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Service Manual

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HP LaserJet Professional P1100 Printer series

Service Manual

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Conventions used in this guide

TIP: Tips provide helpful hints or shortcuts.

NOTE: Notes provide important information to explain a concept or to complete a task.

CAUTION: Cautions indicate procedures that you should follow to avoid losing data or damaging the product.

WARNING! Warnings alert you to specific procedures that you should follow to avoid personal injury, catastrophic loss of data, or extensive damage to the product.

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1 Theory of operation

- Basic operation
- Formatter-control system
- Engine-control system
- Image-formation system
- Pickup, feed, and delivery system
- Input tray, main-input tray, or priority input slot

Basic operation

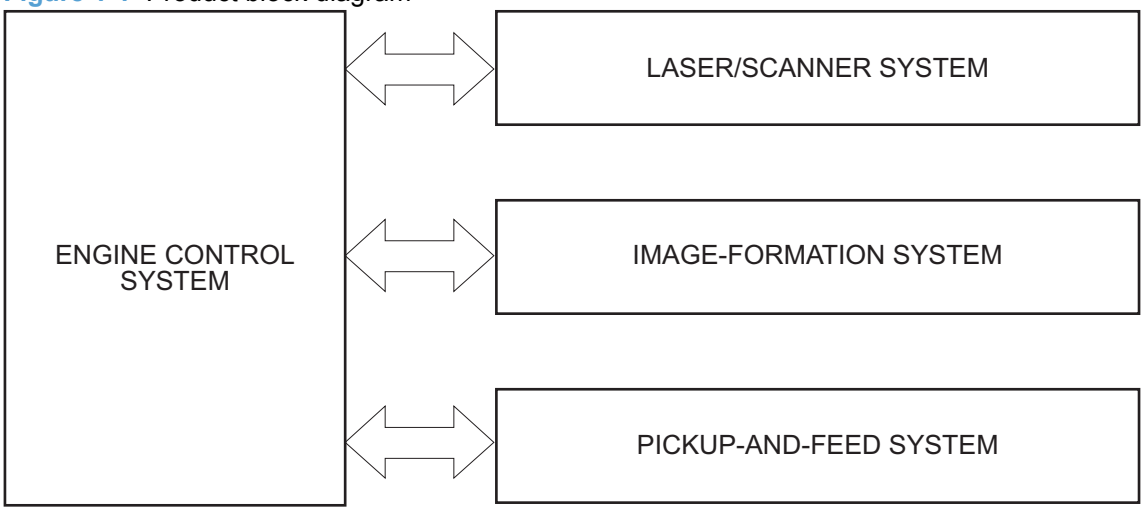
Major product systems

The product contains the following major systems:

- Engine-control system
- Laser/scanner system
- Image-formation system
- Pickup-and-feed system

Product block diagram

Figure 1-1 Product block diagram



Sequence of operation

The DC controller in the engine-control system controls the operational sequences of the product. The table below describes durations and operations for each period of a print operation from when the prroduct is turned on until the motor stops rotating.

Normal sequence of operation

Table 1-1 Sequence of operation

Name	Timing	Purpose
WAIT	From the time the power switch is turned on, the door is closed or the product exits Sleep mode until the product gets ready for a print operation.	Brings the product to the ready state. The product performs the following during the operations: • Detects the print cartridge • Heats the fuser film in the fuser • Rotates, and then stops, the main motor
STBY (standby)	From the end of the WAIT or LSTR period until either a print command is sent or the power switch is turned off.	Maintains the product in printable condition. The product performs the following during the operation: • Enters Auto-Off mode if the Auto-Off command is received
INTR (initial rotation)	From the time a print command is received until the paper is picked up.	The product performs the following during the operations: • Drives the main motor • Activates the high-voltage power supply • Activates the laser/scanner • Warms the fuser heater
PRINT	From the end of the INTR period until the last sheet completes the fuser operation.	Forms the image on the photosensitive drum based on the VIDEO signals from the formatter. Transfers and fuses the toner image to the paper.
LSTR (last rotation)	From the end of the PRINT period until the main motor stops rotating.	Moves the last printed sheet out of the product. The product performs the following during the operations: • Stops the main motor • Deactivates the high-voltage power supply • Deactivates the laser/scanner • Deactivates the fuser heater The product enters the INTR period as the LSTR period is completed, if the formatter sends another print command.

Formatter-control system

The formatter is responsible for the following procedures:

- Controlling sleep mode
- Receiving and processing print data from the various product interfaces
- Monitoring control-panel functions and relaying product-status information (through the control panel and the network or bidirectional interface)
- Developing and coordinating data placement and timing with the DC controller PCA
- Storing font information
- Communicating with the host computer through the network or the bidirectional interface

The formatter receives a print job from the network or bidirectional interface and separates it into image information and instructions that control the printing process. The DC controller PCA synchronizes the image-formation system with the paper-input and -output systems, and then signals the formatter to send the print-image data.

Sleep mode

NOTE: This product uses an Auto-Off feature for sleep mode.

After a user-specified time, the Auto-Off feature automatically conserves electricity by substantially reducing power consumption when the product is not printing. After a user-specified time, the product automatically reduces its power consumption (Auto-Off). The product returns to the ready state when a button is pressed, a print job is received, or a door is opened. When the product is in Auto-Off mode, the control-panel LEDs and the power button backlight LED are off.

NOTE: Although the product lights are off in Auto-Off mode, the product functions normally when it receives a print job.

Input/output

The product receives print data primarily from the following:

- Hi-Speed USB 2.0 port
- 802.11b/g wireless networking (wireless models only)

CPU

The formatter incorporates a 400 MHz Helium processor.

Memory

The random access memory (RAM) on the formatter PCA contains the page, I/O buffers, and the font storage area. RAM stores printing and font information received from the host system, and can also serve to temporarily store a full page of print-image data before the data is sent to the print engine.

Firmware

- HP LaserJet Professional P1100 Printer series
  - The product has 2 MB of Synchronous DRAM, which is used for run-time firmware imaging and specific print job information for the print job.
- HP LaserJet Professional P1100w Printer series
  - The product has 8 MB of Synchronous DRAM, which is used for run-time firmware imaging and specific print job information for the print job.

Memory use

- HP LaserJet Professional P1100 Printer series
  - The product has a 2 KB EEPROM and 64 MB of NAND Flash Memory, which is used for product configuration information and printer driver firmware.
- HP LaserJet Professional P1100w Printer series
  - The product has a 8 KB EEPROM and 64 MB of NAND Flash Memory, which is used for product configuration information and printer driver firmware.

PJL overview

The printer job language (PJL) is an integral part of configuration, in addition to the standard printer command language (PCL). With standard cabling, the product can use PJL to perform a variety of functions such as these:

- Two-way communication with the host computer through a network connection or a USB connection. The product can inform the host about such things as the control-panel settings, and the control-panel settings can be changed from the host.
- Dynamic I/O switching. The product uses this switching to be configured with a host on each I/O. The product can receive data from more than one I/O simultaneously, until the I/O buffer is full. This can occur even when the product is offline.
- Context-sensitive switching. The product can automatically recognize the personality (PS or PCL) of each job and configure itself to serve that personality.
- Isolation of print environment settings from one print job to the next. For example, if a print job is sent to the product in landscape mode, the subsequent print jobs print in landscape mode only if they are formatted for landscape printing.

LEDM overview

NOTE: HP LaserJet Professional P1100w Printer series

The low-end data model (LEDM) provides one consistent data representation method and defines the dynamic and capabilities tickets shared between clients and devices, as well as the access protocol, event, security, and discovery methods.

ACL overview

The advanced control language (ACL) is a language that supports product control and firmware downloads in products that support both PJL/PCL and host-based printing. Each sequence of ACL

commands must be preceded by a unified exit command (UEL) and an @PJL ENTER LANGUAGE=ACL command. The ACL sequence is always followed by a UEL. Any number of commands can be placed between the UELs. The only exception to these rules is the download command. If a firmware download is done, the download command must be the last command in the sequence. It will not be followed by a UEL.

The firmware searches for the UEL sequence when parsing commands. However, while downloading binary data such as host-based code or NVRAM data the firmware suspends UEL parsing. To handle hosts that “disappear” during binary sequences, the firmware times out all ACL command sessions. If a timeout occurs during a non-download command sequence, it is treated as the receipt of a UEL. If a timeout occurs during firmware download the product resets.

Control panel

The formatter sends and receives product status and command data to and from the control-panel PCA.

Wireless PCA

NOTE: Wireless models only.

The wireless PCA controls the wireless function of the product

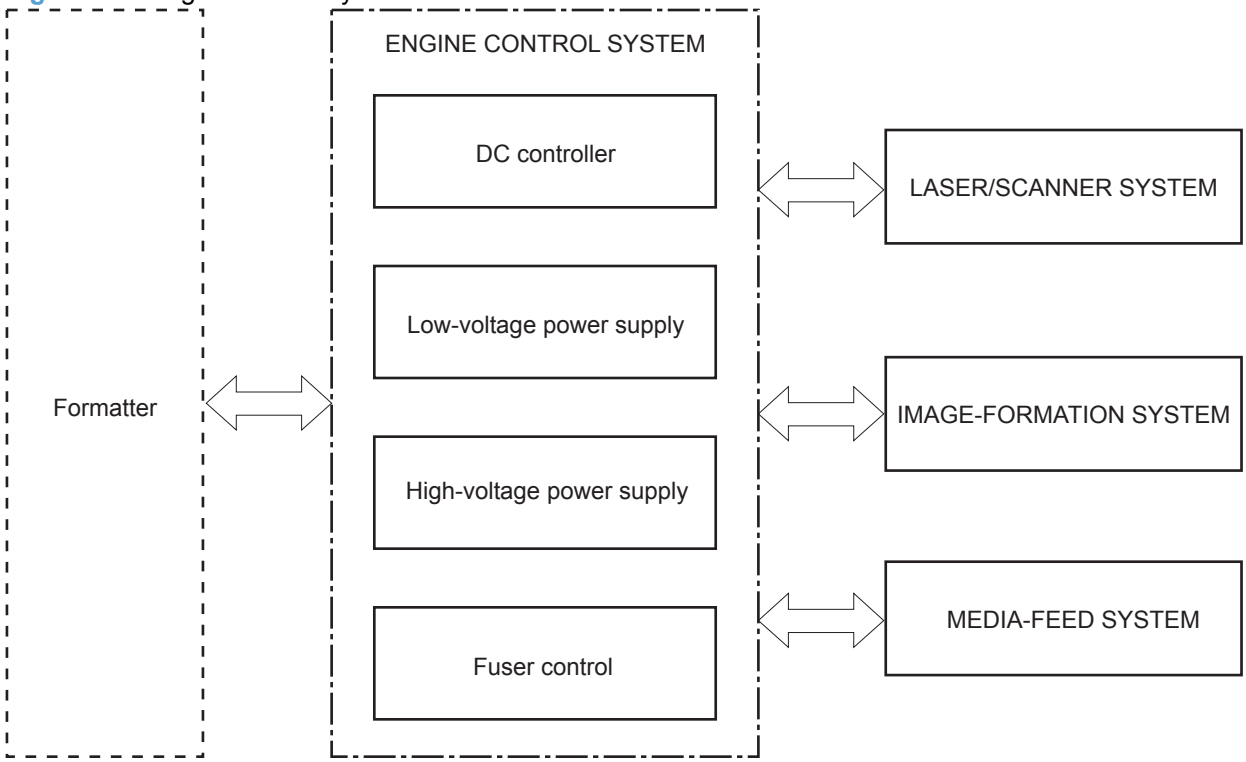
Engine-control system

The engine-control system coordinates all product functions, according to commands that the formatter sends. The engine-control system drives the laser/scanner system, the image-formation system, and the pickup/feed/delivery system.

The engine control system contains the following major components:

- Engine-control unit (ECU)
  - DC controller
  - Low-voltage power supply
- High-voltage power supply
- Fuser control

Figure 1-2 Engine-control system



Motors, fans, clutches, solenoids, switches, and sensors

Figure 1-3 Motors

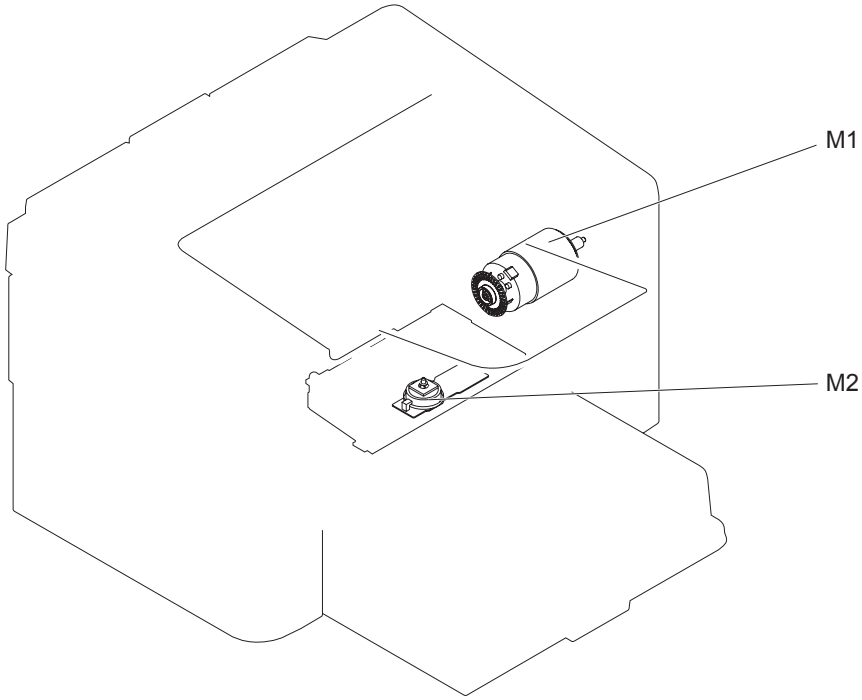


Table 1-2 Motors

Description	Components driven
Main motor (M1)	• Pickup roller • Feed roller • Photosensitive drum • Developing roller • Pressure roller • Delivery roller
Scanner motor (M2)	• Scanner mirror

Figure 1-4 Solenoids and clutches

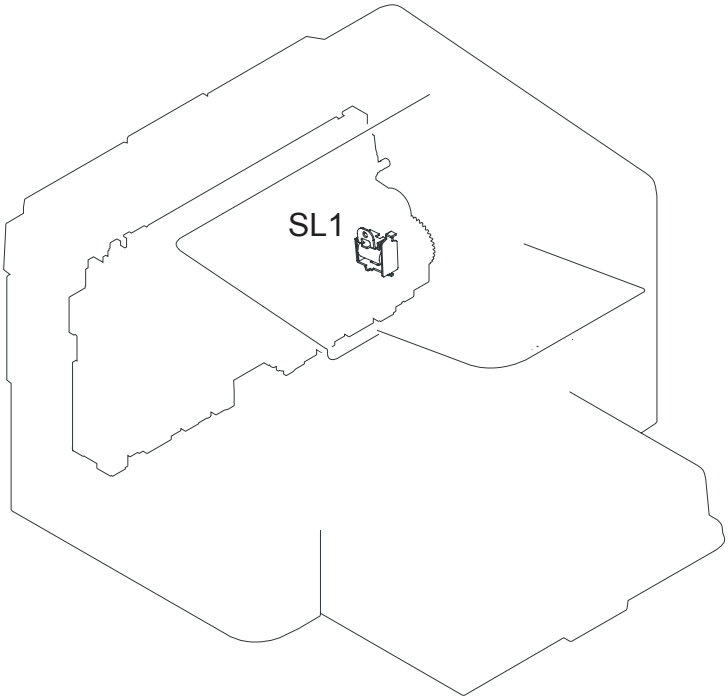


Table 1-3 **Solenoids and clutches**

Item	Description
SL1	Pickup solenoid

Figure 1-5 Switches

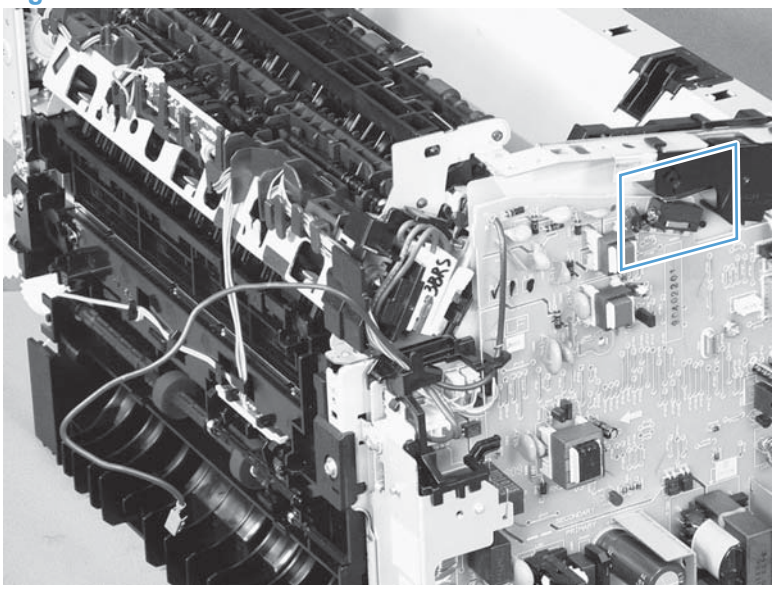


Table 1-4 **Switches**

Item	Description
SW501	Cartridge-door switch
SW502	Power switch; not shown

Figure 1-6 Sensors

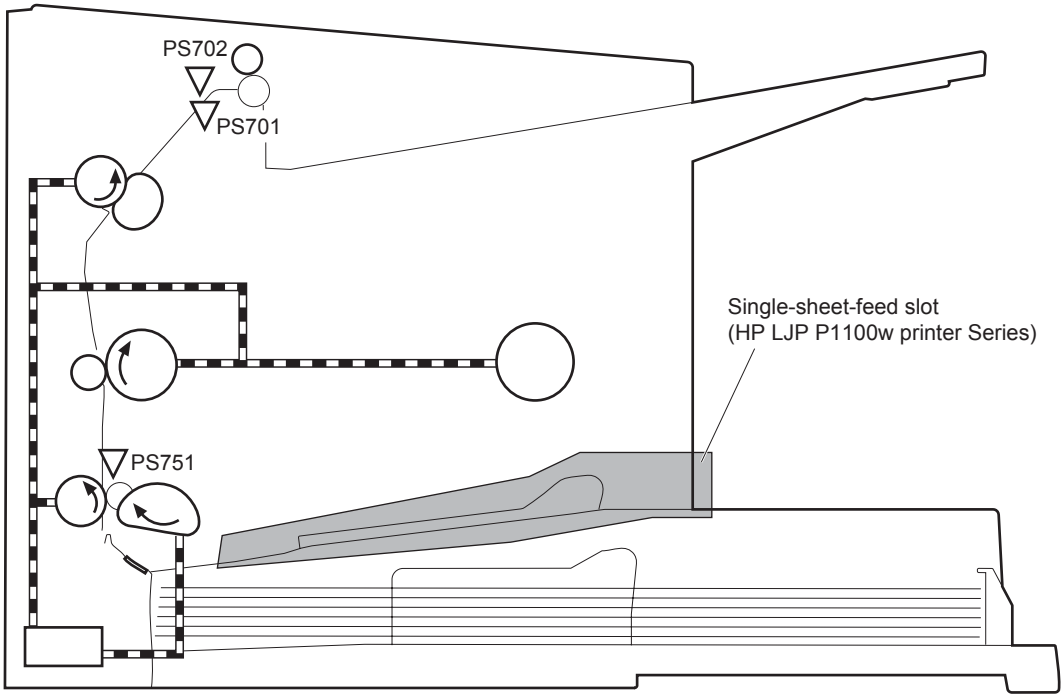


Table 1-5 Sensors

Item	Description
PS701	Fuser delivery sensor
PS702	Media width sensor
PS751	Top-of-Page (TOP) sensor
PS901	Main-motor rotation-number sensor; not shown

DC controller operations

The DC controller controls the operational sequences of the product systems.

Figure 1-7 DC controller block diagram

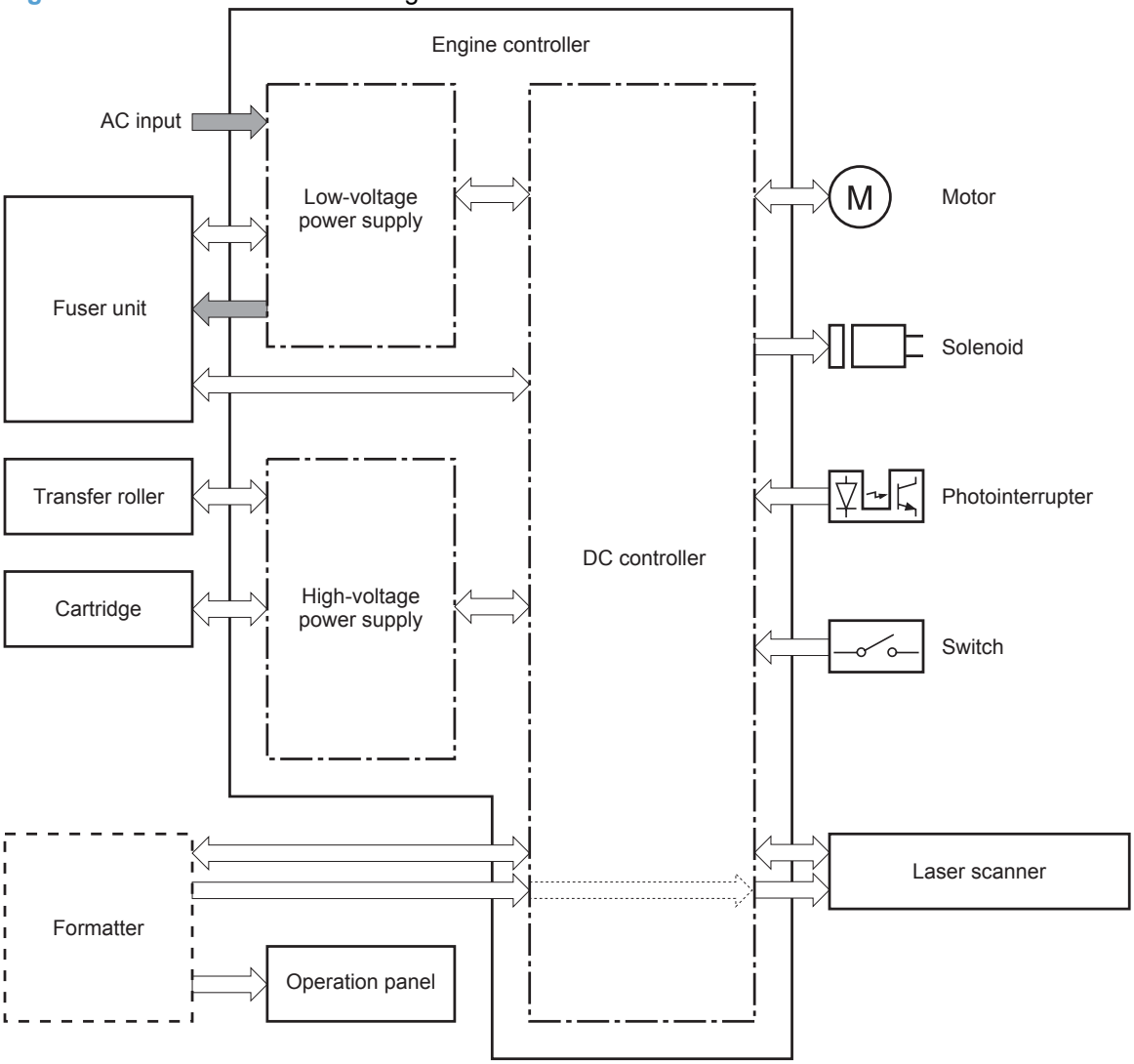


Table 1-6 DC controller controlled components

Component	Designator	Description
Motor	M1	Main motor
	M2	Scanner motor
Solenoid	SL1	Pickup solenoid
Photointerrupter	PS701	Fuser delivery sensor
	PS702	Media width sensor
	PS751	Top-of-Page (TOP) sensor
	PS901	Main-motor rotation-number sensor

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Table 1-3 DC controller controlled components (continued)

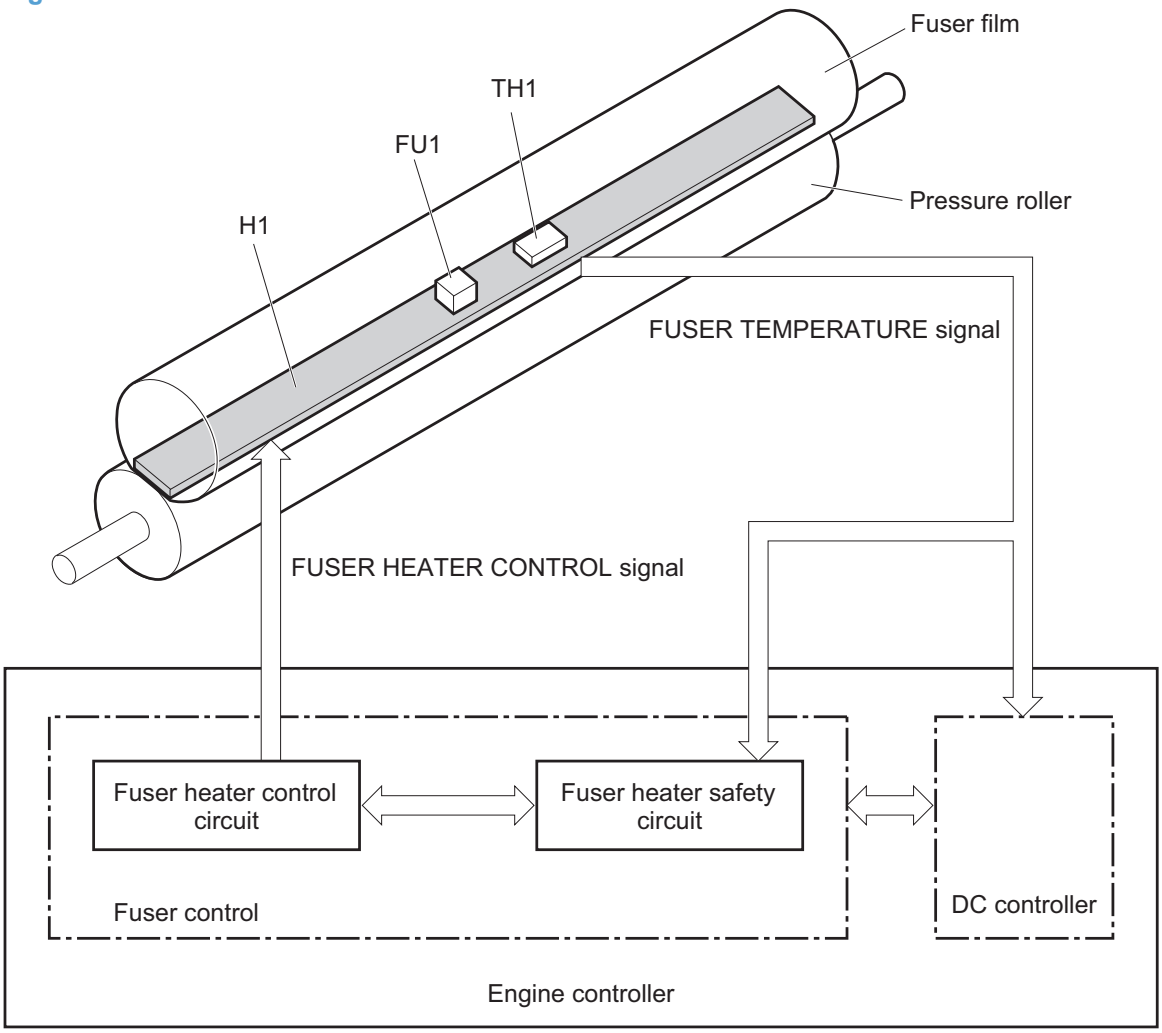
Component	Designator	Description
Switch	SW501	Cartridge-door switch
	SW502	Power switch

Fuser-control circuit

The fuser-control circuit monitors and controls the temperature in the fuser. The product uses on-demand fusing. The fuser-control circuit consists of the following major components:

- Fuser heater (H1); heats the fusing film
- Thermistor (TH1); detects the fuser temperature (contact type)
- Thermal fuse (FU1); prevents abnormal temperature rise in the fuser (contact type)

Figure 1-8 Fuser control circuit



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