LBP-1120

SERVICE MANUAL

REVISION 0

Canon

JULY. 2002 **FY8-13HT-000**

 CANON LBP-1120 REV.0 MAY. 2002 PRINTED IN JAPAN (IMPRIME AU JAPON)

Application

This manual has been issued by Canon Inc. for qualified persons to learn technical theory, installation, maintenance, and repair of products. This manual covers all localities where the products are sold. For this reason, there may be information in this manual that does not apply to your locality.

Corrections

This manual may contain technical inaccuracies or typographical errors due to improvements or changes in products. When changes occur in applicable products or in the contents of this manual, Canon will release technical information as the need arises. In the event of major changes in the contents of this manual over a long or short period, Canon will issue a new edition of this manual.

The following paragraph does not apply to any countries where such provisions are inconsistent with local law.

Trademarks

The product names and company names used in this manual are the registered trademarks of the individual companies.

Copyright

Caution

Use of this manual should be strictly supervised to avoid disclosure of confidential information.

PREFACE

This Service Manual contains basic information required for after-sales service of the laser beam printer LBP-1120 (hereinafter referred to as the "printer"). This information is vital to the service technician in maintaining the high print quality and performance of the printer.

This manual consists of the following chapters:

Chapter 1: Product information
Features, specifications, operation, and installation

Chapter 2: Operation and Timing
A description of the operating principles and timing sequences of the electrical and mechanical systems.

Chapter 3: The Mechanical System
Explanation of mechanical operation, disassembly, reassembly and adjustment procedures

Chapter 4: Troubleshooting
Troubleshooting procedures, reference values and adjustments, maintenance and servicing, etc.

Appendix: General timing chart, general circuit diagram, etc.

Information in this manual is subject to change as the product is improved or redesigned. All relevant information in such cases will be supplied in the Service Information Bulletins.

A thorough understanding of this printer, based on information in this Manual and Service Information bulletins, is required for maintaining its performance and for locating and repairing the causes of malfunctions.

CONTENTS

CHAPTER 1 PRODUCT INFORMATION

CHAPTER 2 OPERATION AND TIMING

CHAPTER 3 THE MECHANICAL SYSTEM

CHAPTER 4 TROUBLESHOOTING

APPENDIX

CHAPTER 1

PRODUCT INFORMATION

I. FEATURES

1. Small-Sized Printer with High Speed and High Resolution

This printer has paper pick-up trays on its top for space saving, and is compact enough to set on a desk. In addition, it has realized high speed of 10 pages per minute (A4) and high resolution of 600 dpi.

2. Employment of Canon Advanced Printing Technology

With Canon Advanced Printing Technology, data can be processed within a host computer. This frees the printer from the PDL conversion and image processing, increasing the speed performance and reducing the cost.

3. Shortened Wait Time & Low Power Consumption

By adopting an on-demand fixing method that drives the heater only during printing, the printer has shorten the wait time and reduced the consumption power during standby.

4. Low Noise

In addition to an on-demand fixing method, the printer has increased its heat exhaust efficiency so as to remove the fan for realizing a low noise level.

5. Employment of USB Interface as a Standard

The printer employs an USB interface as a standard, allowing easy connection to peripherals.

II. SPECIFICATIONS

A. Printer

1. Printer Engine

1)	Type	Desktop page printer
2)	Printing method	Electrophotography
3)	Printing speed **(Note1)**	10 pages/minute (A4)
4)	First print time **(Note2)**	
	Face-down	18 seconds or less
	Face-up	17 seconds or less
5)	Wait time **(Note3)**	8 seconds or less
6)	Resolution	
	Horizontal	600 dots/inch
	Vertical	600 raster lines/inch
7)	Image formation system	
	Laser	Semiconductor laser
	Scanning system	Rotating four-faced prism mirror
	Photosensitive drum	OPC
	Charging	Roller charging
	Exposure	Laser scanning
	Toner	Magnetic single-component dry toner
	Development	Toner projection development system
	Toner supply	Replaceable EP-22 toner cartridge (able to print approx. 2,500 A4-sized print sheets: with image density set in the middle, and 4 % dot density ratio)
	Image transfer	Roller transfer
	Separation	Curvature separation
	Cleaning	Blade
	Fixing method	On-demand fixing
8)	Feeding	Manual feed slot Multi-purpose tray
	Paper types	Plain paper, recycled paper, colored paper, labels, OHT, index cads, postcards and envelops
	Paper size **(Note4)**	
	Manual feed slot	76.2 mm(W) x 127 mm(L) ~ 216 mm(W) x 356 mm(L) sized paper (64 g/m^2 to 105 g/m^2 Canon recommended paper) and above mentioned paper
	Multi-purpose tray	76.2 mm(W) x 127 mm(L) ~ 216 mm(W) x 356 mm(L) sized paper (64 g/m^2 to 105 g/m^2 Canon recommended paper) and above mentioned paper
	Capacity	
	Manual feed slot	one sheet
	Multi-purpose	Depth 12.5 mm (Approx. 125 sheets of 64 g/m^2 paper)
9)	Delivery **(Note5)**	Face-down/face-up
	Face-down tray capacity	Approx. 50 sheets of 64 g/m^2 paper
10)	Duplex printing	
	Manual duplex printing **(Note6)**	The paper is picked up from the multi-purpose tray and delivered face-up. Only plain paper (64-105 g/m^2 Canon recommended paper) can be printed duplex.
11)	Operating environment	
	Temperature	10 to 32.5 °C (50 to 90.5 °F)
	Humidity	20 to 80% RH
	Air pressure	613 to 1013 hPa (460 to 760 mmHg)

12) Power consumption	110-127Vmodel	220-240Vmodel
Maximum	Approx. 740 W (reference)	Approx. 672 W (reference)
During printing	Approx. 250W (average)	Approx. 250W (average)
Durimg standby	Approx. 5W (average)	Approx. 5W (average)
13) Noise level (Officially announced noise emission level in accordance with ISO 9296)		
Sound power level	6.2 B or less (printing)	
(1B = 10 dB)	Dark sound level (standby)	
Sound pressure level	50 dB or less (printing)	
(Bystander position)	Dark sound level (standby)	
14) Dimensions **(Note7)**	362 mm(W) x 307 mm(D) x 240 mm(H)	
	14.2 in.(W) x 12.2 in.(D) x 9.5 in.(H)	
15) Weight		
printer only	Approx. 6.0 Kg / 13.2 lb	
cartridge	Approx. 730 g / 1-5/81 lb	
16) Power supply	110-127V ±10% (50/60 Hz ±2 Hz)	
	220-240V +6%-10% (50 Hz ±2 Hz)	

Notes:
1. A test print when the room temperature is 20 °C and the rated power voltage is input.
2. The time taken from that the Print signal is received from the video controller until that an A-4 sized paper is delivered completely, and also when the printer is in the Ready mode at room temperatures of 20 °C.
3. The time taken from that the power plug is plugged in until that the printer becomes ready to print (Ready or Standby mode.)
4. Paper with the width of less than 182 mm should not exceed 235 mm in length.
5. Only plain paper and recycled paper can be delivered face-down.
6. To print duplex manually, uncurl the face-up delivered paper and set it in the multi-purpose tray.
7. Without the delivery guide and the paper pickup sub tray.

2. Interface controller

1)	Printing System	Canon Advanced Printing Technology
2)	ROM capacity	8 KB
3)	RAM capacity	512 KB
4)	Interface	USB(V1.1) interface

Specifications are subject to change with product improvement.

III. SAFETY INFORMATION

A. Handling the Laser/Scanner Unit

An invisible laser beam is emitted within the laser/scanner unit.

The laser beam can cause eye damage if exposed, so be sure not to disassemble the laser/scanner unit. It is not necessary to adjust the laser/scanner unit in this printer in the filed.

The following label is attached to the laser/scanner cover.

Figure 1-3-1

B. Toner Caution

The toner is non-toxic substance composed of plastics and minute color pigments.

If toner adheres to the skin or clothing, remove as much as possible with dry tissue first, then wash with cold water, Hot water should not be used, as the toner will solidify and become difficult to remove.

Toner will easily decompose vinyl materials, therefore avoid the toner to come close to vinyl.

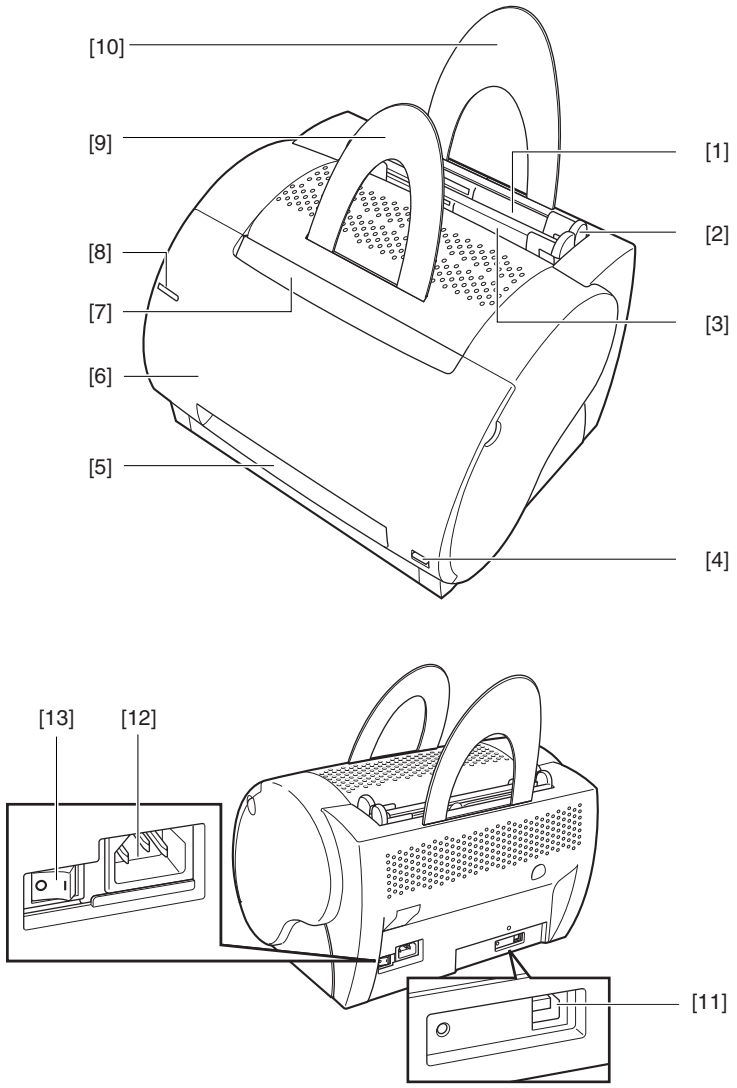
C. Ozone Safety

An infinitesimal amount of ozone gas (O^3) is generated during corona discharge from the charging roller. The ozone gas is emitted only while the printer is operating.

This printer meets the ozone emission reference value set by Underwriters Laboratory (UL) at the time it is shipped from the factory.

IV. PARTS OF THE PRINTER

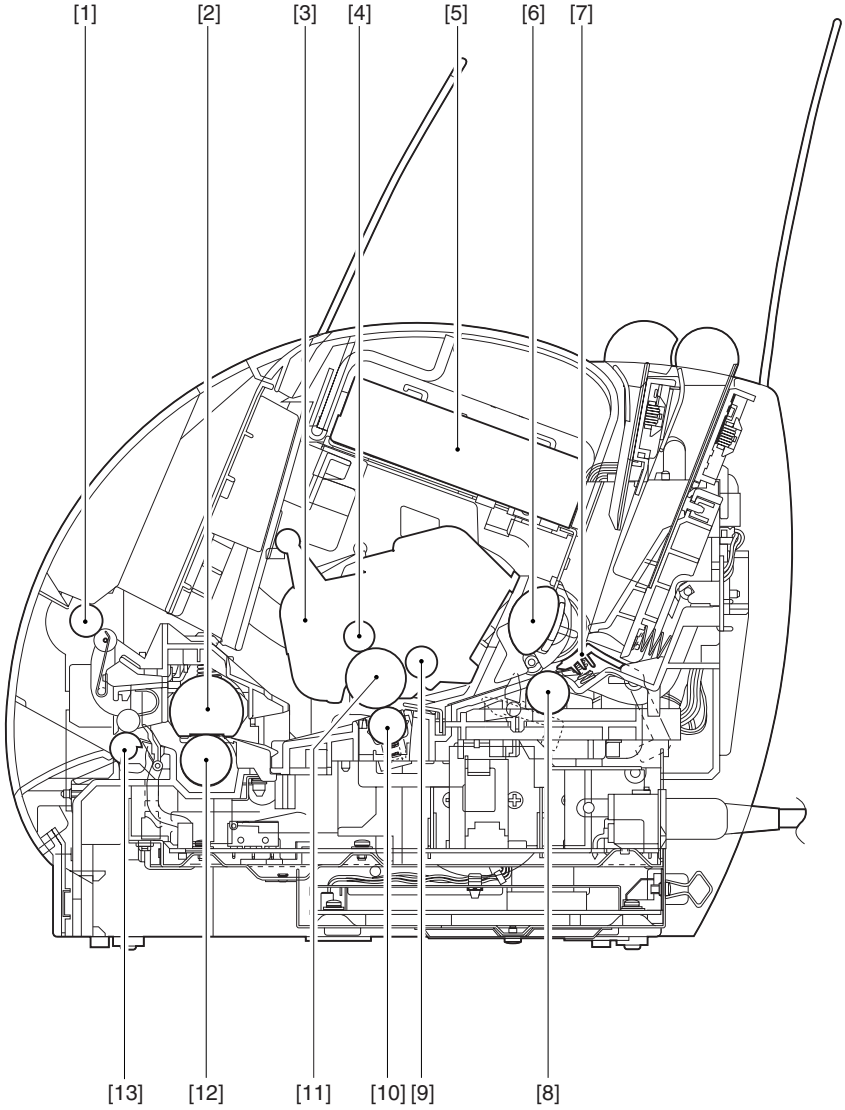
A. External View



[1] : Multi-purpose tray
[2] : Paper width guide
[3] : Manual feed slot
[4] : Delivery switching lever
[5] : Face-up delivery port
[6] : Cartridge cover unit
[7] : Face-down delivery tray
[8] : Display unit
[9] : Delivery guide
[10] : Paper pickup sub tray
[11] : USB port
[12] : Power receptacle
[13] : Power switch

Figure 1-4-1

B. Cross Section



[1] : Face-down delivery roller
[2] : Fixing film unit
[3] : EP-22 cartridge
[4] : Primary charging roller
[5] : Laser/scanner unit
[6] : Pick-up roller
[7] : Separation pad
[8] : Feed roller
[9] : Developing cylinder
[10] : Transfer charging roller
[11] : Photosensitive drum
[12] : Pressure roller
[13] : Fixing delivery roller

Figure 1-4-2

V. INSTALLATION

A. Precautions

This product has been carefully adjusted and strictly inspected before packing and shipping. To make the operation as intended, it is important to install it correctly. Service engineers must understand the performance of the printer sufficiently, install it in the appropriate environment with proper procedures, and operate the necessary checks.

The following requirements must be met when installing the printer.

The service engineer should inspect the installing site before taking the printer to the customer's premises.

- Power must be directly connectable to a single socket with a supply voltage within ± 10 % of the rated voltage (110-127V) or +6 % to -10 % of the rated voltage (220-240V.)
- The temperatures should be in a range from 10 to 32.5 °C and the relative humidity from 20 to 80 %. Avoid areas closed to water faucets, boilers, humidifiers, or refrigerators.
- Avoid areas near open flames, dusty locations, windy locations, areas which emit ammonia gas, and areas directly exposed to sunlight. When exposure to direct sunlight is unavoidable, hanging curtains is recommended.
- The room should be well ventilated.
- The printer should be placed on a level surface.
- If the printer is set up on a desk, be sure a study desk is used.
- Set the printer at a suitable distance from the wall for easy operation (See Figure 1-5-1.)
  There must be enough space around the printer to operate.

Following dimensions should be taken into consideration to select an installation space for the printer.

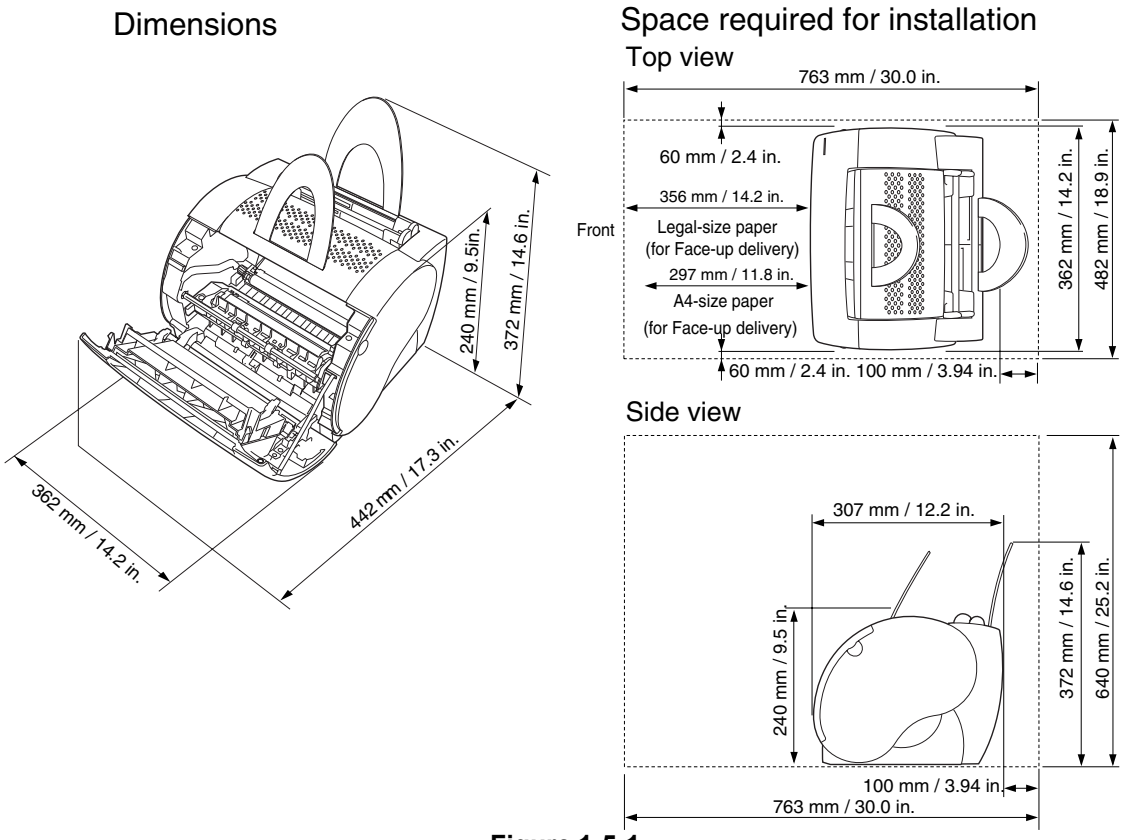


Figure 1-5-1

When metals are moved from a cold area to warm area, condensation may appear. This can lead to various troubles during an operation. When the printer needs to be moved from a cold area to warm area, leave it packed in its box for at least an hour to acclimatize to room temperature.

B. Storage and Handling of EP-22 Cartridge

As time passes, the natural environment will change the cartridge, whether sealed or installed in the printer, or regardless of the number of prints. The progression of this natural change depends largely on the storage and installation environment, therefore, take special care on storage and handling the cartridge.

a. Storage of Sealed EP-22 Cartridge Package

When storing EP-22 cartridge in warehouses or workshops, be sure that they are kept within humidity/storage conditions range shown in Table 1-5-1.

Also note the following:

1) Avoid areas exposed to direct sunlight.
2) Do not place them in locations which are subject to severe vibration.
3) Do not bump or drop the cartridge.
4) Avoid high temperature environment, keep EP-22 cartridge below 35 °C.

Table 1-5-1

Temperature	Normal (total storage time X 9/10)		0 to 35˚C
	Severe (total storage time X 1/10)	High	35 to 40˚C
		Low	-20 to 00˚C
Temperature change (within 3 minutes or so)			400˚C→ 15˚C -20˚C → 250˚C
Relative humidity	Normal (total storage time X 9/10)		35 to 85% RH
	Severe (total storage time X 1/10)	High	85 to 95% RH
		Low	10 to 35% RH
Air pressure			613 to 1013hPa (460 to 760 mmHg)

Note: Total storage time is the valid time span following the manufacture date displayed on the cartridge box.

b. Storage of Unsealed EP-22 Cartridge

Since an organic photoconductor (OPC) is used for the photosensitive drum, intensive light will damage the drum. Since toner is contained in the cartridge, it is necessary to thoroughly explain the various storage and handling procedures of unsealed cartridges to customers.

Also, note the following:

1) Avoid areas which are exposed to direct sunlight such as near windows. Avoid leaving the packages in cars for an extended period of time as high temperatures can damage them.
2) Avoid high temperature and high humidity, and low temperature and low humidity environment. Avoid areas where the temperature or humidity drastically change such as a location near air conditioners.
3) Avoid dusty areas or locations which emit ammonia or organic solvent gases.
4) Keep EP-22 cartridge below 35 °C
5) Avoid placing the package near CRT displays, disk drive units, or floppy disks.

c. Notes on Handling of Cartridge

1) Before installing a new EP-22 cartridge in the printer, hold the cartridge at both sides as shown below, and gently slop it at about 45 ° right-up and left-up 5 or 6 times to distribute toner evenly. Do not rock the cartridge in any other way, as the toner may leak from the developing unit or cleaner unit.

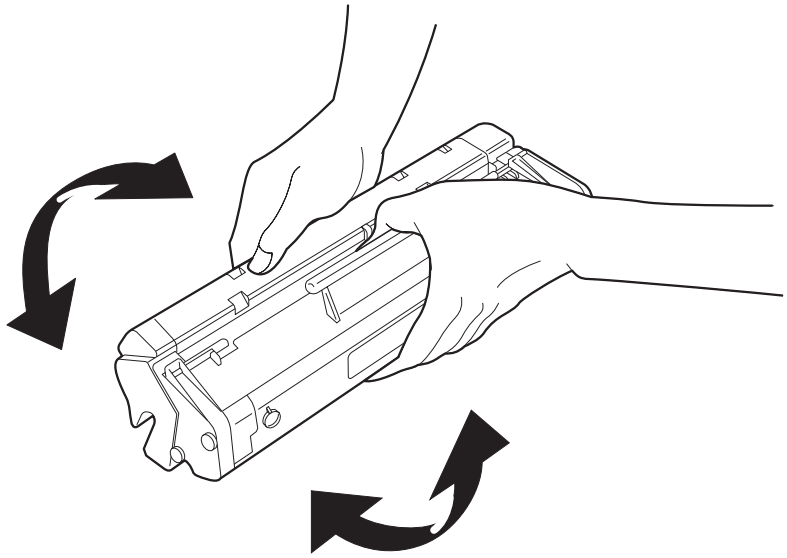


Figure 1-5-2

Print the test pattern of 3 to 5 sheets to ensure that output images are not spoiled by a toner leak after installing the cartridge in the printer.

2) If blank spots appear on the output image due to an uneven distribution of toner in the cartridge, shake the cartridge to evenly distribute as shown in 1).
3) Do not place the cartridge on its end or upside down.
4) Do not open the protective shutter of the photosensitive drum and never touch the drum surface. Do not clean the photosensitive drum.
5) Do not disassemble EP-22 cartridge.
6) Do not give vibration or shock to the cartridge.
7) Intensive light easily damages the photosensitive drum, causing blank spots or black stripes on the printed image. Faulty print images can be corrected by stopping the printer momentarily. However, if the drum is exposed too long, the blank spots and black stripes may remain even after stopping the printer. To prevent this, be sure to always place the unsealed cartridges in their boxes or under a cover. Do not leave them uncovered after removing from the printer.

Reference: If the cartridge are exposed to ordinary light for five minutes and then left in a dark area for another five minutes, the print quality will return to a virtually permissible level. However, do not expose the cartridge to direct sunlight.

VI. MAINTENANCE AND CHECKS BY THE CUSTOMER

The table below lists the maintenance points that should be performed by the customer to maintain the printer at optimum level.

Table 1-6-1

Item	Customer maintenance
Cartridge	Shake or replace the cartridge as necessary.
External Cover	Clean the external cover as necessary.

VII. OPERATION

A. Canon Advanced Printing Technology (CAPT)

Canon Advanced Printing Technology (hereafter referred to as CAPT) reduces the processing time and simplifies the operations for printing in the Microsoft Windows environment.

The easy operations and speedy printing are supported by the following features of CAPT:

- Instead of converting print data sent from application into the printer's page description language (PDL), CAPT translates the print data into resource data compatible to the graphic drawing system commands (GDI data.)
- The resource data compatible to the GDI data is developed to dot data, and then passed to a host computer.
- The printing environment can be set in the dialog box on the host computer screen.
- The printer status is shown on the host computer screen, so users can view and confirm the print time, print paper status, error conditions, and etc..

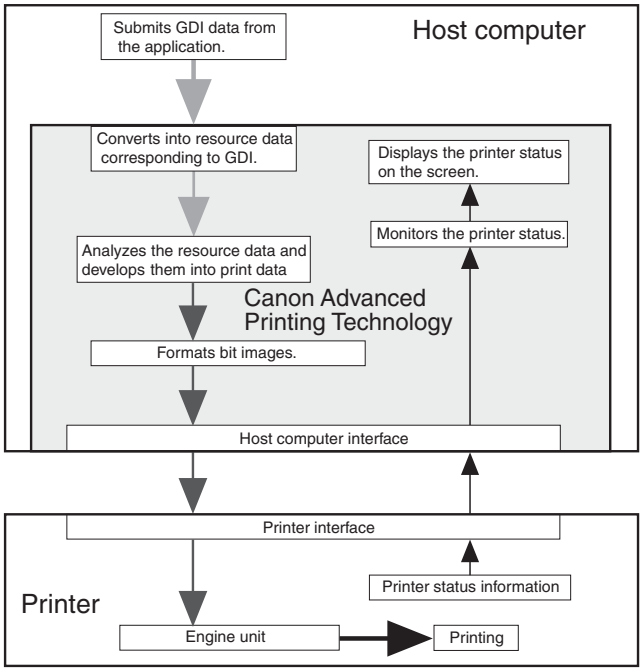


Figure 1-7-1

Note: GDI : Graphic Device Interface
A graphic drawing system that performs printing and displaying in the Windows environment, (and a graphic drawing system interface with the application.)

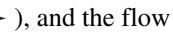
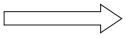
CAPT operates on Microsoft Windows 98/Me/2000/XP. The installation is done using the Canon Advanced Printing Technology disk included with this printer.

CAPT specifies paper sizes, document sizes, number of copies, and print quality on the computer screen. The operation methods of the dialog boxes vary in Microsoft Windows 98/Me/2000/XP.

Refer to the users guides for the installation procedures and operations.

CHAPTER 2

OPERATION AND TIMING

This chapter describes the printer functions, the relationships between mechanisms and circuits, and the timing of operations. Mechanical linkages are indicated by black and white lines (), the flow of control signals by solid arrows (), and the flow of groups of signals by outline arrows ().

There is a microcomputer in this printer. But as the internal operation of the microcomputer cannot be checked, an explanation of the operation of the microcomputer has been left out.

As it is assumed that no repair will be made to customer circuit boards, the explanation of board circuits is limited to an outline using block diagrams. So there are two types of circuit explanations; (1) everything from the sensor to the input sections of the major circuit boards, (2) everything from the output sections of the major circuit boards to the loads. These are explained with block diagrams according to the function.

I. BASIC OPERATION

A. Functions

Printer functions can be divided into five groups: video control system, engine control system, image formation system, laser/scanner system, and paper pickup/feed system.

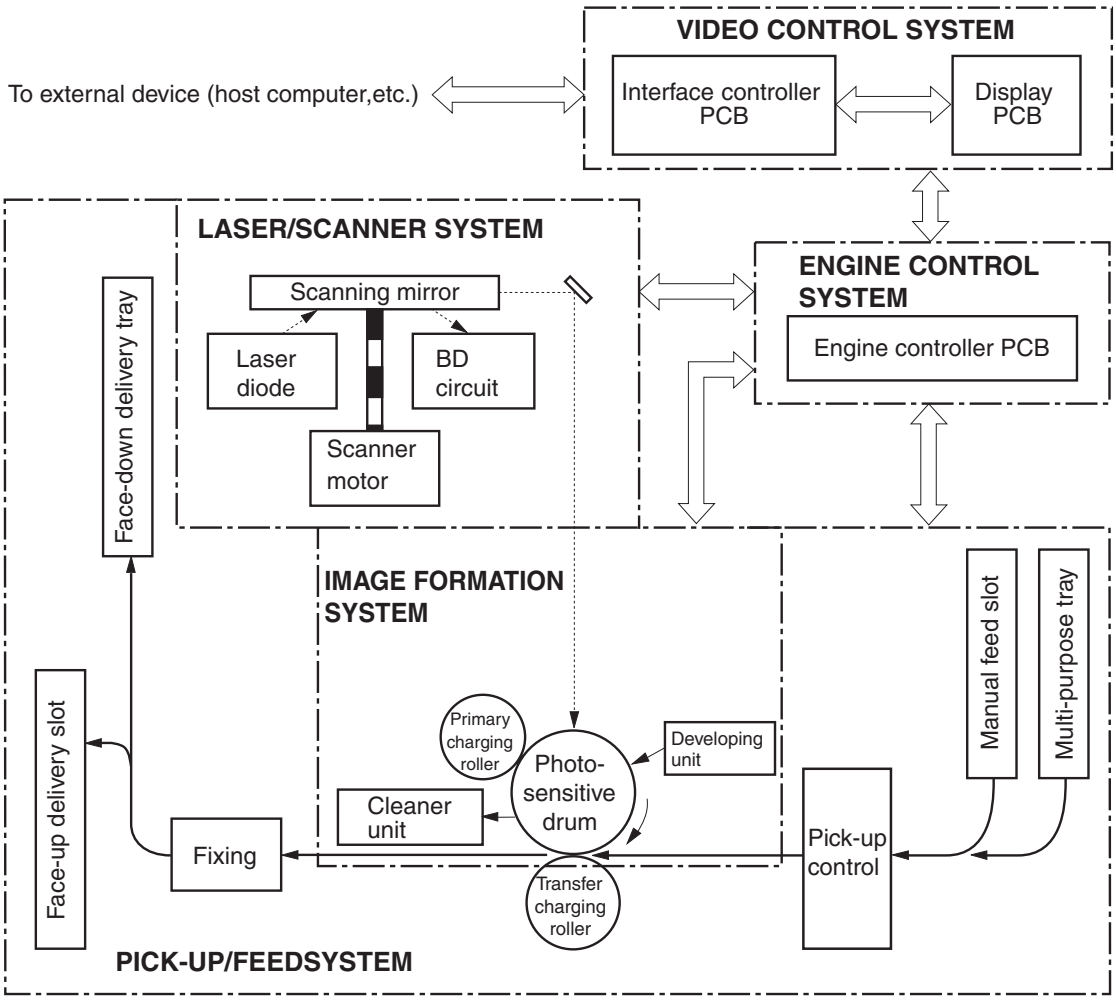


Figure 2-1-1

B. Basic Operation Sequence

The operation sequence of this printer is controlled by the microcomputer on the engine controller PCB. The table describes the purpose of each period from the time the printer is turned ON until the main motor stops rotating after the completion of printing. Refer to the APPENDIX for the detailed timing chart.

Table 2-1-1

Period		Purpose	Remarks
WAIT (WAIT period)	From power-ON until the end of the main motor initial rotation.	To clear the drum surface of potential and to clean the transfer charging roller.	Detects whether the cartridge is installed or not.
STBY (STANDBY)	From the end of the WAIT period or the LSTR period until the input of the pick-up command from the interface controller.Or,from the end of the LSTR period until power-OFF.	To keep the printer ready to print.	
INTR (INITIAL ROTATION period)	From the input of the pick-up command from the interface controller until the paper reaches the paper top sensor.	To stabilize the photosensitive drum sensitivity in preparation for printing. Also to clean the transfer charging roller.	
PRINT (Print)	From the end of the initial rotation until the primary voltage going OFF.	To form images on the photosensitive drum based on the VIDEO signals (/VDO,VDO) input from the interface controller and to transfer the toner image on to the paper.	
LSTR (LAST ROTATION period)	From the time the primary voltage goes OFF until the main motor discontinues rotating.	To deliver the last page. Also to clean the transfer charging roller.	If the pick-up command is input from the interface controller, the printer enters the INTR period immediately after the end of the LSTR period.

C. Power-ON Sequence

The following explains the sequence from power-ON until the printer enters the STANDBY mode.

1) Power-ON.
2) CPU initialization.
3) The video interface communication start.
   After 0.5 seconds from the time the status command signal (/SC) turns “H”, the video interface becomes ready to communicate.
4) Paper jam detection and door open detection.
   Detects the sensors for the presence of paper and door open.
5) Fixing unit ON
   Drives the fixing unit for 0.5 seconds. Stops driving if the fixing unit temperature is 100°C or more.
6) Scanner motor initial rotation.
7) Main motor initial rotation.
8) High-voltage control.
   Detects the presence of the cartridge after the primary high-voltage goes ON. Also, cleans the transfer charging roller.
9) Failure/abnormality check
   Detects the scanner and fixing unit failures.

II. ENGINE CONTROL SYSTEM

A. Engine Controller PCB

1. Outline

The operation sequence of the printer is controlled by the CPU on the engine controller PCB. When the printer is turned ON and enters the STANDBY mode, the CPU outputs signals to drive loads, such as the laser diode, motors, and solenoids, based on the pickup command and image data input from the interface controller.

A block diagram of this circuit is shown below.

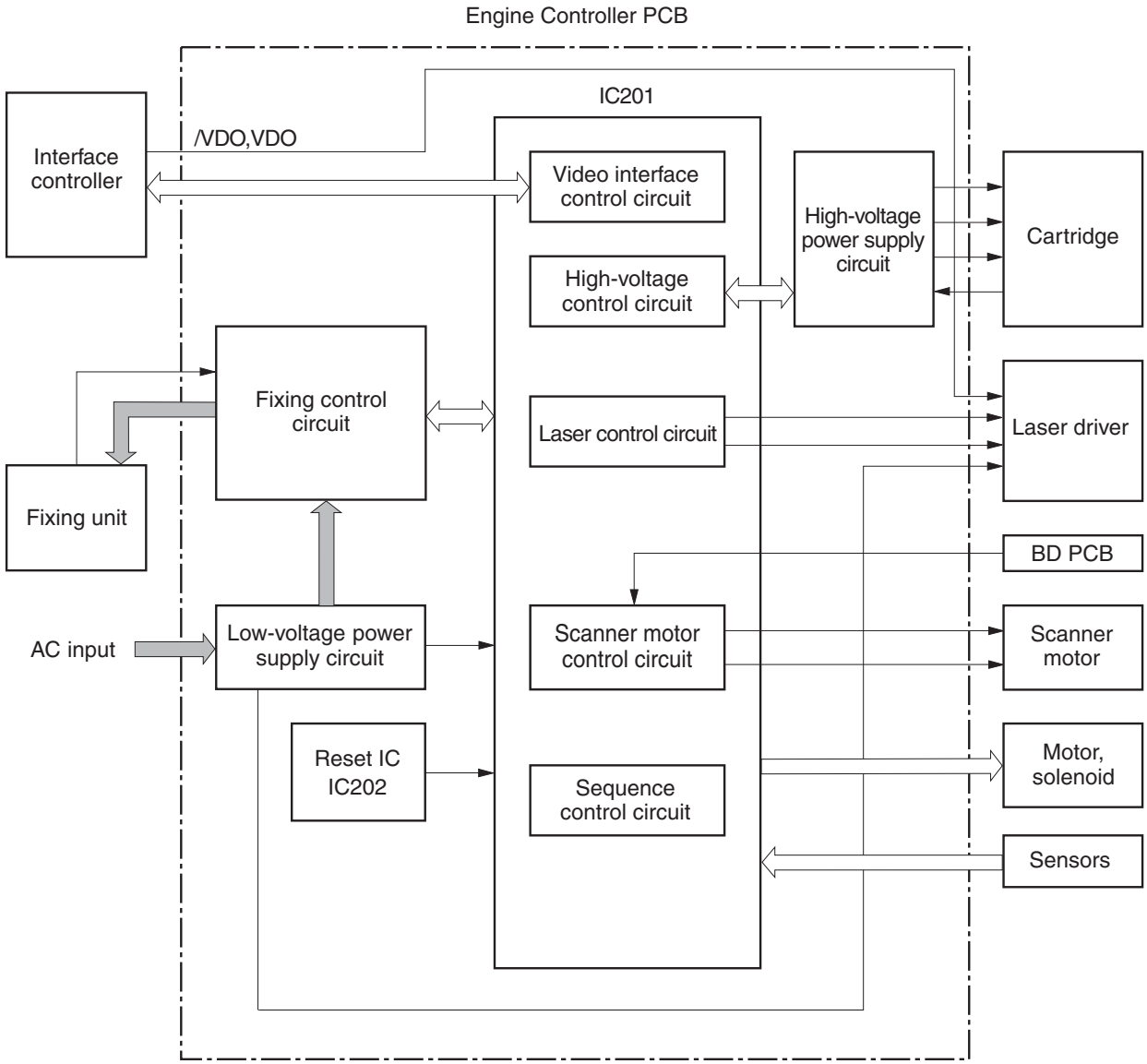


Figure 2-2-1

2. Operations

a. CPU (IC201)

This printer contains an 8-bit single-chip microcomputer for its CPU.

This CPU is a single-chip CPU with a built-in ROM and RAM. It performs the controls for the following items based on the control program stored in the ROM.

1) Printer sequence.
2) Video interface.
3) High-voltage power supply circuit.
4) Laser/scanner.
5) Sensors.
6) Loads (motors, solenoids, etc.).

b. Reset IC (IC202)

IC202 monitors +3.3V and resets the CPU when the power is turned ON.

c. Fixing Control Circuit

See the section “B. Fixing Control Circuit” in this chapter.

d. High-Voltage Power Supply Circuit

See the section “C. High-Voltage Power Supply Circuit” in this chapter.

e. Low-Voltage Power Supply Circuit

See the section “D. Low-Voltage Power Supply Circuit” in this chapter.

3. Engine Controller Input and Output

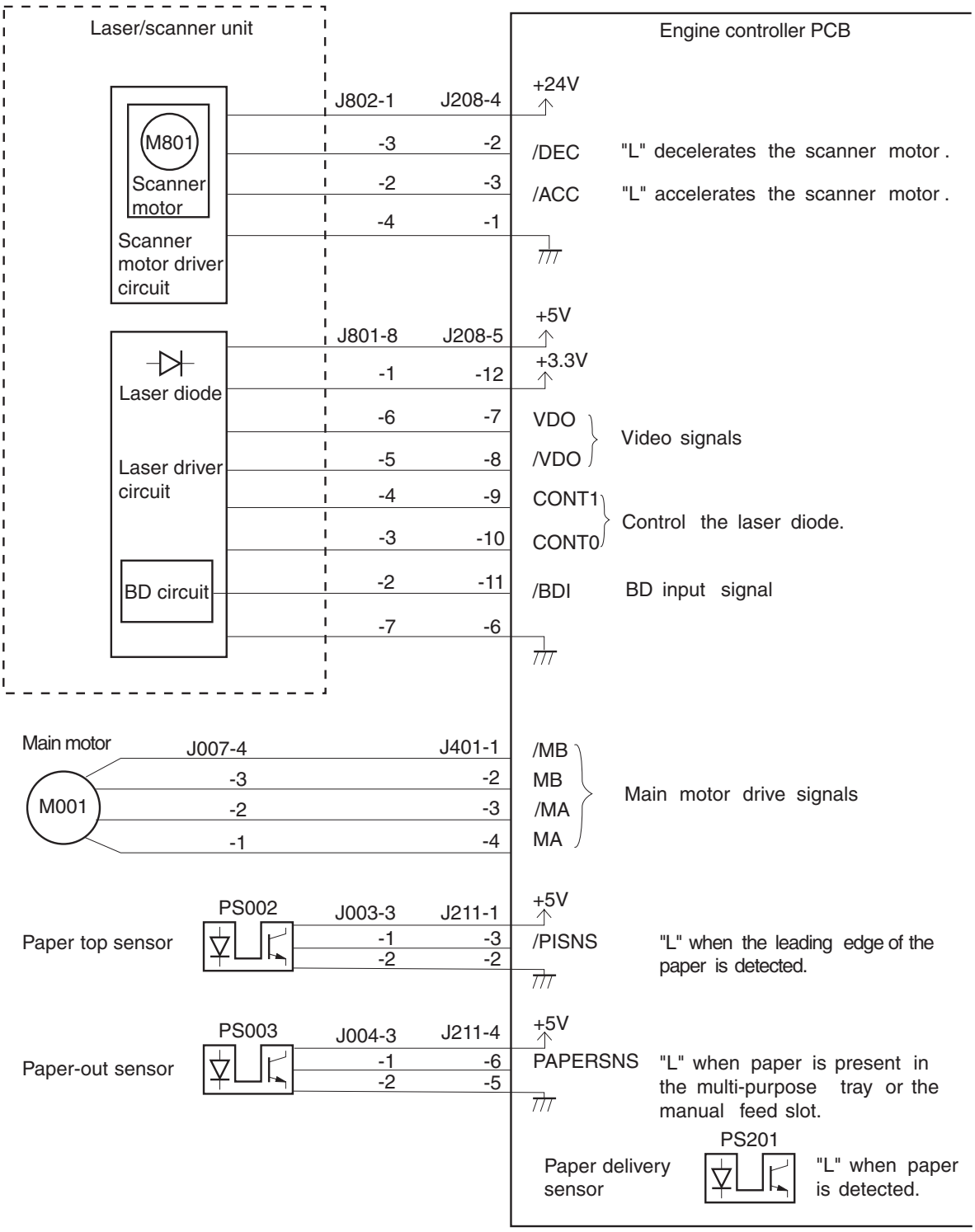


Figure 2-2-2

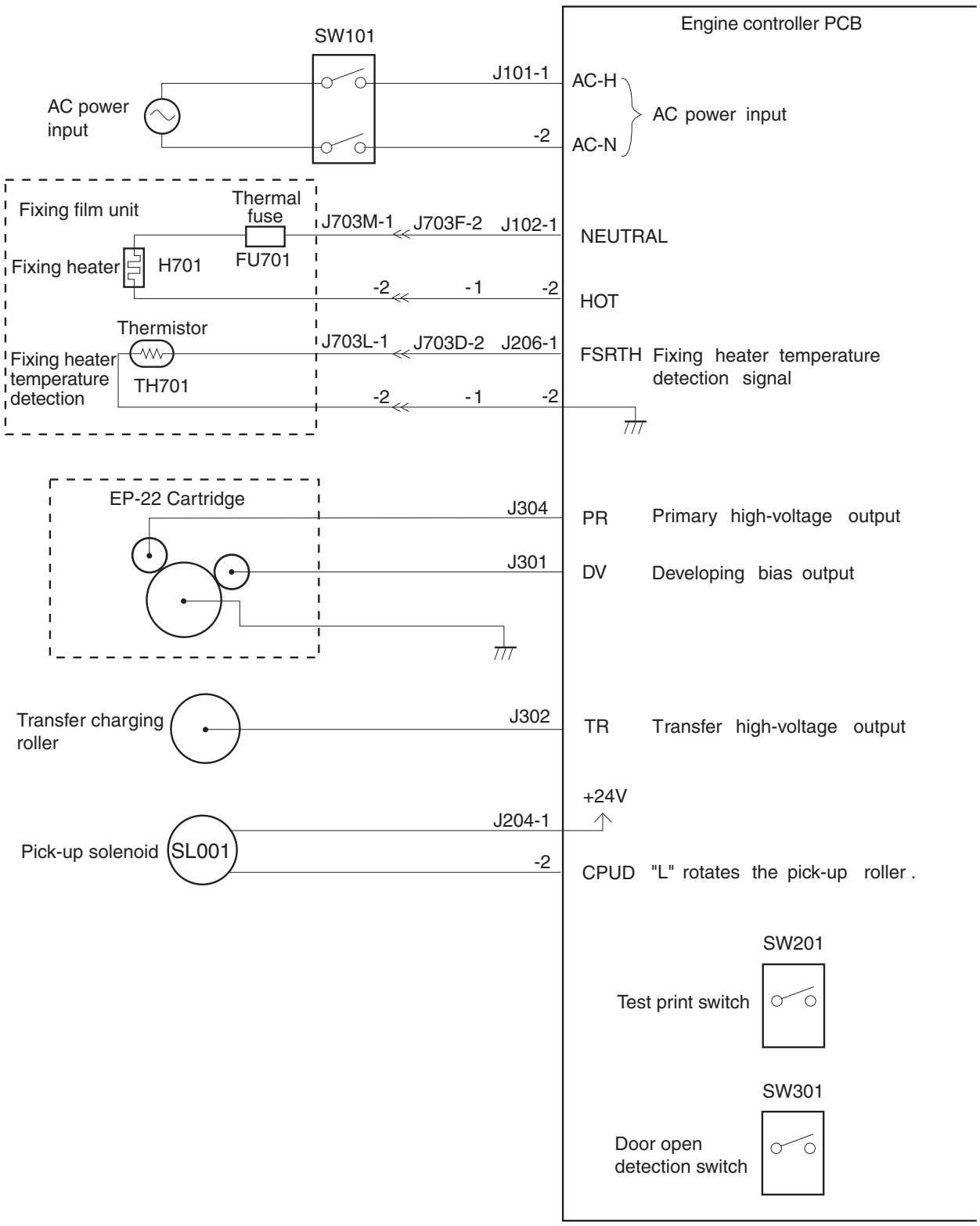

Engine controller PCB
SW101
AC power input
J101-1
-2
AC-H
AC-N
AC power input
Fixing film unit
Thermal fuse
FU701
Fixing heater
H701
J703M-1
J703F-2
J102-1
NEUTRAL
-2
-1
-2
HOT
Thermistor
TH701
Fixing heater temperature detection
J703L-1
J703D-2
J206-1
FSRTH
Fixing heater temperature detection signal
-2
-1
-2
EP-22 Cartridge
J304
PR
Primary high-voltage output
J301
DV
Developing bias output
Transfer charging roller
J302
TR
Transfer high-voltage output
+24V
J204-1
Pick-up solenoid
SL001
-2
CPUD
"L" rotates the pick-up roller.
SW201
Test print switch
SW301
Door open detection switch

Figure 2-2-3

B. Fixing Control Circuit

1. Fixing Temperature Control

The fixing film unit of the printer contains a plate-shaped fixing heater to heat up the fixing film.

The fixing heater temperature is detected by the thermistor (TH701) on the fixing heater. When the temperature rises, the resistance of TH701 drops and the voltage of the FIXING HEATER TEMPERATURE DETECTION signal (FSRTH) decreases.

The CPU (IC201) on the engine controller PCB outputs the FIXING HEATER DRIVE signal (FSRD) based on the FSRTH signal voltage to bring the fixing heater temperature to the specified value.

The fixing heater temperature is controlled by the following three modes:

1) Initial temperature control: Increases to the normal target temperature after the pickup command is input to the engine controller.
2) Normal temperature control: Maintains the normal target temperature (about 190°C) during printing.
3) Between-page temperature control: Controls at low temperature in order to prevent the temperature rise at the non-feeding areas between pages on the fixing film.

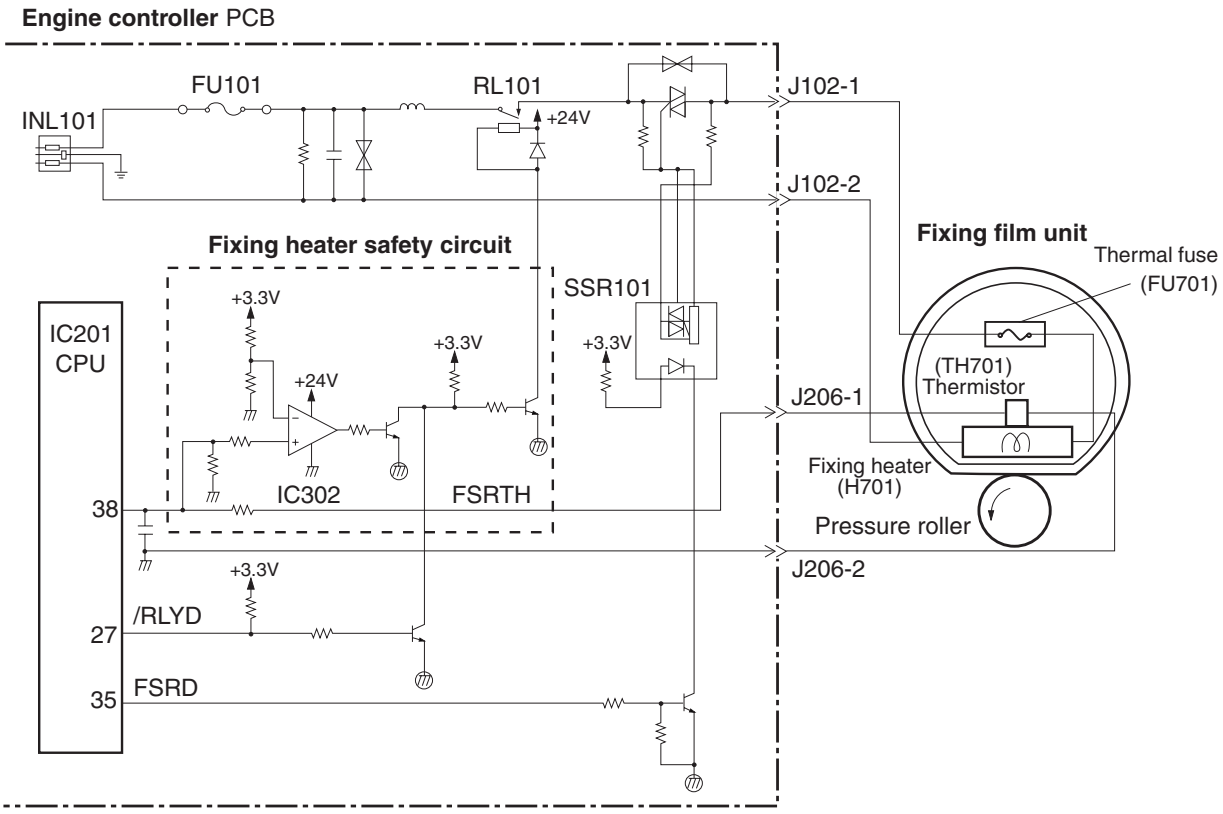


Figure 2-2-4

2. Fixing Heater Safety Circuit

This circuit is installed on the engine controller PCB and always monitors the abnormal rise of the fixing temperature.

When the output voltage from the thermistor falls below about 0.67V (244°C) due to the elevation of the fixing heater temperature, the output of the comparator (IC302) becomes "L" and the relay (RL101) goes OFF, cutting off power to the fixing heater.

3. Protection function

The printer contains the following three protective functions in order to prevent excursion of the fixing heater.

- The CPU monitors the voltage of TH701. When detecting an abnormality, the CPU assesses a fixing heater failure and sets the FIXING HEATER DRIVE signal (FSRD) to "L" and the /RLYD signal to "H" as to turn OFF the relay (RL101), shutting off power to the fixing heater. At the same time, the CPU notifies the failure to the interface controller.
- When the fixing heater temperature rises abnormally and the thermal fuse exceeds 228°C, the thermal fuse melts, cutting off the power supply to the fixing heater.
- When the fixing temperature rises abnormally and the voltage of TH701 falls below about 0.67V (244°C equivalent), the fixing heater safety circuit interrupts the power supply to the fixing heater regardless of the output from the CPU.

4. Detecting Fixing Heater Error

The CPU assesses fixing heater failures and notifies the failure to the interface controller under the following conditions:

a. Within 500 msec after the start of the initial temperature control, the temperature does not reach 20°C.
b. During the fixing heater temperature control, the temperature remains above 250°C for more than the specified period of time.
c. During the print or warm-up period, the temperature does not reach 100°C, even though the power has been supplied for the specified period of time.
d. After the 500-msec fixing heater temperature control at the powering-ON, the CPU starts the normal temperature control and monitors the temperature every 135 msec. During this normal temperature control, the temperature sequentially drops to less than 20°C twice.
e. During the normal temperature control, the fixing heater temperature falls below 100°C for the specified period of time.

Note: The fixing film may be damaged if rotated at a temperature of 100°C or below due to the high oil viscosity. Therefore, the fixing heater is required to rise above 100°C as to melt the oil before rotated.

When determining a fixing unit failure, the CPU performs the following operations:

1) Cuts off the power supply to the fixing heater.
2) Turns off the relay.
3) Immediately stops driving the main motor, scanner motor, and high-voltage system and sets the printer to the error mode regardless of the presence of ongoing paper.

5. Pressure Roller Dirt Prevention Function

This function prevents toner from adhering to the pressure roller and building up on it.

As the temperature goes down after the completion of printing, the toner remaining on the nip adheres to the pressure roller. As the time goes by, the toner develops gradually to form a lump. The lump sticks to the fixing film, causing the paper to be dirty. To prevent this, the CPU performs the following operation:

1) After the printing is completed and the main motor stops, the CPU heats up the fixing heater with high temperature for five seconds.
2) When detecting that the thermistor drops to the specified temperature, the CPU drives the main motor for 500 msec to move the nip location.

C. High-Voltage Power Supply Circuit

1. Outline

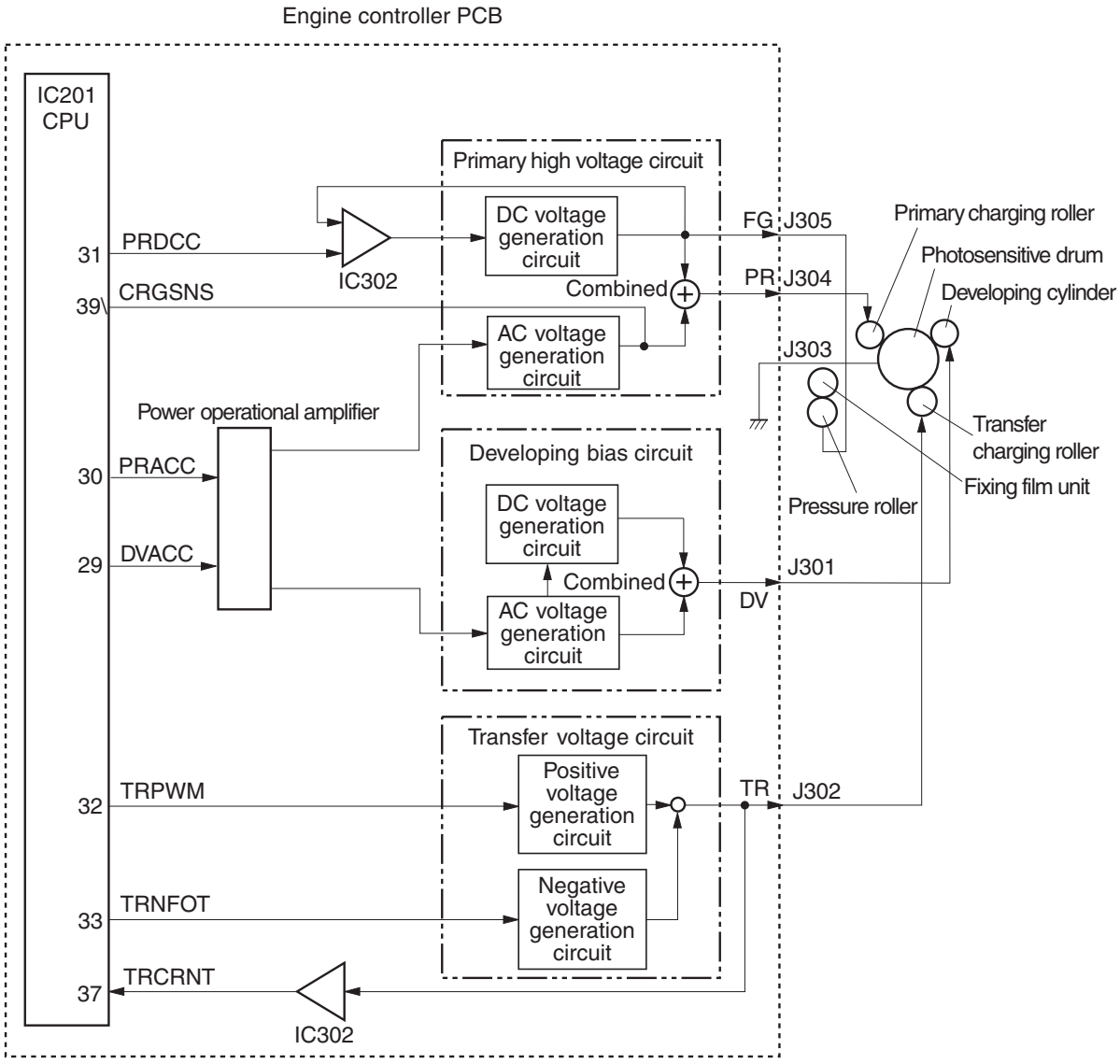


Figure 2-2-5

This circuit applies the combined voltage of the DC voltage and AC voltage to the primary charging roller and developing cylinder, and also applies the positive or negative DC voltage to the transfer charging roller, according to the instructions sent from the microcomputer (CPU) on the engine controller.

The circuit adjusts the image density by changing the primary high-voltage (DC) and the developing bias according to the image density data sent from the interface controller.

2. Operation

a. Primary Charging Roller Voltage Generation

When the pickup command is sent from the interface controller, the INITIAL ROTATION period (INTR) starts, and the PRIMARY HIGH VOLTAGE (AC) DRIVE signal (PRACC) is input to the primary high-voltage circuit via the power operational amplifier. Meanwhile, the PRIMARY HIGH-VOLTAGE (DC) DRIVE signal (PRDCC) is output from the CPU and input to the primary high-voltage circuit. This generates and combines AC bias and DC bias. The combined primary high-voltage is applied to the primary charging roller.

The IC302 compares the primary high-voltage (DC) with the PRIMARY HIGH-VOLTAGE (DC) DRIVE signal (PRDCC) sent from the CPU in order to control the primary high voltage (DC).

The presence of the cartridge is detected by the CPU. If the CPU detects the current flow (CRGSNS) on the J304, it determines the presence of the cartridge.

b. Developing Bias Generation

The DEVELOPING BIAS (AC) DRIVE signal (DVACC) is input to the developing bias circuit via the power operational amplifier, causing the circuit to generate the AC bias. Meanwhile, the developing DC bias is generated in the DC generation circuit on the developing bias circuit. The AC bias and DC bias are combined and applied to the developing cylinder.

c. Transfer Charging Roller Voltage Generation

The transfer charging roller is applied with the negative bias, print bias, and between-page bias according to the print sequence.

The negative bias (negative voltage) cleans the roller by moving the toner adhering to the roller to the photosensitive drum. A negative voltage is applied to the roller at the specified timing.

The print bias (positive voltage) transfers the toner on the photosensitive drum onto the paper. A voltage is applied to the roller.

The between-page bias prevents the residual toner on the photosensitive drum from adhering to the transfer charging roller. A positive voltage lower than the print bias is applied to the roller at the specified timing.

When the interface controller outputs a pickup command, the INITIAL ROTATION period (INTR) starts. At the same time, the CPU outputs the TRANSFER NEGATIVE VOLTAGE DRIVE signal (TRNFOT). This applies negative bias to the transfer charging roller for the specified period of time as to clean the roller.

During the print sequence, the CPU outputs the TRANSFER POSITIVE VOLTAGE DRIVE signal (TRPWM) in order to apply the print bias and between-page bias to the transfer roller.

After printing is completed, the negative bias is applied again to clean the transfer charging roller.

d. Fixing Bias Generation

The CPU outputs the PRIMARY HIGH-VOLTAGE (DC) DRIVE signal (PRDCC), causing the DC generation circuit on the primary high-voltage circuit to output the primary DC bias. The negative DC voltage is applied to the pressure roller as the fixing bias.

e. Cartridge Detection

When the PRIMARY HIGH-VOLTAGE (AC) DRIVE signal (PRACC) is output from the CPU and then the primary AC bias is output from the AC generation circuit on the primary high-voltage circuit, the primary high-voltage circuit feeds back the CARTRIDGE DETECTION signal (CRGSNS) to the CPU.

During WAIT period, the CPU checks the voltage of the CRGSNS signal at the timing the primary AC bias is output, in order to detect the presence or absence of the cartridge.

D. Low-Voltage Power Supply Circuit

1. Outline

The AC voltage input from the inlet is converted into the DC voltage in the rectification circuit, transformer, and power supply circuits. Then, the DC voltage is supplied to the printer as +24VDC, +5VDC, and +3.3VDC.

When the cartridge door is opened, the door switch (SW301) is turned OFF. This cut OFF the +24VU supplied to the high-voltage circuit. At the same time, the DOSNS signal goes "L", causing the CPU to determine that the cartridge door is opened and to stop the printer.

The AC voltage is supplied to the fixing heater through the fuse (FU101), noise filter, relay, and triac.

The +3.3VDC is supplied to the ICs on the engine controller PCB, BD PCB, and interface controller PCB.

The +5VDC is supplied to the ICs on the engine controller PCB, laser/scanner driver PCB, interface controller PCB, and sensors.

The +24VDC is supplied to the high-voltage power supply circuit, main motor, scanner motor, and solenoids.

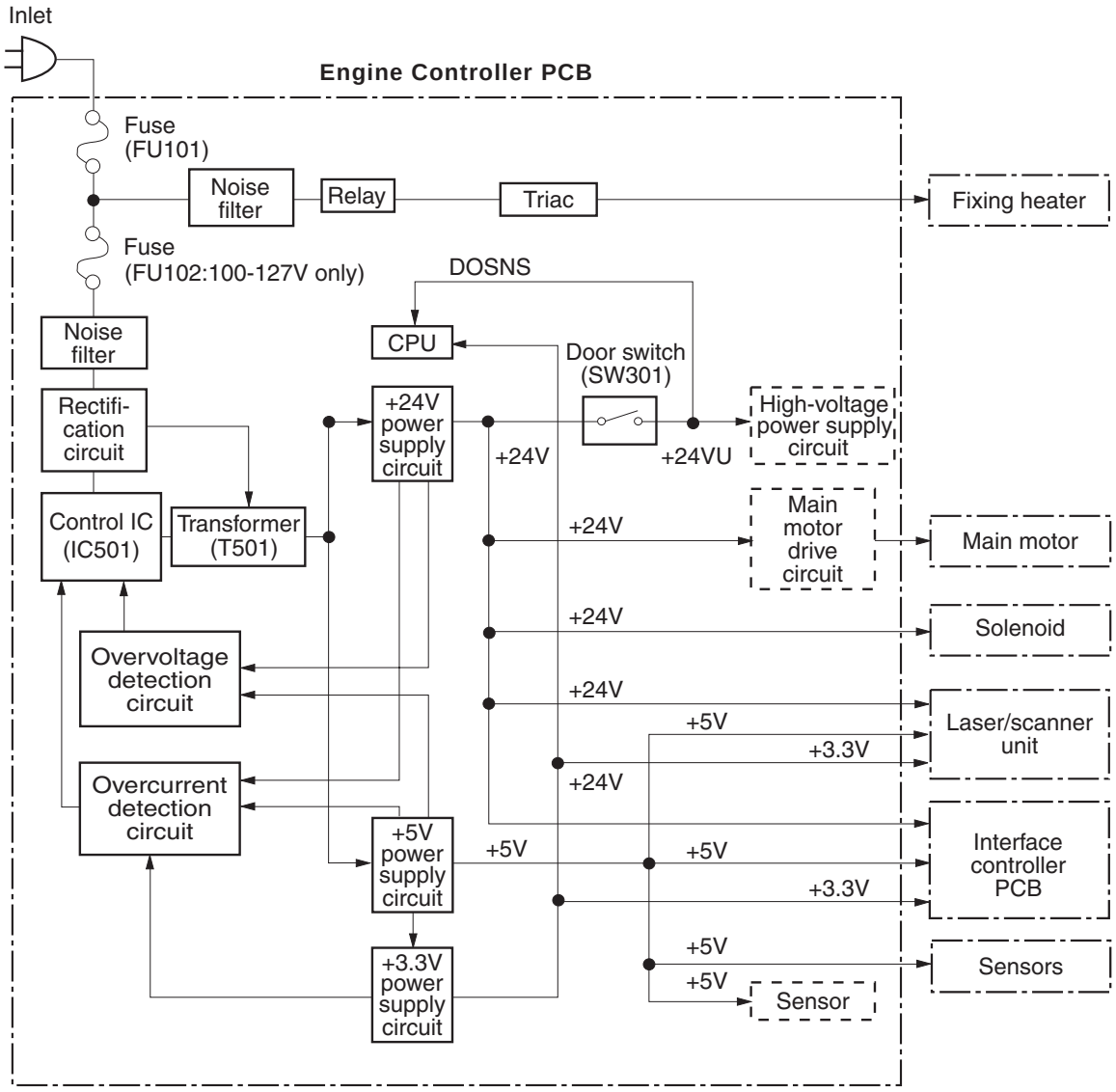


Figure 2-2-6

2. Protective Function

The power supply circuits of the +24VDC and +5VDC contain overcurrent and overvoltage protective functions. These protective functions automatically shut off the output voltage in order to protect the circuits, when an overcurrent or overvoltage condition occurs due to the troubles such as a short circuit on the loads. When the protective functions are activated and no DC voltage is output from the power supply circuits, it is necessary to turn OFF the power, rectify the troubles on the loads, and then turn ON the power again. Be sure to wait for about two minutes before turning the switch ON again.

E. Video Interface

1. Outline

Unlike the conventional video interface, which uses an exclusive line for each of the signals exchanged between the interface controller and engine controller, this printer uses command status.

This section describes the types of the interface signals used between the engine controller and interface controller, and gives information on the sequence of the printer operations.

a. System Diagram

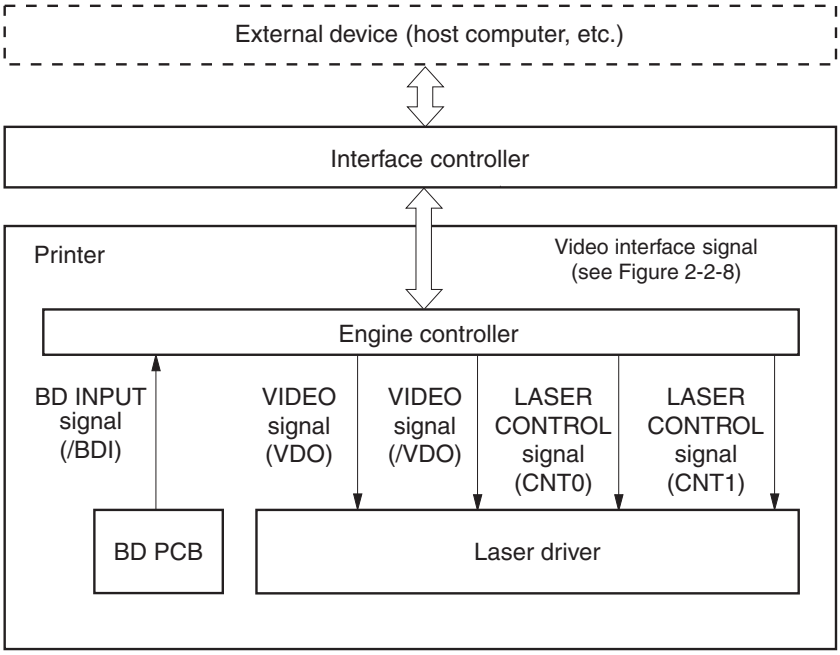


Figure 2-2-7

b. Video Interface Signals

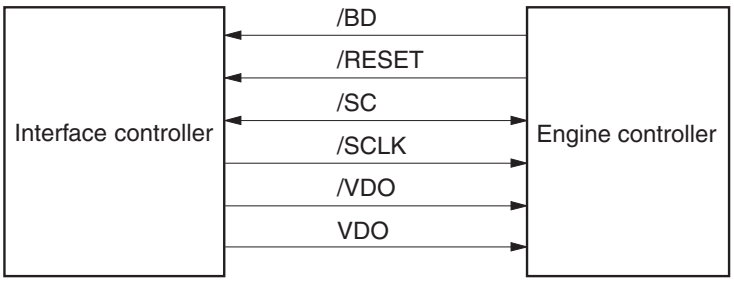


Figure 2-2-8

2. Operation

When the power is switched ON, the printer enters the WAIT period.

When the printer exits the WAIT period and is ready to operate, the engine controller sends ready status to the interface controller to notify that it is ready to print.

On receiving the ready status, the interface controller sends a pickup command to the engine controller.

When the engine controller receives the pickup command, it starts the operation of the initial rotation (INTR) sequence. In this sequence, print paper is picked up and brought to a specified position. Detecting that the paper has reached the specified position, the engine controller starts sending the /BD signal to the interface controller.

In response, the interface controller sends the VIDEO signals (/VDO, VDO) to the laser driver via the engine controller, making the VIDEO signals synchronized with the /BD signal.

The engine controller generates LASER CONTROL signals (CNT0, CNT1) and sends them to the laser driver.

The laser diode emits the laser beam when the /VDO signal is "L", CNT0 signal is "H", and CNT1 signal is "L." The laser beam is scanned by the scanning mirror to form a latent image on the photosensitive drum.

The latent image on the photosensitive drum is transferred onto the paper by the electrophotographic process, and the paper is delivered to the face up delivery slot.

The STATUS COMMAND signal (/SC) is a bi-directional signal used for serial data transfers between the interface controller and engine controller.

The interface controller and engine controller send data using the /SC signal; the interface controller sends 16-bit serial data as a command to the engine controller, and in response, the engine controller sends 16-bit serial data as a status to the interface controller.

The command and status are synchronized with the SYNCHRONOUS CLOCK signal (/SCLK) output from the interface controller at the following timing:

When the interface controller outputs data to the engine controller;

- The interface controller outputs the /SC signal synchronizing with the falling edge of the /SCLK signal.
- The engine controller inputs the /SC signal synchronizing with the rising edge of the /SCLK signal.

When the engine controller outputs data to the interface controller;

- The engine controller outputs the /SC signal synchronizing with the falling edge of the /SCLK signal.
- The interface controller inputs the /SCLK signal synchronizing with the rising edge of the /SCLK signal.

The interface controller can perform the software reset on the engine controller by keeping the /SCLK signal "L" for 2 seconds. The /RESET signal is used to initialize the interface controller at the power-ON. The signal is sent to the interface controller from the engine controller.

3. Cleaning Page

The printer executes a cleaning page sequence by the command sent from the interface controller. The cleaning page cleans the pressure roller.

Receiving a cleaning page execution command from the interface controller, the engine controller conducts the paper pickup operation. Then, the engine controller adjusts the fixing temperature at 200°C and feeds the paper 4mm at a time by step-driving the main motor. This fuses the toner adhering to the pressure roller and moves it to the paper.

Note: The paper used for the cleaning page must be the maximum width in the scanning direction (indicated in the specifications) and 240 mm or more in the feeding direction.

4. Thick Paper Mode

The printer contains a thick paper mode and a thick paper H mode.

This mode is activated by a command sent from the interface controller. The mode is effective until a command for the other paper mode is sent from the interface controller.

The thick paper mode implements the following controls:

- Rises the fixing heater target temperature : higher than usual (in the plain paper mode).
- Delays the paper pickup timing for the first page : 5.5 seconds later than usual.
- A delay is introduced to the pickup timing between 4 and 24 sec to suit the number of prints and selected mode:
  if A4 and a delay of 4 sec, 6 ppm.
  if A4 and a delay of 24 sec, 2 ppm.

III. LASER/SCANNER SYSTEM

A. Outline

The printer contains a laser driver (IC801) on its laser driver PCB.

The microcomputer (CPU : IC201) on the engine controller sends the LASER CONTROL signals (CNT0, CNT1) to the IC801. Meanwhile, the interface controller sends the VIDEO signals (/VDO, VDO) to the IC801 through the engine controller.

The IC801 emits laser diode based on these signals sent from the engine controller and interface controller.

The laser beam emitted form the laser diode passes though the collimator lens and cylindrical lens, and then strikes the four-faced scanning mirror rotating at a constant speed. Then, the beam reflects off the scanning mirror, passes through the focusing lens, and strikes the reflective mirror. The beam reflects off the reflective mirror and finally, scans onto the photosensitive drum.

The photosensitive drum rotates at a constant speed, and at the same time, the laser beam scans across the drum surface at a constant speed. This allows the laser beam to form a latent image on the drum surface.

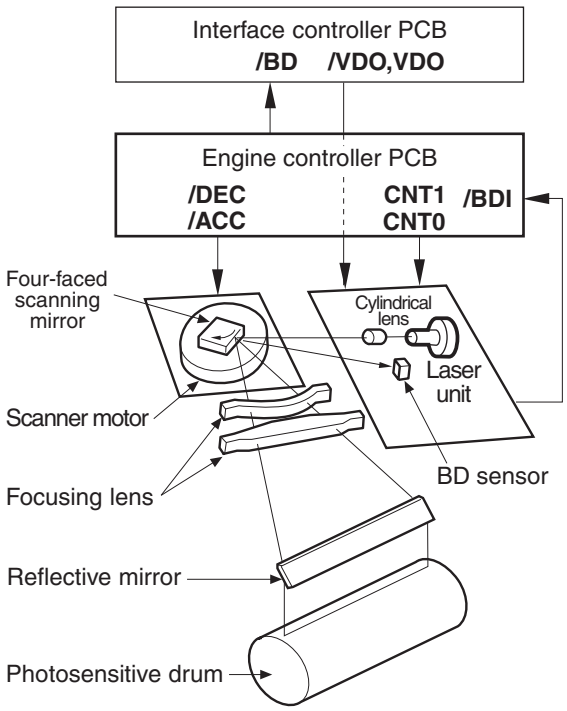


Figure 2-3-1

B. Laser Control Circuit

1. Outline

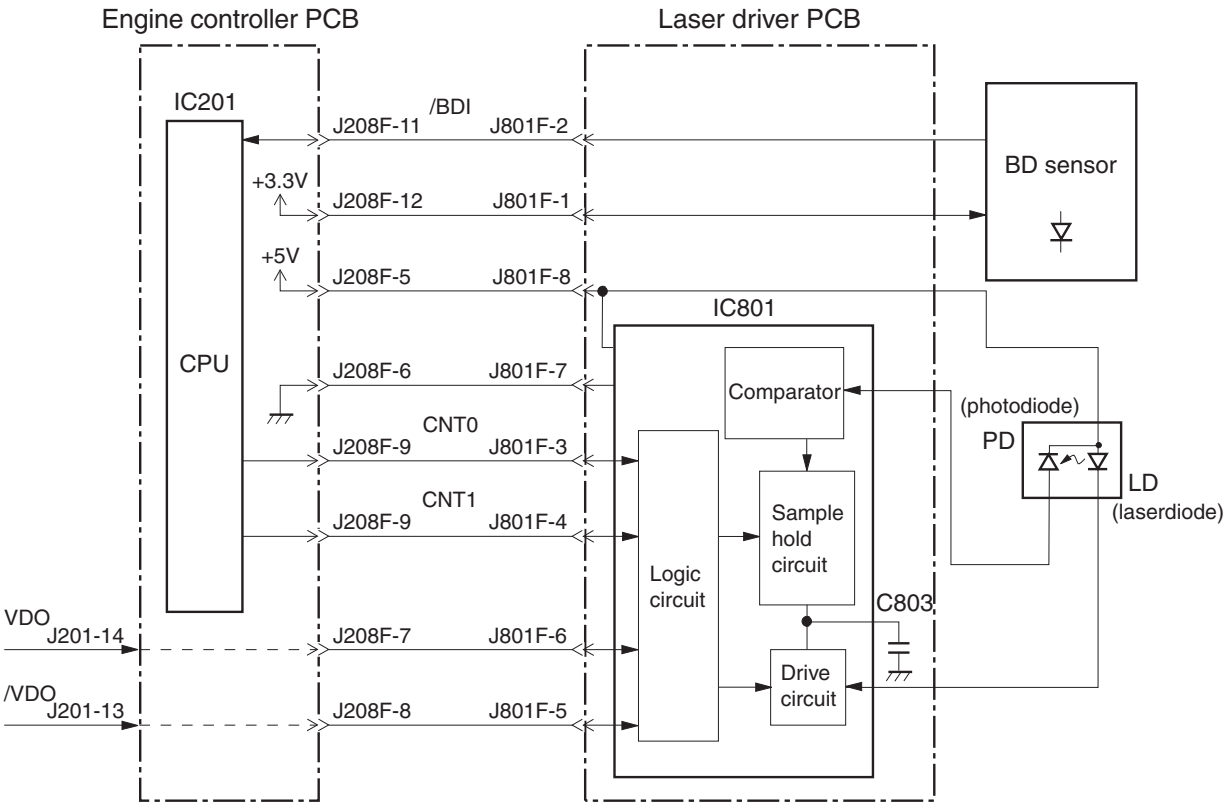


Figure 2-3-2

The CPU controls a switching operation for the following four modes: standby, APC emitting, masking, and unmasking. The CPU switches these modes by sending the LASER CONTROL signals (CNT0, CNT1) to the laser driver (IC801) on the laser driver PCB.

When both CNT0 and CNT1 signals are “L”, the IC801 enters the standby mode to reset the laser driver PCB.

When CNT0 and CNT1 signals are “L” and “H” respectively, the IC801 enters the APC emitting mode to make the laser diode emit the laser beam. The laser driver also performs the Auto Power Control, stated in the following section.

When both the CNT0 and CNT1 signals are “H”, the IC801 enters the masking mode. Regardless of the VIDEO signals (VDO, /VDO), the IC801 prohibits the laser diode from emitting laser beams.

When the CNT0 and CNT1 signals are “H” and “L” respectively, the IC801 enters the unmasking mode to turn the laser ON and OFF according to the VDO, /VDO signals sent from the interface controller.

2. Laser Diode Automatic Power Control

The laser diode automatic power control (APC) is performed by the IC801. The APC makes the laser diode emit laser beams at a constant intensity. It is performed prior to the image formation (Initial APC) and during the between-line (between line APC).

When the CNT0 and CNT1 signals, input to the IC801 from the CPU, are "L" and "H" respectively, the IC801 makes the sample hold circuit enter the sample mode (mode in which the APC is performed). At the same time, the IC801 allows the laser diode (LD) to emit laser beams.

The intensity of the laser beam is detected by the photo diode (PD), converted into voltage, and then fed back to the IC801.

To control the laser intensity, the IC801 maintains the fed-back voltage equal to the reference voltage by increasing or decreasing the drive current for the laser diode.

When the CNT0 signal goes "H", the IC801 makes the sample hold circuit enter the hold mode. In this mode, the IC801 converts the laser intensity controlled by the APC to voltage and stores it in the hold condenser (C803).

3. Horizontal Synchronization Control

The CPU controls the horizontal synchronization based on the HORIZONTAL SYNCHRONOUS INPUT signal (/BDI) sent from the BD sensor in the laser scanner.

The CPU turns CNT0 and CNT1 signals to "L" and "H" respectively, making the laser diode emit a laser beam at the specified timing based on the /BDI signal.

The laser beam passes through the collimator lens and cylindrical lens, and strikes the four-faced scanning mirror. Then, the laser beam reflects off the scanning mirror, passes through the BD lens on the scanning light path, and enters the BD sensor.

Detecting the laser beam, the BD sensor generates the HORIZONTAL SYNCHRONOUS signal (/BD) based on the /BDI signal and then sends it to the interface controller.

4. Image Masking Control

The CPU performs the image masking control in order to prevent the laser diode from emitting in the non-image area.

In this control, the CPU controls the period of the laser diode emission by conducting the CNT0 and CNT1 signals that are sent to the IC801.

In the non-image area, the CPU sets the CNT0 and CNT1 signals "H" as to implement the image masking. The IC801 prohibits the laser diode from emitting regardless of the video signals (VDO, /VDO) sent from the interface controller.

In the image masking area, the CPU sets the CNT0 signal "H" and CNT1 signal "L." as to stop the image masking. The IC801 turns the laser ON and OFF according to the VDO, /VDO signals sent from the interface controller.

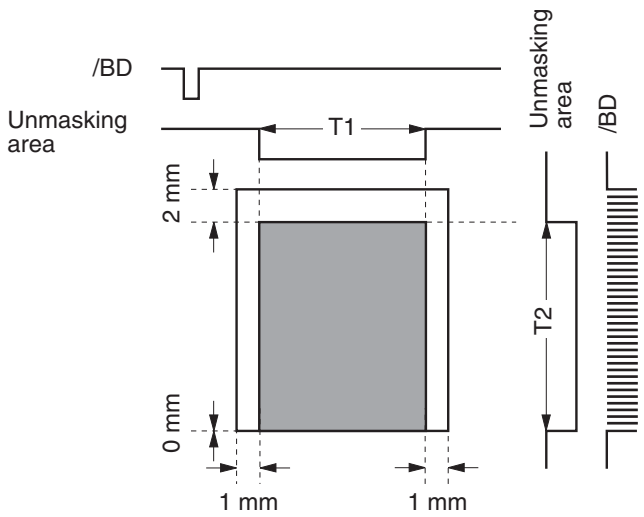


Figure 2-3-3

Notes:
1. The shaded area indicates the area where the laser beam can write.
2. T1 is the range between 1mm from the right side and 1mm from the left side of the Letter size. It is not dependent on the specified paper size.
3. T2 is the range between 2 mm from the leading edge and the trailing edge of the paper. (The output of the /BD signal starts on the leading edge.) If the number of /BD pulse lines (number of scan lines) is specified by the interface controller with the command, the trailing edge will be where the output of the /BD signals completes. If the number of scan lines is not specified, the trailing edge will be where the paper top sensor (PS002) detects a paper-out.

C. Scanner System

The scanner motor control circuit is shown below.

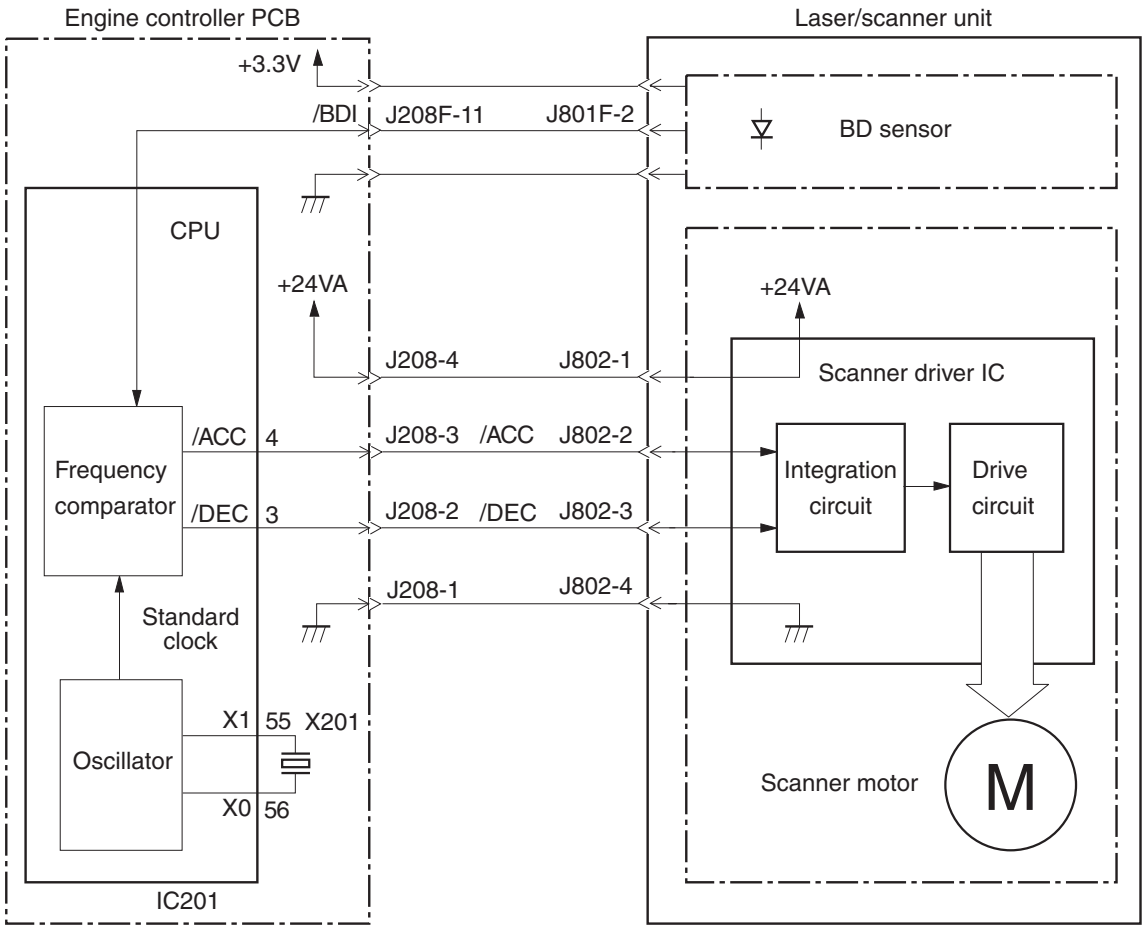


Figure 2-3-4

The scanner motor is a 3-phase DC brushless motor and is unified with the scanner motor drive circuit.

When the printer is turned ON, the CPU (IC201) divides the oscillation frequency of the crystal oscillator (X201), generating the reference clock.

When a pickup command is sent from the interface controller, the CPU forcibly accelerates the scanner motor by turning the SCANNER MOTOR ACCELERATION signal (/ACC) "L" and the SCANNER MOTOR DECELERATION signal (/DEC) "H" for 0.2 seconds.

Then, the CPU obtains the HORIZONTAL SYNCHRONOUS INPUT signal (/BDI) from the BD sensor by emitting the laser diode.

The frequency of the /BDI signal is in proportion to the rotation number of the scanner motor.

To rotate the scanner motor in the specified rotation number, the CPU compares the BDI signal frequency with the reference frequency in the frequency comparator of the CPU, and controls the output of the /ACC signal and /DCC signal.

After 1.5 seconds from the time the scanner motor reaches its specified rotation number, the CPU determines that the scanner is ready.

The CPU determines whether or not the scanner motor is rotating in the specified rotation number by monitoring the /BDI signal sent from the BD sensor.

When the scanner motor is rotating at the specified value, the laser beam scans onto the photosensitive drum at a constant speed.

To stop the scanner motor, the CPU turns the /ACC signal to "H" and the /DEC signal to "L".

The CPU detects the following failures and error by monitoring /BDI signal sent from the BD sensor, and reports it to the interface controller:

1) Scanner Failure
   When the /BDI cycle does not reach the specified value within 3.5 seconds after the scanner motor was forcibly accelerated at its start-up.
2) BD failure
   When the /BDI signal is not detected within 0.1 seconds after the scanner motor was forcibly accelerated. Or, the scanner became ready once and then the /BDI cycle is not detected in the specified value for 2 continuous seconds.
3) BD error
   When the /BDI signal is not detected in the specified cycle while the engine controller is outputting the /BD signal to the interface controller.

The CPU does not report the BD error to the interface controller, if it detects a door open within 0.2 seconds after detecting a BD error.

Also, the CPU cancels the BD error, if it detects a scanner failure or BD failure after detecting the BD error.

IV. IMAGE FORMATION SYSTEM

A. Outline

The image formation system is the central hub of the printer, and consists of the photosensitive drum, developing unit, charging roller, etc.

When receiving a pickup command from the interface controller, the engine controller drives the main motor to rotate the photosensitive drum, developing cylinder, primary charging roller, and transfer charging roller.

The photosensitive drum surface is uniformly applied with a negative charge by the primary charging roller. At the same time, the drum surface is struck by the laser beam that has been modulated by the video signals. This forms a latent image on the photosensitive drum.

The latent image formed on the photosensitive drum is developed into a visible image on the developing cylinder with toner and then transferred onto print paper by the transfer charging roller. The residual toner on the photosensitive drum surface is scraped off by the cleaning blade. The potential on the drum is made uniform by the primary charging roller in preparation for another latent image.

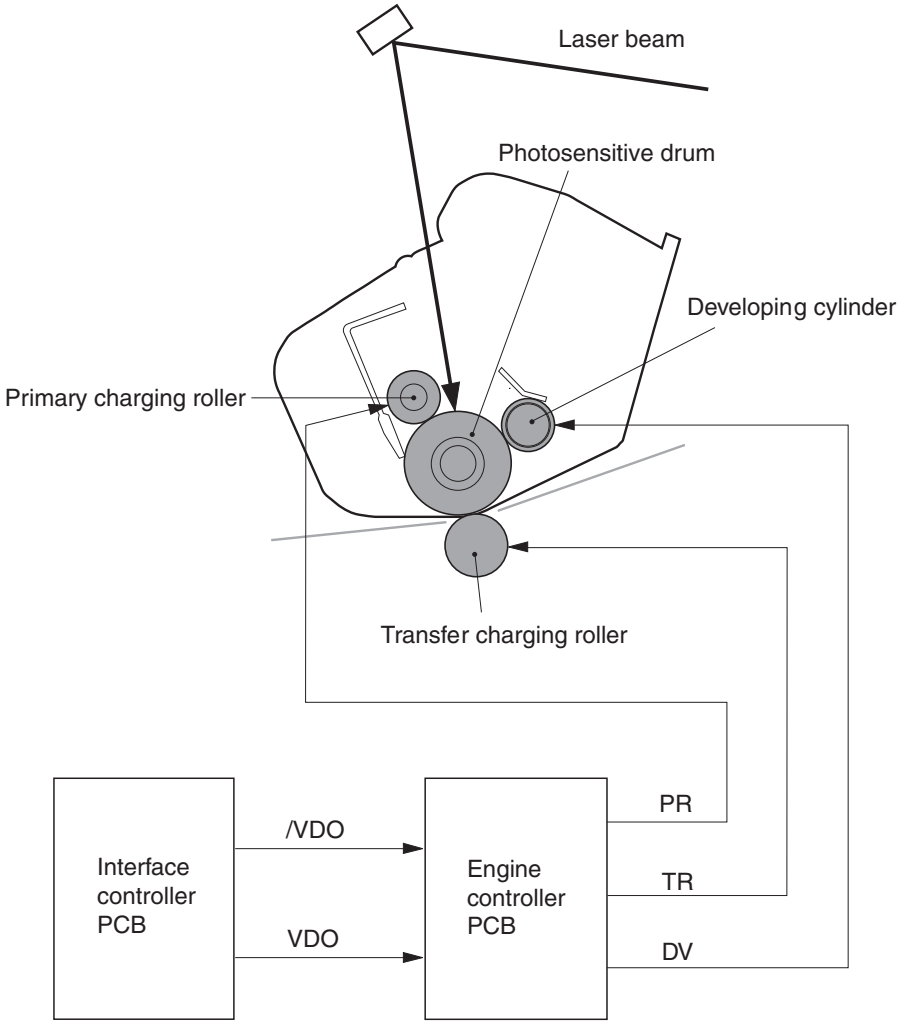


Figure 2-4-1

B. Print Process

The major portion of the image formation system is contained in a cartridge as shown in Figure 2-4-2.

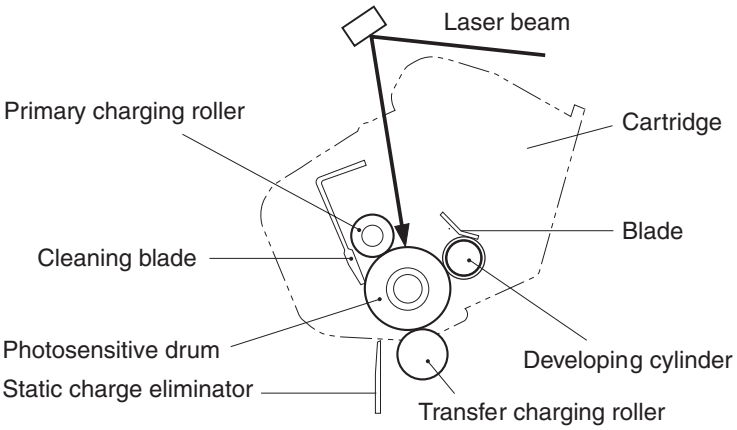


Figure 2-4-2

The cartridge used by the printer contains a two-layered seamless as shown in Figure 2-4-3.

The seamless drum consists of an external organic photoconductive layer (OPC) and an internal aluminum substrate.

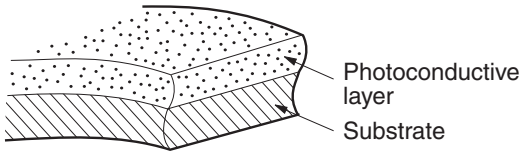


Figure 2-4-3

The printing process can be divided into five major stages.

1. **Electrostatic latent image formation stage**
   Step 1: Primary charging (-)
   Step 2: Scanning exposure
2. **Developing stage**
   Step 3: Developing
3. **Transfer stage**
   Step 4: Transfer (+)
   Step 5: Separation
4. **Fixing stage**
   Step 6: Fixing
5. **Drum cleaning stage**
   Step 7: Drum cleaning

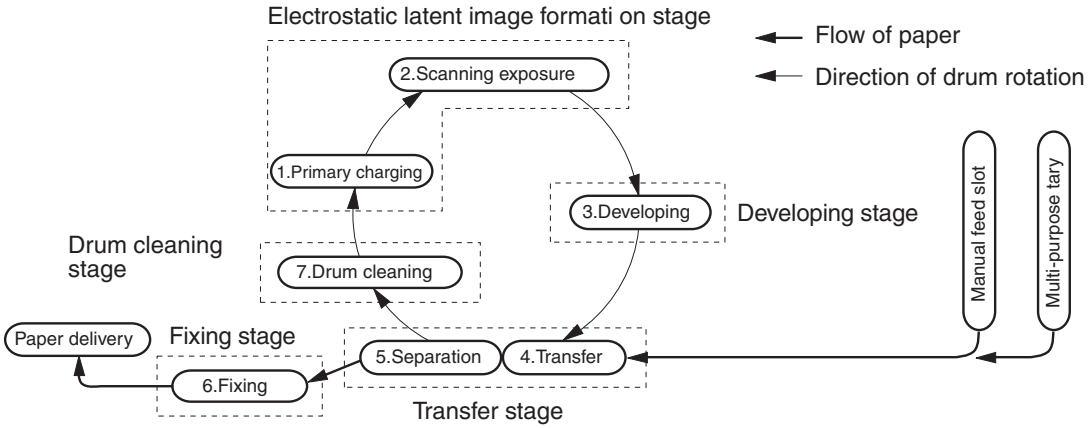


Figure 2-4-4

1. Electrostatic Latent Image Formation Stage

This stage consists of two steps which form an electrostatic latent image on the photosensitive drum.

At the end of this stage, areas not exposed to laser (dark areas) hold the negative charges. Areas exposed to laser (light areas) loose the negative charges.

The image formed on the drum with the negative charges is invisible to eyes, which is called an electrostatic latent image.

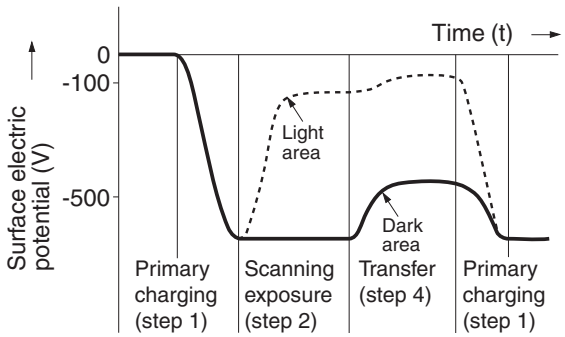


Figure 2-4-5

Step 1: Primary charging

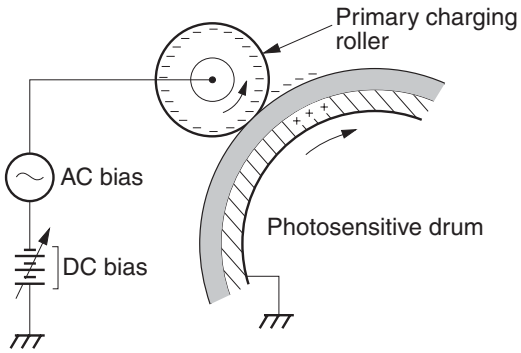


Figure 2-4-6

For preparation of latent image formation, a uniform negative potential is applied to the photosensitive drum surface. Primary charging of this printer is performed by the method that directly charges the photosensitive drum.

The primary charging roller consists of semiconductive rubber. In addition to DC bias, AC bias is applied to the primary charging roller to maintain the potential on the drum surface uniform. The DC bias changes with the developing DC bias that changes according to the IMAGE DENSITY DATA signal sent from the interface controller.

This direct charging method has advantages such as the lower applied voltage and almost no ozone generation over the conventional corona charging method.

Step 2: Scanning Exposure

When the laser beam scans onto the photosensitive drum surface, charges on the light area are neutralized to form an electrostatic latent image.

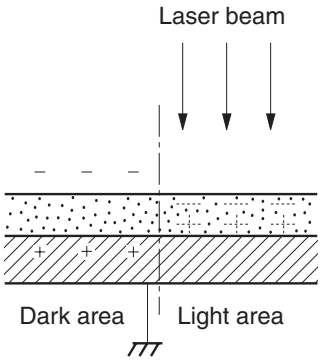


Figure 2-4-7

2. Developing Stage

Toner is applied to the electrostatic latent image on photosensitive drum surface to form a visible image. This printer performs the toner projection development with a single-component toner.

Step 3: Development

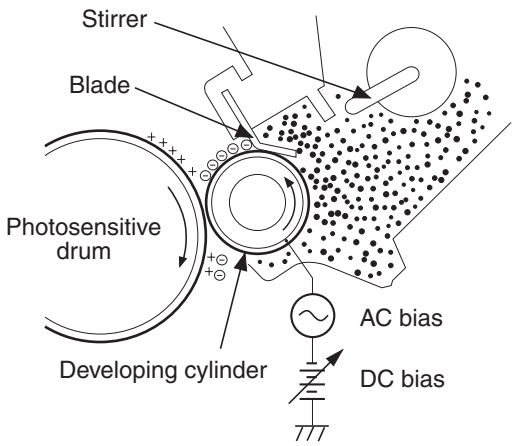


Figure 2-4-8

Note: Charges in the exposed areas of the photosensitive drum are shown as positive in this figure, even though they are actually negative. It means that the photosensitive drum potential is higher as compared with that of cylinder.

As shown in Figure 2-4-8, the developing unit consists of a developing cylinder and rubber blade. The developing cylinder consists of a fixed magnet and a cylinder which rotates around the magnet.

The single-component toner mainly consists of magnetite and resin binder and is held to the cylinder by magnetic attraction. The toner functions as an insulator, and acquires a negative charge by friction due to the rotating cylinder.

The areas on the drum that were exposed to the laser beam have a higher potential (are less negative) than the negatively charged toner particles on the developing cylinder. When these areas approach the toner layer of the cylinder (with negative charges), the potential difference (higher on the drum) projects the toner particles to them.

This is called toner projection development, which develops the latent image on the drum into a visible image.

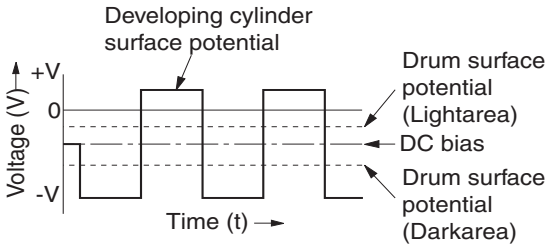


Figure 2-4-9

An AC bias is applied to the developing cylinder to help project the toner particles to the drum surface and improve the contrast of the printed image. The center voltage of the AC bias (1460 Vp-p) varies with the developing DC bias.

This printer changes the developing DC bias value according to the IMAGE DENSITY DATA signal sent from the interface controller. The changes of the developing DC bias value makes the potential difference between the cylinder and drum so that the density of the print can be adjusted.

3. Transfer Stage

In the transfer stage, the toner image is transferred from the drum surface onto the paper.

Step 4: Transfer

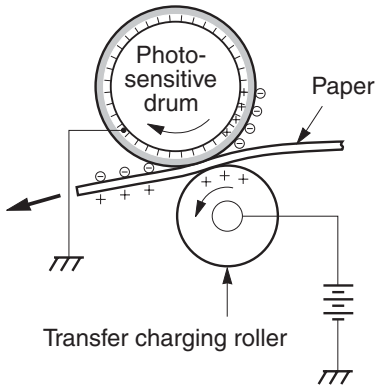


Figure 2-4-10

Positive charges are applied to the back of the paper to attract the negatively charged toner particles to the paper.

Step 5: Separation

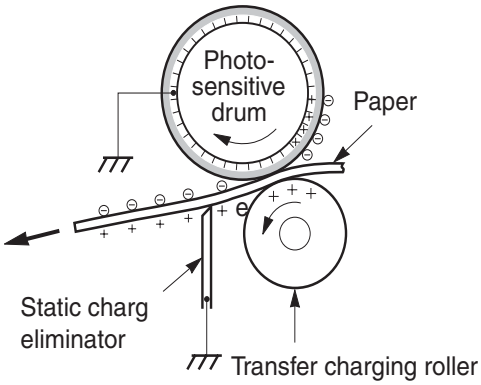


Figure 2-4-11

The elasticity of the paper causes it to separate from the drum (curvature separation).

To stabilize the paper feed system and to prevent droplets on the printed image at low temperature and low humidity, the charge on the back of the paper is reduced by the static charge eliminator.

4. Fixing Stage

As the toner image transferred onto the paper in the transfer stage is held to the paper only by the static electricity, even a light touch will smear the image.

The toner particles are fused to the paper to make a permanent image by applying pressure and heat to the paper and toner.

Step 6: Fixing

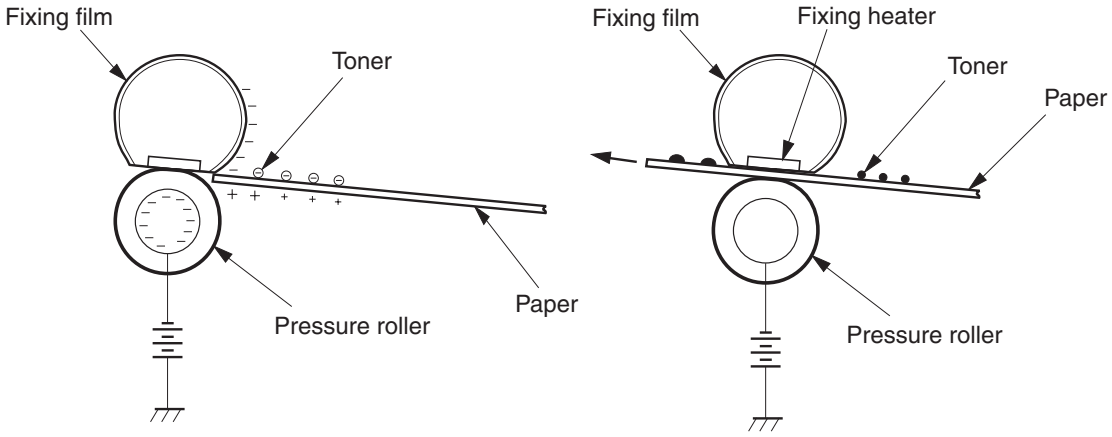


Figure 2-4-12

As the toner particles transferred onto the paper are held to the paper by the positive charge applied to the back of the paper, they may be dispersed at fixing.

This printer applies the negative DC voltage to the fixing film via the pressure roller shaft. The negative charge is applied to the paper surface by the fixing film before the paper reaches the fixing heater. This improves the adhesion force of the toner particles to the paper and prevents dispersion of the toner particles.

This printer utilizes an on-demand fixing method which uses the fixing film that requires small heat capacity. This method can heat the roller quickly and does not require the power supply to the fixing heater at the standby mode. Therefore, the wait time is reduced to eight seconds or less, and the energy can be saved.

The fixing film is a cylindrical polyamide film. The surface is coated with fluorine to prevent offset.

5. Photosensitive Drum Cleaning Stage

At the photosensitive drum cleaning stage, the photosensitive drum surface is cleaned in preparation for the next print operation.

Step 7: Photosensitive Drum Cleaning

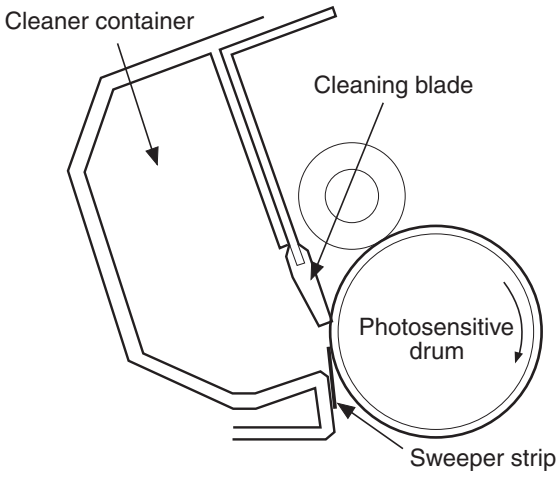


Figure 2-4-13

Prior to the next printing, the residual toner on the drum surface is scraped away by the cleaning blade to clean the drum surface. The removed toner is collected into the cleaner container.

V. PICKUP/FEED SYSTEM

A. Outline

The printer is equipped with two pickup sources, the multi-purpose tray and manual feed slot.

Whether or not the multi-purpose tray and the manual feed slot are loaded with paper is detected by the paper-out sensor (PS003).

The main motor (M001) starts rotating after about 0.5 seconds from the time the engine controller receives a pickup command from the interface controller.

When the printer enters an initial rotation ready state (See Note), the pickup solenoid (SL001) is turned ON for 0.5 seconds. The main motor rotates the pickup roller, and the pickup roller's rotational force moves the pick cam. When the claw of the pickup cam is unhooked from the lifting plate, the plate is lifted by the spring force with print paper on it. A sheet of the paper is picked up by the pickup roller and fed to the printer. The paper pickup timing is the same for the multi-purpose tray and the manual feed slot. If both of the pickup sources are loaded with paper, priority is given to the manual feed slot.

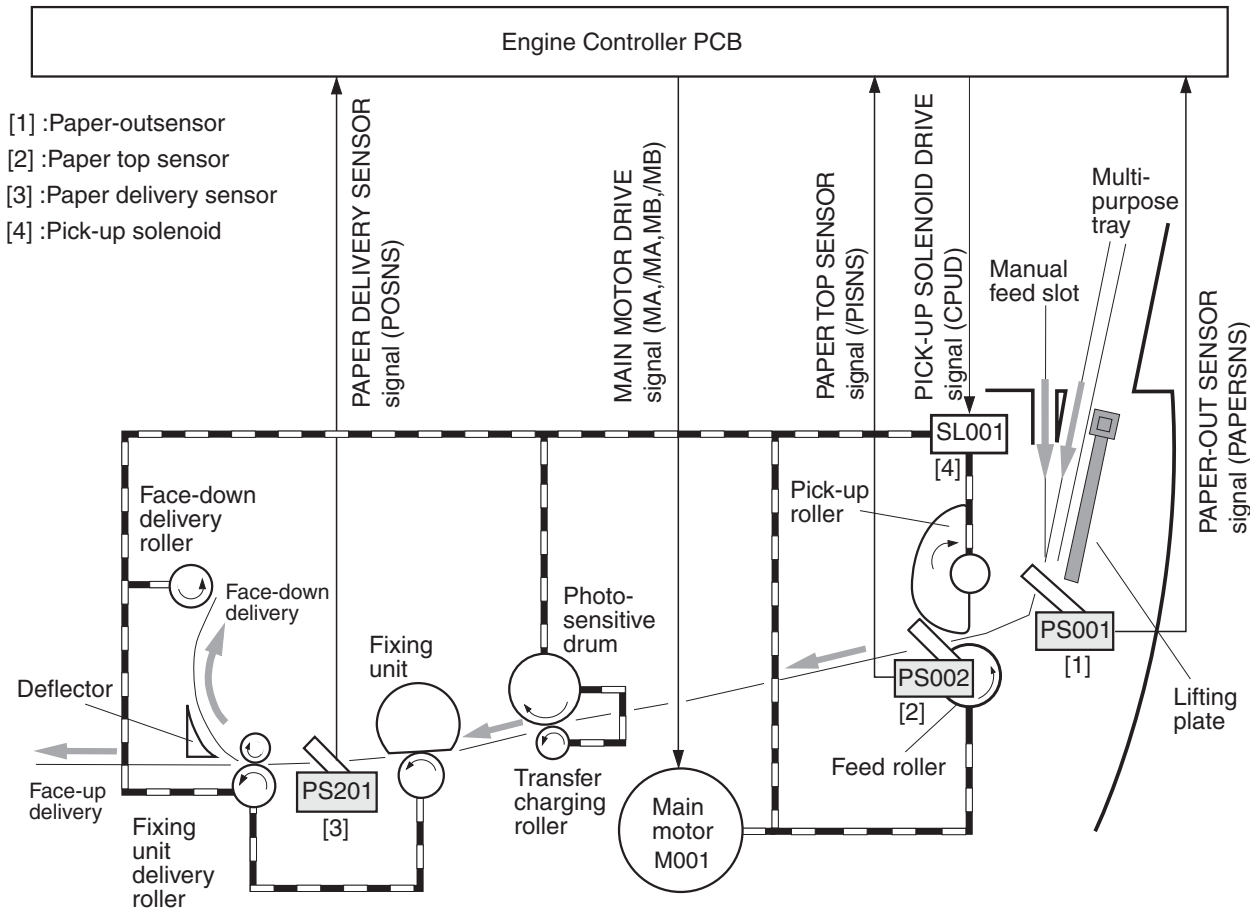


Figure 2-5-1

After the specified period of time from the time the paper reaches the paper top sensor (PS002), the engine controller sends the /BD signal to the interface controller. The interface controller sends the VIDEO signal to the engine controller based on the /BD signal. This matches the leading edge of the image with that of print paper. The paper goes through the transfer, separation, fixing, and delivery blocks, and is delivered to the faceup delivery slot or to the facedown tray.

Turning the delivery lever up and down switches into the faceup delivery (turn down the lever) or facedown delivery (turn up the lever).

There are two photointerrupters (PS002 and PS201) on the paper path. These photointerrupters detect paper's reach and pass.

If the paper does not reach or pass the sensors within the specified period of time, the CPU on the engine controller determines a paper jam and notifies it to the interface controller.

In this printer, print paper is loaded from the top of the printer. This may cause paper pickup failures. To prevent this, the printer contains a pickup retry function. If the paper top sensor does detect the leading edge of paper within the specified period of time after the pickup solenoid turns ON, instead of determining a jam, the printer tries to pickup the paper again. The printer performs the pickup retry up to twice. If the paper top sensor cannot detect the leading edge of the paper within the specified period of time in the third trial, the printer determines that a paper pickup delay jam has occurred.

Note: Initial rotation ready
The state in which the main motor is rotating, the fixing unit temperature has reached its specified value in a specified period of time after the start of main motor rotation, and the scanner motor has reached its specified rotation speed.

B. Jam Detection

The following paper sensors are installed to detect whether paper is present and whether the paper is fed correctly:

- Paper top sensor (PS002)
- Paper delivery sensor (PS201)

The CPU determines a paper jam by checking for the presence of paper in the sensor at the timing stored in the CPU.

If the CPU determines that a jam has occurred, it stops the print operation and notifies the jam to the interface controller.

1. Pickup delay jam

When the paper does not reach the paper top sensor (PS002) after the pickup solenoid (SL001) has been turned ON three times within the specified period of time (includes two pickup retry operations.)

2. Pickup stationary jam

When the paper top sensor (PS002) cannot detect the trailing edge of the paper within 6.7 seconds after detecting the leading edge of the paper.

3. Delivery delay jam

When the paper delivery sensor (PS201) cannot detect the leading edge of the paper within 2.7 seconds after the paper top sensor (PS002) detects the leading edge.

4. Wrapping jam

When the paper delivery sensor (PS201) detects the trailing edge of the paper within 2.0 seconds after the paper top sensor (PS002) detects the trailing edge.

5. Delivery stationary jam

When the paper delivery sensor (PS201) detects no paper-out within 2.7 seconds after the paper top sensor (PS002) detects the trailing edge of the paper.

6. Initial residual paper jam

When the paper delivery sensor (PS201) or the paper top sensor (PS002) detects paper in the initial rotation period.

Note: Automatic paper delivery

- After the output of a pickup command, if the paper top sensor detects the presence of paper before the pickup operation, the CPU immediately stops the high-voltage power supply, laser/scanner, and fixing unit, and delivers the paper.
- The CPU will assume the presence of a start-up residual jam if the paper sensor (PS002) detects print paper after the power has been turned on or when a software reset has been executed by the interface controller.

VI. VIDEO CONTROL SYSTEM

A. Interface Controller PCB

1. Outline

The interface controller receives print information from an external device such as a host computer through an interface cable.

Print information is divided into two types: CAPT commands used for the printer status and information on the printer, and dot data that is converted from the resource-typed print data by the host computer.

The dot data is sent to the engine controller circuit, and the engine controller controls the laser diode emission.

The location of the ICs on the interface controller PCB are shown in Figure 2-6-1, and the block diagram is shown in Figure 2-6-2.

2. Function of Blocks

a. ASIC (IC1)

1) Controls the input/output of the interface controller that comes with a DRAM.
2) Controls the timing of sending the dot pattern data to the engine controller.
3) Performs smoothing, halftone and so on.

b. CPU (IC2)

1) Controls the video interface, USB interface.
2) Processes the serial commands from the video interface.
3) Sends and receives the CAPT commands using the USB interface.

c. DRAM (IC3)

DRAM contains a memory capacity of 512 KB and stores the following information:

1) Dot data converted from image data. (Receive buffer).

d. EEPROM (IC4)

Stores the serial number of the USB interface.

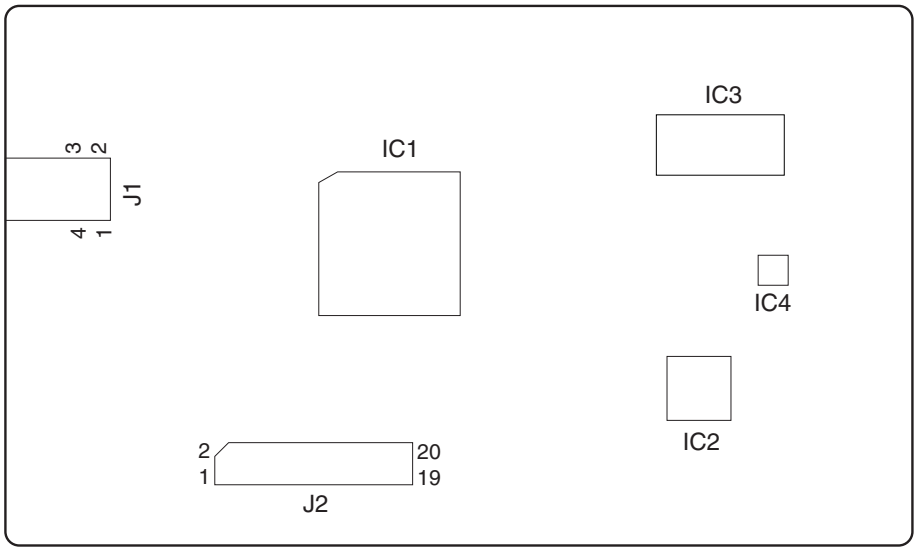


Figure 2-6-1

CHAPTER 3

THE MECHANICAL SYSTEM

I. PREFACE

This chapter describes the disassembly and reassembly procedures of the printer.

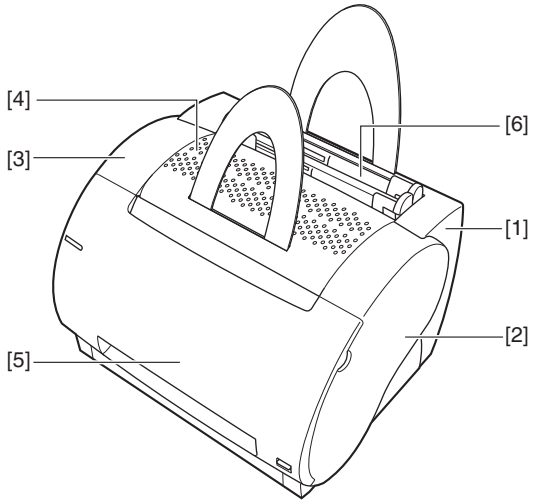
The service technician is to identify the factor of malfunction according to the "Chapter 4 Troubleshooting" and to replace the defective part(s) following the disassembly procedure of each part.

Note the following precautions when working on the printer.

1. Remove the toner cartridge when disassembling, reassembling, or transporting the printer. Removed cartridge must be put in the protective bag to prevent the adverse effect of light.
2. ⚠ **CAUTION: Before servicing the printer, disconnect its power cord from the electrical outlet.**
3. Assembly is the reverse of disassembly unless otherwise specified.
4. Note the lengths, diameters, and locations of screws as you remove them. When reassembling the printer, be sure to use them in their original locations.
5. Do not operate the printer with any parts removed.
6. Discharge electrical static from your body by touching the metal frame of the printer prior to installing the PCB in order to avoid causing damage by the difference in static charge at that time.
7. Do not place the printer with the drive unit or the laser scanner unit at the bottom.

II. EXTERNALS

A. Arrangement of the Components



[1] Rear cover
[2] Right cover
[3] Left cover
[4] Upper cover
[5] Cartridge cover
[6] Pickup tray

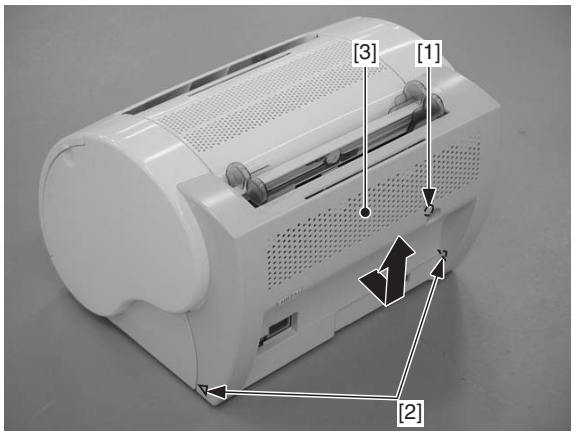
Figure 3-2-1

Remove the covers as necessary when cleaning, inspecting, or repairing the inside of the machine.

B. External Covers

1. Rear Cover

1) Remove the screw.
2) Locate the claw under the area indicated by an arrow. Open the bottom of the left/right side of the rear cover, and slide it to the front; free the claw, and lift the rear cover to detach.

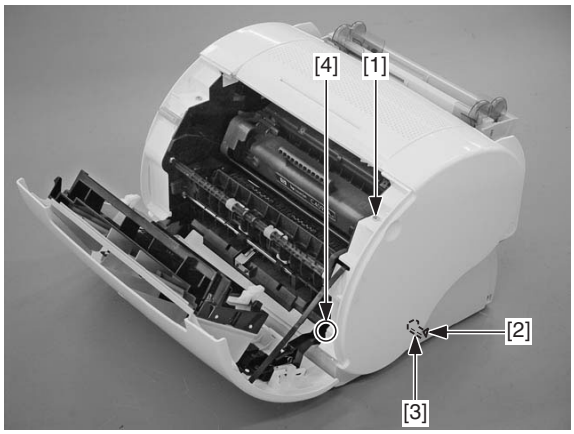


[1] Screw [2] Arrow
[3] Rear cover

Figure 3-2-2

2. Right Cover

1) Remove the rear cover.
2) Open the cover of the cartridge assembly.
3) Remove the screw and, free the claw under the area indicated by an arrow, and free the hook; then, detach the right cover.

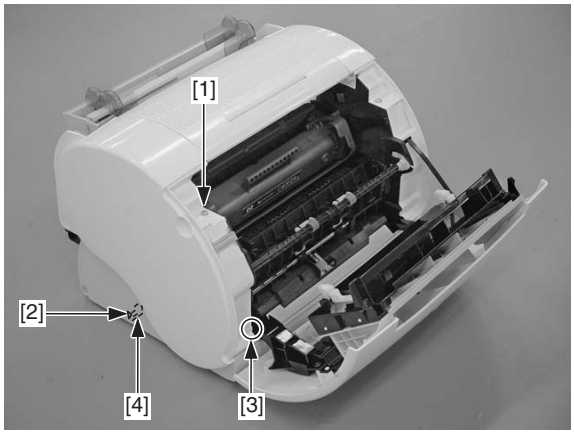


[1] Screw [2] Arrow
[3] Hook [4] Claw

Figure 3-2-3

3. Left Cover

1) Remove the screw
2) Open the cover of the cartridge assembly.
3) Remove the screw and, free the law under the area indicated by an arrow, and free the hook; then, detach the left cover.

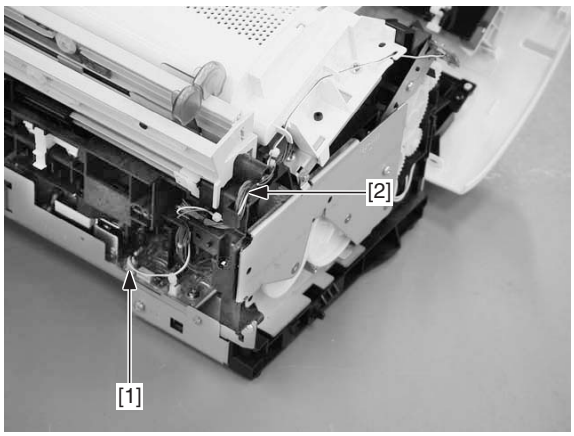


[1] Screw [2] Arrow
[3] Hook [4] Claw

Figure 3-2-4

4. Upper Cover

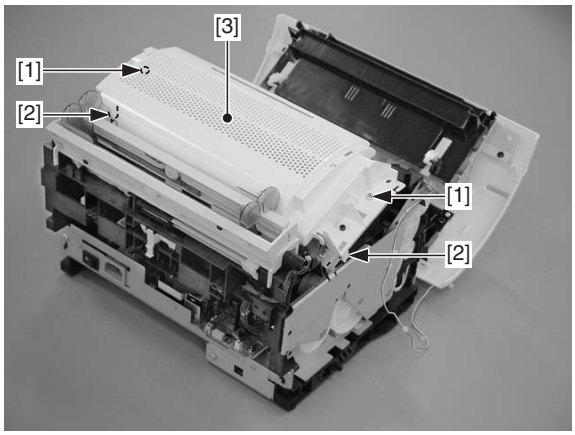
1) Remove the rear cover and the left/right cover.
2) Disconnect the connector J203 from the engine controller PCB; then, free the harness from the guide.



[1] Connector
[2] Harness

Figure 3-2-5

3) Remove the 2 screws, and free the 2 claws; then, detach the upper cover.

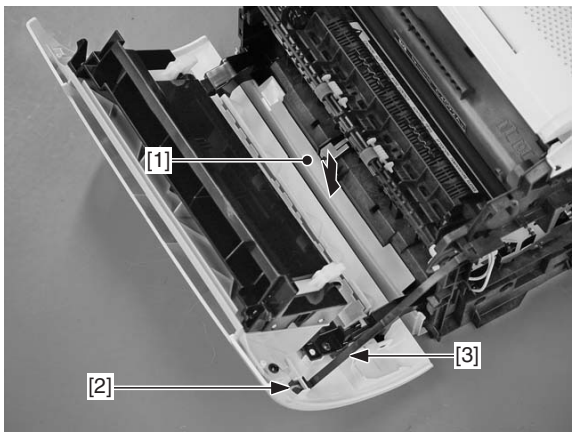


[1] Screw [2] Claw
[3] Upper cover

Figure 3-2-6

5. Cartridge Cover

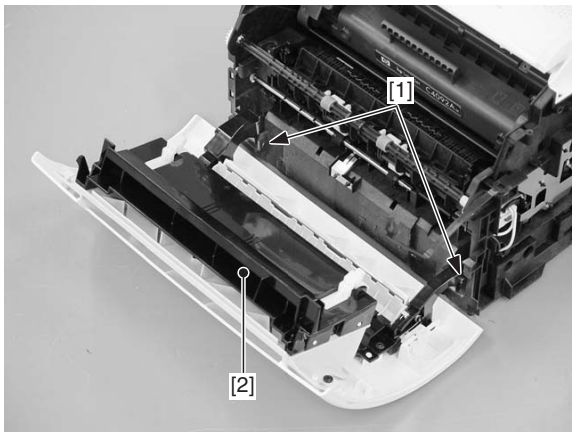
1) Remove the rear cover and the left/right cover.
2) Open the cartridge cover.
3) Force the front cover down to detach.
4) While pushing the claw, detach the cartridge cover from the arm.



[1] Front lower cover
[2] Claw
[3] Arm

Figure 3-2-7

5) Slide the shaft, and detach the cartridge cover.

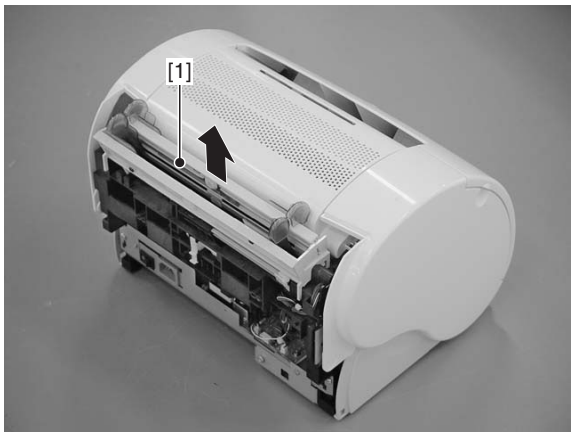


[1] Shaft
[2] Cartridge cover

Figure 3-2-8

6. Pickup Tray

1) Remove the rear cover.
2) Slide up the pickup tray to detach.



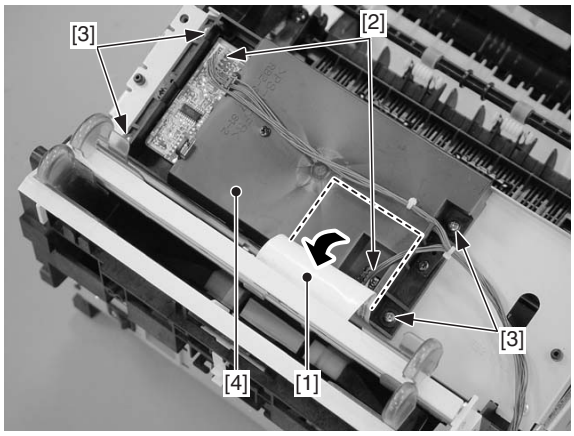
[1] Pickup tray

Figure 3-2-9

III. MAIN UNITS

A. Laser/scanner Unit

1) Remove the rear cover, left/right cover, and upper cover.
2) To enable the disconnection of the connectors, peel off the Warning label (laser) halfway.
3) Disconnect the 2 connectors, and remove the 4 screws; then, detach the Laser/scanner unit.



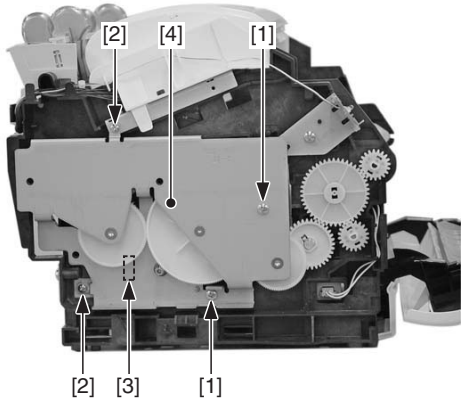
[1] Warning label (laser)
[2] Connector
[3] Screw
[4] Laser/scanner unit

Figure 3-3-1

Caution: 1. Do not disassemble the Laser/scanner unit; you will not be able to adjust it in the field.
2. There is no Warning label (laser) used on the Laser/scanner unit offered as a service part. If you are replacing the assembly, remove the label from the existing assembly, and transfer it to the new assembly. Or, use the newly available Warning label (service part). Be sure also to fully hide the connector openings from view.

B. Drive Assembly

1) Remove the rear cover and the left/right cover.
2) Remove the 2 screws and 2 screws equipped with a washer. Slide out the drive assembly slightly, and disconnect the connectors to remove the drive assembly.

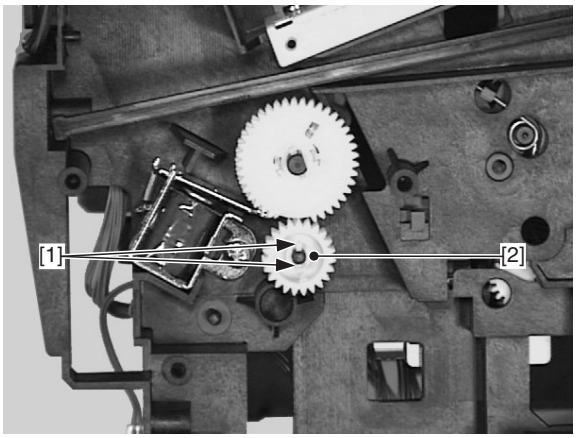


[1] Screw
[2] Screw (w/ washer)
[3] Drive assembly
[4] Connector

Figure 3-3-2

C. Feed Assembly

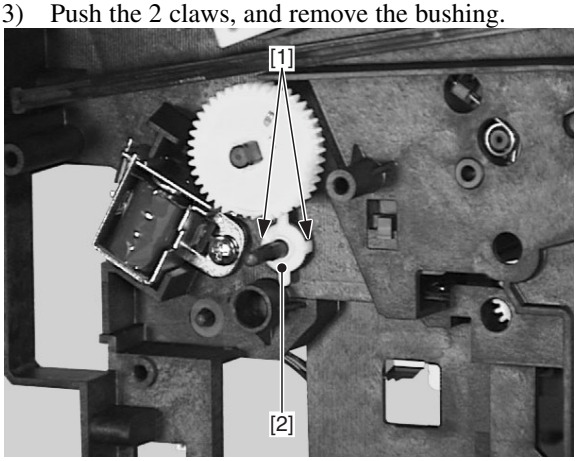
1) Remove the engine controller assembly. (See VII-C of Chapter 3.)
2) Free the 2 claws, and remove the 2 gears and the



[1] Claw
[2] Gear

Figure 3-3-3

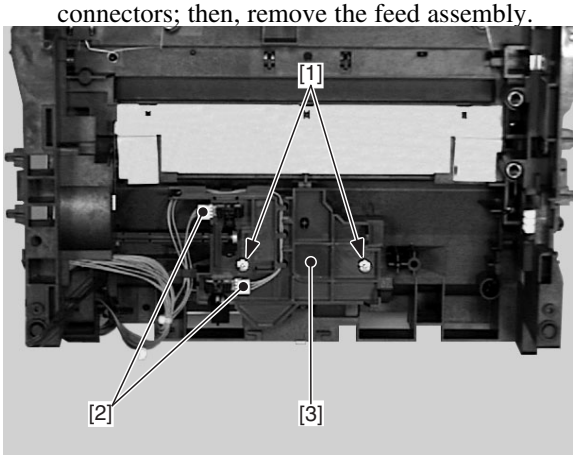
3) Push the 2 claws, and remove the bushing.



[1] Claw
[2] Bushing

Figure 3-3-4

4) Remove the 2 screws, and disconnect the 2 connectors; then, remove the feed assembly.

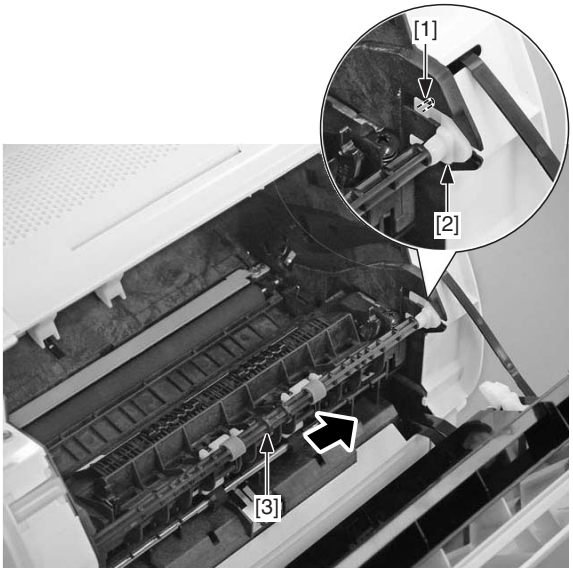


[1] Screw
[2] Connector
[3] Feed assembly

Figure 3-3-5

D. Delivery Assembly

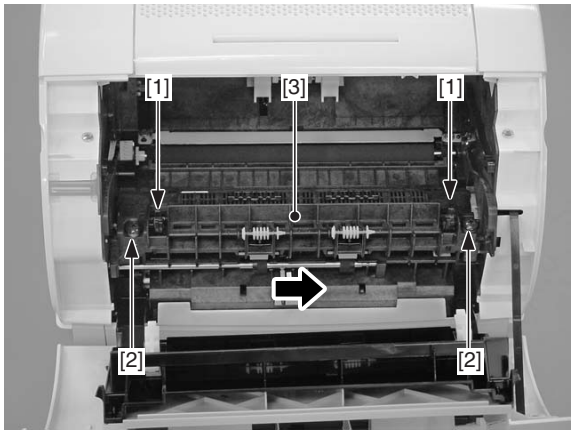
1) Open the cartridge cover.
2) Remove the boss, and remove the face-down delivery roller bushing; then, slide the face-down delivery roller to the right to detach.



[1] Claw [2] Bushing
[3] Face-down delivery roller

Figure 3-3-6

3) Pull the pressure release lever to the front to release the pressure.
4) Remove the 2 screws, and slide the delivery assembly to the right to detach.

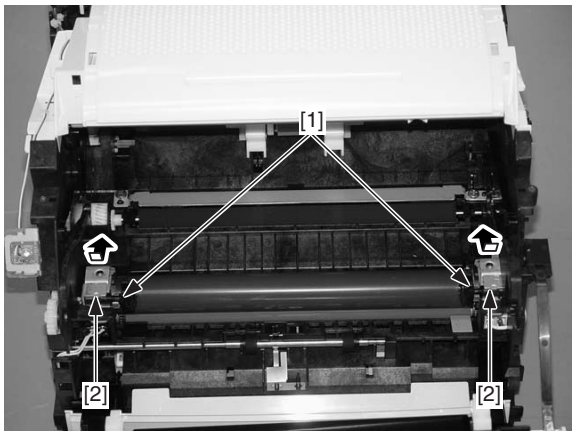


[1] Pressure release lever
[2] Screw
[3] Delivery assembly

Figure 3-3-7

E. Fixing Film Unit

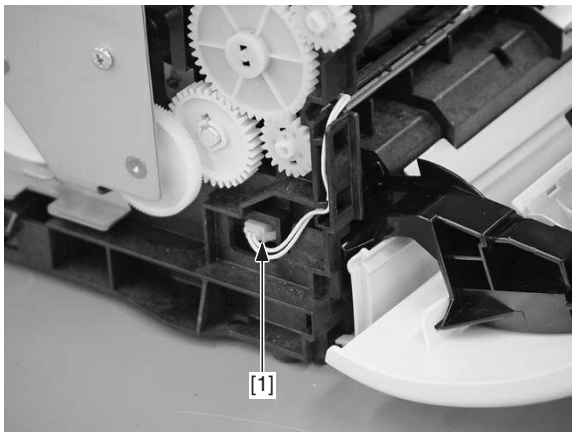
1) Remove the rear cover and the left/right cover.
2) Remove the delivery assembly.
3) With the pressure release lever shifted up, push down on the fixing pressure unit (left/right) from above; then, slide it to the rear to detach.



[1] Pressure release lever
[2] Fixing assembly locking unit

Figure 3-3-8

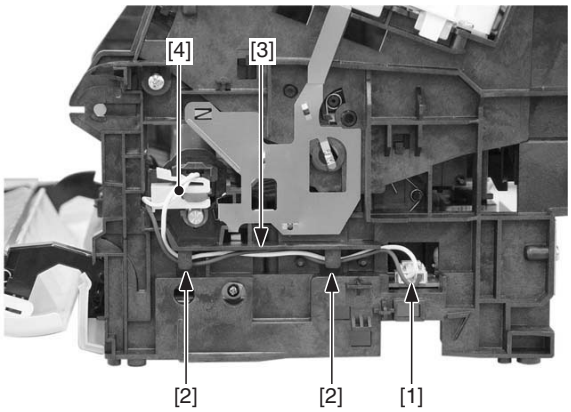
4) Disconnect the connector.



[1] Connector

Figure 3-3-9

5) Disconnect the connector, and free the harness from the harness guide.
6) Remove the fixing film unit.



[1] Connector
[2] Harness guide
[3] Harness
[4] Fixing film unit

Figure 3-3-10

IV. MAJOR COMPONENTS

A. Arrangements of the Components

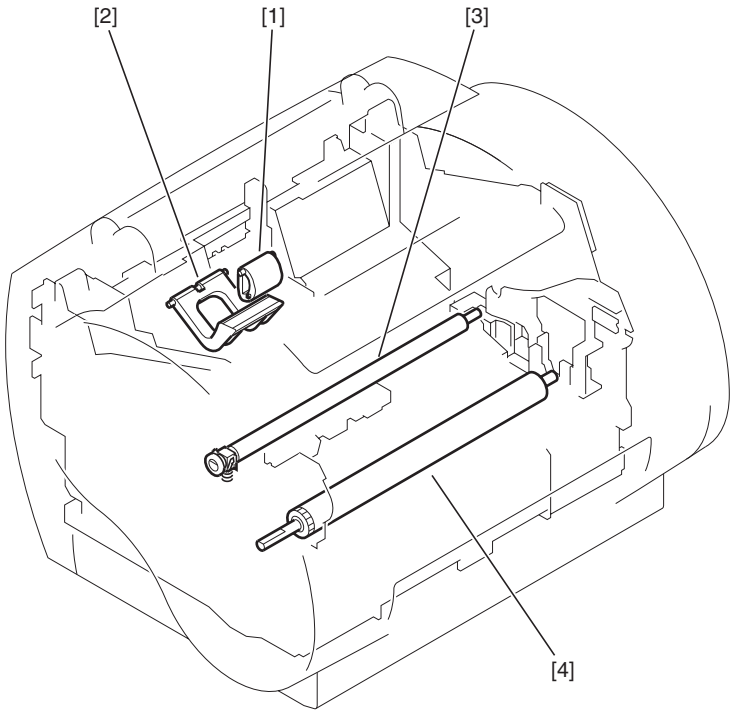
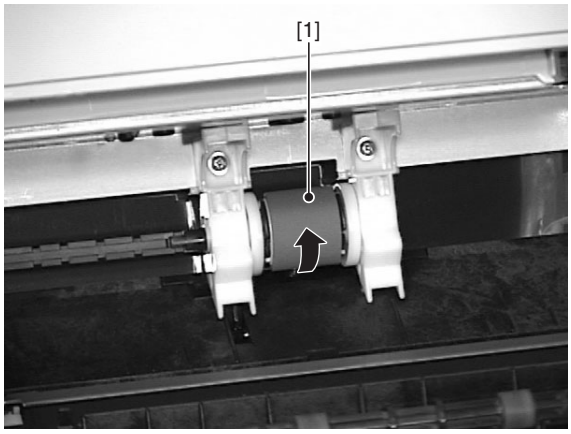


Figure 3-4-1

[1] Pickup roller
[2] Separation pad
[3] Transfer charging roller
[4] Pressure roller

B. Pickup Roller

1) Open the cartridge cover.
2) Pull the bottom of the pickup roller to the front to detach.

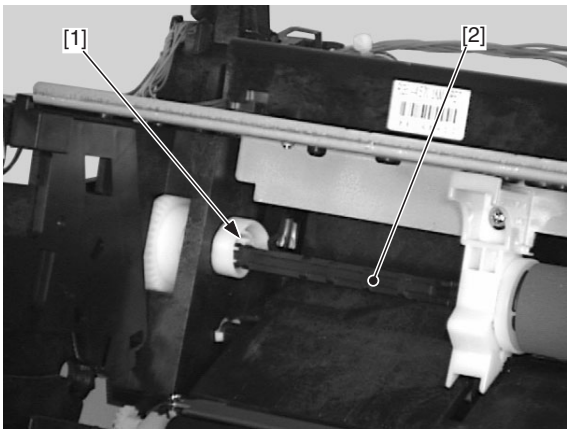


[1] Pickup roller

Figure 3-4-2

C. Separation Pad

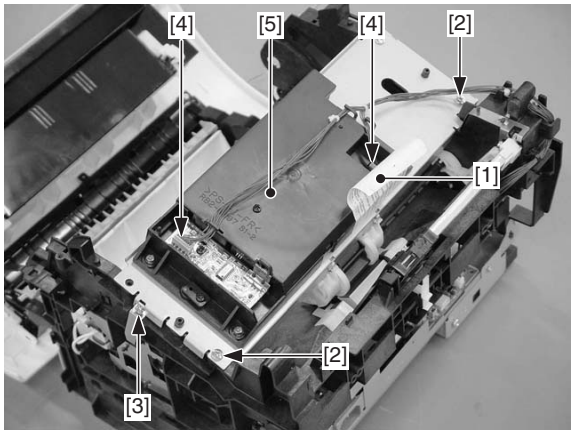
1) Remove the drive assembly. (See III-B of Chapter 3.)
2) Remove the pickup tray.
3) Remove the claw, and slide the pickup roller shaft to the left.



[1] Claw
[2] Pickup roller shaft

Figure 3-4-3

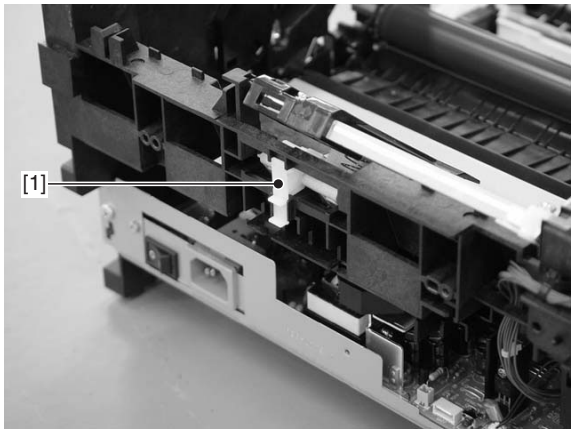
4) Peel the Warning label (laser) halfway from the Laser/scanner unit.
5) Remove the 2 screws and the screw equipped with a washer; then, disconnect the 2 connectors, and detach the scanner base unit.



[1] Warning label (laser)
[2] Screw
[3] Screw (w/ washer)
[4] Scanner base unit
[5] Connector

Figure 3-4-4

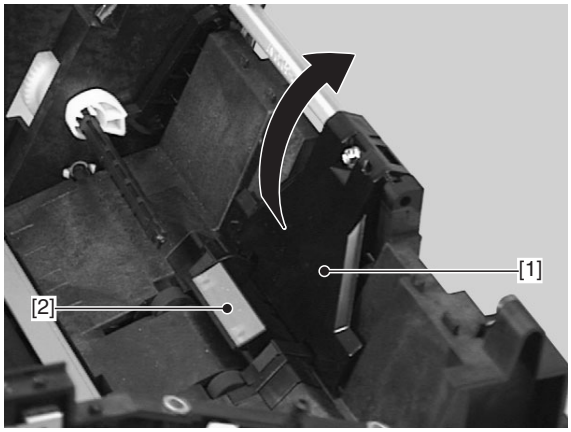
6) Slide up the pad fixing member found at the rear of the machine to remove.



[1] Pad fixing member

Figure 3-4-5

7) Move the holding unit in the direction of the arrow to detach the separation pad.



[1] Holding plate unit
[2] Separation pad

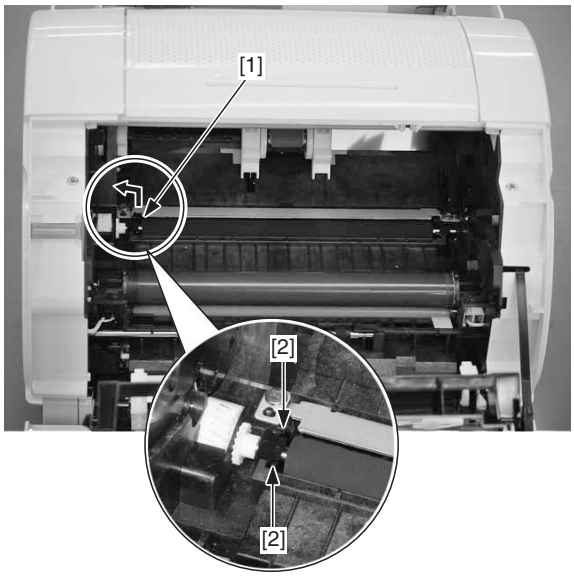
Figure 3-4-6

8) Remove the spring from the separation pad.

Caution: When mounting the separation pad/ holding unit, be sure to fit the spring properly.

D. Transfer Charging Roller

1) Open the cartridge cover.
2) Pick the 2 claws of the bushing found on the left, and lift them; while doing so, slide the transfer charging roller to the left to detach. (The bushing on the right will remain intact.)



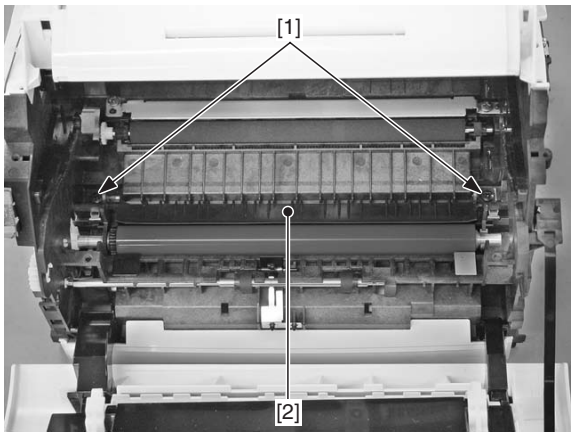
[1] Bushing
[2] Claw
[3] Transfer charging roller

Figure 3-4-7

Caution: Be sure to hold the transfer roller by its shaft, NOT by its sponge portion.

E. Pressure Roller

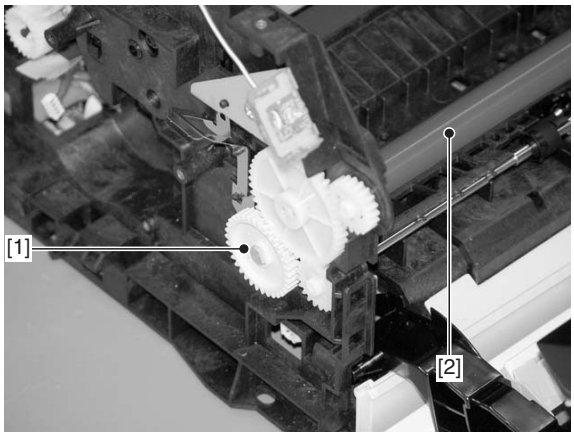
1) Remove the drive assembly.
(See III-B of Chapter 3.)
2) Remove the fixing film unit.
(See III-E of Chapter 3.)
3) Remove the 2 screws, and detach the fixing inlet guide.



[1] Screw
[2] Fixing inlet guide

Figure 3-4-8

6) Remove the gear, and lift the shaft on the right of the pressure roller; then, slide the pressure roller to the right to remove.



[1] Gear
[2] Pressure roller

Figure 3-4-9

V. SWITCHES, SENSORS, AND LEDS

A. Arrangement of the Components

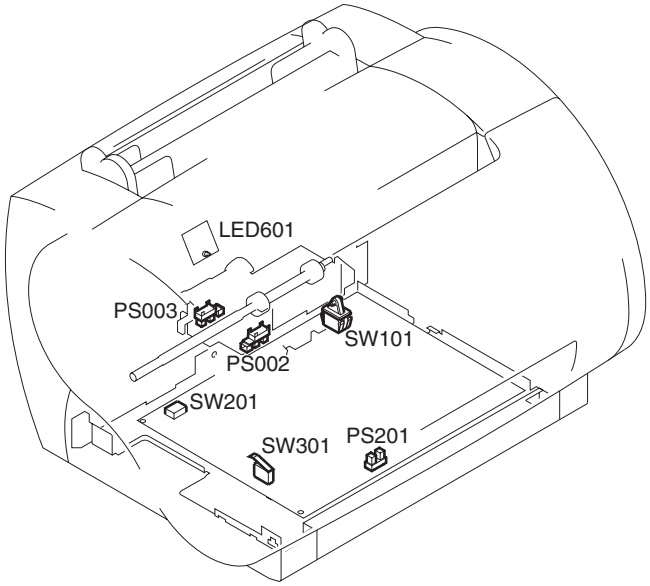
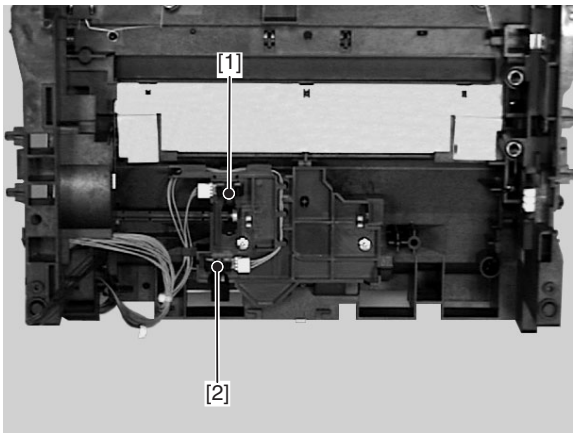


Figure 3-5-1

SW101: power switch (engine controller PCB)
SW201: test print switch (engine controller PCB)
SW301: door open detection switch (engine controller PCB)
PS002: paper top sensor
PS003: paper-out sensor
PS201: paper delivery sensor (engine controller PCB)
LED601: indicator LED (display PCB)

B. Paper Top Sensor/Paper-Out Sensor

1) Remove the feed assembly.
(See III-C of Chapter 3.)
2) Remove the paper top sensor/paper-out sensor.



[1] Paper top sensor
[2] Paper-out sensor

Figure 3-5-2

C. Power Switch, Test Print Switch, Door Open Detection Switch, Paper Delivery Sensor

1) Remove the engine controller PCB. (See VII-C of Chapter 3.)

D. Indicator LED

1) Remove the display PCB.
(See VII-D of Chapter 3.)

VI. MOTORS AND SOLENOIDS

A. Arrangement of the Components

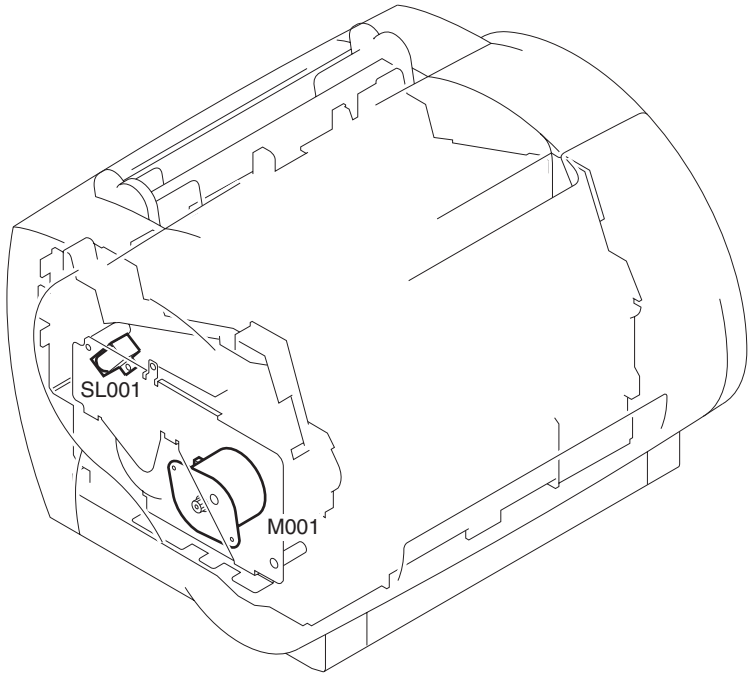
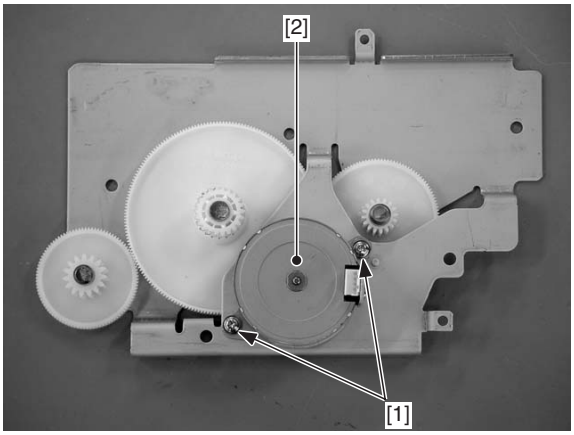


Figure 3-6-1

M001: main motor
SL001: pick-up motor

B. Main Motor

1) Remove the drive assembly.
(See III-B of Chapter 3.)
2) Remove the 2 screws, and detach the main motor.

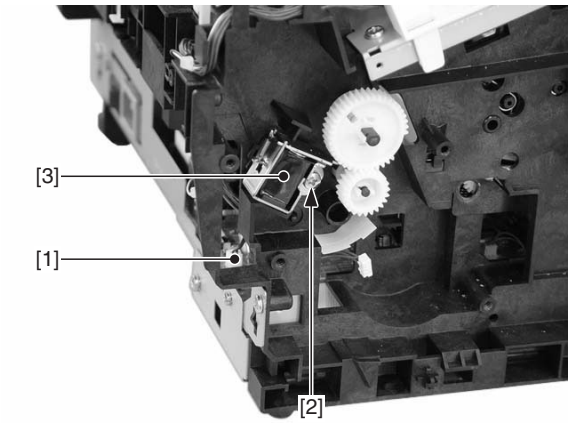


[1] Screw
[2] Main motor

Figure 3-6-2

C. Pick-up Solenoid

1) Remove the drive assembly.
(See III-B of Chapter 3.)
2) Disconnect the connector J204 from the engine controller PCB; then, remove the screw, and detach the pick-up solenoid.



[1] Connector
[2] Screw
[3] Pick-up solenoid

Figure 3-6-3

VII. PCBS

A. Arrangement of the Components

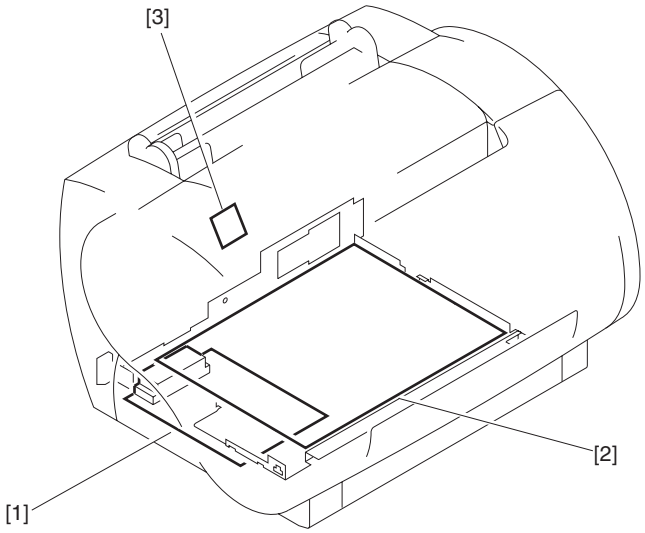
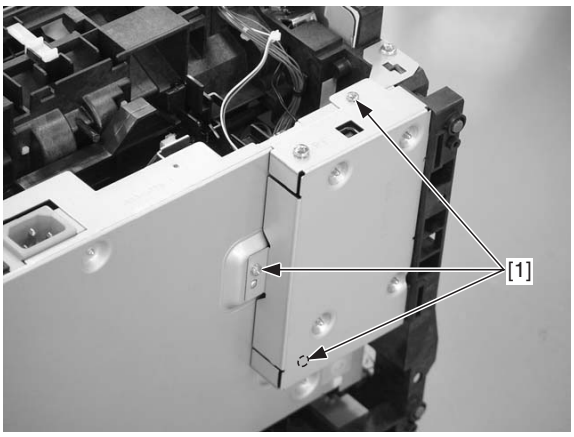


Figure 3-7-1

[1] Interface controller PCB
[2] Engine controller PCB
[3] Display PCB

B. Interface Controller PCB

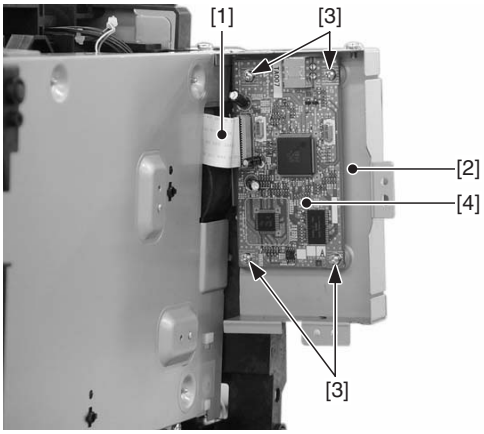
1) Remove the 3 screws equipped with a washer.



[1] Screw (w/ washer)

Figure 3-7-2

2) Remove the flexible cable, and detach the interface controller assembly.
3) Remove the 4 screws, and detach the interface controller PCB.

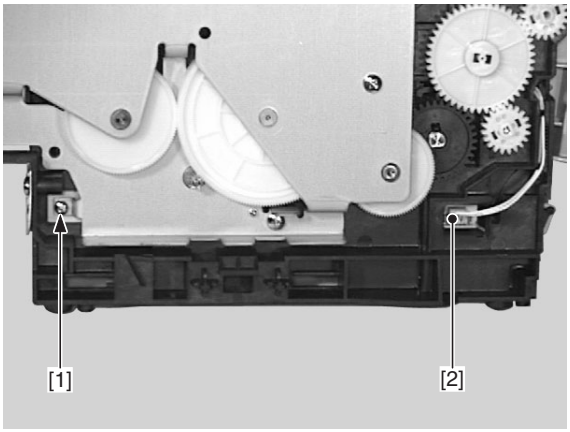


[1] Flexible cable
[2] Interface controller assembly
[3] Screw
[4] Interface controller PCB

Figure 3-7-3

C. Engine Controller PCB

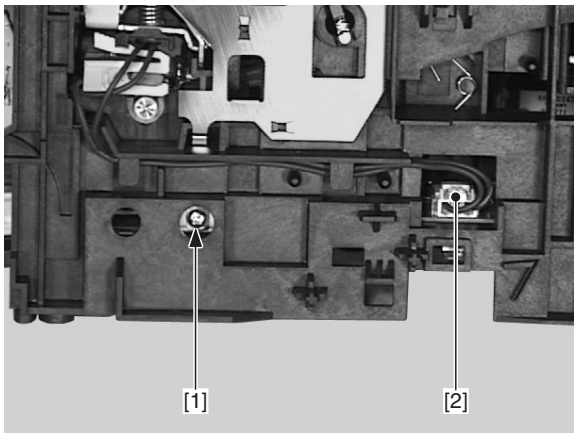
1) Remove the rear cover, left/right cover, and upper cover.
2) Remove the interface controller assembly. (See VII-B of Chapter 3.)
3) Remove the screw found on the left side of the machine, and disconnect the connector.



[1] Screw
[2] Connector

Figure 3-7-4

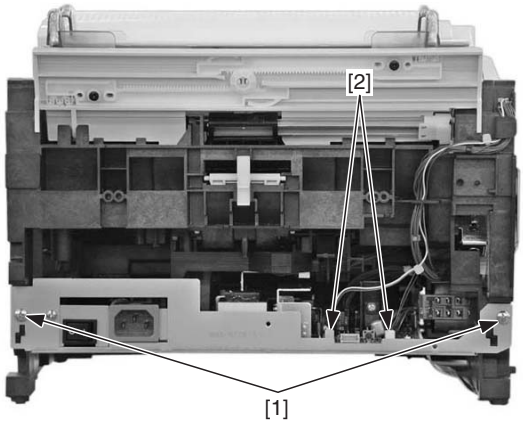
4) Remove the screw equipped with a washer (found on the right side of the machine), and disconnect the connector.



[1] Screw (w/ washer)
[2] Connector

Figure 3-7-5

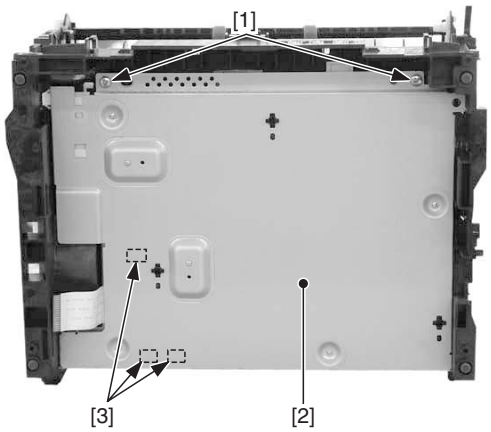
5) Remove the 2 screws from the rear of the machine, and disconnect the 2 connectors.



[1] Screw
[2] Connector

Figure 3-7-6

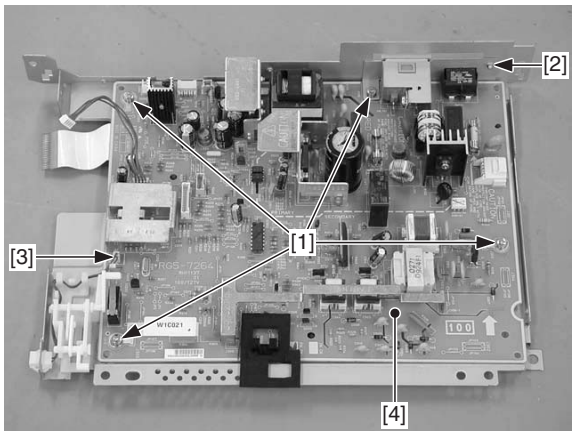
6) Remove the 2 screws, and slide out the bottom of the engine controller assembly to the front.
7) Disconnect the 2 connectors from the PCB, and disconnect the connector of the main controller assembly; then, detach the engine controller assembly.



[1] Screw
[2] Engine controller assembly
[3] Connector

Figure 3-7-7

8) Remove the 4 screws and the screw with a washer; then, disconnect the connector to detach the engine controller PCB.

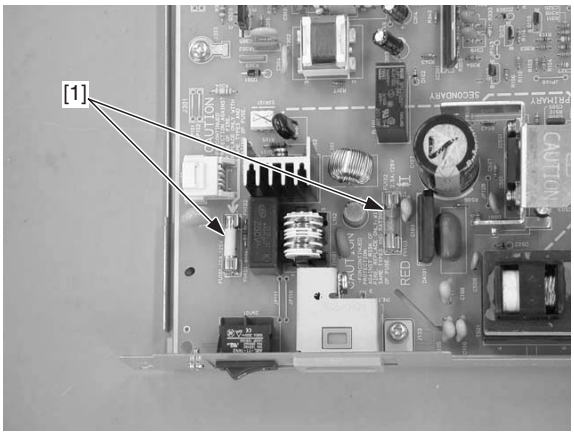


[1] Screw
[2] Screw (w/ washer)
[3] Connector
[4] Engine controller PCB

Figure 3-7-8

a. Fuse

1) Remove the engine controller assembly.
\ (See VII-C of Chapter 3.)
2) Remove the fuse.



[1] Fuse

Figure 3-7-9

Caution: When mounting the fuse, be sure that its orientation is correct.

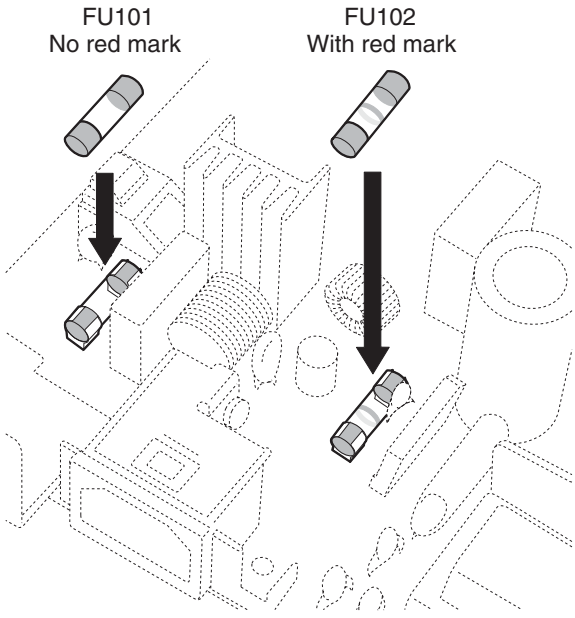
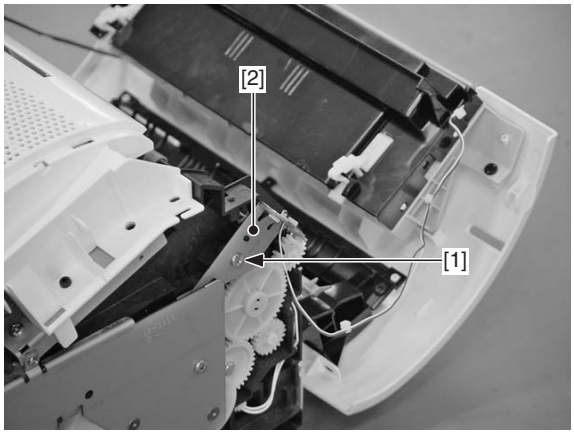


Figure 3-7-10

E. Display PCB

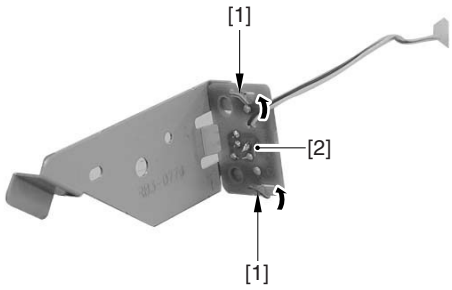
1) Remove the rear cover, left/right cover and upper cover.
2) Remove the screw, and detach the display assembly.



[1] Screw
[2] Display assembly

Figure 3-7-11

3) Using a radio wrench, bend the support of the display PCB, and detach the display PCB.



[1] Support segment
[2] Display PCB

Figure 3-7-12

CHAPTER 4

TROUBLESHOOTING

I. PREFACE

A. Malfunction Diagnosis Flowchart

The malfunctions that occur in the printer are mainly classified to five factors; “image defects”, “jams”, “transport defects”, “malfunction”, and “malfunction status”.

If a malfunction occurred in the printer, the service technician is to identify the factor according to the flowchart and then to rectify the problem according to the action procedures of each malfunction.

Make sure the following points at the execution of troubleshooting.

- Be sure that the connector has no poor contact when measuring the voltage at the specified terminal of the connector.
- Before handling PCBs, be sure to touch a metal part of the printer to discharge static electricity, as it can cause damage to the PCBs.
- The laser/scanner unit cannot be adjusted in the field, so do not attempt to disassemble it.

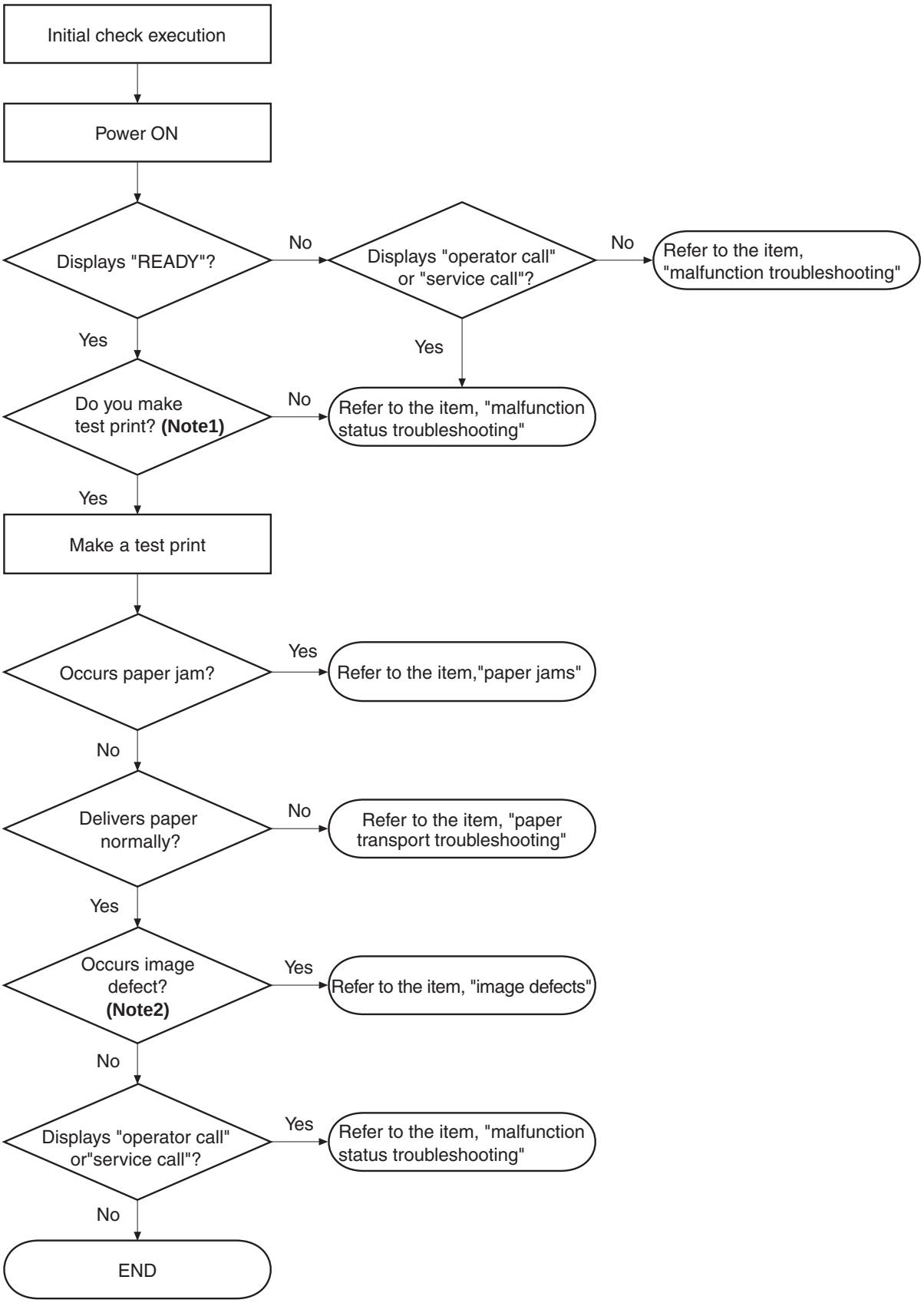

Initial check execution
Power ON
Displays "READY"?
No
Displays "operator call" or "service call"?
No
Refer to the item, "malfunction troubleshooting"
Yes
Yes
Do you make test print? (Note1)
No
Refer to the item, "malfunction status troubleshooting"
Yes
Make a test print
Occurs paper jam?
Yes
Refer to the item,"paper jams"
No
Delivers paper normally?
No
Refer to the item, "paper transport troubleshooting"
Yes
Occurs image defect? (Note2)
Yes
Refer to the item, "image defects"
No
Displays "operator call" or"service call"?
Yes
Refer to the item, "malfunction status troubleshooting"
No
END

Figure 4-1-1

Notes: **1.** Before executing a test print, make sure to select the pickup source and delivery source that were used when the malfunction occurred according to the information given by the user.
If the information is not available, make test prints with all feasible combination of paper source and delivery source in the printer, and find out the factor.

2. The image defect occurred at the user side might not re-occur on its test print. In this case, make a test print from the external device and infer the factor by the output image. Then, find the factor according to the item, “image defects”.

B. Initial Check

Check the following items before making a diagnosis of malfunction. If any failure is found, the service technician is to clear the problems and to give instructions to the user.

1. Installation Environment

Make sure that the requirements stated below meet when installing the printer.

a. The power supply voltage is ± 10% (110-127V) or from + 6% to - 10% (220-240V) of the rated voltage.
b. The printer is installed on a level surface.
c. The room temperature is kept between 10°C and 32.5°C, and the relative humidity, between 20% and 80%.
d. Avoid sites generating ammonia gas, areas with high temperature and high humidity (near water faucet, kettle, humidifier), areas near open flames, and dusty place.
e. Avoid sites exposed to direct sunlight. If unavoidable, advise the customer to hang curtains.
f. The printer is installed at a well-ventilated place.
g. Make sure that the power supply plug is inserted to the printer and the outlet.

2. Paper

Confirm that:

a. Recommended paper is used.
b. The paper is not moist.

3. Loading paper into the pickup source

a. The stack of paper loaded into the pickup source should be within the specified capacity of the source.
b. The paper is set in the selected pickup source correctly.

4. Installing the EP-22 cartridge

The EP-22 cartridge should be installed correctly.

5. Condensation

During winter, if the printer is brought from a cold place (such as a warehouse) into a warm room, condensation will appear inside the printer, causing various problems.

For example:

a. Condensation on a scanner (such as the our-faced scanning mirror, reflective mirror, and lenses) will cause a light print image.
b. If the photosensitive drum is cold, the electrical resistance will be high, making it impossible to obtain correct contrast of printed outputs.

If condensation appears, wipe these assemblies with a dry cloth, or leave the printer power ON for 10 - 20 minutes.

If an EP-22 cartridge is unsealed immediately after it is brought from a cold place into a warm room, condensation will also appear inside the cartridge; this can cause various troubles.

Be sure to instruct the customer that the cartridge needs to be left at a room temperature for one to two hours before unsealing it.

C. Test Print

Test print is divided into two types: engine test print and controller test print.

If an image defect occurred in this printer, make a test print and assess the abnormality of the printer.

1. Engine Test Print

Test print contains the test pint pattern as shown in Figure 4-1-3.

Follow the procedures below to make a test print.

1) Load paper into the printer and switch the power ON.
2) When the printer is in the STANDBY mode, press the test print switch (pointed by the arrow in Figure 4-1-2) with a precision flat-blade screwdriver, and print a test print (shown in Figure 4-1-3.)

Figure 4-1-2

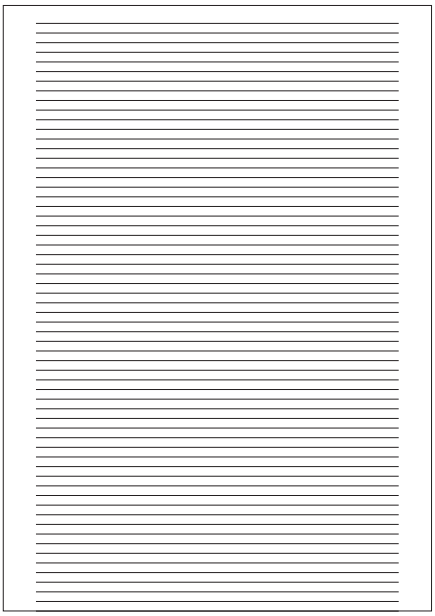


Figure 4-1-3

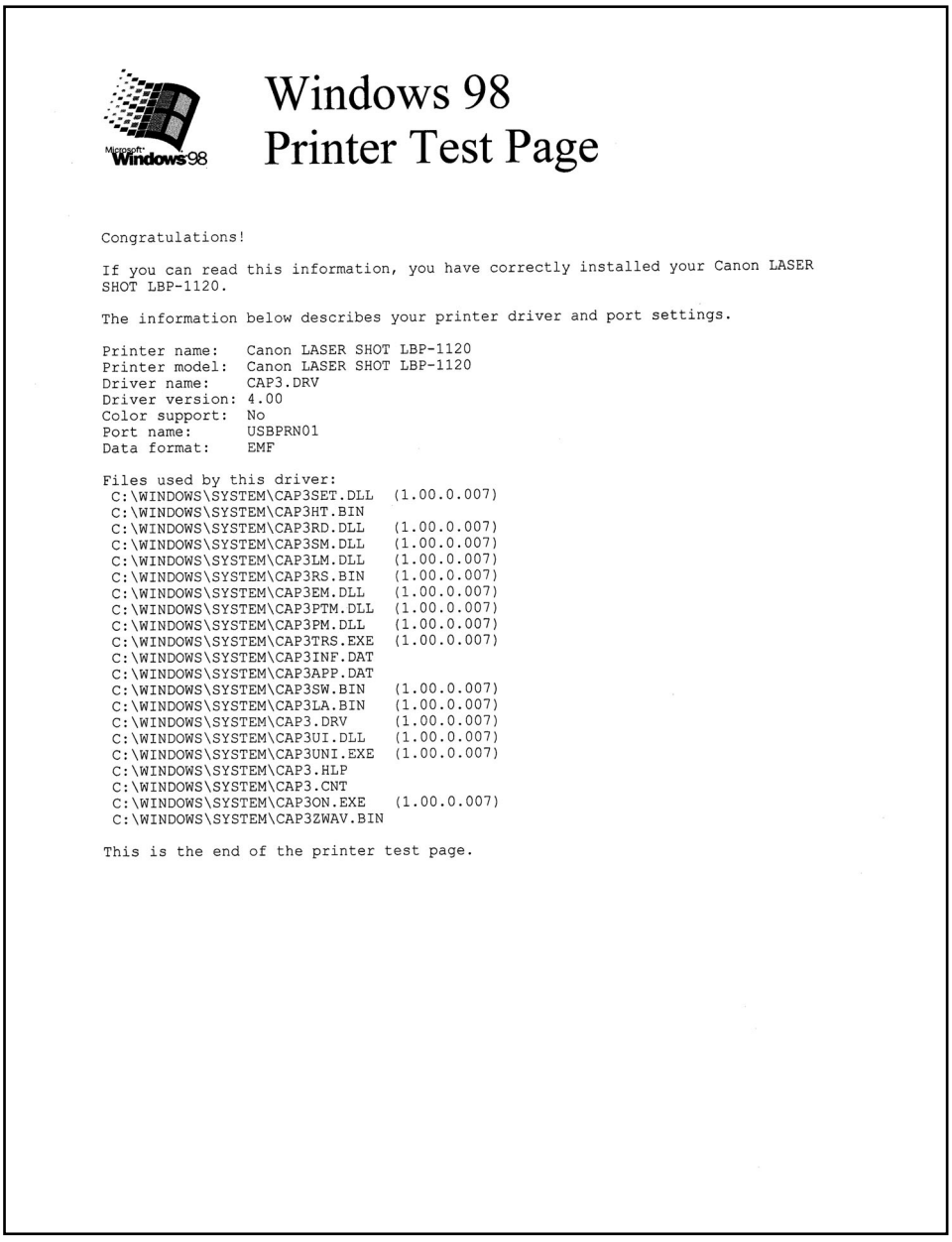
3) Identify the contents of the failure from the test print and rectify the problem according to the action procedures of image defects. Test pattern can be printed continuously as long as the test print switch is held down.

Note: Use paper with the width of B5-size or above for a test print.

2. Controller Test Print

a. CAPT test print

1) Set print paper in the multipurpose tray and turn ON the power switch.
2) When the printer is in the standby mode, open the Properties dialog box. Clicking on Print a Test Page prints the test pattern shown in figure below.



Windows 98
Printer Test Page

Congratulations!

If you can read this information, you have correctly installed your Canon LASER SHOT LBP-1120.

The information below describes your printer driver and port settings.

Printer name: Canon LASER SHOT LBP-1120
Printer model: Canon LASER SHOT LBP-1120
Driver name: CAP3.DRV
Driver version: 4.00
Color support: No
Port name: USBPRN01
Data format: EMF

Files used by this driver:
C:\WINDOWS\SYSTEM\CAP3SET.DLL (1.00.0.007)
C:\WINDOWS\SYSTEM\CAP3HT.BIN
C:\WINDOWS\SYSTEM\CAP3RD.DLL (1.00.0.007)
C:\WINDOWS\SYSTEM\CAP3SM.DLL (1.00.0.007)
C:\WINDOWS\SYSTEM\CAP3LM.DLL (1.00.0.007)
C:\WINDOWS\SYSTEM\CAP3RS.BIN (1.00.0.007)
C:\WINDOWS\SYSTEM\CAP3EM.DLL (1.00.0.007)
C:\WINDOWS\SYSTEM\CAP3PTM.DLL (1.00.0.007)
C:\WINDOWS\SYSTEM\CAP3PM.DLL (1.00.0.007)
C:\WINDOWS\SYSTEM\CAP3TRS.EXE (1.00.0.007)
C:\WINDOWS\SYSTEM\CAP3INF.DAT
C:\WINDOWS\SYSTEM\CAP3APP.DAT
C:\WINDOWS\SYSTEM\CAP3SW.BIN (1.00.0.007)
C:\WINDOWS\SYSTEM\CAP3LA.BIN (1.00.0.007)
C:\WINDOWS\SYSTEM\CAP3.DRV (1.00.0.007)
C:\WINDOWS\SYSTEM\CAP3UI.DLL (1.00.0.007)
C:\WINDOWS\SYSTEM\CAP3UNI.EXE (1.00.0.007)
C:\WINDOWS\SYSTEM\CAP3.HLP
C:\WINDOWS\SYSTEM\CAP3.CNT
C:\WINDOWS\SYSTEM\CAP3ON.EXE (1.00.0.007)
C:\WINDOWS\SYSTEM\CAP3ZWAV.BIN

This is the end of the printer test page.

Figure 4-1-4

II. IMAGE DEFECTS TROUBLESHOOTING

Perform troubleshooting according to the malfunction diagnosis flowchart (Figure 4-1-1). If an "image defect" is found, the defective part must be located and rectified by the following procedures.

Table 4-2-1

Image defects

Defects	Additional explanation
2-1 Light	Output very light image.
2-2 Dark	Output very dark image.
2-3 Completely blank	Output no image.
2-4 All black	Output all black paper.
2-5 Dirt on back of paper	Output dirt on the back of the paper.
2-6 Dirt	Output dirt on surface of the paper.
2-7 Black vertical lines	Output black vertical lines.
2-8 White vertical lines	Output white vertical lines.
2-9 Black horizontal lines	Output black horizontal lines.
2-10 White horizontal lines	Output white horizental lines.
2-11 Blank spots	Output image with blank spots.
2-12 Poor fixing	Output image with poorly fixed toner.
2-13 Image distortion	Output distored image.
2-14 Faulty registration	Gap between the leading edges of the paper and the image.

II-1. Light

<Possible Causes>

1. Improperly adjusted image density.
   Action: Adjust the image density by operating the external device.

2. Open the cartridge cover and remove the EP-22 cartridge while printing. Open the drum protective shield of the cartridge and check the toner image on the photosensitive drum surface. If the toner image has not been transferred onto the paper properly, go to step 3). If the toner image on the drum is faint, go to step 6).
   Do not open the drum protective shield for more than 10 seconds.

3. Deformation or deterioration of the transfer charging roller.
   Action: Replace the transfer charging roller.

4. Poor contact in the transfer charging roller contact on the engine controller PCB and the transfer charging roller shaft contact.
   Action: Clean the contacts if dirty. If the problem still remains after cleaning, or parts are deformed or damaged, replace them.
5. Defective laser/scanner unit.
   Action: Replace the laser/scanner unit.

6. Defective engine controller PCB.
   Action: Replace the engine controller PCB.

II-2. Dark

<Possible Causes>

1. Improperly adjusted image density.
   Action: Adjust the image density by operating the external device.

2. Poor contact in the drum grounding contact on the engine controller PCB and cartridge contact.
   Action: Clean the contacts if dirty. If the problem still remains after cleaning, or parts are deformed or damaged, replace them.

3. Poor contact in the primary high voltage contact on the engine controller PCB and cartridge contact.
   Action: Clean the contacts if dirty. If the problem still remains after cleaning, or parts are deformed or damaged, replace them.

4. Defective laser/scanner unit.
   Action: Replace the laser/scanner unit.

5. Defective engine controller PCB.
   Action: Replace the engine controller PCB.

II-3. Completely Blank

<Possible Causes>

1. Damaged laser shutter open/close projection of the cartridge cover.
   Action: Replace the cartridge cover.

2. Poor contact in the developing bias contact on the engine controller PCB and cartridge contact.
   Action: Clean the contacts if dirty. If the problem still remains after cleaning, or parts are deformed or damaged, replace them.

3. Defective engine controller PCB.
   Action: Replace the engine controller PCB.

II-4. All Black

<Possible Causes>

1. Poor contact in the primary high voltage contact on the engine controller PCB and cartridge contact.
   Action: Clean the contacts if dirty. If the problem still remains after cleaning, or parts are deformed or damaged, replace them.
2. Defective primary charging roller.
   Action: Replace the cartridge.

3. Defective engine controller PCB.
   Action: Replace the engine controller PCB.

II-5. Dirt on Back of Paper

<Possible Causes>

1. Dirty feed guide or fixing unit entrance guide.
   Action: Clean the dirty areas.

2. Dirty delivery roller.
   Action: Clean the delivery roller.

3. Periodic dirt (transfer charging roller, pressure roller).
   Action: Identify and clean the dirty roller according to Table 4-2-2 on page 4-12. If dirt cannot be removed, replace the dirty roller.

II-6. Dirt

<Possible Causes>

1. Dirty facedown delivery sub-roller or fixing delivery sub-roller.
   Action: Clean the facedown delivery sub-roller or fixing delivery sub-roller.

2. Periodic dirt (pickup roller, fixing film unit, EP-22 cartridge).
   Action: Identify and clean the dirty part(s) according to Table 4-2-2 on page 4-12. If the dirt cannot be removed, replace the dirty part(s).

II-7. Black vertical lines

<Possible Causes>

1. Circumferential scars on the photosensitive drum.
   Action: Replace the cartridge.

2. Dirty fixing unit entrance guide.
   Action: Clean the guide.

3. Scar(s) on fixing film unit.
   Action: Replace the fixing film unit.

II-8. White Vertical Lines

<Possible Causes>

1. Lack of toner
   Action: Remove the cartridge from the printer. Rock the cartridge in the manner described on V-B-c of Chapter 1, and then install it back to the printer. If the problem still remains, replace the cartridge.
2. Circumferential scars on the photosensitive drum.
   Action: Replace the cartridge.

3. Foreign materials are deposited on the laser outlet of the printer or the laser inlet of the cartridge.
   Action: Remove the foreign materials.

4. Dirty facedown delivery sub-roller or fixing delivery sub-roller.
   Action: Clean the sub-rollers.

5. Dirt or foreign materials on the fixing unit entrance guide.
   Action: Clean the fixing unit entrance guide.

6. Foreign materials on the fixing film unit.
   Action: Replace the fixing film unit.

7. Defective developing cylinder.
   Action: Replace the cartridge.

8. Dirty mirror in the laser/scanner unit.
   Action: Replace the laser/scanner unit.

II-9. Black Horizontal Lines

<Possible Causes>

1. Horizontal scar(s) on the photosensitive drum.
   Action: Replace the cartridge.

2. Dirty, deformed or worn fixing film.
   Action: Replace the fixing film unit.

II-10. White Horizontal Lines

<Possible Causes>

1. Horizontal scar(s) on the photosensitive drum.
   Action: Replace the cartridge.

2. Defective fixing film unit.
   Action: Replace the fixing film unit.

II-11. Blank Spots

<Possible Causes>

1. Lack of toner.
   Action: Remove the cartridge from the printer. Rock the cartridge in the manner described on V-B-c of Chapter 1, and then install it back to the printer. If the problem still remains, replace the cartridge.
2. Dirty or deformed transfer charging roller.
   Action: Replace the transfer charging roller.

3. Defective photosensitive drum or developing cylinder.
   Action: Replace the cartridge.

II-12. Poor Fixing

<Possible Causes>

1. The nip width of the fixing unit is not within the specification.
   Action: Replace the fixing pressure units.

2. Dirty pressure roller.
   Action: Clean the pressure roller. If the dirt cannot be removed, replace the pressure roller.

3. Scar(s) or dent(s) on the pressure roller surface.
   Action: Replace the pressure roller.

4. Scar(s) or dent(s) on the fixing film.
   Action: Replace the fixing film unit.

5. Deterioration of the thermistor.
   Action: Replace the fixing film unit.

II-13. Image Distortion

<Possible Causes>

1. Poor contact in the connectors on the laser/scanner unit.
   Action: Reconnect the connector J208F on the engine controller PCB, or connector J801F and J802F on the laser/scanner unit correctly.

2. Defective laser/scanner unit.
   Action: Replace the laser/scanner unit.

3. Defective engine controller PCB.
   Action: Replace the engine controller PCB.

II-14. Faulty Registration

<Possible Causes>

1. Dirty or worn pickup roller.
   Action: Clean the pickup roller. Replace the roller if the dirt cannot be removed or the roller is worn.

2. Dirty or worn feed roller.
   Action: Clean the feed roller. Replace the roller if the dirt cannot be removed or the roller is worn.

3. Defective paper top sensing lever.
   Action: Replace the lever if it does not move smoothly or is damaged.

Table 4-2-2

Periodical dirt and spots appearing on the image

Susceptible location	Diameter (mm)	Period of the image (mm)	Phenomenon			
			Dirt	Blank spots	Dirt on back of paper	Poor fixing]
Transfer charging roller	14.4	Approx. 45		○	○	
Fixing film unit	24	Approx. 75	○	○		○
Pressure roller	20	Approx. 63			○	○
Feed roller	16.5	Approx. 52	○		○	
Photosensitive drum	24	Approx. 75	○	○		
Developing cylinder	12	Approx. 38	○	○		
Primary charging roller	12	Approx. 38	○	○		

III. JAMS TROUBLESHOOTING

Perform troubleshooting according to the malfunction diagnosis flowchart (Figure 4-1-1). If a “jam” is found, the defective part must be located and rectified by the following procedures.

The paper path can be divided into two sections: 1) paper pickup and feed block, and 2) fixing and delivery block.

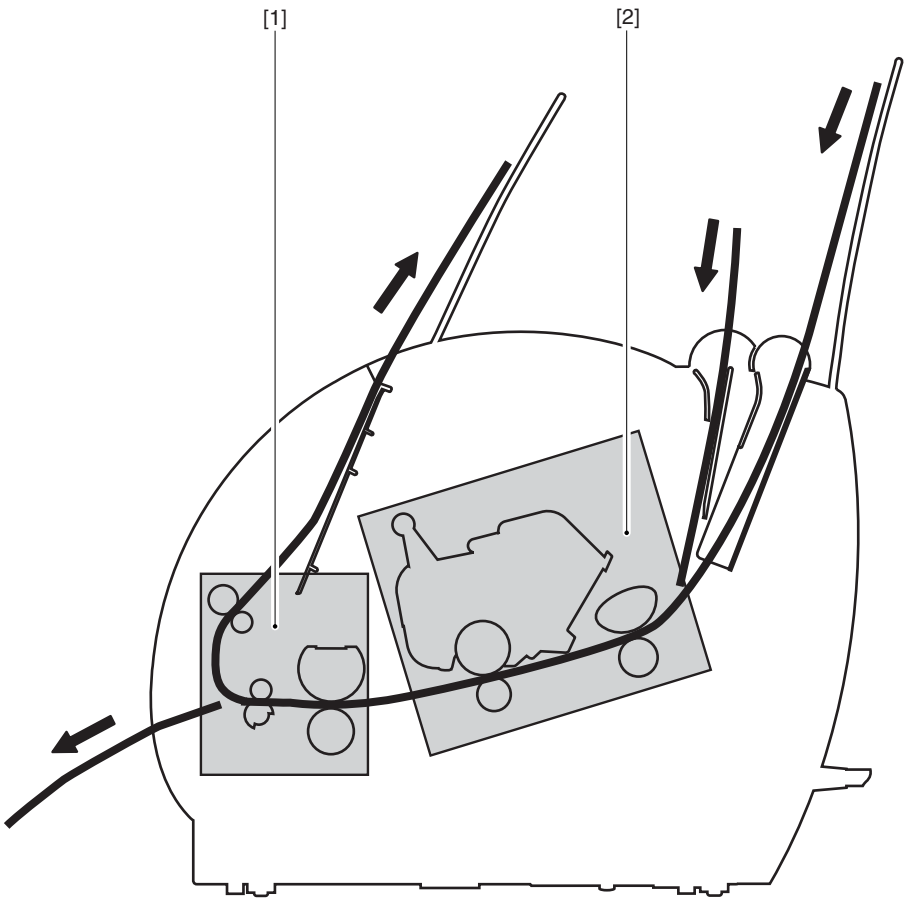


Figure 4-3-1

III-1. Paper Pickup Unit

<Possible Causes>

1. The paper top sensing lever does not move smoothly or is damaged.
   Action: If the lever is not installed properly, reinstall it correctly. If the lever is damaged or deformed, replace it.

2. Defective paper top sensing lever spring.
   Action: If the spring is out of place, set it in the right position. If the spring is deformed or damaged, replace it.

3. Worn, deformed or dirty pickup roller or feed roller
   Action: Clean the rollers if dirty. If the rollers are worn or deformed, replace them.

4. Defective lifting plate spring
   Action: If the spring is out of place, set it in the right position. If the spring is deformed or damaged, replace it.

5. Poor contact in the connectors on the main motor drive signal line.
   Action: Reconnect the connector J007F on the main motor.

6. Poor contact in the connectors on the pickup roller solenoid drive signal line.
   Action: Reconnect the connector J204F on the engine controller PCB.

7. Defective pickup roller solenoid
   Action: Disconnect the connector J204F on the engine controller PCB. Measure the resistance between the connector J204-1 and J204-2 on the cable side. If the measured value is not about 120Ω, replace the pickup roller solenoid.

8. Defective paper top sensor.
   Action: Replace the paper top sensor.

9. Defective main motor.
   Action: Replace the main motor.

10. Defective engine controller PCB.
    Action: Replace the engine controller PCB.

III-2. Fixing and Delivery Unit

<Possible Causes>

1. Defective deflector.
   Action: If the deflector is worn, broken, nicked or damaged, replace it.

2. Dirty or scarred fixing unit entrance guide or toner build-up on the guide.
   Action: Clean the guide if dirty. Replace the guide if the dirt cannot be removed.

3. The pressure (nip width) of the pressure roller is not within the specification.
   Action: Replace the fixing pressure units.

4. The pressure roller does not rotate smoothly.
   Action: Check whether the gear is worn or damaged. If the pressure roller is worn, replace it.

5. Deformed or damaged fixing film unit and pressure roller.
   Action: If the fixing film unit and pressure roller are deformed or damaged, replace them.

6. The paper delivery sensing lever does not move smoothly or is damaged.
   Action: Adjust the lever to move smoothly. Replace the lever if damaged.

7. Defective paper delivery sensing lever spring.
   Action: If the spring is out of place, set it in the right position. Replace the spring if damaged or deformed.

8. The fixing delivery roller does not rotate smoothly.
   Action: Check the gears, and replace any worn or fractured gear(s). If the fixing delivery roller is worn, replace it.

9. The facedown delivery roller does not rotate smoothly.
   Action: Check the gears, and replace any worn or fractured gear(s). If the facedown delivery roller is worn, replace it.

10. Defective engine controller PCB.
    Action: Replace the engine controller PCB.

IV. TRANSPORT TROUBLESHOOTING

Perform troubleshooting according to the malfunction diagnosis flowchart (Figure 4-1-1). If a "transport defect" is found, the defective part must be located and rectified by the following procedures.

IV-1. Multiple Feed

<Possible Causes>

1. Worn or dirty separation pad surface.
   Action: Clean the separation pad surface if dirty. Replace the separation pad if worn.

2. Defective separation pad spring.
   Action: If the spring is out of position, set it in the right position. Replace the spring if deformed.

3. Worn or dirty sub pad surface.
   Action: Clean the sub pad surface if dirty. Replace the sub pad if worn.

IV-2. Wrinkles/Folded Leading Edge

<Possible Causes>

1. Paper dust or dirt accumulates on the pickup roller, feed roller, and paper guide.
   Action: Clean the dirty areas.

2. Dirty fixing unit entrance guide and pressure roller.
   Action: Clean the fixing unit entrance guide and pressure roller.

3. Scarred or deformed fixing film unit.
   Action: Replace the unit if scarred or deformed.

4. Scarred or deformed paper guide.
   Action: Check the paper path. Replace any scarred or deformed guide(s).

IV-3. Skew

<Possible Causes>

1. Paper dust or dirt accumulates on the pickup roller, feed roller, and paper guide.
   Action: Clean the dirty areas.

2. Scarred or deformed feed roller.
   Action: Replace the roller if scarred or deformed.

3. Scarred or deformed paper guide.
   Action: Check the paper path. Replace any scarred or deformed guide(s).

V. MALFUNCTION TROUBLESHOOTING

Perform troubleshooting according to the malfunction diagnosis flowchart (Figure 4-1-1). If an "malfunction" is found, the defective part must be located and rectified by the following procedures.

V-1. No AC Power

<Possible Causes>

1. Blown fuse (FU101).
   Action: Referring to VII-C-a in Chapter 3, replace the fuse (FU101).

2. Defective engine controller PCB.
   Action: Replace the engine controller PCB.

V-2. No DC Power

<Possible Causes>

1. No AC power is supplied.
   Action: Perform the "No AC Power" checks.

2. Overcurrent/overvoltage detection circuit is activated.
   Action: If the problem persists after the power supply connector is plugged OFF and then IN again, find the cause of activation of the overcurrent/overvoltage detection circuit in the power supply unit. Wait for two minutes or more before turning the power back ON.

3. Blown fuse (FU102).
   Action: Referring to VII-C-a in Chapter 3, replace the fuse (FU102).

4. Defective engine controller PCB.
   Action: Replace the engine controller PCB.

VI. MALFUNCTION STATUS TROUBLESHOOTING

Perform troubleshooting according to the malfunction diagnosis flowchart (Figure 4-1-1). If an "malfunction status" is found, the defective part must be located and rectified by the following procedures.

VI-1. Laser Failure/BD Failure

<Possible Causes>

1. The laser shutter cannot be opened due to the damaged claw of the cartridge cover.
   Action: Replace the cartridge cover.

2. Poor contact in the connectors in the laser scanner unit.
   Action: Reconnect the connector J801F, J802F on the laser/scanner unit and connector J208F on the engine controller PCB.

3. Defective laser/scanner unit.
   Action: Turn ON the printer. Immediately after turning ON the printer, if the voltage between the connectors J208M-5 and J208M-6 on the engine controller PCB is about +5V and also the voltage between the connectors J208M-1 and J208M-4 is about +24V, replace the laser/scanner unit.

4. Defective engine controller PCB.
   Action: Replace the engine controller PCB.

VI-2. Fixing Unit Failure

<Possible Causes>

1. Poor contact in the connectors.
   Action: Reconnect the connector J206 on the engine controller PCB.

2. Broken wire or short-circuited thermistor.
   Action: Turn OFF the power and remove the fixing unit from the printer. Measure the resistance between the connectors J703-1 and J703-2 on the fixing unit side. If the resistance is not within the range from about 250 kΩ to about 800 kΩ (room temperature), replace the fixing film unit.

3. Broken wire of the heater or blown thermal fuse.
   Action: Remove the fixing unit. Check the connectors J102F-1 and J102F-2 on the fixing unit side for continuity. If the connectors have no continuity between them, replace the fixing film unit.

4. Defective engine controller PCB.
   Action: Replace the engine controller PCB.

VI-3. Although a paper jam has not occurred, the printer cannot enter the READY mode, outputting a "JAM" status.

<Possible Causes>

1. Defective paper delivery sensor spring.
   Action: If the spring is not installed correctly, reinstall it correctly. Or, if the spring is deformed or damaged, replace it.

2. Defective paper delivery sensing lever.
   Action: If the lever is not installed correctly, reinstall it correctly. Or, if the lever is deformed or damaged, replace it.

3. Defective paper top sensor spring.
   Action: If the spring is not installed correctly, reinstall it correctly. Or, if the spring is deformed or damaged, replace it.

4. Defective paper top sensing lever.
   Action: If the lever is not installed correctly, reinstall it correctly. Or, if the lever is deformed or damaged, replace it.

5. Defective engine controller PCB.
   Action: Replace the engine controller PCB.

VI-4. Although the door is closed after installing the cartridge, the printer cannot enter the READY mode, outputting a "DOOR OPEN" status.

<Possible Causes>

1. Damaged claw of the door switch on the connector holder.
   Action: Replace the connector holder.

2. Defective door open detection unit.
   Action: Replace the door open detection unit.

3. Defective door open detection switch / engine controller PCB.
   Action: Replace the engine controller PCB.

VI-5. Although paper is set in the printer, the printer cannot enter the READY mode, outputting a "PAPER OUT" status.

<Possible Causes>

1. Defective paper out sensing lever.
   Action: If the lever is not installed correctly, reinstall it correctly. Or, if the lever is deformed or damaged, replace it.

2. Defective paper out sensor.
   Action: Replace the paper out sensor (PS003.)

3. Defective engine controller PCB.
   Action: Replace the engine controller PCB.

VI-6. Although the cartridge is installed in the printer, the printer cannot enter the READY mode, outputting a "NO CARTRIDGE" status.

<Possible Causes>

1. Poor contact in the primary high-voltage contact on the engine controller PCB and cartridge contact.
   Action: Clean the contacts if dirty. If the problem still remains after cleaning, or parts are deformed or damaged, replace them.

2. Defective cartridge.
   Action: Replace the cartridge.

3. Defective engine controller PCB.
   Action: Replace the engine controller PCB.

VII. MEASUREMENT AND ADJUSTMENT

A. Mechanical Adjustment

1. Checking the Nip Width of the Pressure Roller.

The fixing unit is not designed to allow the adjustment of the pressure (nip width); however, the incorrect nip width can cause fixing problems.

Follow the procedures below to check the nip width:

1) Make an all-black print of A4 size using an EP-22 cartridge, and bring the print to the customer's site.
2) Place the all-black print in the multipurpose tray of the printer, with the printed side facing down.
3) Select faceup delivery by turning the delivery switching lever down.
4) Press on the test print switch.
5) Turn OFF the printer when the leading edge of the print emerges at the faceup tray. After 10 seconds from tuning OFF the printer, open the cartridge cover and take out the print.
6) Measure the width of the glossy band across the paper and check that it meets the requirements as shown in Table 4-7-1.

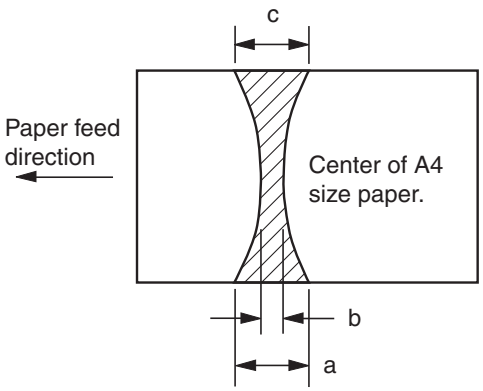


Figure 4-7-1

Table 4-7-1

	Dimensions
a,b,c	4 to 6 [mm]
|a - c|	0.5 [mm] or less
|a - b|	1.0 [mm] or less
|b - c|	1.0 [mm] or less

B. Electrical Adjustment

This printer's electrical system does not require adjustment.

C. LEDs, Test Pins, Jumpers and Switches on PCBs

This section lists only the LEDs, test pins, jumpers, and switches required during the after-sales service in the field.

All other test pins, etc. are for the factory use only. The adjustment and check using these test pins, etc. require special tools, measuring instruments and high precision. Do not touch them in the field.

1. Engine Controller PCB

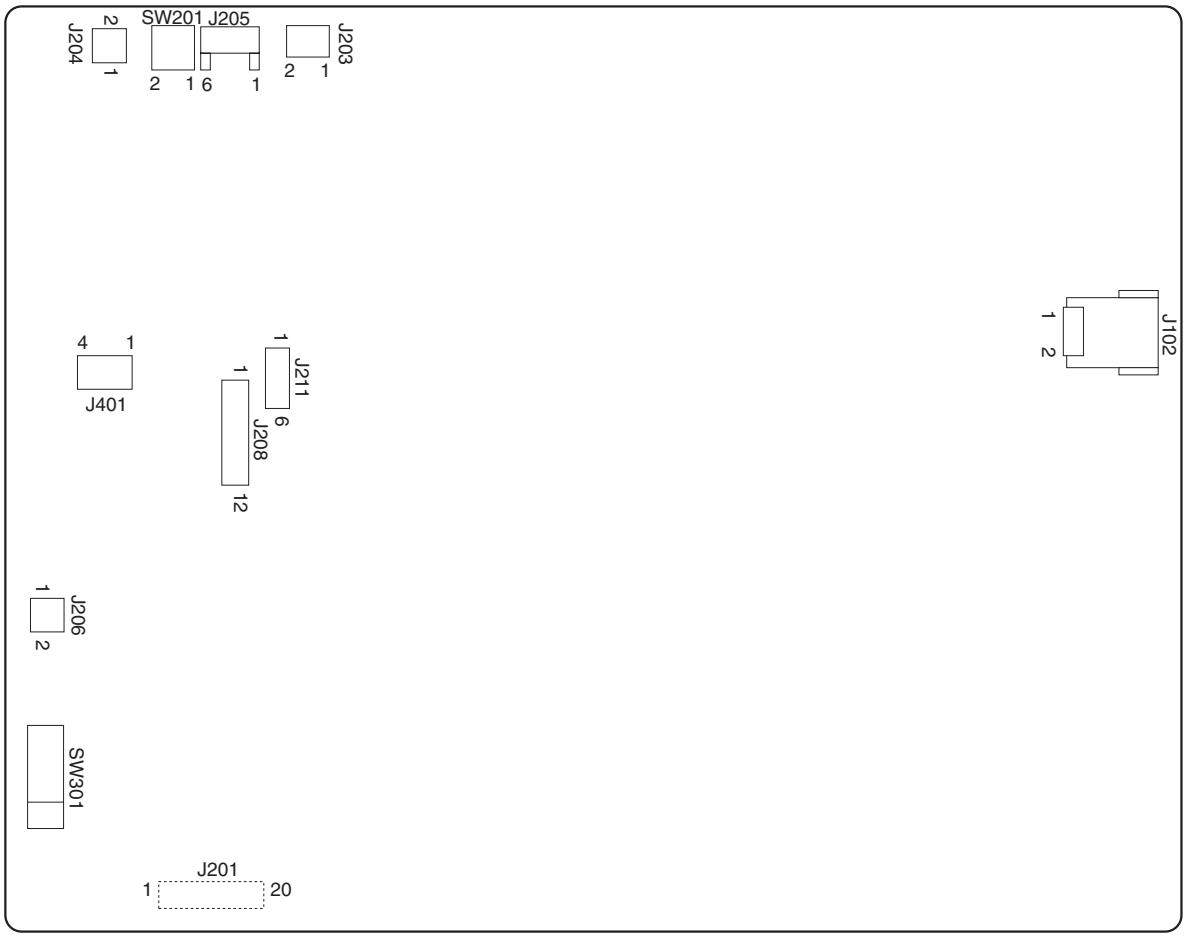


Figure 4-7-2

Table 4-7-2

SW No.	Function
SW201	Switch for test print
SW301	Switch for door open detection

VIII. MAINTENANCE AND SERVICING

A. Periodic Replacement Parts

● This printer does not have any periodic replacement parts.

Note: Periodic replacement parts are the parts that must be replaced at regular intervals, even if they are functioning properly and show no signs of wear. (Failure of these parts can seriously affect printer performance.) These parts should be replaced during a regular service visit closest to the end of the parts expected life.

B. Expected Service Lives of Consumable Parts

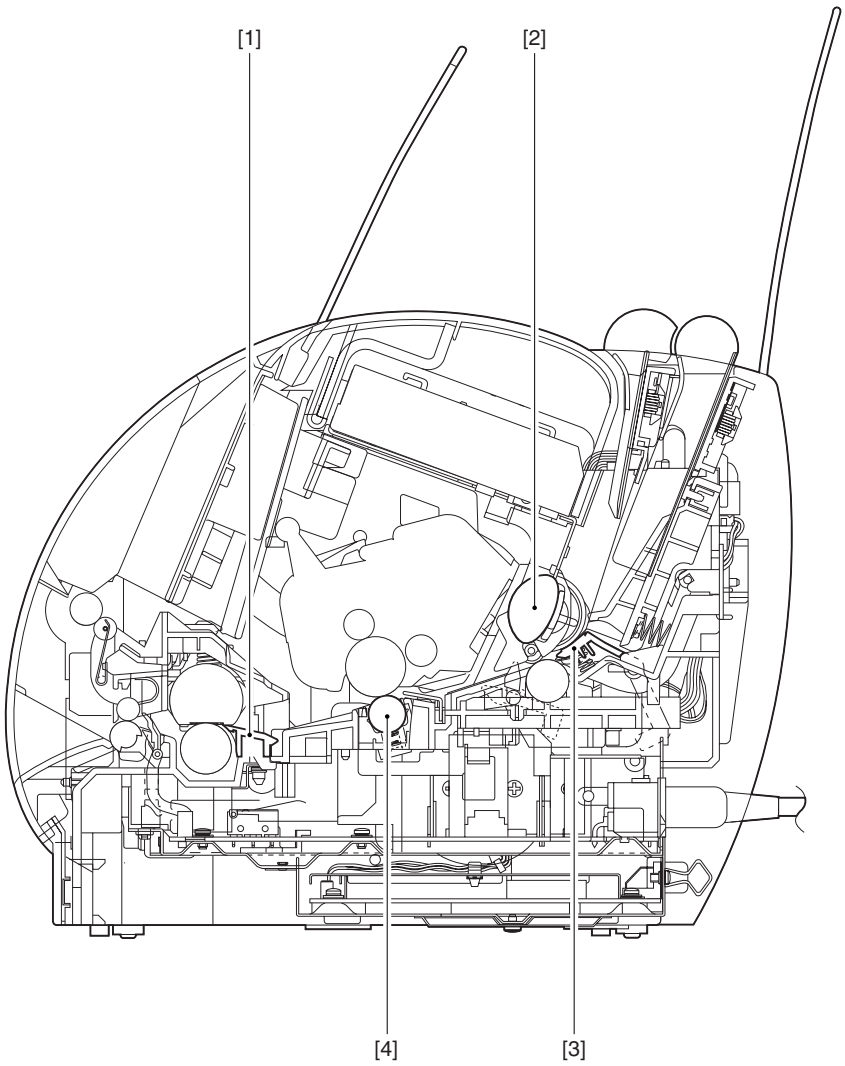
● This printer does not have any consumable parts.

Note: Consumable parts are the parts that may need to be replaced due to deterioration or damage at least once prior to the elapse of the printerÕs warranty period.
They only need to be replaced when faulty.

C. Periodic Service

This printer does not have any areas that require periodic servicing.

D. Cleaning During a Service Visit



[1] Fixing unit entrance guide
[2] Pick-up roller
[3] Separation pad
[4] Transfer charging roller

Figure 4-8-1

Following the procedures below, clean the printer during a service visit.

1. Fixing Unit Entrance Guide
Clean with a dry lint free paper.

2. Pickup Roller
Clean with a dry lint free paper.

3. Separation Pad
Clean the rubber area with a dry lint free paper

4. Transfer Charging Roller
In general, the transfer charging roller is not to be touched or cleaned. If unavoidable, clean the roller with a dry lint free paper. Do not use water or solvent, and be careful not touch the roller with bare skin. Make sure not to contaminate the roller with solvent or oil.

E. Standard Tools

The table below lists the standard tools required for servicing the printer.

Table 4-8-1

No.	Tool name	Tool No.	Remark
1	Tool case	TKN-0001	
2	Jumper wire	TKN-0069	With a clip
3	Clearance gauge	CK-0057	0.02 to 0.3mm
4	Phillips screwdriver	CK-0101	M4, M5 Length : 363mm
5	Phillips screwdriver	CK-0104	M3, M4 Length : 155mm
6	Phillips screwdriver	CK-0105	M4, M5 Length : 191mm
7	Phillips screwdriver	CK-0106	M4, M5 Length : 85mm
8	Flat-blade screwdriver	CK-0111	
9	Precision flat-blade screw driver set	CK-0114	Set of 6
10	Allen wrench set	CK-0151	Set of 5
11	File, fine	CK-0161	
12	Allen (hex) screwdriver	CK-0170	M4 Length:107mm
13	Diagonal cutting pliers	CK-0201	
14	Needle-nose pliers	CK-0202	
15	Pliers	CK-0203	
16	Retaining ring pliers	CK-0205	Applied to the axis ring
17	Crimper	CK-0218	
18	Tweezers	CK-0302	
19	Ruler	CK-0303	Measure 150mm measurement
20	Soldering iron	CK-0309	100V , 30W
21	Mallet, plastic head	CK-0314	
22	Brush	CK-0315	
23	Penlight	CK-0327	
24	Plastic bottle	CK-0328	100cc
25	Solder	CK-0329	Ø1.5 (mm) X 1 (mm)
26	Desoldering wick	CK-0330	1.5mm
27	Lint-free paper	CK-0336	500SH/PKG
28	Oiler	CK-0349	30cc
29	Plastic jar	CK-0351	30cc
30	Blower brush	CK-0399	
31	Digital multimeter	CK-0552	

F. Special Tools

No special tools are required other than standard tools for servicing.

G. List of Lubricants and Cleaners

Table 4-8-2

No.	Name	Components	Use	Remarks
1	MEK (methyl ethyl ketone)	$CH_3CO\text{-}C_2H_5$	Cleaning : oil and toner stains	• Purchase locally • Highly flammable : keep away from flame
2	Lubricant	Special oil Special solid lubricating material Lithium soap	Apply to gears and between gear and shaft.	• Tool No. HY9-0007 (20g tube)
3	Electricity grease	High performance grease	Apply to grounding plate	• Electricity grease • Tool No. CK-8006

IX. LOCATION OF CONNECTORS

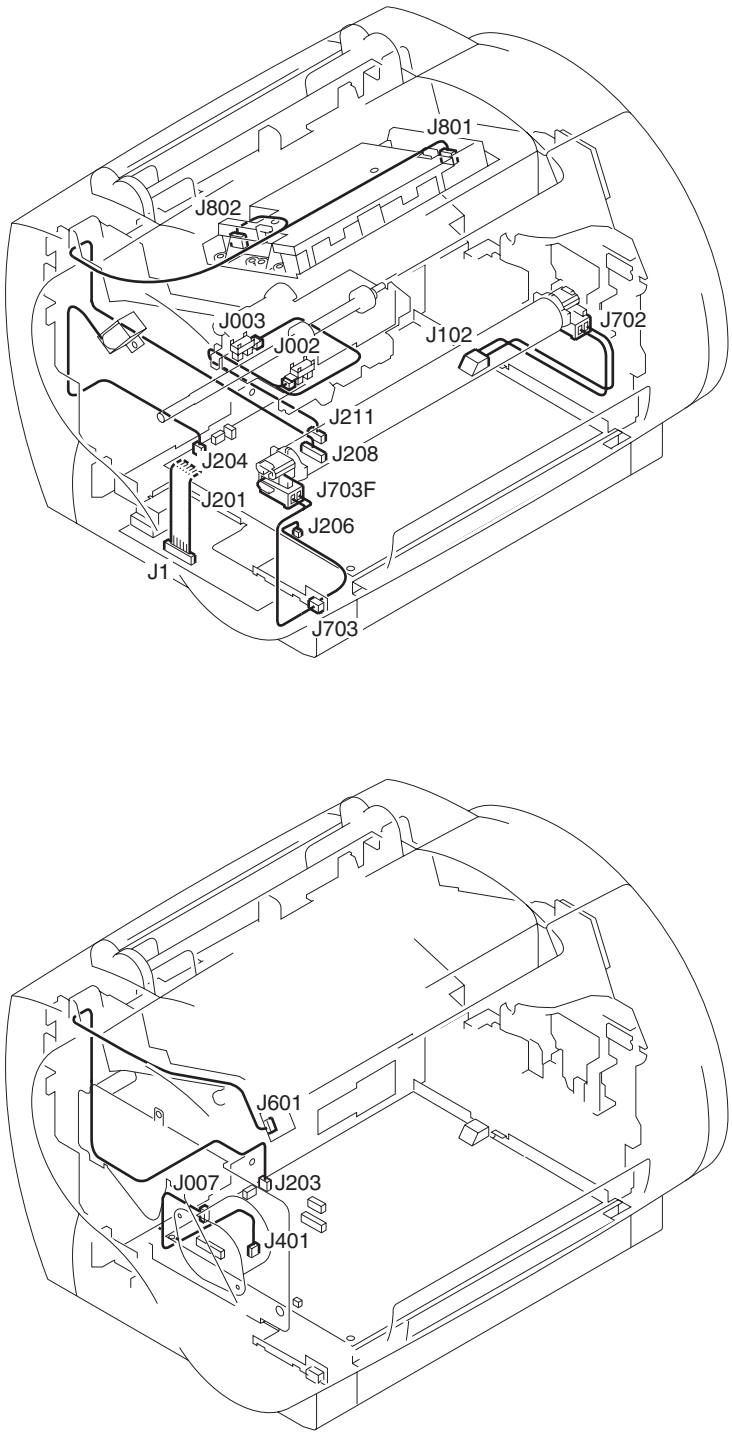
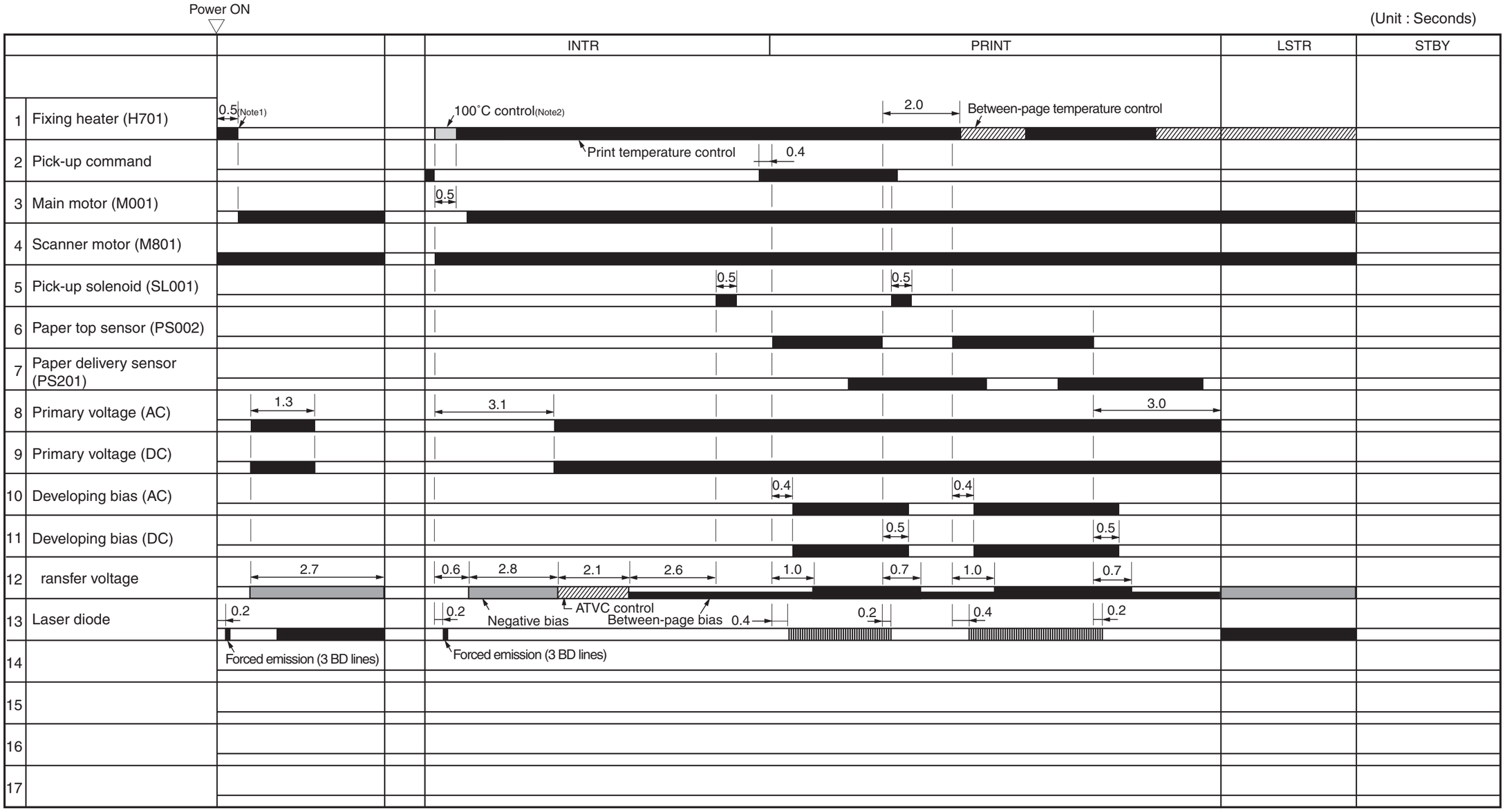


Figure 4-9-1

APPENDIX

I. GENERAL TIMING CHART

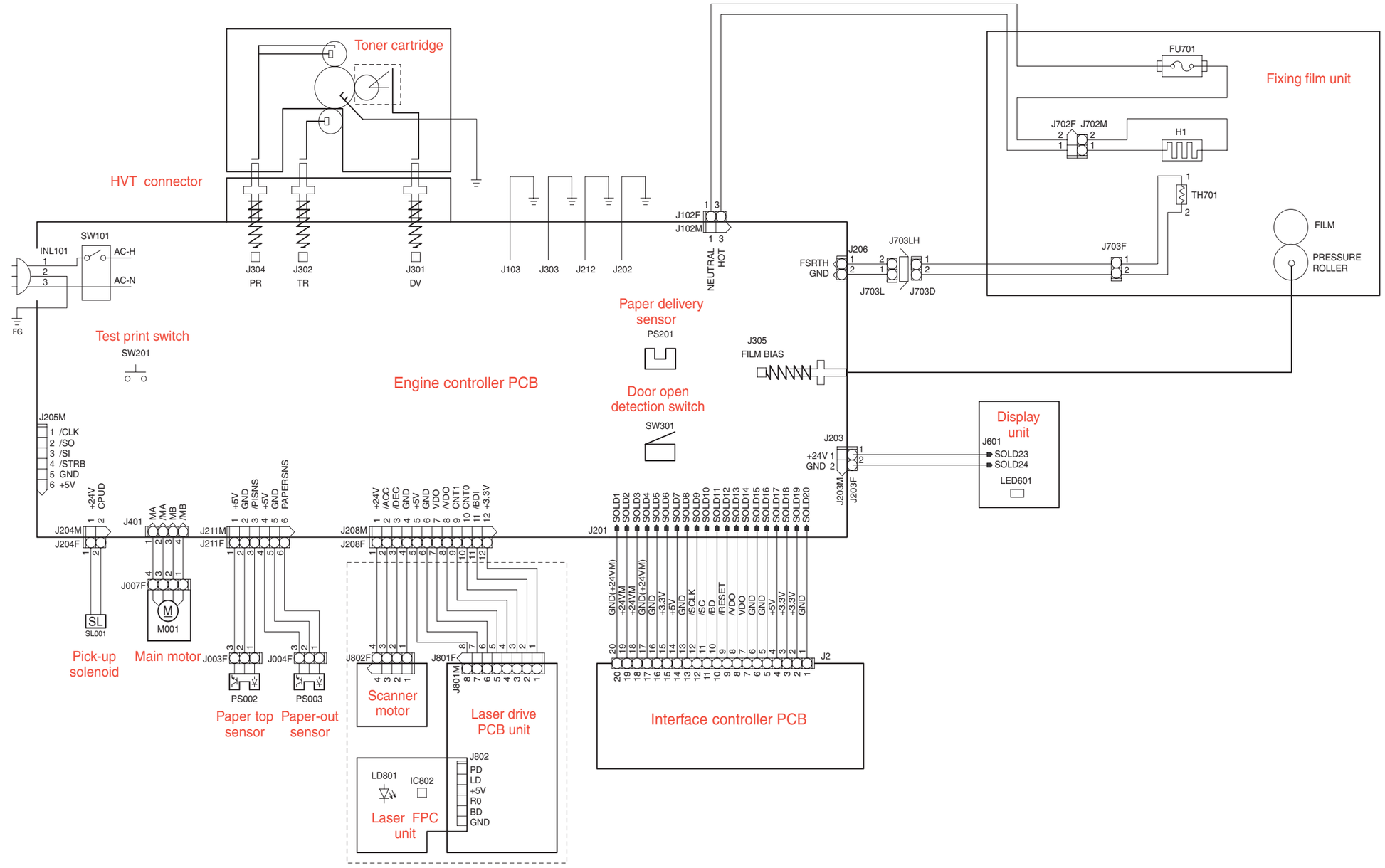
A. Timing Chart for Printing Two A4-size Sheet Continuously



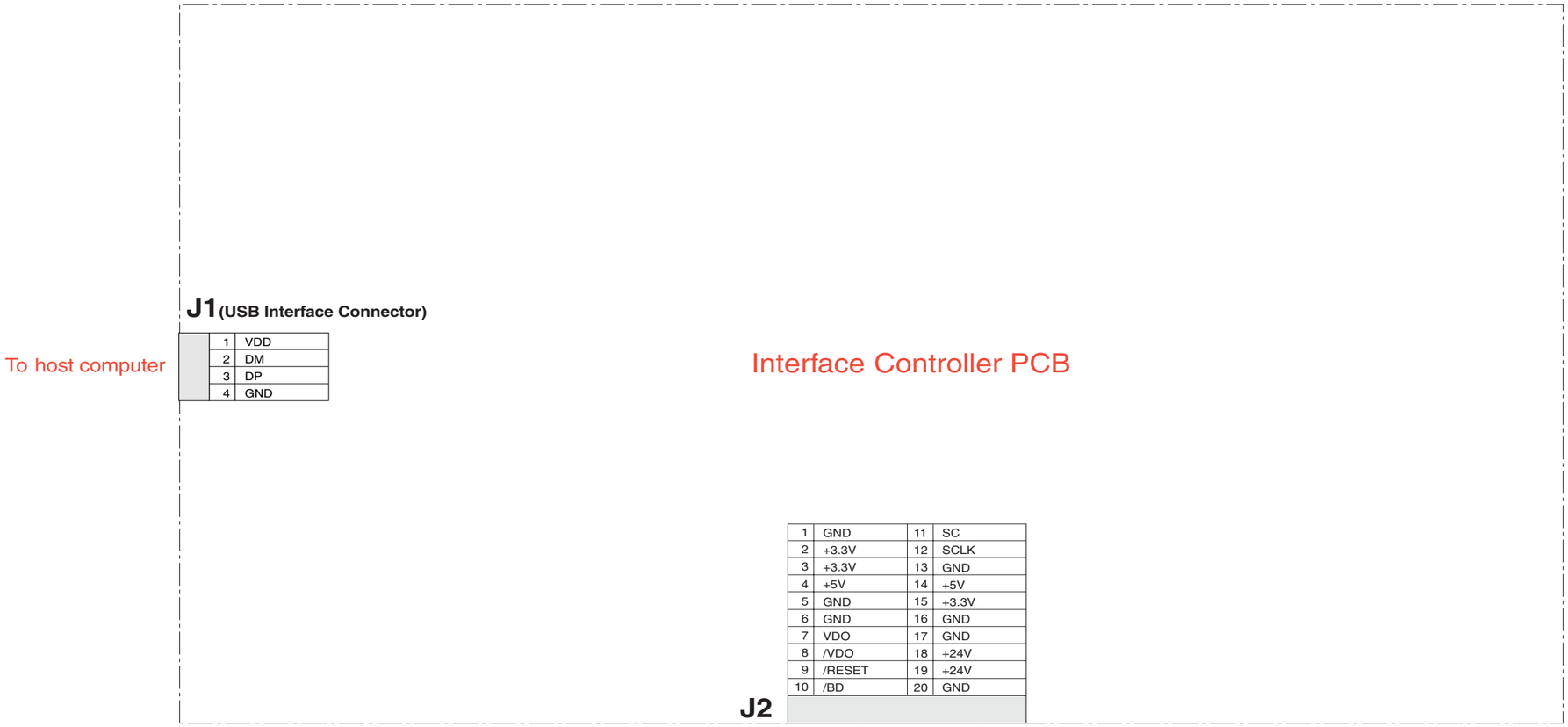
Note1 :100˚C control is not executed when thermistor temperature is already 100˚C.
Note2 :The heater is turned OFFwhen the thermistor temperature reaches 100˚C.

II. GENERAL CIRCUIT DIAGRAM

A. Engine Controller PCB



B. Interface Controller PCB



III. LIST OF SIGNALS

A. Engine Controller

Connector	Pin	Abbreviation	I/O	Logic	Signal name
J102	1	NEUTRAL	I		AC power input
	2	HOT	I		AC power input
J201	1	GND			
	2	+24VM			
	3	+24VM			
	4	GND			
	5	GND			
	6	3.3V			
	7	5V			
	8	GND			
	9	SCLK	I	L	SERIAL CLOCK signal
	10	/SC	I/O	H	STATUS COMMAND signal
	11	/BD	O	L	BEAM DETECTION signal
	12	/RESET	O	L	RESET signal
	13	/VDO	I	L	VIDEO signal
	14	VDO	I	L	VIDEO signal
	15	GND			
	16	GND			
	17	5V			
	18	3.3V			
	19	3.3V			
	20	GND			
J203	1	+24V			
	2	GND			
J204	1	+24V			
	2	CPUD	O	H	PICK-UP SOLENOID DRIVE signal
J205	1	/CLK			
	2	/SO			
	3	SI			
	4	/STRB			
	5	GND			
	6	+5V			
J206	1	FSRTH	I		FIXING HEATER TEMPERATURE DETECT signal
	2	GND			
J208	1	+24V			
	2	/ACC	O	L	SCANNER ACCELERATION signal
	3	/DEC	O	L	SCANNER ACCELERATION signal
	4	GND			
	5	+5V			
	6	GND			
	7	VDO	O	L	VIDEO signal
	8	/VDO	O	L	VIDEO signal
	9	CONT1	O	H	LASER CONTROL signal
	10	CONT0	O	H	LASER CONTROL signal

Connector	Pin	Abbreviation	I/O	Logic	Signal name
J208	11	/BDI	I	L	BD INPUT signal
	12	+3.3V			
J211	1	+5V			
	2	GND			
	3	/PISNS	I	L	PAPER PICK-UP SENSOR signal
	4	+5V			
	5	GND			
	6	PAPERSNS	I	H	PAPER-OUT SENSOR signal
J301		DV	O	L	DEVELOPING HIGH-VOLTAGE DRIVE signal
J302		TR	O	L	TRANSFER HIGH-VOLTAGE DRIVE signal
J303		GND			
J304		PR	O	L	PRIMARY CHARGING HIGH-VOLTAGE DRIVE signal
J401	1	/MB	O	H	MAIN MOTOR DRIVE signal
	2	MB	O	H	MAIN MOTOR DRIVE signal
	3	/MA	O	H	MAIN MOTOR DRIVE signal
	4	MA	O	H	MAIN MOTOR DRIVE signal

IV. MESSAGES TABLE

A. Message List

Status or error messages of the printer are displayed on a computer screen, as the printer is not equipped with a status display. This section will describe the messages, and their contents and procedures displayed on the computer screen. For the Service Calls, see Chapter 4.

B. Status Window

CAPT displays the printing environment and printing status on the status window. On the status window, messages are indicated in the Message area depending on the following four conditions:

- Idling Status
- Printing Status
- Status Not Available
- Error Status

Also, the descriptions and procedures for the messages are displayed in the Error message area. For the details of the status window, refer to users guide.

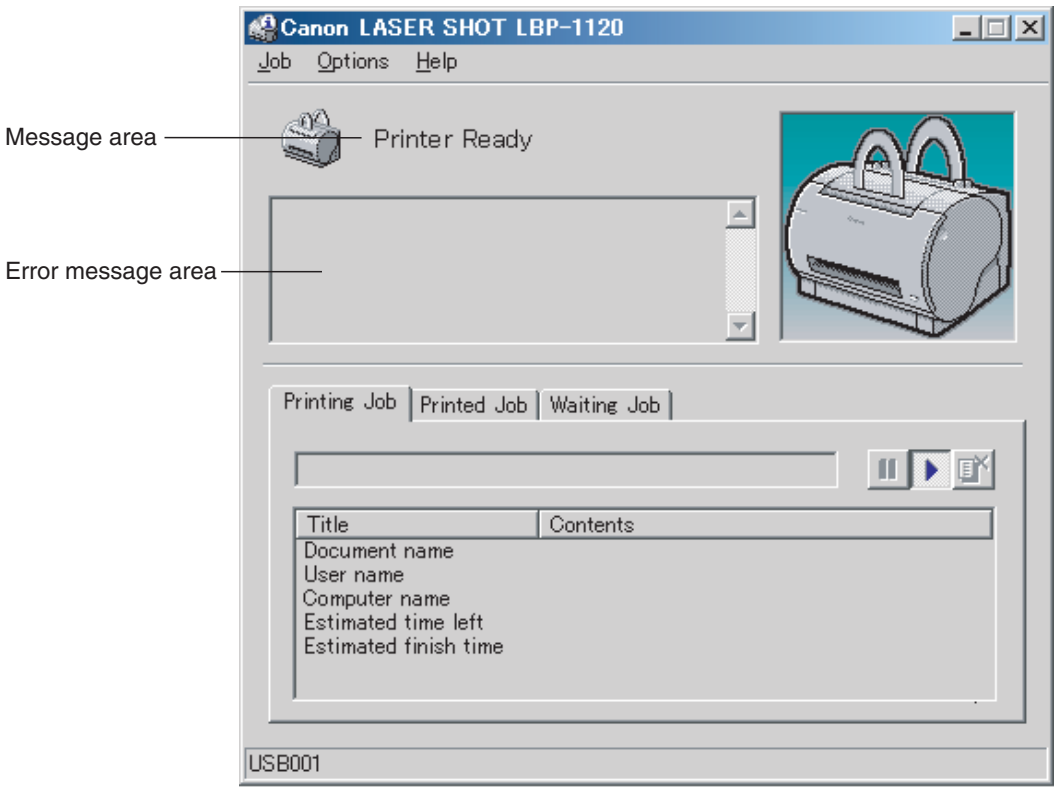


Figure A-4-1

1. Idling status

Indicates the printer contains no print jobs, and no problems for the printing operation.
The following three messages are indicated for the idling status:

Message area: Printer Ready
Error message area: None
Content: The printer is ready to print.

Message area: Printing Completed
Error message area: None
Content: The printer has completed the print job.

Message area: Printing Stopped
Error message area: None
Content: The printer has stopped the printing operation.

2. Printing status

Indicates the printer contains printing jobs and has no problems for the printing operation.
The following four messages are indicated for the printing status:

Message area: Printing
Error message area: None
Content: The printer is printing.

Message area: Printing Paused
Error message area: None
Content: The printer has stopped the printing operation and paused, because the Pause Job button is clicked during printing.

Message area: Stopping
Error message area: None
Content: The printer has stopped the printing operation, because the Delete Job button is clicked during printing.

Message area: Cleaning
Error message area: Now printing a cleaning page. Please wait a moment.
Content: The printer is printing a cleaning page.

3. Status Not Available

Indicates the printer information is not available.
The following three messages are indicated for the Status Not Available.

Message area: Status Not Available
Error message area: The printer is connected to a port of an unsupported type.
Content: The printer is connected as a local printer, and the port is not supported (FILE, LPT1.DOS, etc.).
Message area: Check Print Server
Error message area: The printer server is down or the server status window is not active.
Content: The printer is connected as a network printer, and the status window on the server side has not been started up.

Message area: Getting status
Error message area: Please wait a moment
Content: The printer has not received the port status, as the local port to which the printer is connected has just been switched from another printer.

4. Error status

Indicates errors have occurred on the printer.

When multiple errors occur, an error with the highest priority will be indicated first. When the first error is cleared, then an error with the second high priority will be indicated.

When an error occurs and then is cancelled in the middle of printing, the printer will resume printing on the on-going page.

The following describes the messages for the Status Not Available. The messages are listed from the higher priority to lower priority.

Message area: Port Busy
Error message area: The port is being used by another device.
Content: The port is being used by another device.
Action: Check the port whether the correct printer is connected to it. If not, connect the correct printer to the port.

Message area: Check Printer/Cable
Error message area: Check the following. Is the printer switched on? Is the printer cable connected?
Content: The printer has become incommunicable during printing.
Action: Check the printer by following the instructions indicated in the Error message area, and perform the trouble shooting.

Message area: Incompatible Printer
Error message area: The wrong printer is connected.
Content: The printer is not LBP-1120.
Action: When you use a printer other than LBP-1120, make sure to switch to the driver to which you are to connect.

Message area: Clear Paper Jam
Error message area: 1.Open cover 2.Remove toner cartridge 3.Remove jammed paper
Content: A paper jam has occurred in the printer.
Action: Follow the instructions indicated in the Error message area.

Message area: Clear Paper Jam
Error message area: 4.Replace toner cartridge 5.Close cover
Content: A jam has occurred and then the cartridge cover has been opened.
Action: Follow the instructions indicated in the Error message area.

Message area: Close Printer Cover
Error message area: None
Content: The cartridge cover is open.
Action: Close the cartridge cover.

Message area: Check Toner Cartridge
Error message area: None
Content: The toner cartridge is not present in the printer. Or, the cartridge is not installed correctly.
Action: Set the cartridge correctly.

Message area: Change paper to xxx
Error message area: Change paper to xxx or force to print on yyy.
Content: The paper to be printed (yyy), recognized by the driver, differs from the specified paper (xxx).
Action: Switching the paper to xxx causes the printer to automatically resume printing. Or, clicking the Resume Job button causes the printer to resume printing with the present paper.

Message area: Add xxx Paper
Error message area: No paper loaded in printer
Content: Print paper is not set in the printer.
Action: Set print paper in the printer.

Message area: Printing Failed
Error message area: Data transfer to the printer was too late or a data transfer error occurred. Perform the following. 1.Discard last printed page. 2.Resume printing.
Content: Data transfer to the printer was too late. Or, the printer cable is disconnected or the port is connected to another printer during printing.
Action: If you follow the instructions indicated in the Error message area, the printer will print with lower resolution.

Message area: Insufficient Memory
Error message area: Quit all unnecessary applications running on the machine to which the printer is connected.
Content: The printer cannot obtain enough work memory for the language monitor.
Action: Follow the instructions indicated in the Error message area.

Message area: Service Error
Error message area: Printer Error. Contact the Shop the Printer Was Bought From.
Content: A service error has occurred in the printer engine.
Action: Refer to Chapter 4 "Troubleshooting."

Prepared by
Office Imaging Products Device Quality Assurance Center
CANON INC.
Printed in Japan

REVISION 0 (JULY. 2002) [30359]

5-1, Hakusan 7-chome, Toride-shi, Ibaraki 302-8501 Japan

This publication is
printed on 100%
reprocessed paper.

Canon

PRINTED IN JAPAN (IMPRIME AU JAPON) XXXXxxx.XX-1 CANON INC.