current events.

Telephone over-voltage events can be either differential mode or common mode. The event can be transient in nature (a lightning-induced surge or ESD) or continuous (a power line crossed with a phone line). The fax card protection circuitry provides margin against combinations of over-voltage and overcurrent events.

Common mode protection is provided by the selection of high-voltage-barrier critical components (transformer and relay). The safety barrier of the fax card PCB traces and the clearance between the fax card and surrounding components also contribute to common mode protection.

A voltage suppressor (a crowbar-type thyristor) provides differential protection. This device becomes low impedance at approximately 300 V differential, and crowbars to a low voltage. A series thermal switch works in conjunction with the crowbar for continuous telephone line events, such as crossed power lines.

All communications cross the isolation barrier magnetically. The breakdown voltage rating of barrier-critical components is greater than 5 kV.

Data path

TIP and RING are the two-wire paths for all signals from the telephone network. All signaling and data information comes across them, including fax tones and fax data.

The telephone network uses DC current to determine the hook state of the telephone, so line current must be present during a call. The silicon DAA provides a DC holding circuit to keep the line current constant during a fax call.

The silicon DAA converts the analog signal to a digital signal for DSP processing, and also converts the digital signal to an analog signal for transmitting data through a telephone line.

The magnetically coupled signals that cross the isolation barrier go through either a transformer or a relay.

The DSP in the fax card communicates with the ASIC in the formatter using the high-speed serial interface.

Hook state

Another magnetically coupled signal is the control signal that disconnects the downstream telephone devices (such as a phone or answering machine). A control signal originating on the DSP can change the relay state, causing the auxiliary jack (downstream jack) to be disconnected from the telephone circuit.

The printer takes control of calls that it recognizes as fax calls. If the printer does not directly pick up the call, it monitors incoming calls for the fax tone or for the user to direct it to receive a fax. This idle mode is also called eavesdropping. This mode is active when the printer is on-hook but current exists in the downstream phone line because another device is off-hook. During eavesdropping, the receive circuit is enabled but has a different gain from the current that is generated during normal fax transmissions.

The printer does not take control of the line unless it detects a fax tone or the user causes it to connect manually. This feature allows the user to make voice calls from a phone that is connected to the printer without being cut off if a fax is not being received.

Downstream device detection

The line voltage monitoring module of the silicon DAA can detect the line state as well as the downstream device. It tells DSP via DIB that an active device (telephone, modem, or answering machine) is connected to the auxiliary port on the printer (the right side of the dual RJ-11 jack). The DSP uses the signal to ensure that the printer does not go off-hook (and disconnects a downstream call) until it has been authorized to do so (by a manual fax start or the detection of the appropriate tones).

Hook switch control

In the silicon DAA the CODEC controls the hook switch directly. The CODEC is activated when it receives commands from the DSP. When the circuit is drawing DC current from the central office it is considered off-hook. When no DC current flows the state is considered on-hook.

Ring detect

Ring detect is performed by the line voltage monitoring module of the silicon DAA, and is a combination of voltage levels and cadence (time on and time off). Both must be present to detect a valid ring. The CODEC works with DSP as well as the firmware to determine if an incoming signal is an answerable ring.

Line current control

The DC current from the CO needs to have a path to flow from TIP to RING. The DC impedance emulation line modulator and DC terminations modules in the silicon DAA act as a DC holding circuit, and work with the firmware to achieve the voltage-current characteristic between TIP and RING. The impedance (the current-voltage characteristic) changes corresponding to certain special events, such as pulse dialing or when the printer goes on-hook.

Billing or metering tone filters

Switzerland and Germany provide high-frequency AC signals on the phone line in order to bill customers.

A filter in a special fax cable (for certain countries/regions), can filter these signals. Because these billing signals are not used in the U.S., these filters are not present in the U.S. fax cable.

To obtain a special fax cable, contact your local telephone service provider.

Fax page storage in flash memory

Fax pages are the electronic images of the document page. They can be created in any of three ways: scanned to be sent to another fax machine, generated to be sent by the computer, or received from a fax machine to be printed.

The printer stores all fax pages in flash memory automatically. After these pages are written into flash memory, they are stored until the pages are sent to another fax machine, printed on the printer, transmitted to the computer, or erased by the user.

These pages are stored in flash memory, which is the nonvolatile memory that can be repeatedly read from, written to, and erased. The printer has 8 MB of flash memory, of which 7.5 MB is available for fax storage. The remaining 0.5 MB is used for the file system and reclamation. Adding RAM does not affect the fax page storage because the printer does not use RAM for storing fax pages.

Stored fax pages

The user can reprint stored fax receive pages in case of errors. For a fax send, the printer will resend the fax in case of errors. The printer will resend stored fax pages after a busy signal, communication error, no answer, or power failure. Other fax devices store fax pages in either normal RAM or short-term RAM. Normal RAM immediately loses its data when power is lost, while short-term RAM loses its data about 60 minutes after power failure. Flash memory maintains its data for years without any applied power.

Advantages of flash memory storage

Fax pages that are stored in flash memory are persistent. They are not lost as a result of a power failure, no matter how long the power is off. Users can reprint faxes in case the print cartridge runs out of toner or the printer experiences other errors while printing faxes.

The printer also has scan-ahead functionality that makes use of flash memory. Scan-ahead automatically scans pages into flash memory before a fax job is sent. This allows the sender to pick up the original document immediately after it is scanned, eliminating the need to wait until the fax transmission is complete.

Because fax pages are stored in flash memory rather than RAM, more RAM is available to handle larger and more complicated copy and print jobs.

2   Solve problems

For additional service and support information

HP service personnel, go to the Service Access Work Bench (SAW) at http://h41302.www4.hp.com/km/saw/home.do.

Channel partners, go to HP Channel Services Network (CSN) at https://h30125.www3.hp.com/hpcsn.

● To access HP PartSurfer information from any mobile device, go to http://partsurfermobile.hp.com/ or scan the Quick Response (QR) code below.

● Install and configure

● Printer specifications

● Up-to-date control panel message (CPMD) troubleshooting

● Solutions for printer issues and emerging issues

● Remove and replace part instructions and videos

● Service advisories

● Warranty and regulatory information

Solve problems checklist (M501)

If the printer is not correctly functioning, complete the steps (in the order given) in the following checklist. If the printer fails a checklist step, follow the corresponding troubleshooting suggestions for that step. If a checklist step resolves the problem, skip the remaining checklist items.

1. Make sure that the printer is set up correctly.

    a. Press the power button to turn on the printer or to deactivate the Auto-Off mode.

    b. Check the power-cable connections.

    c. Make sure that the line voltage is correct for the printer power configuration. See the label that is on the printer for voltage requirements. If you are using a power strip and its voltage is not within specifications, plug the printer directly into the wall. If it is already plugged into the wall, try a different outlet.

2. Check the cable connections.

    a. Check the cable connection between the printer and the computer. Make sure that the connection is secure.

    b. Make sure that the cable itself is not faulty, by using a different cable if possible.

    c. Check the network connection: Make sure that the network light is lit. The network light is next to the network port on the back of the printer.

       If the printer remains unable to connect to the network, uninstall and then reinstall the printer. If the error persists, contact a network administrator.

3. Check to see if any messages appear on the control panel.

4. Make sure that the paper you are using meets specifications.

5. Make sure that the paper is loaded correctly in the input tray.

6. Make sure that the printer software is installed correctly.

7. Verify that you have installed the printer driver for this printer, and that you are selecting this printer from the list of available printers.

8. Print a configuration page.

    a. On the printer control panel, press the OK button.

    b. Open the Reports menu.

    c. Select Configuration Report.

    After printing the configuration page, check the following:

    a. If the page does not print, verify that the input tray contains paper and that the paper is properly loaded.

    b. Make sure that each toner cartridge is installed correctly.

    c. If the page jams in the printer, clear the jam.

    d. If the print quality is unacceptable, complete the following steps:

- Verify that the print settings are correct for the paper you are using.

- Solve print-quality problems.

9. Print a small document from a different program that has printed in the past. If this solution works, then the problem is with the program you are using. If this solution does not work (the document does not print), complete these steps:

   a. Try printing the job from another computer that has the printer software installed.

   b. Check the cable connection. Direct the printer to the correct port, or reinstall the software, selecting the connection type you are using.

Print the menu map (M501)

To more easily navigate individual settings, print a report of the complete printer menus.

1. On the printer control panel, press the OK button.

2. Open the Reports menu.

3. Select Menu Structure.

Print the service page (includes the event log) (M501)

Printing the service page provides a list of printer settings that might be helpful in the troubleshooting process, as well as the event log, which stores the last 10 error events that the printer experienced.

1. On the printer control panel, press the OK button.

2. Open the Reports menu.

3. Select the Service Page option to print the report.

The event log is located in the lower right-hand corner of the service page.

Solve problems checklist (M506/M527)

-

-

-

-

-

Solve problems checklist

If the printer is not correctly functioning, complete the steps (in the order given) in the following checklist. If the printer fails a checklist step, follow the corresponding troubleshooting suggestions for that step. If a checklist step resolves the problem, skip the remaining checklist items.

1. If the control panel is blank or black, check the following before proceeding:

   ❑ Check to make sure that the printer is not in Sleep mode (tap the touchscreen control panel or press a button on the LCD control panel).

   ❑ Check the power cable.

   ❑ Check that the power is turned on.

   ❑ Make sure that the line voltage is correct for the printer power configuration. (See the label that is on the back of the printer for voltage requirements.) If a power strip is in use, and its voltage is not within specifications, connect the printer directly into the electrical outlet. If it is already connected into the outlet, try a different outlet.

   If the control panel is not responding to touch (M506x and M527 models), or if it appears black or blank, try the following:

   > **NOTE:** The following conditions indicate that the printer has frozen while in Sleep mode. Opening a door, tapping the control panel (touchscreen control panels), or pressing a control-panel button (LCD control panels) causes the printer to wake up from Sleep mode.

   - The control-panel home button LED is illuminated.

   - The power-switch LED flashes once every three to five seconds.

   a. Turn the printer power off, and then on again.

   b. b. Verify that the control panel is correctly functioning by accessing the control panel diagnostics. See the Control-panel checks section of the printer Troubleshooting Manual.

   > **TIP:** The LED on the formatter will blink if the control panel is not detected or the cables are not properly seated.

   If the control panel does not respond to the diagnostic button, try the following:

   - Try printing from a host computer. Does the printer print a test page?

   - Is the printer HP Embedded Web Server (EWS) accessible?

- Turn the power off.

- Reseat the cable connections on the bottom of the control-panel assembly and the control-panel connectors at the formatter.

- Turn the printer power on, and then check for functionality of the control-panel by tapping the touchscreen or pressing a button on the LCD control panel.

c. Try upgrading the firmware. If the firmware upgrade fails to resolve the problem, and the printer still freezes while in Sleep mode, elevate the case after collecting the following info:

d. If the error persists, replace the control-panel assembly.

2. The control panel should indicate a Ready, Paused, or Sleep mode on status. If an error message displays, resolve the error.

- Try using the Power-on checks section in the printer *Troubleshooting Manual* to solve the problem.

3. For network connection errors, check the cables.

a. Check the network cable connections between the printer and the computer or network port. Make sure that the connections are secure.

> **NOTE:** The network LEDs should be illuminated and flashing.

b. Make sure that the cables are not faulty by trying different cables, if possible.

c. Check the network connection. Verify that the port is active.

4. Print a configuration page. If the printer is connected to a network, an HP Jetdirect page also prints.

Print a configuration page from a touchscreen control panel

a. From the Home screen on the printer control panel, scroll to and touch the Administration button.

b. Open the following menus:

- Reports

- Configuration/Status Pages

- Configuration Page

c. Touch Configuration Page to select it.

> **TIP:** Multiple report pages can be selected, and then printed together.

d. Touch the Print button to print the pages.

Print a configuration page from a LCD control panel

a. From the Home screen on the printer control panel, use the ▼ to scroll to Administration, and then press the OK button.

b. If necessary, use the down arrow ▼ button to scroll to Reports, and then press the OK button.

c. If necessary, use the down arrow ▼ button to scroll to Configuration/Status Pages, and then press the OK button.

d. Use the down arrow ▼ button to scroll to Configuration page, and then press the OK button to select it.

e. Use the up arrow ▲ button to scroll to Print, and then press the OK button to print the pages.

> ☆ **TIP:** Multiple report pages can be selected, and then printed together.

● If the pages do not print, check that at least one tray contains paper.

> ☆ **TIP:** Make sure that the selected paper size and type meet HP specifications. Also open the **Trays** menu on the printer control panel and verify that the tray is configured correctly for the paper type and size.

● If the page jams in the printer, follow the instructions on the control panel to clear the jam.

● If the page does not print correctly, the problem is with the printer hardware.

● If the page prints correctly, the printer hardware is working. The problem is with the host computer, with the print driver, or with the program.

5. Print a supplies status page and then check that the maintenance items below are not at their end-of-life.

> ☆ **TIP:** If a maintenance item needs to be replaced, order the part number provided below.

Print a supplies status page from a touchscreen control panel

a. From the Home screen on the printer control panel, scroll to and touch the Administration button.

b. Open the following menus:

- Reports
- Configuration/Status Pages
- Supplies Status Page

c. Touch the Print button to print the page, and then check the maintenance items (listed below in this step).

> ☆ **TIP:** Multiple report pages can be selected, and then printed together.

Print a supplies status page from a LCD control panel

a. From the Home screen on the printer control panel, use the down arrow ▼ button to scroll to Administration, and then press the OK button.

b. If necessary, use the down arrow ▼ button to scroll to Reports, and then press the OK button.

c. If necessary, use the down arrow ▼ button to scroll to Configuration/Status Pages, and then press the OK button.

d. Use the down arrow ▼ button to scroll to Supplies Status Page, and then press the OK button to select it.

e. Use the up arrow ▲ button to scroll to Print, and then press the OK button to print the page, and then check the maintenance items (listed below in this step).

☼ **TIP:** Multiple report pages can be selected, and then printed together.

📝 **NOTE:** HP long-life consumables and maintenance kit life specifications are estimations. Actual individual life/yield during normal use varies depending on usage, environment, media, and other factors. Estimated life is not an implied guarantee or warrantable.

- Fixing assembly (fuser); estimated life: 150,000 pages

    ◦ RM2–5679–000 (110V)

    ◦ RM2–5692–000 (220V)

- Document feeder maintenance kit; estimated life: 150,000 pages

    ◦ B5L52–67903

6. Verify that the correct print driver for this printer is installed. Check the program to make sure that the print driver for this printer is used. The print driver is on the CD that came with the printer, or can be downloaded from this Web site: www.hp.com/support/ljM501, www.hp.com/support/ljM506, www.hp.com/support/ljM527MFP.

7. Print a short document from a different program that has worked in the past. If this solution works, the problem is with the program. If this solution does not work (the document does not print), complete these steps:

    a. Try printing the job from another computer that has the printer software installed.

    b. If the printer is connected to the network, connect the printer directly to a host computer with a USB cable. Redirect the printer to the correct port, or reinstall the software (make sure to select the new connection type).

Print menu map (M506/M527)

To more easily navigate individual settings, print a report of the complete Administration menu.

Print the menu map from a touchscreen control panel

1. From the Home screen on the printer control panel, scroll to and touch the Administration button.

2. Open the following menus:

   - Reports

   - Configuration/Status Pages

3. Select the Administration Menu Map option.

4. Touch the Print button to print the report.

   ☼ **TIP:** Multiple report pages can be selected, and then printed together.

Print the menu map from a LCD control panel

1. From the Home screen on the printer control panel, use the down arrow ▼ button to scroll to Administration, and then press the OK button.

2. Open the following menus:

   - Reports

   - Configuration/Status Pages

3. Use the down arrow ▼ button to scroll to Administration Menu Map, and then press the OK button to select it.

4. Use the up arrow ▲ button to scroll to Print, and then press the OK button to print the pages.

   ☼ **TIP:** Multiple report pages can be selected, and then printed together.

Print current settings pages (M506/M527)

Printing the current settings page provides a map of the user configurable settings that might be helpful in the troubleshooting process.

Print the current settings page from a touchscreen control panel

1. From the Home screen on the printer control panel, scroll to and touch the Administration button.

2. Open the following menus:

   - Reports

   - Configuration/Status Pages

3. Select the Current Settings Page option.

4. Touch the Print button to print the report.

   ☼ **TIP:** Multiple report pages can be selected, and then printed together.

Print the current settings page from a LCD control panel

1. From the Home screen on the printer control panel, use the down arrow ▼ button to scroll to Administration, and then press the OK button.

2. Open the following menus:

   ● Reports

   ● Configuration/Status Pages

3. Use the down arrow ▼ button to scroll to Current Settings Page, and then press the OK button to select it.

4. Use the up arrow ▲ button to scroll to Print, and then press the OK button to print the pages.

   ☼ **TIP:** Multiple report pages can be selected, and then printed together.

Print event log (M506/M527)

Printing the event log might be helpful in the troubleshooting process. For more information, see the Interpret control-panel messages and event log entries section in the printer troubleshooting manual.

Print the event log from the Administration menu from a touchscreen control panel

1. From the Home screen on the printer control panel, scroll to and touch the Administration button.

2. Open the following menus:

   ● Troubleshooting

   ● Event Log

3. The event log displays on the screen. To print it, touch the Print button.

Print the event log from the Administration menu from a LCD control panel

1. From the Home screen on the printer control panel, use the down arrow ▼ button to scroll to Administration, and then press the OK button.

2. Use the down arrow ▼ button to scroll to Troubleshooting, and then press the OK button.

3. If necessary, use the down arrow ▼ button to scroll to Print Event Log, and then press the OK button to print the page.

Print the event log from the Service menu from a touchscreen control panel

1. From the Home screen on the printer control panel, scroll to and touch the Device Maintenance button.

2. Open the Service menu.

3. On the sign-in screen, select the Service Access Code option from the drop-down list.

4. Enter the following service access code for the printer:

   ● 10050615 (M506)

   ● 11052715 (M527)

5. Touch the Print Event Log item.

Print the event log from the Service menu from a LCD control panel

1. From the Home screen on the printer control panel, use the down arrow ▼ button to scroll to Device Maintenance, and then press the OK button.

2. Use the down arrow ▼ button to scroll to Service, and then press the OK button.

3. On the sign-in screen, use the down arrow ▼ button to scroll to Service Access Code option and then press the OK button.

4. Enter the following service access code for the printer:

    ● 10050615 (M506)

    ● 11052715 (M527)

5. If necessary, use the down arrow ▼ button to scroll to Print Event Log, and then press the OK button to print the page.

Clear the event log from a touchscreen control panel

1. From the Home screen on the printer control panel, scroll to and touch the Device Maintenance button.

2. Open the Service menu.

3. On the sign-in screen, select the Service Access Code option from the drop-down list.

4. Enter the following service access code for the printer:

    ● 10050615 (M506)

    ● 11052715 (M527)

5. Select the Clear Event Log item, and then touch the OK button.

Clear the event log from a LCD control panel

1. From the Home screen on the printer control panel, use the down arrow ▼ button to scroll to Device Maintenance, and then press the OK button.

2. Use the down arrow▼ button to scroll to Service, and then press the OK button.

3. On the sign-in screen, use the down arrow ▼ button to scroll to Service Access Code option and then press the OK button.

4. Enter the following service access code for the printer:

    ● 10050615 (M506)

    ● 11052715 (M527)

5. If necessary, use the down arrow ▼ button to scroll to Clear Event Log, and then press the OK button.

Pre-boot menu options (M506/M527)

The Pre-boot menus are available prior to the printer initializing.

⚠ **CAUTION:**   The Format Disk option (printers with a hard-disk drive only) performs a disk initialization for the entire disk. The operating system, firmware files, and third party files (among other files) will be completely lost. HP does not recommend this action.

💡 **TIP:**   The Pre-boot menu can be remotely accessed by using a telnet network protocol to establish an administration connection to the printer. See Remote Admin (M506/M527) on page 88.

Open the Pre-boot menu from a touchscreen control panel

1.   Touch the middle of the control-panel display when you see the 1/8 under the logo.

Figure 2-1 Open the Pre-boot menu
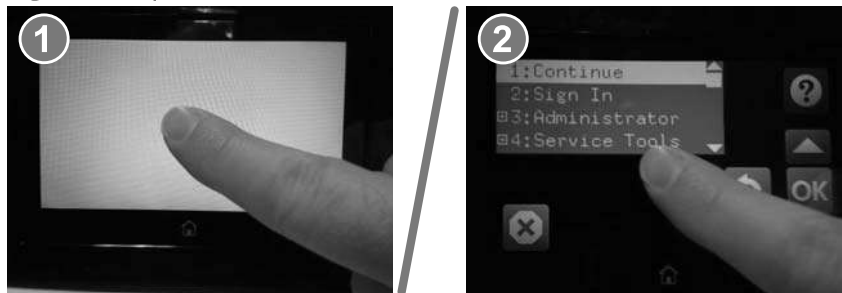
2. On the Pre-boot menu screen, use the following buttons to navigate the tests.

Figure 2-2 Pre-boot menu
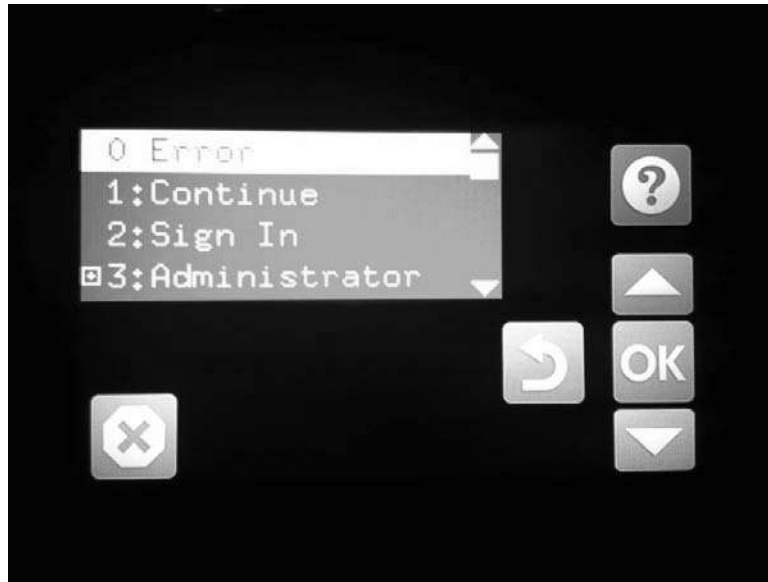
	Use this button to see more information about a selected item.
	Use this button to scroll up through menu items.
	Use this button to select a highlighted menu item.
	Use this button to scroll down through menu items.
	Use this button to go back to the previous menu.
	Not used.
	Use this button to exit a diagnostic test.

3. Use the arrow buttons on the touchscreen to navigate the Pre-boot menu.

4. Touch the OK button to select a menu item.

Open the Pre-boot menu from a LCD control panel

1. Press the Cancel ⊗ button when you see the 1/8 under the logo.

2. Use the arrow buttons on the control panel to navigate the Pre-boot menu.

3. Press the OK button to select a menu item.

Cold reset using the Pre-boot menu from a touchscreen control panel

⚠ **CAUTION:** This procedure resets all printer configurations and settings to factory defaults (customer configurations and settings are lost).

1. Touch the middle of the control-panel display when you see the 1/8 under the logo.

   Figure 2-3 Open the Pre-boot menu
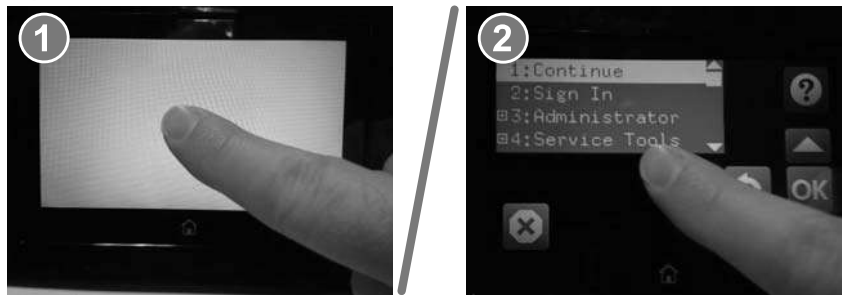
2. Use the ▼ button to highlight the +3:Administrator item, and then touch the OK button.

3. Use the ▼ button to highlight the +8:Startup Options item, and then touch the OK button.

4. Use the ▼ button to highlight the 2 Cold Reset item, and then touch the OK button to select it.

5. Touch the Home button to return to the main Pre-boot menu and highlight the 1:Continue item, and then touch the OK button.

   📝 **NOTE:** The printer will initialize.

Cold reset using the Pre-boot menu from a LCD control panel

⚠ **CAUTION:** This procedure resets all printer configurations and settings to factory defaults (customer configurations and settings are lost).

1. Press the Cancel ⊗ button when you see the 1/8 under the logo.

2. Use the down arrow ▼ button to highlight the +3:Administrator item, and then press the OK button.

3. Use the down arrow ▼ button to highlight the +8:Startup Options item, and then press the OK button.

4. Use the down arrow ▼ button to highlight the 2 Cold Reset item, and then press the OK button to select it.

5. Touch the Home button to return to the main Pre-boot menu and highlight the 1:Continue item, and then touch the OK button.

> **NOTE:** The printer will initialize.

> **NOTE:** Some of the pre-boot options in the following tables are not supported by the current version of the printer firmware and are included for information only. Future versions of firmware will support these options.

Table 2-1 Pre-boot menu options (1 of 7)

Menu option	First level	Second level	Third level	Description
Continue				Selecting the Continue item exits the Pre-boot menu and continues the normal boot process.
				If a selection is not made in the initial menu within 30 seconds, the printer returns to a normal boot (the same as selecting Continue).
				If the user navigates to another menu, the timeout does not apply.
Sign In				Enter the administrator PIN or service PIN if one is required to open the Pre-boot menu.
Administrator				This item navigates to the Administrator submenus.
				If authentication is required (and the user is not already signed in) the Sign In prompt displays. The user is required to sign in.
	Download	Network		This item initiates a Pre-boot firmware download process. A USB Thumbdrive option will work on all FutureSmart printers. USB or Network connections are not currently supported.
		USB		
		USB Thumbdrive		
	Format Disk			This item reinitializes the disk and cleans all disk partitions.
				CAUTION: Selecting the Format Disk item removes **all** data.
				A delete confirmation prompt is **not** provided.
				The system is **not** bootable after this action and a **99.09.67** error displays on the control panel. A firmware download must be performed to return the system to a bootable state.

Table 2-1 Pre-boot menu options (1 of 7) (continued)

Menu option	First level	Second level	Third level	Description
	Partial Clean			This item reinitializes the disk (removing all data except the firmware repository where the master firmware bundle is downloaded and saved).
				CAUTION: Selecting the Partial Clean item removes **all** data except the firmware repository. A delete confirmation prompt is **not** provided.
				CAUTION: This procedure resets all printer configurations and settings to factory defaults (customer configurations and settings are lost).
				This allows a user to reformat the disk by removing the firmware image from the active directory without having to download new firmware code (printer remains bootable).
	Change Password			Select this item to set or change the administrator password.
	Clear Password			Select the Clear Password item to remove a password from the Administrator menu. Before the password is actually cleared, a message will be shown asking to confirm that the password should be cleared. Press the OK button to confirm the action.
				When the confirmation prompt displays, press the OK button to clear the password.

Table 2-2 Pre-boot menu options (2 of 7)

Menu option	First level	Second level	Third level	Description
Administrator (continued)	Manage Disk	Clear disk		Select the Clear disk item to enable using an external device for job storage. Job storage is normally enabled only for the Boot device. This will be grayed out unless the **99.09.68** error is displayed.
		Lock Disk		Select the Lock Disk item to lock (mate) a new secure disk to this printer.
				The secure disk already locked to this printer will remain accessible to this printer. Use this function to have more than one encrypted disk accessible by the printer when using them interchangeably.
				The data stored on the secure disk locked to this printer always remains accessible to this printer.
		Leave Unlocked		Select the Leave Unlocked item to use a new secure disk in an unlocked mode for a single service event. The secure disk that is already locked to this printer will remain accessible to this printer and uses the old disk's encryption password with the new disk.
				The secure disk that is already locked to this printer remains accessible to this printer.

Table 2-2 Pre-boot menu options (2 of 7) (continued)

Menu option	First level	Second level	Third level	Description
		Clear Disk Pwd		Select the Clear Disk Pwd item to continue using the non-secure disk and clear the password associated with the yet-to-be installed secure disk.
				CAUTION: Data on the missing secure disk will be permanently inaccessible.
		Retain Password		Select the Retain Password item to use the non-secure disk for this session only, and then search for the missing secure disk in future sessions.
		Boot Device	Secure Erase	Select the Secure Erase item to erase all of the data on the disk and unlock it if required.
				This might take a long time.
				NOTE: The system will be unusable until the system files are reinstalled. The ATA secure-erase command is a one-pass overwrite, which erases the entire disk including firmware. The disk remains an encrypted disk.
			Erase/Unlock	Select the Erase/Unlock item to cryptographically erase all data on the disk and unlock the disk to allow a user to gain access to it from any printer.
				NOTE: The system will be unusable until the system files are reinstalled. It erases the encryption key. The encryption key is erased, so the disk becomes a non-encrypted disk.
			Get Status	This item provides disk status information if any is available.

Table 2-3 Pre-boot menu options (3 of 7)

Menu option	First level	Second level	Third level	Description
Administrator (continued)	Manage Disk (continued)	Internal Device		Select the Internal Device item to erase the internal device or get a status about the internal device.
			Secure Erase	Select the Secure Erase item to erase all of the data on the disk and unlock it if required.
				This might take a long time.
				NOTE: The system will be unusable until the system files are reinstalled. The ATA secure-erase command erases the entire disk, including firmware. The disk remains an encrypted disk.
			Erase/Unlock	Select the Erase/Unlock item to cryptographically erase all of the data on disk and unlock the disk to allow the user to gain access to it from any printer.
				NOTE: The system will be unusable until the system files are reinstalled. The HP High Performance Secure Hard Disk is erased.
			Get Status	This item provides disk status information if any is available.
		External Device		Select the External Device item to erase the external device or get status about the external device.

Table 2-3 Pre-boot menu options (3 of 7) (continued)

Menu option	First level	Second level	Third level	Description
			Secure Erase	Select the Secure Erase item to erase all of the data on the disk and unlock it if required. This might take a long time. **NOTE:** The system will be unusable until the system files are reinstalled. The ATA secure-erase command erases the entire disk, including firmware. The disk remains an encrypted disk.
			Erase/Unlock	Select the Erase/Unlock item to cryptographically erase all of the data on disk and unlock the disk to allow a user to gain access to it from any printer. **NOTE:** The system will be unusable until the system files are reinstalled. The encryption key is erased, so the disk becomes a non-encrypted disk.
			Get Status	This item provides disk status information if any is available.

Table 2-4 Pre-boot menu options (4 of 7)

Menu option	First level	Second level	Third level	Description
Administrator (continued)	Configure LAN **NOTE:** This configuration is only active when the Pre-boot menu is open.	IP Mode [DHCP]		The network can be configured to obtain the network settings from a DHCP server or as static. Use this item for automatic IP address acquisition from the DHCP server.
		IP Mode [STATIC]		Use this item to manually assign the network addresses.
			IP Address	Use this item to manually enter the IP addresses.
			Subnet Mask	Use this item to manually enter the subnet mask.
			Default Gateway	Use this item to manually enter the default gateway.
			Save	Select the Save item to save the manual settings.

Table 2-5 Pre-boot menu options (5 of 7)

Menu option	First level	Second level	Third level	Description
Administrator (continued)	Startup Options			Select the Startup Options item to specify options that can be set for the next time the printer is turned on and initializes to the **Ready** state.
		Show Revision		**Not currently functional**: Select the Show Revision item to allow the printer to initialize and show the firmware version when the printer reaches the **Ready** state. Once the printer power is turned on the next time, the Show Revision item is unchecked so that the firmware revision is not shown.

Table 2-5 Pre-boot menu options (5 of 7) (continued)

Menu option	First level	Second level	Third level	Description
		Cold Reset		Select the Cold Reset item to clear the IP address and all customer settings. (This item also returns all settings to factory defaults.) **NOTE:** Items in the Service menu are not reset.
		Skip Disk Load		Select the Skip Disk Load item to disable installed third-party applications.
		Skip Cal		Select the Skip Cal item to skip the printer calibration for the very next power-initialization cycle only.
		Lock Service		**CAUTION:** Select the Lock Service item to lock the Service menu access (both in the Pre-boot menu and the Device Maintenance menu). Service personnel must have the administrator remove the Lock Service setting before they can open the Service menu.
		Skip FSCK		Select the Skip FSCK item to disable Chkdisk/ScanVolume during startup.
Administrator (continued)	Startup Options (continued)	First Power		**Not currently functional**: This item allows the printer to initialize as if it is the first time it has been turned on. For example, the user is prompted to configure first-time settings like date/time, language, and other settings. Select this item so that it is enabled for the next time the printer power is turned on. When the printer power is turned on the next time, this item is unchecked so that the pre-configured settings are used during configuration, and the first-time setting prompt is not used.
		Embedded Jetdirect Off		Select the Embedded Jetdirect Off item to disable the embedded HP Jetdirect. By default this item is unchecked so that HP Jetdirect is always enabled.
		WiFi Accessory		Select the WiFi Accessory item to enable the wireless accessory.

Table 2-6 Pre-boot menu options (6 of 7)

Menu option	First level	Second level	Third level	Description
Administrator (continued)	Diagnostics			Diagnostic items are useful to diagnose hardware components and their interface connections. Use these items to troubleshoot specific hardware components, and the interface between them and other components.
		Memory	Do Not Run	Use the Do Not Run item to exclude the Memory diagnostic when executing multiple diagnostics.

Table 2-6 Pre-boot menu options (6 of 7) (continued)

Menu option	First level	Second level	Third level	Description
			Short	Use the Short item to select a brief memory test. **NOTE:** This test requires about four minutes to execute.
			Long	Use the Long item to select an extended memory test. **NOTE:** This test requires about twenty minutes to execute.
		Disk	Do Not Run	Use the Do Not Run item to exclude the Disk diagnostic when executing multiple diagnostics.
			Short	Use the Short item to select a brief firmware self-test. **NOTE:** This test requires about two or three minutes to execute.
			Long	Use the Long item to select an extended firmware self-test. **NOTE:** This test requires about sixty minutes to execute.
			Optimized	Use the Optimized item to select a test that checks the active sectors on the disk. **NOTE:** This test requires about thirty minutes to execute.
			Raw	Use the Raw item to select a test that checks every sector on the disk. **NOTE:** This test requires about fifty minutes to execute.
			Smart	Use the Smart item to select a very brief test that checks the drive self-monitoring analysis and reporting technology (SMART) status—the drive detects and reports reliability indicators to help anticipate disk failures (SMART status).
		CPB		Use the CPB item to verify the integrity of the copy processor board (CPB) and the formatter PCA connections.
		Interconnect		Use the Interconnect item to verify the integrity of the interconnect PCA (ICB) and its connections.
		Run Selected		Select the Run Selected item to execute a selected test. **NOTE:** If more than one test is selected, they are executed in sequence.

Table 2-7 Pre-boot menu options (7 of 7)

Menu option	First level	Second level	Third level	Description
Administrator (continued)	Remote Admin	Start Telnet		The Remote Admin item allows a service technician to access to the printer Pre-boot menu remotely, and to navigate the menu selections from a remote location.
				IMPORTANT: A Remote Admin connection must be initiated by a person that is physically present at the printer.
				This person will also need to provide a randomly generated PIN to the remote service technician.
				NOTE: For more information about using the Remote Admin function, see Remote Admin (M506/M527) on page 88.
		Stop Telnet		
		Refresh IP		
	System Triage	Copy Logs		If the device will not boot to the **Ready** state, or the diagnostic log feature found in the Troubleshooting menu is not accessible, then use the System Triage item to copy the diagnostic logs to a USB flash drive at the next printer start up.
				The files can then be sent to HP to help diagnose the problem.
	Change Svc PWD			Use this item to change the Service menu personal identification number (PIN).
	Reset Svc PWD			If the Service menu personal identification number (PIN) has been changed. Use this item to reset it to the original PIN.
Service Tools	Reset Password			Use this item to reset the Pre-boot administrator password.
	Subsystems			For manufacturing use only. Do not change these values.
Developer Tools	Netexec			

Remote Admin (M506/M527)

The Remote Admin feature allows remote access the printer Pre-boot menu (BIOS environment). The printer functions as a telnet server which uses the telnet networking protocol to transmit text data. Any computer (with telnet installed and enabled) can function as the telnet client to remotely display and interact with the Pre-boot menu.

**IMPORTANT:** While the Remote Admin function allows remote access the Pre-boot menu, for security reasons the Remote Admin connection must be initiated by a person that is physically present at the printer.

This section describes the following Remote Admin items.

● Required software and network connection

● Connect a remote connection

● Disconnect a remote connection

Required software and network connection

Before using the Remote Admin feature, make sure that the telnet network protocol is installed, and enabled, on the remote telnet client computer.

NOTE: This section describes enabling and configuring the telnet feature for computers using a Windows® operating system.

HP recommends that the telnet client computer be a Windows based system, however, there are other operating systems that support the telnet network protocol. For information about enabling and configuring the telnet network protocol for other operating systems, see the owner's manual for that operating system.

Telnet client

Enable the Windows telnet client

All computers using the Windows operating system have the telnet client installed, however, the telnet client function might not be enabled by default.

NOTE: The figures and menus in this section are for the Windows 7 Enterprise® operating system. Screens and menu selections might vary slightly for other operating systems.

1. Use the **Start** menu to open the **Control Panel**, and then click the **Programs** item to select it.

Figure 2-4 Open the Control Panel

2. Click the **Turn Windows features on or off** item to select it.

Figure 2-5 Turn Windows features on or off
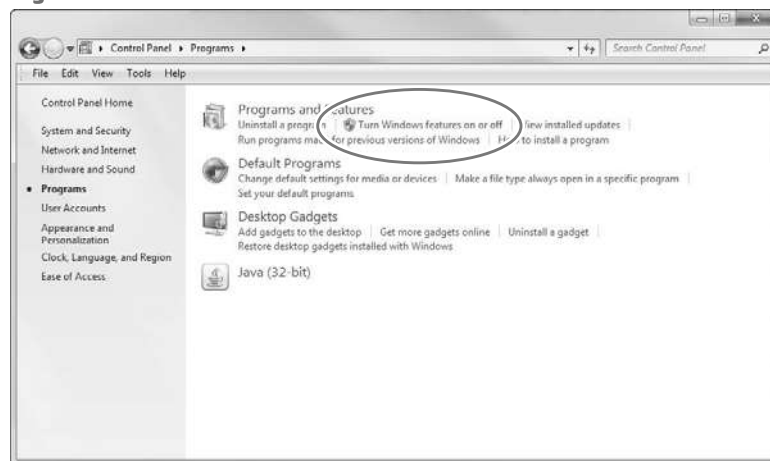
3. In the **Windows Features** box, scroll down to **Telnet Client**. If the check box is not checked, click the box to select it, and then click the **OK** button.

☼ **TIP:**   If the check box is already checked then the telnet client function is already enabled. Click the **Cancel** button.

Figure 2-6 Enable the telnet client feature
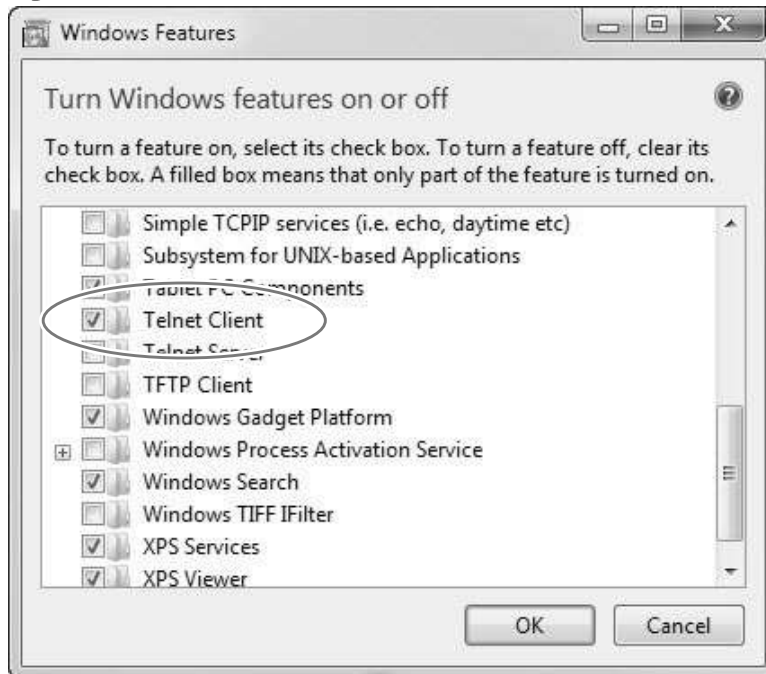
Network connection

The remote telnet client computer must have direct network access to the printer for the Remote Admin function to operate. This means that the telnet client computer must be on the same network as the printer. The Remote Admin function cannot be accessed through a network firewall or other remote access network security programs.

If a private network is not accessible, ask the network administrator to set up a virtual private network (VPN) connection to the network.

Connect a remote connection

Start the telnet server function at the printer

For security reasons the Remote Admin feature must be initiated by a person that is physically present at the printer. The following steps must be performed by a person that is physically present at the printer.

📝 **NOTE:**   This person might need to sign in with an administrator or service password depending on how the printer is configured.

1. Turn the printer on.

2. The HP logo displays on the printer control panel. When a "1/8" with an underscore displays, touch the middle of the screen to open the Pre-boot menu.

3. Use the arrow buttons on the touchscreen to scroll down and highlight the **+3:Administrator** item, and then touch the OK button to select it.

    Figure 2-7 Select the +3:Administrator item

    ```
     1:Continue
     2:Sign In
    +3:Administrator
    +4:Service Tools
    ```
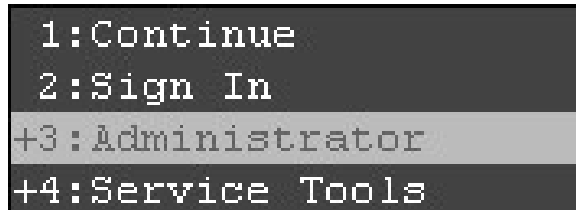
4. Use the arrow buttons on the touchscreen to scroll down and highlight the **+A:Remote Admin** item, and then touch the OK button to select it.

    Figure 2-8 Select the +A:Remote Admin item

    ```
    +7:Configure LAN
    +8:Startup Options
     9:Diagnostics
    +A:Remote Admin
    ```
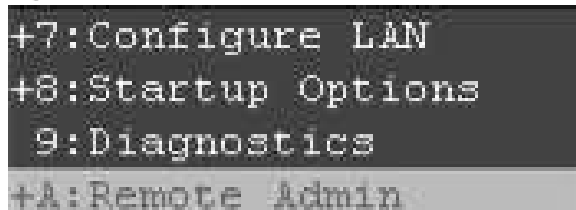
5. Use the arrow buttons on the touchscreen to scroll down and highlight the **1:Start Telnet** item, and then touch the OK button to select it.

    Figure 2-9 Select the 1:Start Telnet item

    ```
     1:Start Telnet
     2:Stop  Telnet
     3:Refresh IP
    ```

6. Do one of the following

    ● If a connecting message displays briefly, go to step 7.

       Figure 2-10 Telnet connecting message

       ```
          Start Telnet
       Connecting...
       ```
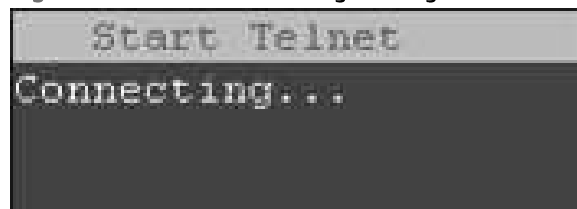
    ● If an error message displays, use the steps below to identify the problem.

Figure 2-11 Telnet error message

```
     Start Telnet
Unable to connect
Contact network
administrator.
```

a. The printer network cable is not correctly connected.

b. The BIOS LAN settings are incorrect.

 ● The printer should be configured to use a static IP address, but is configured to use DHCP instead.

 ● The printer is configured to use a static IP address, but the IP address is incorrect.

c. The printer is correctly configured to use DHCP, but the DHCP server is not turned on or is malfunctioning.

7. When the printer telnet server function is initialized, the following screen appears. Use the information on this screen to connect the remote telnet client computer to the printer.

📝 **NOTE:**   The printer is now ready to receive remote telnet client commands.

 ● **IP**: The static or dynamically allocated IP address for the printer.

 ● **Port**: The standard telnet port (23).

 ● **Pin**: A randomly generated 4-digit personal identification number (PIN).

Figure 2-12 Telnet server function initialized

```
     Start Telnet
IP: 16.88.109.66
Port: 23
Pin : 4031
```
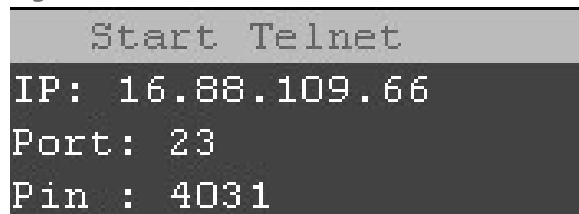
Start the telnet client function at the remote computer

The following steps establish a Remote Admin connection from a remote computer to the printer.

1. From the **Start** menu click **Run** to open a dialog box, type `cmd` in the **Open** field, and then click the **OK** button to open a Windows command window.

Figure 2-13 Open a command window
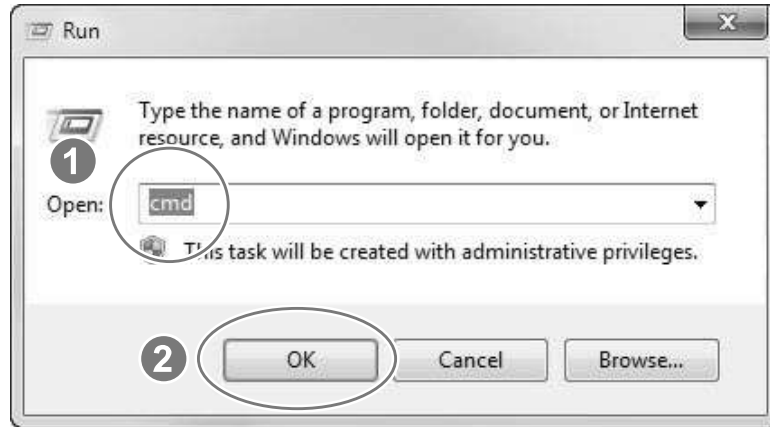
2. From any displayed directory, type `telnet` at the prompt, and then press the **Enter** key.

Figure 2-14 Start a telnet session
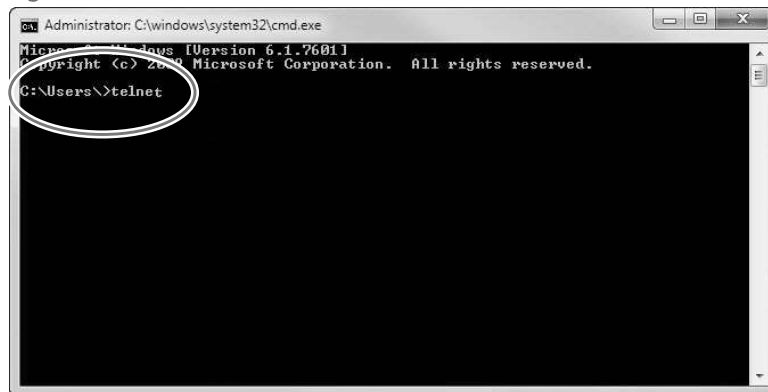
3. Type `o <IP ADDRESS>` at the telnet prompt, and then press the **Enter** key.

📝 **NOTE:** For `<IP ADDRESS>`, substitute the IP address that was displayed in step 7 in Start the telnet server function at the printer on page 90.

💡 **TIP:** If the telnet connection fails to establish a connection, the printer is probably behind a firewall or on a different network that the remote telnet client computer. See Network connection on page 90.

Figure 2-15 Establish a telnet connection
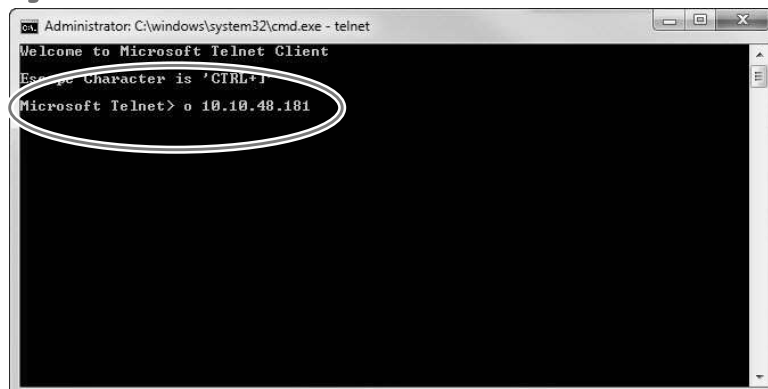
4. Type the PIN that was displayed in step 7 in <u>Start the telnet server function at the printer on page 90</u> at the prompt, and then press the **Enter** key.

> 📝 **IMPORTANT:** Make sure to type the PIN correctly. After five incorrect PIN entries, the printer terminates the Remote Admin connection. The Remote Admin feature must be re-initiated at the printer. See <u>Start the telnet server function at the printer on page 90</u>.

Figure 2-16 Enter the PIN

5. The following screen displays when the correct PIN is entered and the Remote Admin connection is successful. For information about the Pre-boot menu and options, see <u>Pre-boot menu options (M506/M527) on page 78</u>.

> 📝 **NOTE:** Because a Remote Admin connection is an unsecure telnet network protocol connection, the following Pre-boot menu items are disabled for the remote telnet client computer.

- The **+3:Administrator** menu **4:Change Password** item.

- The **+3:Administrator** menu **5:Clear Password** item.

- The **+3:Administrator** menu **6:Disk Manage** item.

Figure 2-17 Remote Admin window

Disconnect a remote connection

The Remote Admin connection can be terminated from the printer control panel or the remote telnet client computer.

> 📝 **NOTE:** The following procedure describes terminating a Remote Admin connection from the remote telnet client computer.

1. From the Pre-boot main menu, use the arrow buttons on the keyboard to scroll down to the **+3:Administrator** item, and then press the **Enter** key.

   Figure 2-18 Access the administrator menu
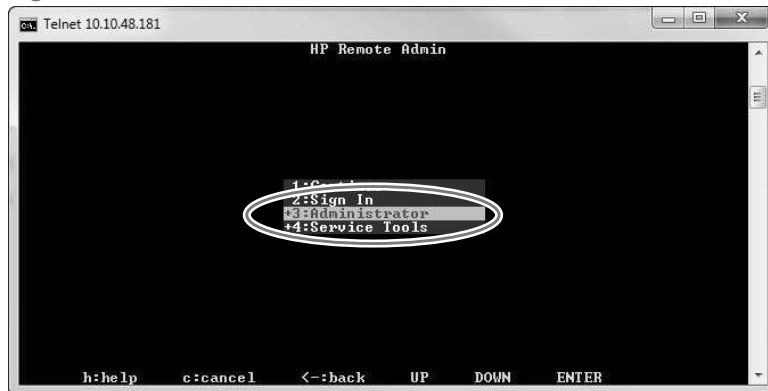
2. Use the arrow buttons on the keyboard to scroll down to the **+A:Remote Admin** item, and then press the **Enter** key.

   Figure 2-19 Access the remote admin menu
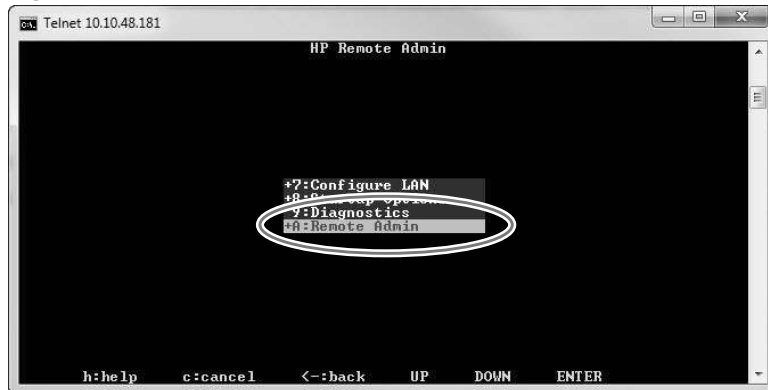
3. Use the arrow buttons on the keyboard to scroll down to the **2:Stop Telnet** item, and then press the **Enter** key. The Remote Admin connection between the printer and the remote telnet client computer terminates.

   IMPORTANT: The printer remains in the Pre-boot menu. Have the person that is physically present at the printer do the following:

   ● Touch the Home button to return to the main Pre-boot menu and highlight the **1:Continue** item, and then touch the OK button. The printer will continue to initialize.

Figure 2-20 Terminate the telnet connection
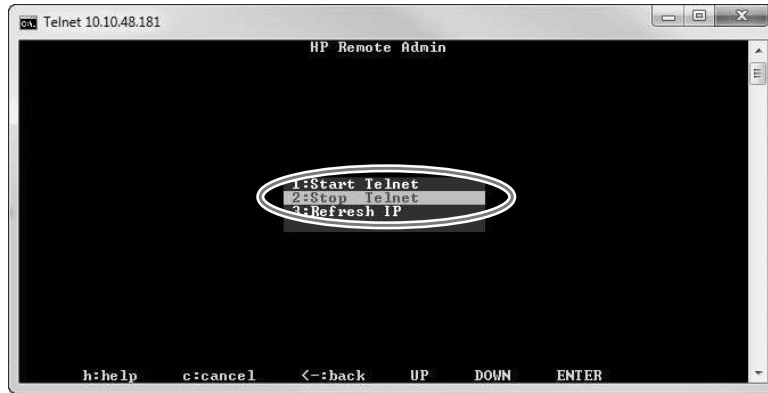
Troubleshooting process

- Determine the problem source

- Power subsystem

- Control panel checks (M501)

- Control panel checks (M506/M527)

Determine the problem source

When the printer malfunctions or encounters an unexpected situation, the printer control panel alerts the user to the situation. This section contains a pre-troubleshooting checklist and a troubleshooting flow chart to filter out many possible causes of the problem. Use the pre-troubleshooting checklist to gather information about the problem from the customer. Use the troubleshooting flowchart to help diagnose the root cause of the problem. The remainder of this chapter provides steps for correcting problems.

- Use the pre-troubleshooting check list to gather information about the problem from the customer. See Pre-troubleshooting checklist on page 97.

- Use the troubleshooting flowchart to pinpoint the root cause of hardware malfunctions. The flowchart provides guides to the section of this chapter that contain steps to correct the malfunction. See Troubleshooting flowchart on page 98.

Before beginning any troubleshooting procedure, check the following issues:

- Are supply items within their rated life?

- Does the configuration page reveal any configuration errors?

📝 **NOTE:** The customer is responsible for checking supplies and for using supplies that are in good condition.

Pre-troubleshooting checklist

The following table includes basic questions to ask the customer to quickly help define the problem(s).

General topic	Questions
Environment	- Is the printer installed on a solid, level surface (+/- 1°)?
	- Is the power-supply voltage within ± 10 volts of the specified power source?
	- Is the power-supply plug inserted in the printer and the wall outlet (not a surge protector)?
	- Is the operating environment within the specified parameters?
	- Is the printer exposed to ammonia gas, such as that produced by diazo copiers or office cleaning materials?
	NOTE: Diazo copiers produce ammonia gas as part of the copying processes. Ammonia gas (from cleaning supplies or a diazo copier) can have an adverse effect on some printer components (for example, the toner cartridge or cartridges OPC).
	- Is the printer exposed to direct sunlight?
	- Is the printer exposed to an air conditioning or heating vent that can cause temperature fluctuations?

General topic	Questions
Media	• Does the customer use only supported media?
	• Is the media in good condition (no curls, folds, or distortion)?
	• Is the media stored correctly and within environmental limits?
Input trays	• Is the amount of media in the tray within specifications?
	• Is the media correctly placed in the tray?
	• Are the paper guides aligned with the stack (no gaps in the stack or excessive pressure causing the stack to bow)?
	• Is the tray (or trays) correctly installed in the printer?
Toner cartridge	• Is the toner cartridge (or cartridges) installed correctly?
Transfer unit and fuser	• Are the transfer unit and fuser installed correctly?
	NOTE: For printers with an intermediate transfer belt (ITB), is the ITB installed correctly and fully seated. If a replacement ITB was installed, was all of the packing materials removed?
Covers	• Is the toner cartridge door closed?
Condensation	• Does condensation occur following a temperature change (particularly in winter following cold storage)? If so, wipe affected parts dry or leave the printer on for 10 to 20 minutes.
	• Was a toner cartridge (or cartridges) opened soon after being moved from a cold to a warm room? If so, allow the toner cartridge (or cartridges) to sit at room temperature for 1 to 2 hours.
Miscellaneous	• Check for and remove any non-HP components (toner cartridges, memory modules, and EIO cards) from the printer.
	• Remove the printer from the network and ensure that the failure is associated with the printer before beginning troubleshooting.
	• For any color print-quality issues (color printers only), calibrate the printer, and then print a diagnostics page to verify print quality.

Troubleshooting flowchart

This flowchart highlights the general processes to follow to quickly isolate and solve printer hardware problems.

Each row depicts a major troubleshooting step. Follow a "yes" answer to a question to proceed to the next major step. A "no" answer indicates that more testing is needed. Go to the appropriate section in this chapter, and follow the instructions there. After completing the instructions, go to the next major step in this troubleshooting flowchart.

Table 2-8 Troubleshooting flowchart

1 **Power on**	Is the printer on and does a readable message display?		Follow the power-on troubleshooting checks. See Power subsystem on page 99.
	Yes ↓	No →	After the control panel display is functional, see step 2.

Table 2-8 Troubleshooting flowchart (continued)

2 Control panel messages	Does the message **Ready** display on the control panel?		After the errors have been corrected, go to step 3.
	Yes ↓	No →	
3 Event log	Open the Troubleshooting menu and print an event log to see the history of errors with this printer. Does the event log print?		If the event log does not print, check for error messages. If paper jams inside the printer, see the jams section of the printer service manual. If error messages display on the control panel when trying to print an event log, see the control panel message section of the printer troubleshooting service manual. After successfully printing and evaluating the event log, see step 4.
	Yes ↓	No →	
4 Information pages	Open the Reports menu and print the configuration pages to verify that all the accessories are installed. Are all the accessories installed?		If accessories that are installed are not listed on the configuration page, remove the accessory and reinstall it. After evaluating the configuration pages, see step 5.
	Yes ↓	No →	
5 Print quality	Does the print quality meet the customer's requirements?		Compare the images with the sample defects in the image defect tables. See the images defects table in the printer repair service manual. After the print quality is acceptable, see step 6.
	Yes ↓	No →	
6 Interface	Can the customer print successfully from the host computer?		Verify that all I/O cables are connected correctly and that a valid IP address is listed on the HP Jetdirect configuration page.
	Yes. This is the end of the troubleshooting process.	No →	If error messages display on the control panel when trying to print an event log, see the control-panel message section of the printer troubleshooting service manual. When the customer can print from the host computer, this is the end of the troubleshooting process.

Power subsystem

Power-on checks

The basic printer functions should start up when the printer is connected into an electrical outlet and the power switch is pushed to the *on* position. If the printer does not start, use the information in this section to isolate and solve the problem.

If the control panel display remains blank, random patterns display, or asterisks remain on the control panel display, perform power-on checks to find the cause of the problem.

NOTE: For touchscreen control panel models, also try the control panel checks in the printer troubleshooting manual.

Power-on troubleshooting overview

During normal operation, cooling fans begins to spin briefly after the printer power is turned on. Place a hand over the vents in the right- and left-side covers. Lean close to the printer to hear the fans operating. If the fan are operating, the dc side of the power supply is functioning.

If the fans are operating correctly, the next troubleshooting step is to isolate print engine, formatter, and control panel problems. Perform an engine test. If the formatter is damaged, it might interfere with the engine test. If the engine-test page does not print, try removing the formatter, and then performing the engine test again. If the engine test is then successful, the problem is almost certainly with the formatter, the control panel, or the cable that connects them.

NOTE: Depressing, and holding down, the test-page switch causes the printer to continually print test pages. Releasing the switch stops the test page continuous printing.

Troubleshooting power on problems

1. Verify that power is available to the printer. If the printer is plugged into a surge protector or uninterruptible power supply (UPS), remove it, and then plug the printer directly into a known operating wall receptacle (make sure that the wall receptacle provides the correct voltage and current for the printer).

   Unplug any other devices on the same circuit that the printer is using.

2. Try another known operating wall receptacle and a different power cord.

3. Listen for startup noises (for example, fans or motors) and look for illuminated lights on the control panel and formatter LEDs.

   NOTE: Operational fans, motors, and control-panel lights indicate the following:

   ● AC power is present at the printer.

   ● The power supply is providing either or both 24 Vdc and 5 Vdc voltages.

   ● The DC controller microprocessor is functioning.

4. Check the following:

   a. Turn the printer on, and then listen for startup noises. If normal startup noises are heard, go to step c below.

   b. If normal startup noises are not heard, turn the printer off, and then remove any installed accessories (for example, envelope feeders, paper feeders, or output accessories).

      Turn the printer on, and then listen for startup noises. If normal startup noises are heard, the problem might be with one of the accessories.

   c. Turn the printer off and then remove the power connector from the formatter. Turn the printer on, and then use a small pointed object (like a paper clip) to depress the test-page switch located on the rear side of the printer (near the formatter).

      NOTE: The test page can only use Tray 2 as the paper source, so make sure that paper is loaded in Tray 2.

d. If the engine test page prints, the print engine is operating normally. Replace the formatter.

> NOTE: **M506 (all) and M527dn models only**: If the engine test page does not print, turn the printer off, remove the embedded MultiMedia Card (eMMC), and then try the engine test again. If the page prints, the problem might be the eMMC.

e. If after replacing the formatter normal startup noises are still not heard, replace the DC controller.

> NOTE: If the error persists after replacing these assemblies, escalate the problem to the Global Business Unit (GBU).

Troubleshooting a blank control panel

A blank control panel display can be caused by one or more of the following:

- No power to the printer.

- Power supply has tripped (over-current/over-voltage/temperature issue).

- Check the cables and connections on the formatter and at the control panel.

- Faulty components installed on the formatter (for example, memory DIMM or disk drive).

- Faulty control panel.

- **M506 (all) and M527dn models only**: Make sure that the embedded MultiMedia Card (eMMC) PCA is fully seated.

- For touchscreen models, use the control panel checks section in the printer troubleshooting manual to troubleshoot the control panel

1. Verify that power is available to the printer. If the printer is plugged into a surge protector or uninterruptible power supply (UPS), remove it, and then plug the printer directly into a known operating wall receptacle (make sure that the wall receptacle provides the correct voltage and current for the printer).

2. Make sure that the power switch is in the *on* position.

3. Make sure that the fans run briefly, which indicates that the power supply is operational.

4. Make sure that the control-panel display wire harness is connected.

5. Make sure that the formatter connectors are fully seated. Make sure the power switch is in the on position, and then verify that the heartbeat LED is blinking and that the connectivity LED is illuminated.

6. Remove any external solutions, and then try to turn the printer on again.

7. If the control panel display is blank, but the cooling fans run briefly after the printer power is turned on, try printing an engine-test page to determine whether the problem is with the control-panel display, formatter, or other printer assemblies.

    a. Remove the formatter.

    b. Use a small pointed object to depress the test-page switch located on the rear of the printer.

    > **NOTE:** The test page can only use Tray 2 as the paper source, so make sure that paper is loaded in Tray 2.

    c. If the engine test page prints, the print engine is operating normally (a failed engine test print page does not necessarily indicate that the print engine or DC controller is defective).

    d. Use the control-panel diagnostics to test the control panel. See the control panel checks section in the printer troubleshooting manual. If the error persists, proceed to step 8.

8. If the print engine appears to be correctly operating (the engine test page successfully printed) and the control panel is still blank, replace the power supply.

9. If after replacing the power supply normal startup noises and lights are still not present, replace the DC controller.

    > **NOTE:** If the error persists after replacing these assemblies, escalate the problem to the Global Business Unit (GBU).

Control panel checks (M501)

The printer includes diagnostic tests for the control panel. This mode allows for troubleshooting issues with the LEDs (2-line control panels), display, and the buttons.

1. Open the secondary service menu.

   a. From the printer control panel, press the setup ⚲ button to open the main menu.

   b. Press and the down arrow ▼ button, and then quickly press the Cancel ✕ button.

   c. Press the setup ⚲ button. The message **2ndary Service** appears on the control-panel display.

   d. Press the OK button to open the **2ndary Service** menu.

   > 📝 **NOTE:** Use the arrow buttons to scroll though the **2ndary Service** menu.

2. Select one of the following tests:

   - LED test: Test the LED lights on 2-line control panels. The touchscreen control panels do not have any LEDs.

   - Display Test: Test the control panel display.

   - Button Test: Test the control panel buttons.

Control panel checks (M506/M527)

NOTE: The printer includes a diagnostic test mode for the touchscreen control panels. Diagnostic tests are not available for the LCD control panel.

- Control-panel diagnostics (M506x and M527)
- Control panel diagnostic flowcharts (M506x and M527)

Control-panel diagnostics (M506x and M527)

- Touchscreen diagnostic mode (M506x and M527)
- Control-panel system diagnostics (M506x and M527)

Touchscreen diagnostic mode (M506x and M527)

Use the diagnostics in this section to test the control-panel hardware and embedded firmware. These tests are useful for checking control-panel functionality independent of the printer control-panel system diagnostics. To test the control panel using the system diagnostics, see Control-panel system diagnostics (M506x and M527) on page 109.

1. **M506x only**: Locate the diagnostic-tests access button on the back of the control panel.

   Figure 2-21 Diagnostic-tests access button (M506x)

2. **M506x only**: Press the diagnostics-access button. Repeatedly pressing the button cycles through the available diagnostics.

    📝 **NOTE:**   A pen, pencil, or other small blunt object is needed to press the button.

    💡 **TIP:**   When pressed, the button illuminates green.

    Figure 2-22 Press the diagnostics-access button (M506x)
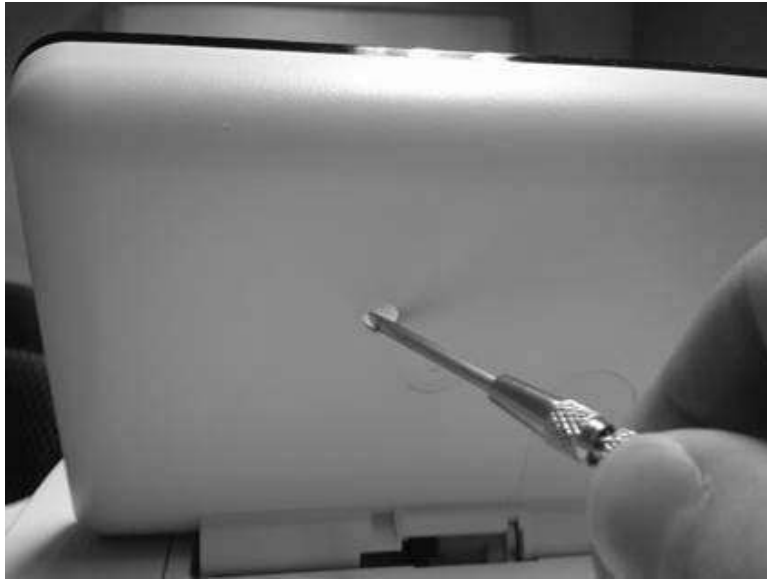
3. **M527 only**: Locate the diagnostic-tests access button on the back of the control panel.

    Figure 2-23 Diagnostic-tests access button (M527)

4. **M527 only**: Press the diagnostics-access button. Repeatedly pressing the button cycles through the available diagnostics.

Figure 2-24 Press the diagnostics-access button (M527)

5. A yellow screen appears (after the first press of the button) indicating that the control-panel firmware is version A (a magenta screen indicates version B firmware).

NOTE: If a different color appears on the screen, contact your global business unit (GBU) to determine the firmware version.

TIP: After 4 seconds of inactivity, the diagnostic mode times out and is exited.

Figure 2-25 Control-panel version A yellow screen
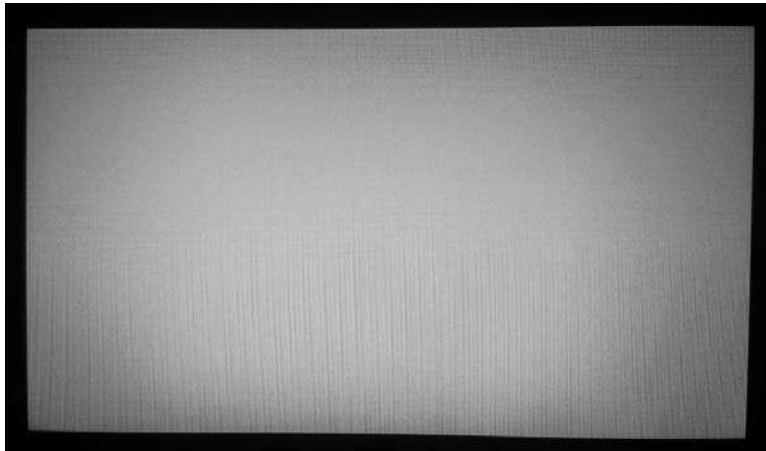
6. Touch the screen to cycle the screen through the following:

● A red screen.

● A green screen.
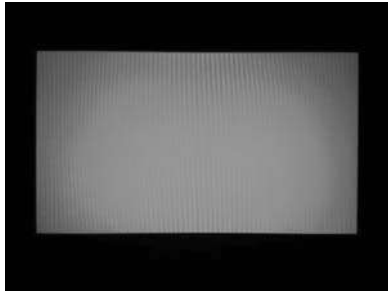
● A blue screen.

● Five brightness levels of a white screen.
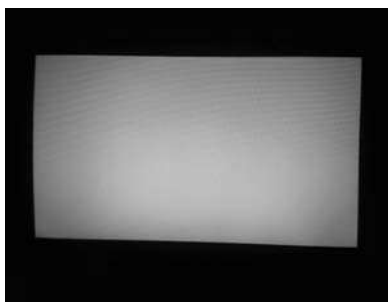
● A final black screen.

☼ **TIP:** When the final black screen displays, press the Home button to cycle through the diagnostic screens and test its functionality.
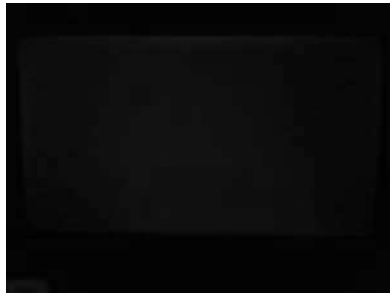
7. Pressing the diagnostic-tests button with the black screen displayed, exits the diagnostic mode.

Figure 2-26 Exit the diagnostic mode

Control-panel system diagnostics (M506x and M527)

Use the diagnostics in this section to test the control-panel hardware and display using the printer firmware system diagnostics.

- Open the control-panel system diagnostic tests

- Screen test

- Touch test

- SoftKey test

- Backlight test

- Sound test

- Keyboard test (M527c/z only)

- Version

Open the control-panel system diagnostic tests

Open the control-panel system diagnostic tests from a touchscreen control panel

1. Turn the printer power off, and then on again.

2. Touch the middle of the control-panel display when you see the 1/8 under the logo.

Figure 2-27 Open the Pre-boot menu
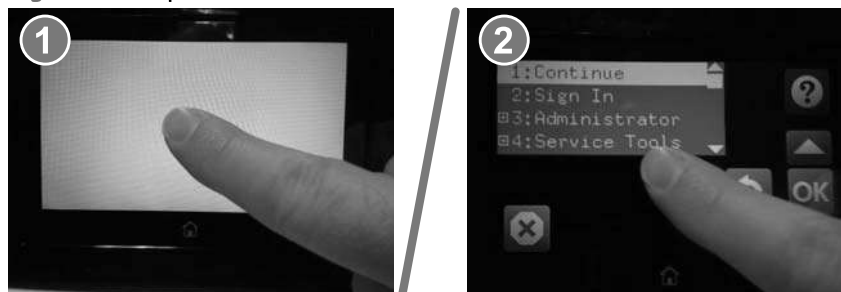
3. On the Pre-boot menu screen, use the following buttons to navigate the tests.

Figure 2-28 Pre-boot menu

	Use this button to see more information about a selected item.
	Use this button to scroll up through menu items.
	Use this button to select a highlighted menu item.
	Use this button to scroll down through menu items.
	Use this button to go back to the previous menu.
	Not used.
	Use this button to exit a diagnostic test.

4. Use the down arrow ▼ button to scroll to +3 Administration, and then press the OK button to select it.

Figure 2-29 Access the administration menu

5. Use the down arrow ▼ button to scroll to +E CP Diagnostics, and then press the OK button to select it.

📝 **NOTE:** An administrator password might be required to continue.
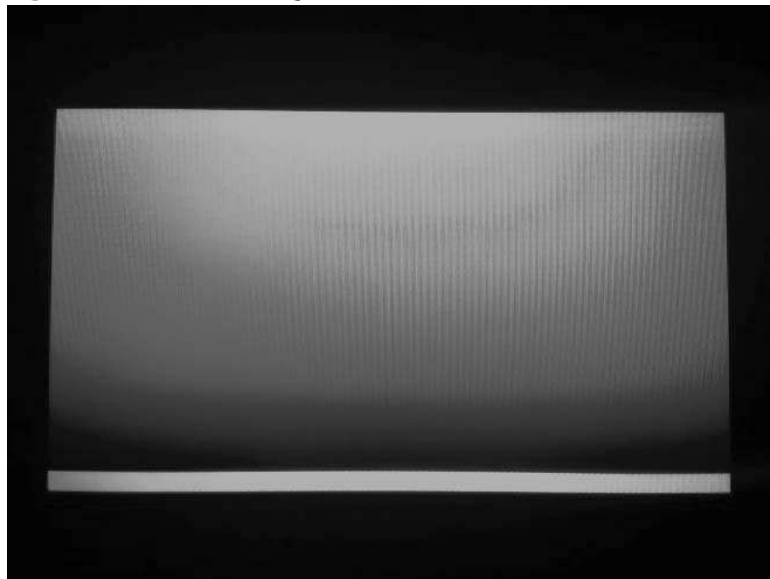
Figure 2-30 Access the diagnostics menu

1. Open the control-panel system diagnostic tests. See Open the control-panel system diagnostic tests on page 109.

2. With 1 Screen Test highlighted, press the OK button to select it.

    Figure 2-31 Open the screen test
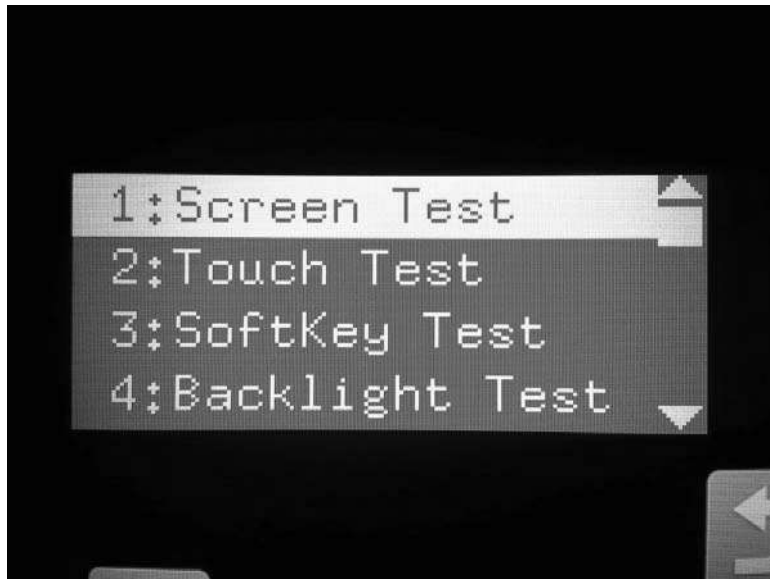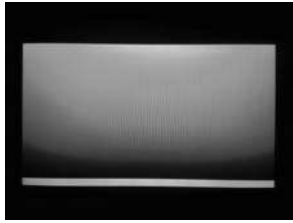

3. The blue vertical gradient screen appears.

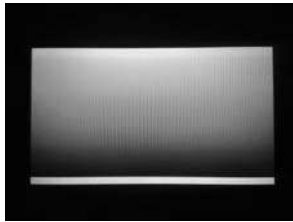   **Figure 2-32** Blue vertical gradient screen

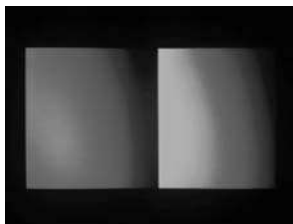4. Touch the touchscreen to scroll though the remaining touchscreen test screens.

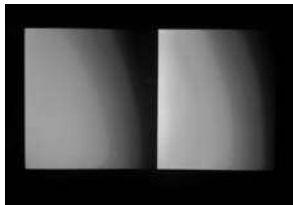   📝 **NOTE:** Touch the Home button to exit the test.
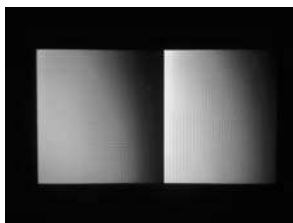
Green vertical gradient

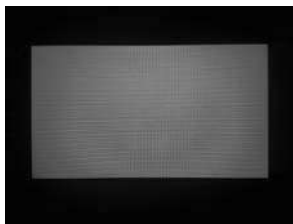Red vertical gradient

Blue horizontal gradient

Green horizontal gradient

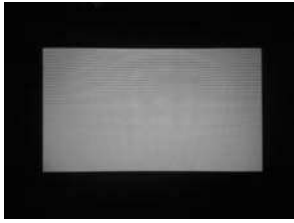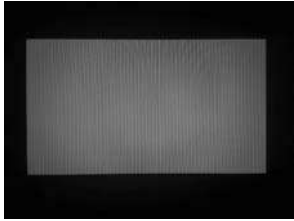Red horizontal gradient

Blue with black horizontal interlaced

Green with black horizontal interlaced

	Red with black horizontal interlaced
	Blue with black vertical interlaced
	Green with black vertical interlaced
	Red with black vertical interlaced
	Black with white center
	White with black center
	Checkerboard
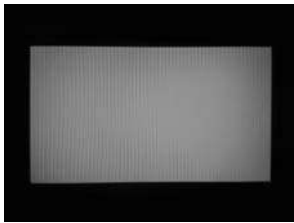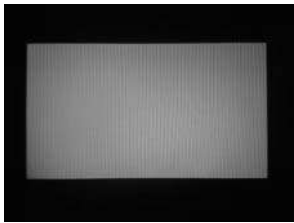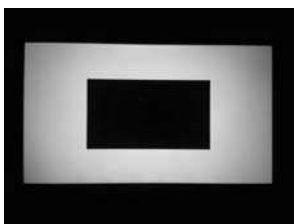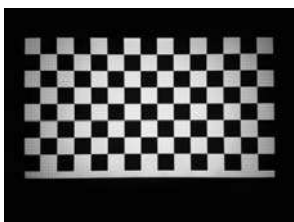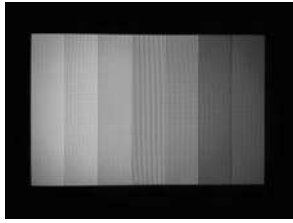
Multicolor stripes
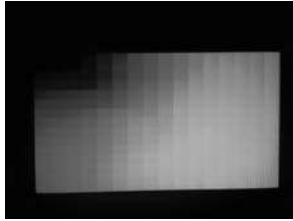
Blue green grid meshing

Touch test

1. Open the control-panel system diagnostic tests. See .

2. Use the down arrow ▼ button to scroll to 2 Touch Test, and then press the OK button to select it.

   Figure 2-33 Open the touch test

3. Use your finger to touch the white grid on the display.

   Figure 2-34 Touch the white grid

4. A mark appears on the grid where it was touched.

📝 **NOTE:** Touch the Home button to exit the test.

Figure 2-35 Verify the mark
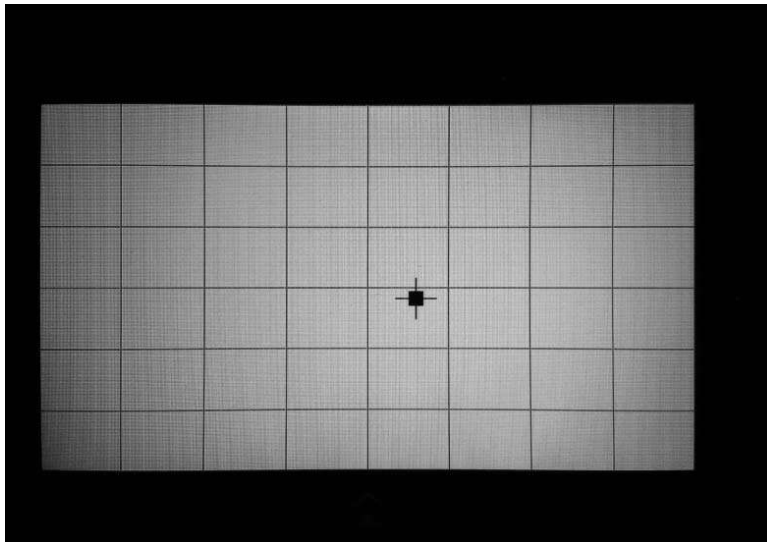
1. Open the control-panel system diagnostic tests. See <u>Open the control-panel system diagnostic tests on page 109</u>.

2. Use the down arrow ▼ button to scroll to 3 SoftKey Test, and then press the OK button to select it.

    Figure 2-36 Open the softkey test

3. When prompted, touch the Home button.

    Figure 2-37 Touch the Home button

4. If the test is successful, the following screen appears on the display.

NOTE: Touch the screen to exit the test.

Figure 2-38 Successful test
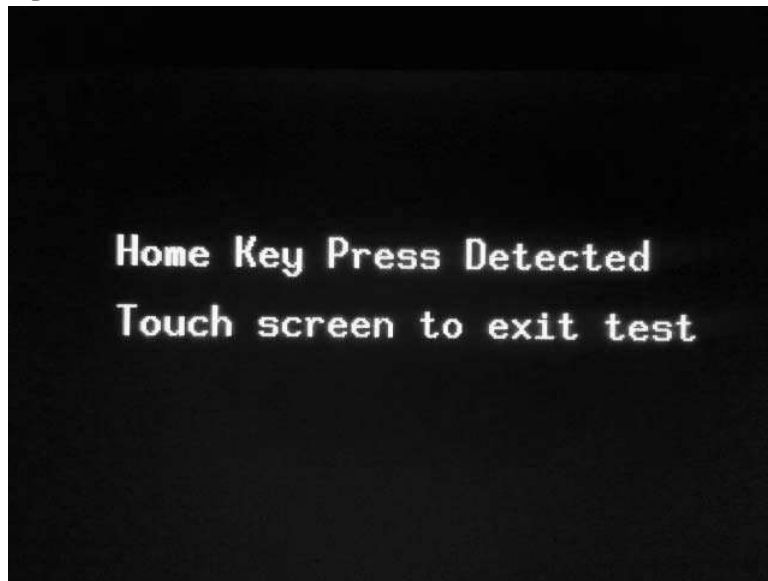
Backlight test

1. Open the control-panel system diagnostic tests. See .

2. Use the down arrow ▼ button to scroll to 4 Backlight Test, and then press the OK button to select it.

 After selecting the 4 Backlight Test, the screen automatically dims, and then returns to full brightness.

 NOTE: Touch any key to exit the test.

Figure 2-39 Open the backlight test

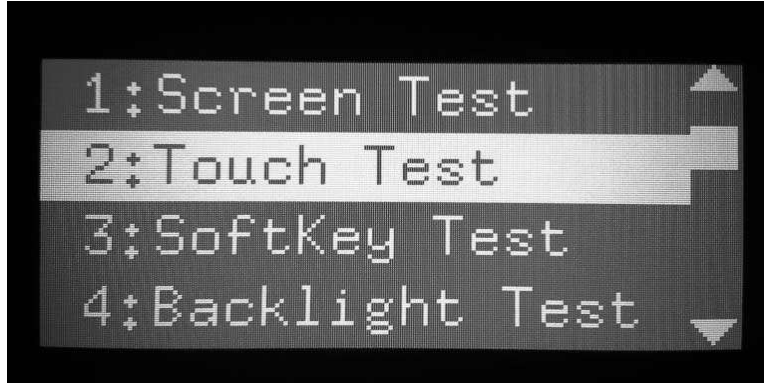**Sound test**
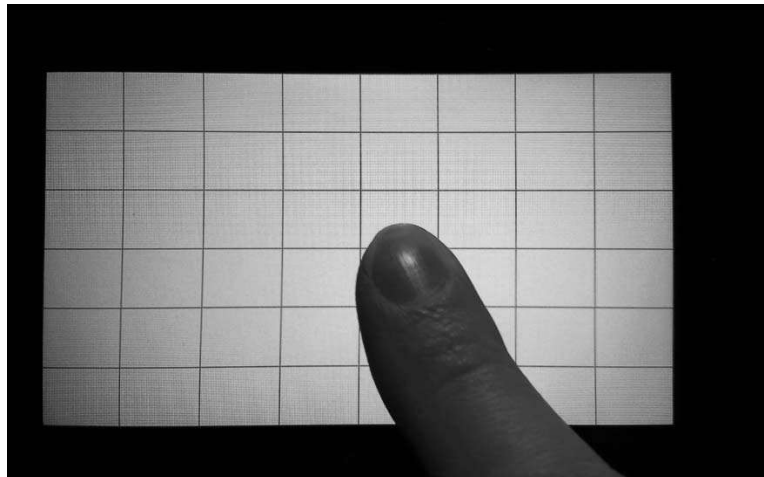
1. Open the control-panel system diagnostic tests. See Open the control-panel system diagnostic tests on page 109.

2. Use the down arrow ▼ button to scroll to 5 Sound Test, and then press the OK button to select it.

   After selecting the 5 Sound Test, the printer emits a series of audible tones.

   📝 **NOTE:** Touch any key to exit the test.

   Figure 2-40 Open the sound test
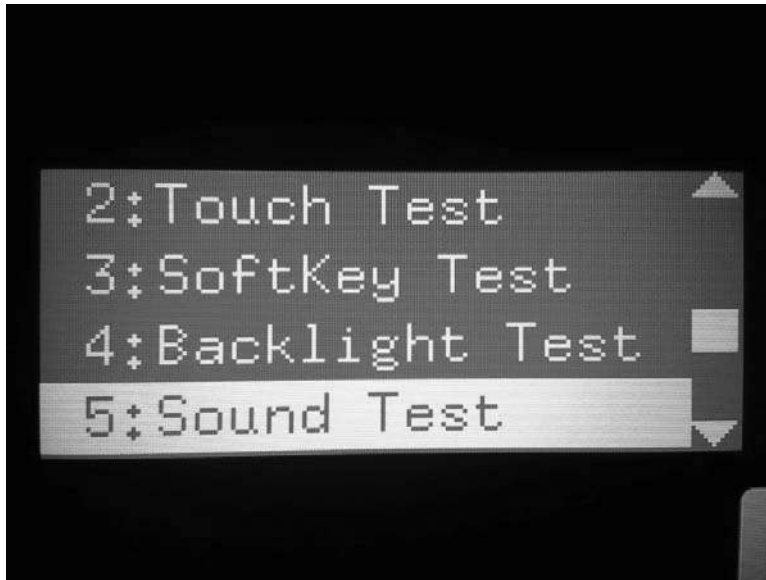
📝 **IMPORTANT:** The control-panel system diagnostic tests include a 6 Keyboard Test item. This test is **not** valid for the M506x or M527dn/f printers, even though this option is present in the control-panel system diagnostic tests menu.

If the 6 Keyboard Test is opened on the M506x or M527dn/f printers, the printer power must be turned off to exit the test.

HP does not recommend turning the printer power off during the control-panel system diagnostic tests.

1. Open the control-panel system diagnostic tests. See Open the control-panel system diagnostic tests on page 109.

2. Use the down arrow ▼ button to scroll to 6 Keyboard Test, and then press the OK button to select it.

    Figure 2-41 Do not open the keyboard test

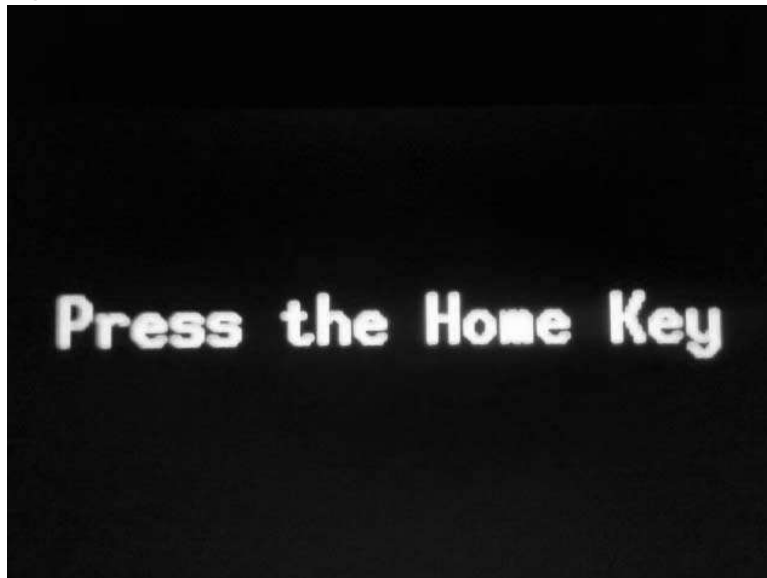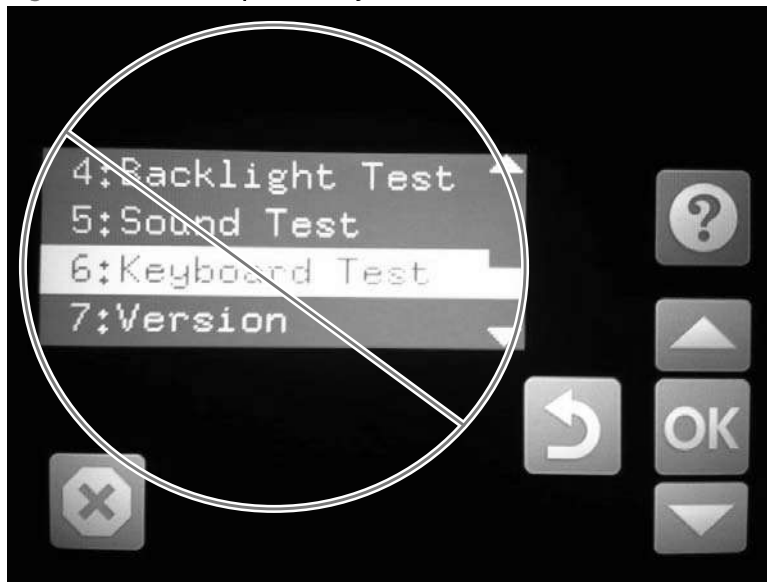3. When prompted, touch the H key on the keyboard or the Home button to exit the test.

Version

1. Open the control-panel system diagnostic tests. See Open the control-panel system diagnostic tests on page 109.

2. Use the down arrow ▼ button to scroll to 7 Version, and then press the OK button to select it.

    📝 **NOTE:** Touch any key to exit the test.

    Select 7 Version to view the following types of information:

    📝 **NOTE:** The following types of information are for the control panel only, not the printer.

    ● Panel ID

    ● Hardware (version)

    ● Firmware (version)

    ● KB Hw (version)

    ● KB Firm (version)

    ● LCD Vendor

    ● Touch Controller Version

    Figure 2-42 Open the sound test

Control panel diagnostic flowcharts (M506x and M527)

Use the flowcharts in this section to troubleshoot the following control panel problems.

- Touchscreen is blank, white, or dim (no image).

- Touchscreen is slow to respond or requires multiple presses to respond.

- Touchscreen has an unresponsive zone.

- No control panel sound.

- Home button is unresponsive.

- Hardware integration pocket (HIP) is not functioning (control panel functional).

Touchscreen black, white, or dim (no image)

NOTE: To open the diagnostic function, press the button on the back of the control panel.

Figure 2-43 Touchscreen blank, white, or dim (no image)
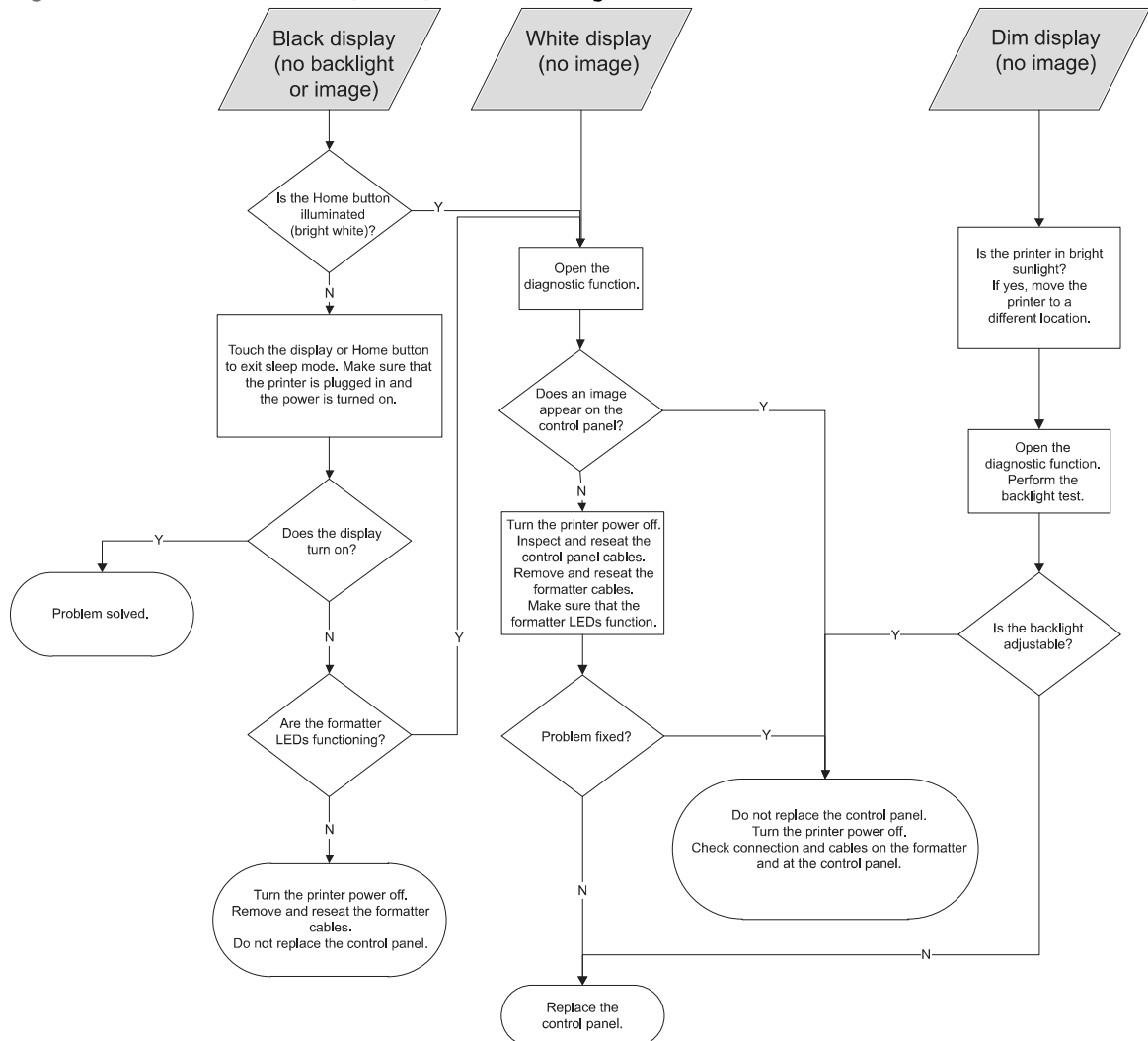
Touchscreen has an unresponsive zone

NOTE: To open the diagnostic function, press the button on the back of the control panel.

Figure 2-44 Touchscreen has an unresponsive zone
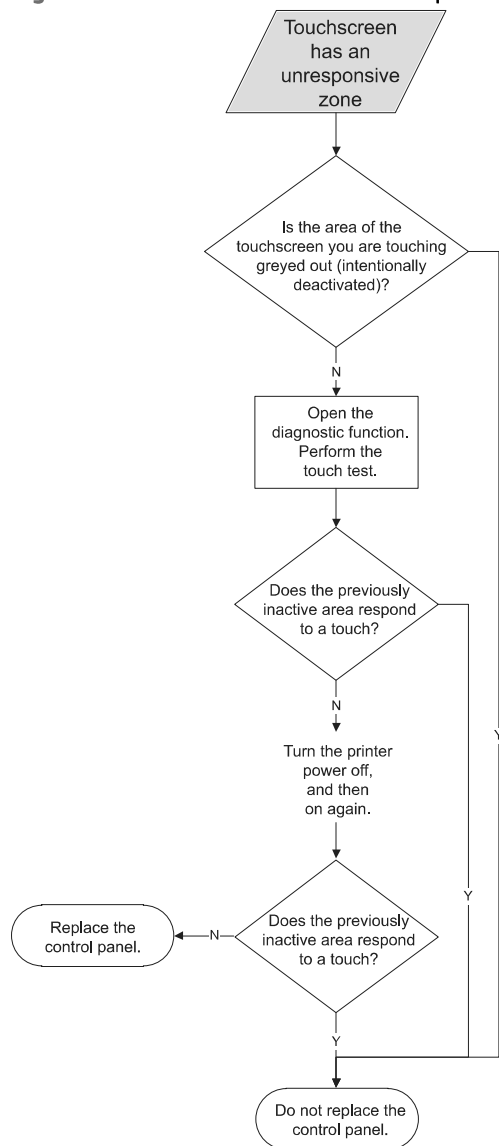
No control panel sound

NOTE: To open the diagnostic function, press the button on the back of the control panel.

Figure 2-45 No control panel sound
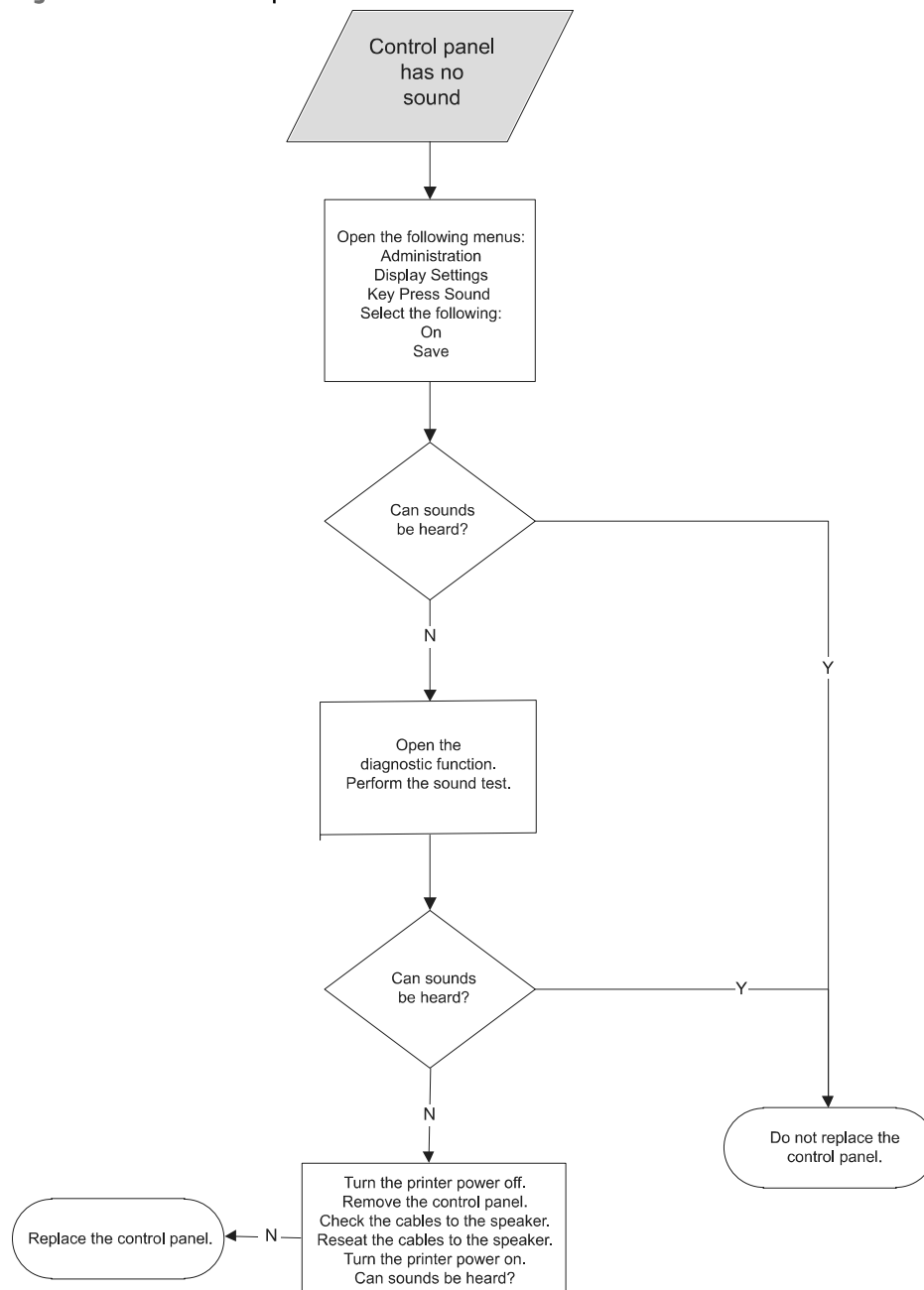
```
                    ┌──────────────────┐
                   /  Control panel     /
                  /   has no           /
                 /    sound           /
                └──────────────────┘
                         │
                         ▼
              ┌─────────────────────────┐
              │ Open the following menus:│
              │      Administration      │
              │     Display Settings     │
              │     Key Press Sound      │
              │    Select the following: │
              │           On             │
              │          Save            │
              └─────────────────────────┘
                         │
                         ▼
                      ◇ Can sounds
                        be heard?  ◇─────────────────── Y
                         │                              │
                         N                              │
                         ▼                              │
              ┌─────────────────────────┐               │
              │       Open the          │               │
              │  diagnostic function.   │               │
              │  Perform the sound test.│               │
              └─────────────────────────┘               │
                         │                              │
                         ▼                              │
                      ◇ Can sounds                      │
                        be heard? ◇────── Y ────────────┤
                         │                              │
                         N                              ▼
                         ▼                      ╭──────────────────╮
              ┌─────────────────────────┐       │ Do not replace the│
   ╭──────────────────────╮             │       │  control panel.   │
   │ Replace the control  │◄── N ──│ Turn the printer power off. │   ╰──────────────────╯
   │ panel.               │        │ Remove the control panel.   │
   ╰──────────────────────╯        │ Check the cables to the speaker.│
                                   │ Reseat the cables to the speaker.│
                                   │ Turn the printer power on.  │
                                   │ Can sounds be heard?        │
                                   └─────────────────────────────┘
```

📝 **NOTE:** To open the diagnostic function, press the button on the back of the control panel.

Figure 2-46 Home button is unresponsive
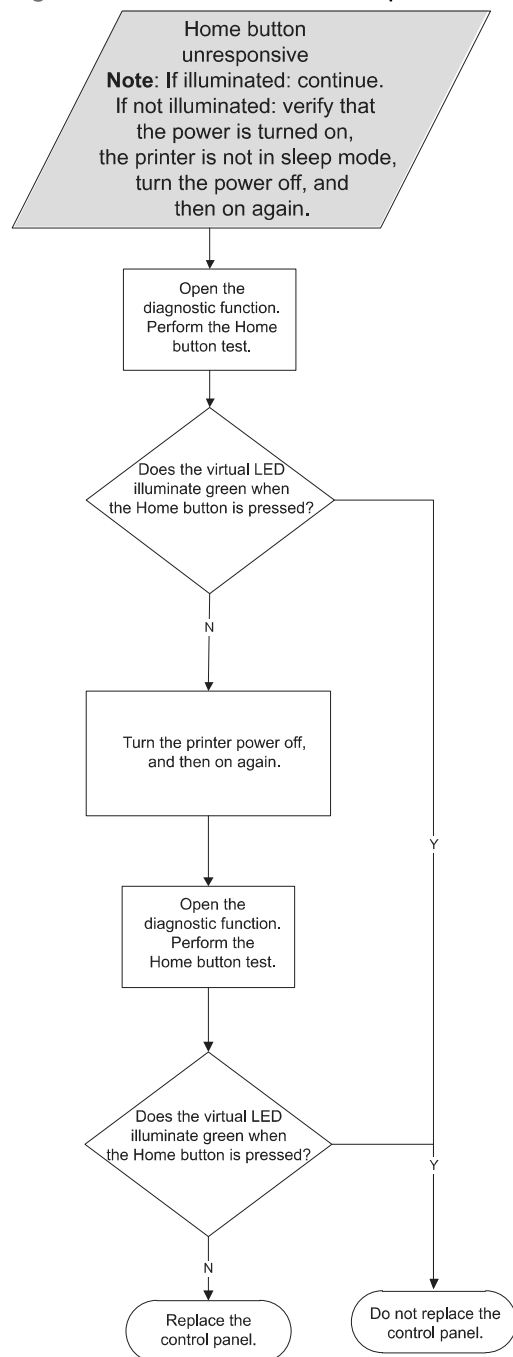
Hardware integration pocket (HIP) is not functioning (control panel functional)

Figure 2-47 Hardware integration pocket (HIP) is not functioning (control panel functional)

Hardware integration
pocket (HIP)
not functional
(control panel
functional)

Check that all installed hardware integration
pocket devices are within HP specifications.
The control panel provides only 0.5 Amps to
the port. If an installed device attempts to draw
more power than is provided, the port is
automatically disabled. Troubleshoot third-party
devices with the device manufacturer.
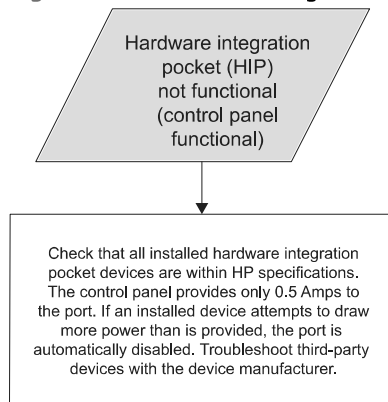
Tools for troubleshooting

📝 **NOTE:** This section describes tools that can help to solve printer problems.

- Individual component diagnostics
- Diagrams
- Internal test and information pages
- Control panel menus (M501)
- Control-panel menus (M506/M527)
- Control panel message document (CPMD)

Individual component diagnostics

Tools for troubleshooting: LED diagnostics (M501)

LED, engine, and individual diagnostics can identify and troubleshoot printer problems.

Network port LEDs (M501)

The formatter has two network port LEDs. When the printer is connected to a properly working network through a network cable, the amber LED indicates network activity, and the green LED indicates the link status.

| 1 | Link status LED (green) |
| 2 | Network activity LED (amber) |

A blinking amber LED indicates network traffic. If the green LED is off, a link has failed. For link failures, check all of the network cable connections. In addition, you can try to manually configure the network card link speed setting by using the printer control panel.

1. On the printer control panel, press the OK button.

2. Open the following menus:

   ● Network Setup

   ● Link Speed

3. Select the appropriate link speed.

M501 control panel LEDs

The state of the Ready light and Attention light on the printer signal the printer status. The following table outlines the possible control-panel light states.

Printer state	Ready light state	Attention light state
Initializing	Blinking	Blinking
Ready	On	Off
Receiving data/processing job or cancelling job	Blinking	Off
Error message	Off	Blinking
Fatal error (49 or 79 error)[1]	On	On

[1] The printer restarts after one of these errors occurs.

Tools for troubleshooting: LED diagnostics (M506/M527)

LED, engine, and individual diagnostics can identify and troubleshoot printer problems.

Understand lights on the formatter (M506/M527)

Three LEDs on the formatter indicate that the printer is functioning correctly.

	M506		M527

1	Heartbeat LED
2	HP Jetdirect LEDs
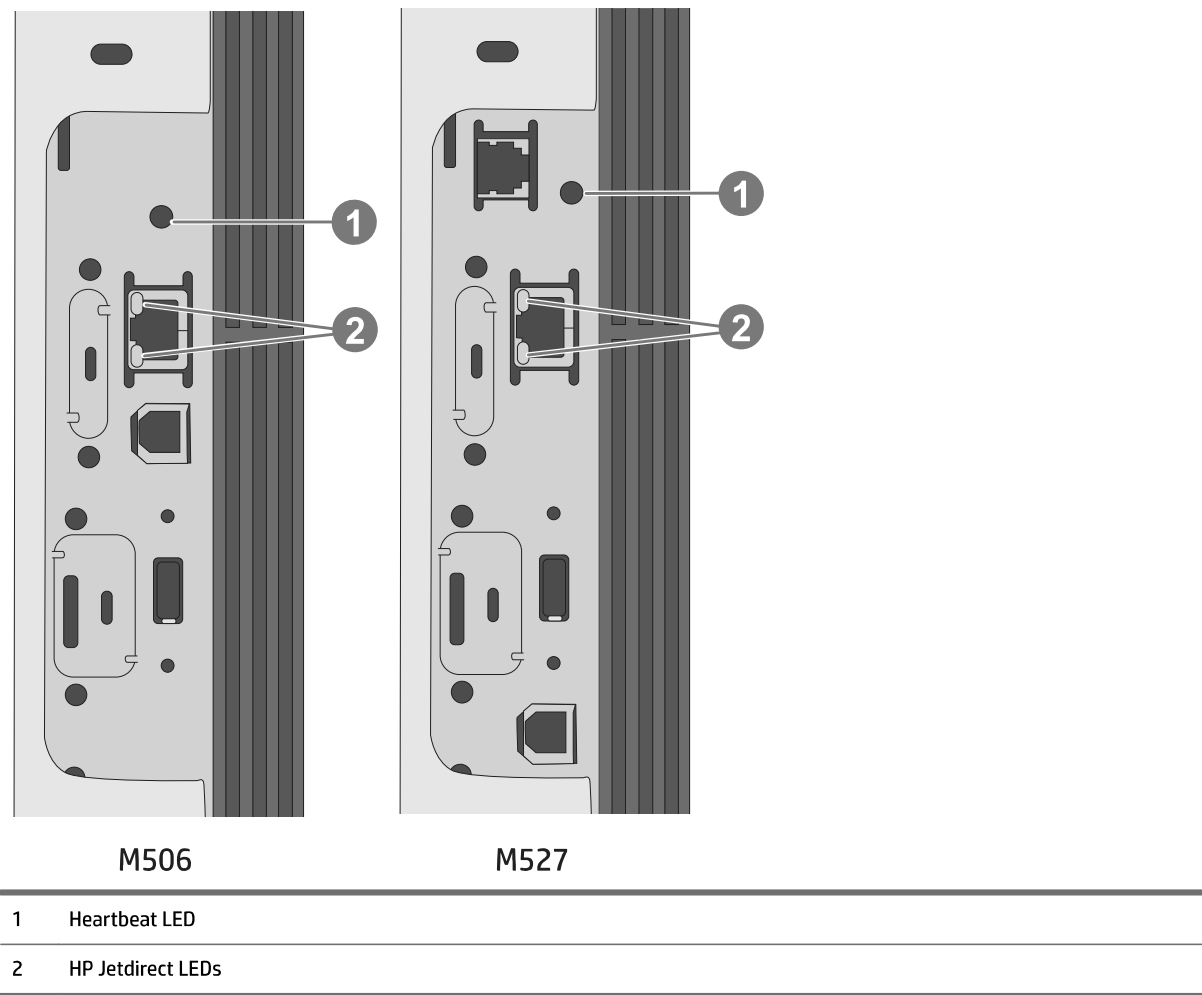
Heartbeat LED (M506/M527)

The heartbeat LED indicates that the formatter is functioning correctly. While the printer is initializing after it is turned on, the LED blinks rapidly, and then turns off. When the printer has finished the initialization sequence, the heartbeat LED pulses on and off.

The following list describes the heartbeat LED operation while the printer is executing the firmware boot process.

📝 **NOTE:** When the initialization process completes, the heartbeat LED should be illuminated solid green.

If after initialization, the heartbeat LED is not solid green, see .

● Green

- ◦ Blinking: The printer is correctly functioning.

- ◦ Solid: The FW has not yet booted.

- Amber

  - ◦ Blinking: The control panel is not detected.

  - ◦ Solid: The FFC between the formatter and DC controller is not connected or is damaged.

- Red

  - ◦ Solid: Valid SPI code; there is a problem releasing ASIC and running the BIOS

    Solid: BIOS initiates PROSAC to change the LED from red to green.

    Solid: PROSAC is not running (No ROM or SPI code).

  - ◦ Blinking: Valid SPI code not found.

- Off: No 5V or 3.3V PROSAC power.

The following table describes the heartbeat LED operation when the printer completes the firmware boot process and is in the **Ready** state.

Table 2-9 Heartbeat LED, printer operational (M506/M527)

LED color	Description

Green	- Normal operation
	
	   ◦ Formatter is operating normally
	
	   ◦ Firmware is operating normally
	
	   ◦ Control panel is connected

Yellow	- Formatter cannot connect to the control panel
	
	   ◦ Check control panel connections
	
	   ◦ Verify control panel functionality

Red	- Formatter error or failure
	
	   ◦ Serial peripheral interface (SPI) flash memory boot error
	
	   ◦ Power on self-test (formatter) failed
	
	   ◦ Diagnostic (formatter) failed

Off	**TIP:** The heartbeat LED is off if the power cable is disconnected, the printer power switch is in the off position, or the printer is in Sleep Mode.
	
	- Firmware or system freeze
	
	   ◦ Check control panel for an error message
	
	   ◦ Control panel failure
	
	NOTE: This condition is not usually caused by a formatter failure. Turn the power off, and then on again. If the error persists, perform a firmware upgrade.

HP Jetdirect LEDs (M506/M527)

The embedded HP Jetdirect print server has two LEDs. The yellow LED indicates network activity, and the green LED indicates the link status. A blinking yellow LED indicates network traffic. If the green LED is off, a link has failed.

For link failures, check all the network cable connections. In addition, try to manually configure the link settings on the embedded print server by using the printer control-panel menus.

1. From the Home screen on the printer control panel, scroll to and touch the Administration button.

2. Open the following menus:

    ●   Network Settings

    ●   Embedded Jetdirect Menu

    ●   Link Speed

3. Select the appropriate link speed, and then touch the OK button.

Tools for troubleshooting: Engine diagnostics

The printer contains extensive internal engine diagnostics that help in troubleshooting print quality, paper path, noise, assembly, and timing issues.

Engine test button

To verify that the printer engine is functioning, print an engine test page. Use a small pointed object to depress the test-page switch located on the rear side of the printer. The test page should have a series of lines that are parallel to the short end of the page. The test page can use only Tray 2 as the paper source, so make sure that paper is loaded in Tray 2.

NOTE: Depressing, and holding down, the test-page switch causes the printer to continually print test pages. Releasing the switch stops the test page continuous printing.

Figure 2-48 Engine test button

Defeating interlocks

Different tests can be used to isolate different types of issues. For assembly or noise isolation, run the diagnostic test when the toner cartridge door or rear door is open.

Defeating the door interlocks allows observation of the paper pick operation (and view the page enter registration).

WARNING! Be careful when performing printer diagnostics to avoid risk of injury. Only trained service personnel should open and run the diagnostics with a door open. Never touch any of the power supplies when the printer is turned on.

Defeat the toner cartridge door interlock

1.   Open the toner cartridge door.

2. Insert a folded piece of paper into the slot.

☼ **TIP:** Fold a stiff piece of paper, for example a business card or index card, into two 10 mm (.375 in) strips, and insert the strips into the slot for the cartridge door logic switches.

Figure 2-49 Defeat the toner cartridge door interlock

Defeat the rear door interlock

1. Open the rear door.

2. Insert a folded piece of paper into the slot.

☼ **TIP:** Fold a stiff piece of paper, for example a business card or index card, into two 10 mm (.375 in) strips, and insert the strips into the slot for the cartridge door logic switches.

Figure 2-50 Defeat the rear door interlock

Disable cartridge check (M506/M527)

Use this diagnostic test to print internal pages or send an external job to the printer when the toner cartridge is removed or exchanged. Supply errors are ignored while the printer is in this mode. When the printer is in this mode, access the troubleshooting menus and print internal pages (the print quality pages will be the most useful). This test can be used to isolate problems, such as noise, and to isolate print–quality problems that are related to the toner cartridge.

NOTE: Do not remove or exchange the toner cartridge until after beginning the disable cartridge check diagnostic.

Disable cartridge check from a touchscreen control panel

1. From the Home screen on the printer control panel, scroll to and touch the Administration button.

2. Open the following menus:

   ● Troubleshooting

   ● Diagnostic Tests

   ● Disable Cartridge Check

Disable cartridge check from a LCD control panel

1. From the Home screen on the printer control panel, use the down arrow ▼ button to scroll to Administration, and then press the OK button.

2. Use the down arrow ▼ button to scroll to Troubleshooting, and then press the OK button.

3. Use the down arrow ▼ button to scroll to Diagnostics, and then press the OK button.

4. Use the down arrow ▼ button to scroll to Disable Cartridge Check, and then press the OK button to select it.

Tools for troubleshooting: Paper path and sensor diagnostic tests (M506/M527)

● Paper path test (M506/M527)

● Paper path sensors test (M506/M527)

● Manual sensor tests (M506/M527)

● Tray/bin manual sensor test (M506/M527)

Paper path test (M506/M527)

This diagnostic test generates one or more test pages. Use these pages to isolate the cause of jams.

To isolate a problem, specify which input tray to use, specify whether to use the duplex path (duplex models only), and specify the number of copies to print. Multiple copies can be printed to help isolate intermittent problems. The following options become available after beginning the diagnostic feature:

● Print Test Page: Run the paper-path test from the default settings: Tray 2, no duplex, and one copy. To specify other settings, scroll down the menu, and select the setting, and then scroll back up and select Print Test Page to start the test.

● Source Tray: Select Tray 1, Tray 2, or the optional tray.

- Test Duplex Path: Enable or disable two-sided printing from designated optional tray (depending on how many optional accessories are installed.

- Number of Copies: Set the numbers of copies to be printed; the choices are 1, 10, 50, 100, or 500.

Access the paper path test from a touchscreen control panel

1. From the Home screen on the printer control panel, scroll to and touch the Administration button.

2. Open the following menus:

    - Troubleshooting

    - Diagnostic Tests

    - Paper Path Test

3. Select the paper-path test options for the test.

Access the paper path test from a LCD control panel

1. From the Home screen on the printer control panel, use the down arrow ▼ button to scroll to Administration, and then press the OK button.

2. Use the down arrow ▼ button to scroll to Troubleshooting, and then press the OK button.

3. Use the down arrow ▼ button to scroll to Diagnostic Tests, and then press the OK button.

4. Use the down arrow ▼ button to scroll to Paper Path Test, and then press the OK button.

Paper path sensors test (M506/M527)

This test displays the status of each paper-path sensor and allows viewing of sensor status while printing internal pages.

Access the paper path sensors test from a touchscreen control panel

1. From the Home screen on the printer control panel, scroll to and touch the Administration button.

2. Open the following menus:

    - Troubleshooting

    - Diagnostic Tests

    - Paper Path Sensors

3. Touch Start to run the test.

Access the paper path sensors test from a LCD control panel

1. From the Home screen on the printer control panel, use the down arrow ▼ button to scroll to Administration, and then press the OK button.

2. Use the down arrow ▼ button to scroll to Troubleshooting, and then press the OK button.

3. Use the down arrow ▼ button to scroll to Diagnostic Tests, and then press the OK button.

4. Use the down arrow ▼ button to scroll to Paper Path Sensors, and then press the OK button.

NOTE: The menu list of sensors and switches for the Paper path sensors test, Manual Sensor Test, and the Tray/Bin Manual Sensor Test varies depending on which optional accessories are installed.

The tables in this section describe the sensor tests available with an optional 1x550-sheet paper feeder installed.

For trays other than Tray 1 or Tray 2, the tray number associated with a sensor or switch depends on the number of accessories installed.

Table 2-10 Paper-path sensors diagnostic tests (M506/M527)

Sensor name	Sensor/Switch number	Replacement part number	Descriptions
Tray 3 feed sensor[1]	PS8008	F2A68-67909	Optional paper feeder
Prefeed sensor	PS102	NA	Not replaceable[2]
Top-of-Page (TOP) sensor	PS215	NA	Not replaceable[2]
Paper width 3 sensor	NA	NA	Not replaceable[2]
Paper width 2 sensor	NA	NA	Not replaceable[2]
Paper width 1 sensor	NA	NA	Not replaceable[2]
Fuser output sensor	PS2	RM2-5679-000CN (110 V)	Fuser
		RM2-5692-000CN (220 V)	
Duplexer refeed sensor **NOTE:** Duplex models only.	PS502	NA	Not replaceable[2]
Output bin full sensor	PS4	NA	Not replaceable[2]

[1] Only appears if optional accessories are installed.
[2] Require whole unit replacement.

Manual sensor tests (M506/M527)

The table in this section lists the sensors and switches available in the Manual Sensor Test.

Access the manual sensor test from a touchscreen control panel

The Manual Sensor Test screen shows the sensor number, sensor name (M506x and M527 only), sensor state (active or inactive), and the number of times the sensor has been toggled (activated).

1. From the Home screen on the printer control panel, scroll to and touch the Administration button.

2. Open the following menus:

   ● Troubleshooting

   ● Diagnostic Tests

   ● Manual Sensor Test

3. Activate the desired sensor, and then check the control-panel display to verify the sensor state (active or inactive).

   📝 **NOTE:** Only the M605x and M606x control panel displays the State and Toggle descriptor.

   ● The State virtual LED next to the sensor number and sensor name (M506x and M527 only) illuminates green when the sensor is active.

   ● The Toggle virtual LED next to the sensor number and sensor name (M506x and M527 only) illuminates green after the sensor is activated and increments by one each time the sensor is interrupted (activated or deactivated).

      For example, opening the front door increments the SW501 Cartridge door Toggled item count two times—once when the door is opened, and once when the door is closed.

4. Touch the Reset Sensors button to reset the Toggle count item.

   -or-

   Touch the Cancel button (M506x and M527 only) or the Return arrow button to exit the Manual Sensor Test screen and return to the Diagnostic Tests menu.

Access the manual sensor test from a LCD control panel

1. From the Home screen on the printer control panel, use the down arrow ▼ button to scroll to Administration, and then press the OK button.

2. Use the down arrow ▼ button to scroll to Troubleshooting, and then press the OK button.

3. Use the down arrow ▼ button to scroll to Diagnostic Tests, and then press the OK button.

4. Use the down arrow ▼ button to scroll to Manual Sensor Test, and then press the OK button.

5. Activate the desired sensor, and then check the control-panel display to verify the sensor state (active or inactive).

   💡 **TIP:** Press the return arrow ↰ button to reset the sensor or press the Cancel ⊗ button to exit the test.

NOTE: Only the M605x and M606x control panel displays the State and Toggle descriptor.

- The State virtual LED next to the sensor number and sensor name (M506x and M527 only) illuminates green when the sensor is active.

- The Toggle virtual LED next to the sensor number and sensor name (M506x and M527 only) illuminates green after the sensor is activated and increments by one each time the sensor is interrupted (activated or deactivated).

  For example, opening the cartridge door increments the SW501 Front door opening/closing Toggled item count two times—once when the door is opened, and once when the door is closed.

NOTE: The following table describes the sensor tests available with an optional 1x550-sheet paper feeder installed.

For trays other than Tray 1 or Tray 2, the tray number associated with a sensor or switch depends on the number and type of accessories installed.

Table 2-11 Manual sensor diagnostic tests (M506/M527)

Sensor or switch	Replacement Part number	Description
SW501 Cartridge door sensor	RK2-0534-000CN	Microswitch (SW2)
PS8008 Tray 3 feed sensor[1]	F2A68-67909	550-sheet paper feeder
PS102 Prefeed sensor	NA	Not replaceable[2]
PS215 Top-of-Page (TOP) sensor	NA	Not replaceable[2]
Paper width 3 sensor	NA	Not replaceable[2]
Paper width 2 sensor	NA	Not replaceable[2]
Paper width 1 sensor	NA	Not replaceable[2]
PS2 Fuser output sensor	RM2-5679-000CN (110 V)	Fuser
	RM2-5692-000CN (220 V)	
PS502 Duplexer refeed sensor **NOTE:** Duplex models only.	NA	Not replaceable[2]
PS4 Output bin full sensor	NA	Not replaceable[2]

[1] Only appears if optional accessories are installed.
[2] Requires whole unit replacement.

Tray/bin manual sensor test (M506/M527)

The table in this section lists the sensors and switches available in the Tray/Bin Manual Sensor Test.

Access the tray/bin manual sensor test from a touchscreen control panel

The Tray/Bin Manual Sensor Test screen shows the sensor number, sensor name (M506x and M527 only), sensor state (active or inactive), and the number of times the sensor has been toggled (activated).

1.   From the Home screen on the printer control panel, scroll to and touch the Administration button.

2.   Open the following menus:

●   Troubleshooting

●   Diagnostic Tests

●   Tray/Bin Manual Sensor Test

3.   Activate the desired sensor, and then check the control-panel display to verify the sensor state (active or inactive).

NOTE: Only the M506x and M527 control panel displays the State and Toggle descriptor.

●   The State virtual LED next to the sensor number and sensor name (M506x and M527 only) illuminates green when the sensor is active.

●   The Toggle virtual LED next to the sensor number and sensor name illuminates green after the sensor is activated and increments by one each time the sensor is interrupted (activated or deactivated).

For example, raising, and then releasing, the output bin full flag increments the PS4 Output bin full Toggled item count two times—once when the flag is raise, and once when it is released.

4.   Touch the Reset Sensors button (M506x and M527 only) to reset the Toggle count item.

-or-

Touch the Cancel (M506x and M527) or the Return arrow button to exit the Tray/Bin Manual Sensor Test screen and return to the Diagnostic Tests menu.

Access the tray/bin manual sensor test from a LCD control panel

1.   From the Home screen on the printer control panel, use the down arrow ▼ button to scroll to Administration, and then press the OK button.

2.   Use the down arrow ▼ button to scroll to Troubleshooting, and then press the OK button.

3.   Use the down arrow ▼ button to scroll to Diagnostic Tests, and then press the OK button.

4.   Use the down arrow ▼ button to scroll to Tray/Bin manual Sensor Test, and then press the OK button.

5.   Activate the desired sensor, and then check the control-panel display to verify the sensor state (active or inactive).

TIP: Press the return arrow ↰ button to reset the sensor or press the Cancel ⊗ button to exit the test.

NOTE: Only the M506x and M527 control panel displays the State and Toggle descriptor.

- The State virtual LED next to the sensor number and sensor name (M506x and M527 only) illuminates green when the sensor is active.

- The Toggle virtual LED next to the sensor number and sensor name (M506x and M527 only) illuminates green after the sensor is activated and increments by one each time the sensor is interrupted (activated or deactivated).

  For example, raising, and then releasing, the output bin full flag increments the PS4 Output bin full Toggled item count two times—once when the flag is raise, and once when it is released.

NOTE: The following table describes the sensor tests available with an optional 1x550–sheet paper feeder installed.

For trays other than Tray 1 or Tray 2, the tray number associated with a sensor or switch depends on the number and type of accessories installed.

Table 2-12 Tray/bin manual sensors (M506/M527)

Sensor or switch name	Replacement part number	Descriptions
PS205 Tray 1 paper sensor	F2A68-67914	Cartridge door assembly
PS3 Tray 2 paper sensor	NA	Not replaceable[2]
PS451 Tray 3 paper sensor[1]	F2A68-67909	Optional paper feeder
PS8008 Tray 3 paper feed sensor[1]	F2A68-67909	Optional paper feeder
PS1603 Tray 3 feed sensor[1]	F2G68-67901	Optional paper feeder
PS4 Output bin full sensor	NA	Not replaceable[2]

[1] Only appears if optional accessories are installed.
[2] Requires whole unit replacement.

Tools for troubleshooting: Print/stop test (M506/M527)

Use this diagnostic test to isolate the cause of problems such as image-formation defects and jams within the engine. During this test, stop the paper anywhere along the printer paper path. The test can be programmed to stop printing internal pages or an external print job when the paper reaches a certain position. The test can also be programmed to stop from 0 to 60,000 ms. If the timer is set to a value that is greater than the job-print time, the printer can recover in one of two ways.

- After the print job is completed press OK button to return to the Troubleshooting menu before the timer times out.

- After the timer times out, touch the Stop button. Activate the door switch to restart the engine and return it to a normal state.

Access the print/stop test from a touchscreen control panel

1. From the Home screen on the printer control panel, scroll to and touch the Administration button.

2. Open the following menus:

   - Troubleshooting

   - Diagnostic Tests

   - Print/Stop Test

3. Enter a range, and then touch the OK button.

Access the print/stop test from a LCD control panel

1. From the Home screen on the printer control panel, use the down arrow ▼ button to scroll to Administration, and then press the OK button.

2. Use the down arrow ▼ button to scroll to Troubleshooting, and then press the OK button.

3. Use the down arrow ▼ button to scroll to Diagnostic Test, and then press the OK button.

4. Use the down arrow ▼ button to scroll to Print/Stop Test, and then press the OK button.

Common print stop test timing millisecond (ms) stops

- **600 ms**: The page has passed the registration area and the leading edge is just short of entering the fuser. The image can be seen on the paper but has not fused. If the defect is visible then the cause might be the drum, transfer roller, or a roller prior to, or in, the registration area.

- **1200 ms**: The leading edge is about 18mm (0.71 in) into the top output bin. The image has gone through the fuser. If the defect was not visible prior to the fuser, and is visible after the fuser, then the fuser it is the likely cause of the print quality defect. Inspect the fuser for damage, debris, or labels stuck to the fuser. Replace the fuser. Discuss media specifications and proper care of the fuser with the customer.

Tools for troubleshooting: Component tests (M506/M527)

Use the procedure below to test various printer mechanical and electromechanical assemblies.

Individual component diagnostics (special-mode test; M506/M527)

📝 **NOTE:** The following table describes the sensor tests available with an optional 1x550-sheet paper feeder installed.

For trays other than Tray 1 or Tray 2, the tray number associated with a sensor or switch depends on the number and type of accessories installed.

This test activates individual parts independently to isolate problems.

Each component test can be performed once or repeatedly. If the Repeat option is enabled from the drop-down menu, the test cycles the component on and off. This process continues for two minutes, and then the test terminates.

📝 **NOTE:** The cartridge door interlocks must be defeated to run the component tests. A control-panel display prompt appears to indicate removing the toner cartridge, during certain tests.

Access the individual component diagnostics from a touchscreen control panel

1. From the Home screen on the printer control panel, scroll to and touch the Administration button.

2. Open the following menus:

    ● Troubleshooting

    ● Diagnostic Tests

    ● Component Test

3. Select the component test options for the test.

Access the individual component diagnostics from a LCD control panel

1. From the Home screen on the printer control panel, use the down arrow ▼ button to scroll to Administration, and then press the OK button.

2. Use the down arrow ▼ button to scroll to Troubleshooting, and then press the OK button.

3. Use the down arrow ▼ button to scroll to Diagnostic Test, and then press the OK button.

4. Use the down arrow ▼ button to scroll to Component Test, and then press the OK button.

📝 **NOTE:** The following table describes the sensor tests available with an optional 1x550-sheet paper feeder installed.

For trays other than Tray 1 or Tray 2, the tray number associated with a sensor or switch depends on the number and type of accessories installed.

Table 2-13 Component test details (M506/M527)

Component test	Item tested	Comments
Fuser motor	M1	Activates the specified motor.

Table 2-13 Component test details (M506/M527) (continued)

Component test	Item tested	Comments
Pickup motor	M2	Activates the specified motor.
Tray 1 Pickup Solenoid	SL2	Activates the specified solenoid.
Tray 2 Pickup Solenoid	SL1	Activates the specified solenoid.
Tray 3 Pickup Solenoid[1]		Activates the specified solenoid.
Duplex switchback solenoid **NOTE:** Duplex models only.	SL3	Activates the specified solenoid.
Optional Clutch Drive		Activates the specified clutch/drive.
Repick Clutch **NOTE:** Duplex models only.	CL1	Activates the specified clutch.
Laser Scanner Motor	M3	Activates the specified motor.
Repeat	NA	Choose Off to execute the test once. Choose On to execute the test continuously.

[1] Only appears if an optional 550-sheet paper feeder accessory is installed.

Tools for troubleshooting: Scanner tests (M527)

Use these diagnostic tests to manually test the document feeder and scanner sensors.

Scanner tests (M527)

This section lists the sensors available in the Scanner Tests.

Document feeder and image scanner sensor replacement parts

If a document feeder or image scanner sensor fails, replace the following assemblies:

- Document feeder sensors

    ◦ Document feeder whole unit kit Enterprise printers; 5851-6568

    📝 **NOTE:** Includes the white backing kit.

    ◦ Document feeder whole unit kit Work Flow printers; 5851-6569

    📝 **NOTE:** Includes the white backing kit.

    ◦ Scanner sub assembly (SSA) kit; F2A76-67909

    📝 **NOTE:** Includes the white backing kit.

Use the scanner tests

The Scanner Tests screen shows the sensor name, sensor state (active or inactive), and the number of times the sensor has been toggled (activated).

1. From the Home screen on the printer control panel, scroll to and touch the Administration button.

2. Open the following menus:

    - Troubleshooting

    - Diagnostic Tests

    - Scanner Tests

    - Sensors

3. Touch the sensor name on the Scanner Tests screen to display a sensor location graphic on the control-panel display.

4. Activate the desired sensor, and then check the control-panel display to verify the sensor state (active or inactive).

    - The State virtual LED next to the sensor number and sensor name illuminates green when the sensor is active.

    - The Toggle virtual LED next to the sensor number and sensor name illuminates green after the sensor is activated and increments by one each time the sensor is interrupted (activated or deactivated).

For example, opening the flatbed cover increments the Flatbed cover Toggle item count two times —once when the door is opened, and once when the door is closed.

5. Touch the Reset Sensors button to reset the Toggle count item.

    -or-

    Touch the Cancel button to exit the Scanner Tests screen, and then touch the Cancel button again to return to the Diagnostic Tests menu.

Scanner tests sensors

- ADF paper present
- ADF Y (length)
- ADF jam cover
- ADF paper path deskew
- ADF paper path pick success
- Paper path sensor 1(unreachable)
- Paper path sensor 2 (unreachable)
- Flatbed Y (length)
- Flatbed cover

Diagrams

Use the diagrams in this section to identify printer components.

Diagrams: Block diagrams

Use the diagrams in this section to identify printer sensors, switches, and assemblies.

Sensors and switches

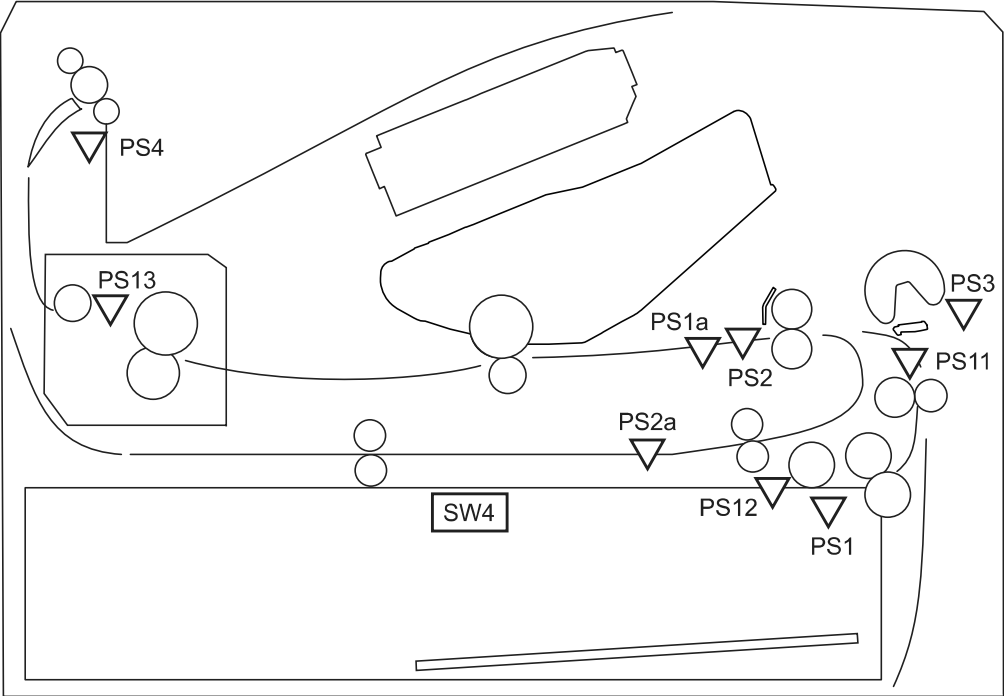Figure 2-51 Printer base, sensors and switches block diagram

Table 2-14 **Printer base, sensors and switches block diagram**

Sensor	Description	Sensor	Description
SR1a	Media width sensor	SR4	Output bin media-full sensor
SR2b	Duplex feed sensor	SR11	Registration sensor
SR1	Cassette media out sensor	SR12	Prefeed sensor
SR2	Top-of-Page (TOP) sensor	SR13	Fuser output sensor
SR3	Tray 1 (multipurpose tray) media out and registration sensor	SW4	Cassette detection switch

[1] Duplex models only.

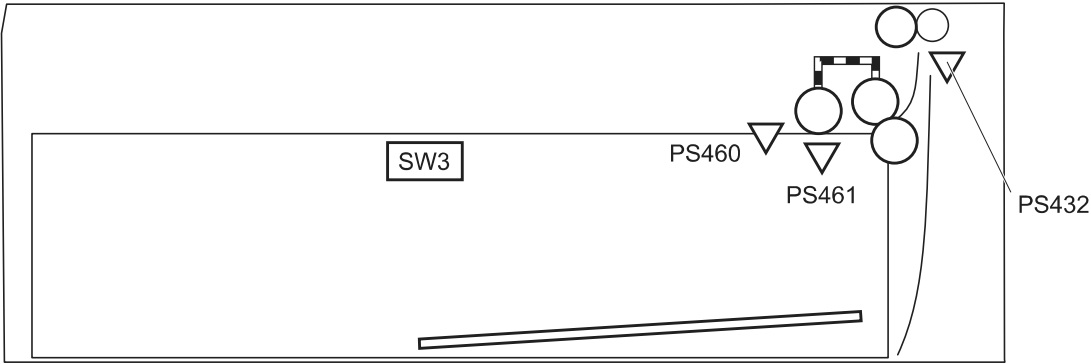Figure 2-52 1x550-sheet paper feeder, sensors and switches block diagram

Table 2-15 1x500-sheet paper feeder, sensors and switches block diagram

Sensor	Description
PS460	Media surface sensor
PS461	Cassette media out sensor
PS432	Feed sensor
SW3	Cassette detection switch