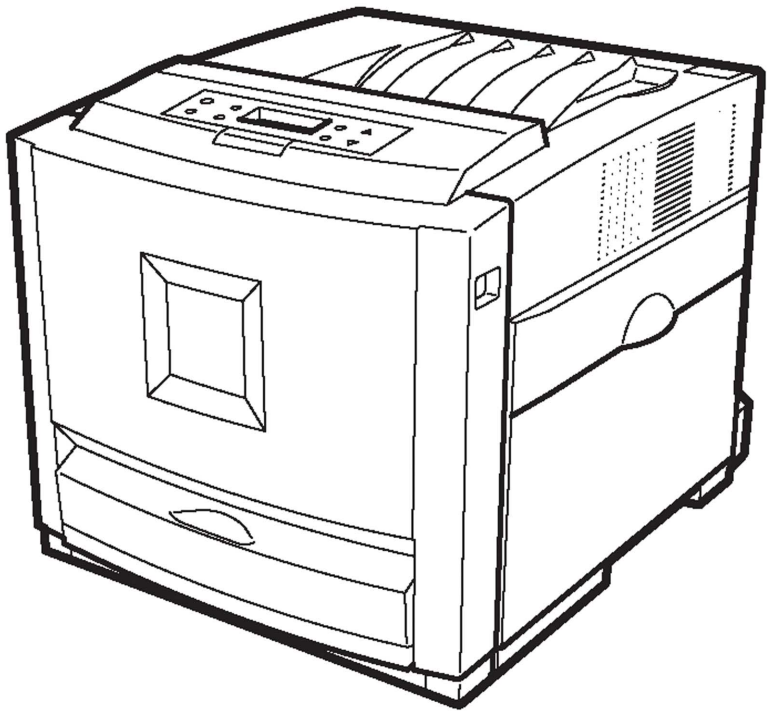
Gestetner LANIER RICOH savin



G081/G092

SERVICE MANUAL

001481MIU

RICOH GROUP COMPANIES

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SERVICE MANUAL

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Ricoh Corporation

LEGEND

PRODUCT CODE	COMPANY			
	GESTETNER	LANIER	RICOH	SAVIN
G081	C7116	LP020c	CL3000	CLP1620
G092	–	–	–	–

DOCUMENTATION HISTORY

REV. NO.	DATE	COMMENTS
*	2/2003	Original Printing

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PAPER FEED UNIT TYPE 3000 G342

SEE SECTION G342 FOR DETAILED TABLE OF CONTENTS

⚠IMPORTANT SAFETY NOTICES

PREVENTION OF PHYSICAL INJURY

1. Before disassembling or assembling parts of the copier and peripherals, make sure that the printer power cord is unplugged.
2. The wall outlet should be near the printer and easily accessible.
3. Note that some components of the printer and the paper tray unit are supplied with electrical voltage even if the main power switch is turned off.
4. If any adjustment or operation check has to be made with exterior covers off or open while the main switch is turned on, keep hands away from electrified or mechanically driven components.
5. The inside and the metal parts of the fusing unit become extremely hot while the printer is operating. Be careful to avoid touching those components with your bare hands.

HEALTH SAFETY CONDITIONS

Toner, including monocomponent toner, and developer are non-toxic, but if you get either of them in your eyes by accident, it may cause temporary eye discomfort. Try to remove with eye drops or flush with water as first aid. If unsuccessful, get medical attention.

OBSERVANCE OF ELECTRICAL SAFETY STANDARDS

1. The printer and its peripherals must be installed and maintained by a customer service representative who has completed the training course on the appropriate models.
2. The NVRAM module (option) installed on the controller has a lithium battery which can explode if replaced incorrectly. Replace the NVRAM only with an identical one. The manufacturer recommends replacing the entire NVRAM. Do not recharge or burn this battery. Used NVRAM must be handled in accordance with local regulations.

SAFETY AND ECOLOGICAL NOTES FOR DISPOSAL

1. Do not incinerate toner bottles or used toner. Toner dust may ignite suddenly when exposed to an open flame.
2. Dispose of or recycle as required, used toner, developer, and organic photoconductors in accordance with local regulations. (These are non-toxic supplies.)
3. Dispose of or recycle as required, replaced parts in accordance with local regulations.

LASER SAFETY

The Center for Devices and Radiological Health (CDRH) prohibits the repair of laser-based optical units in the field. The optical housing unit can only be repaired in a factory or at a location with the requisite equipment. The laser subsystem is replaceable in the field by a qualified Customer Engineer. The laser chassis is not repairable in the field. Customer engineers are therefore directed to return all chassis and laser subsystems to the factory or service depot when replacement of the optical subsystem is required.

⚠WARNING

Use of controls, or adjustment, or performance of procedures other than those specified in this manual may result in hazardous radiation exposure.

⚠WARNING

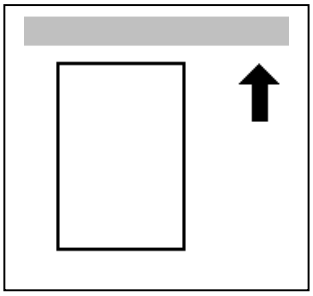
WARNING: Turn off the main switch before attempting any of the procedures in the Laser Unit section. Laser beams can seriously damage your eyes.

CAUTION MARKING:

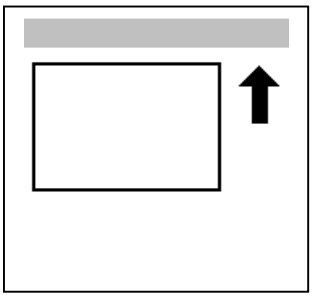
Conventions in this Manual

This manual uses several symbols.

Symbol	What it means
☛	Refer to section number
CT	See Core Tech Manual for details
	Screw
	Connector



Lengthwise, SEF (Short Edge Feed)



Sideways, LEF (Long Edge Feed)

INSTALLATION

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PREVENTIVE MAINTENANCE

TAB POSITION 2

REPLACEMENT AND ADJUSTMENT

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TAB POSITION 8

INSTALLATION

1. INSTALLATION

1.1 INSTALLATION REQUIREMENTS

1.1.1 ENVIRONMENT

1. Temperature Range : 10 °C to 32 °C (50 °F to 89.6 °F)
2. Humidity Range : 15 % to 80 % RH
3. Ambient Illumination : Less than 2,000 lux (do not expose to direct sunlight)
4. Ventilation : 3 times/hr/person
5. Avoid areas that are exposed to sudden temperature changes. This includes:
   1) Areas directly exposed to cool air from an air conditioner.
   2) Areas directly exposed to heat from a heater.
6. Do not place the machine in an area where it will be exposed to any corrosive gas (i.e. ammonia as used in a print shop).
7. Do not install the machine at any location over 2,500 m (8,125 ft.) above sea level.
8. Place the machine on a strong, level base. (Inclination on any side should be no more than 5 mm.)
9. Do not place the machine where it may be subjected to strong vibration.

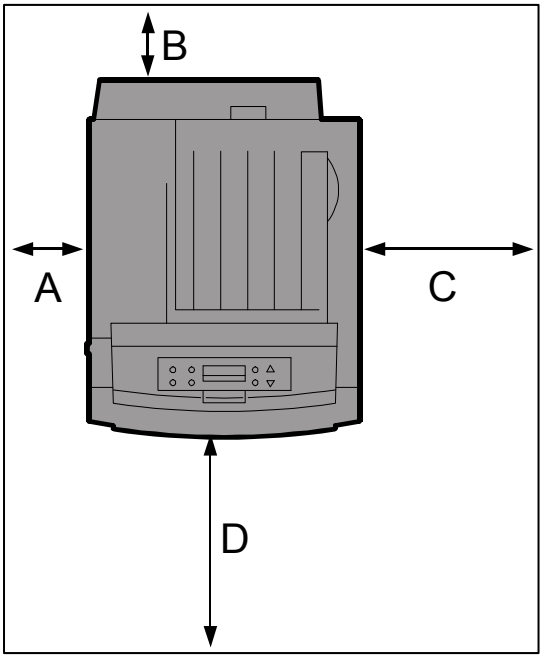
1.1.2 MACHINE LEVEL

Front to back: Within 5 mm (0.2") of level

Right to left : Within 5 mm (0.2") of level

1.1.3 MACHINE SPACE REQUIREMENT

Place the machine near the power source, providing clearance as shown.



A (left side) : Over 10 cm (4")
B (rear) : Over 10 cm (4")
C (right side) : Over 55 cm (22")
D (front) : Over 75 cm (30")

1.1.4 POWER REQUIREMENTS

⚠CAUTION

1. **Make sure the plug is firmly inserted in the outlet.**
2. **Avoid multi-wiring.**
3. **Be sure to ground the machine.**

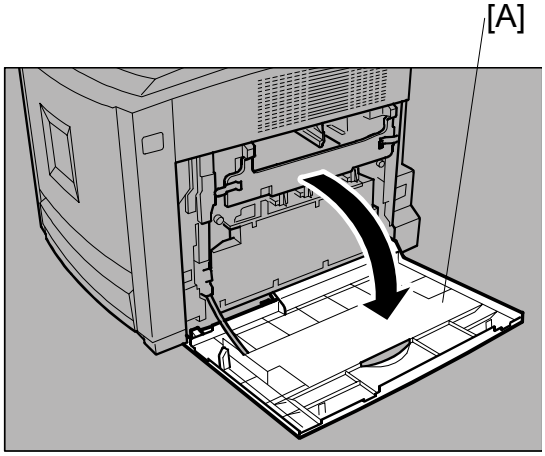
1. Input voltage level: 120 V, 60 Hz: More than 10 A
   220 V to 240 V, 50 Hz/60 Hz: More than 6 A
2. Permissible voltage fluctuation: ±10 %
3. Do not set anything on the power cord.

1.2 MACHINE INSTALLATION

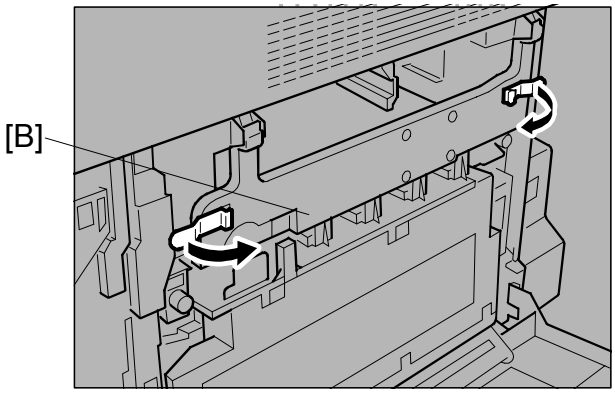
1.2.1 INSTALLING THE PHOTOCONDUCTOR UNIT & WASTE TONER BOTTLE

1. Open the right cover [A] of the printer.

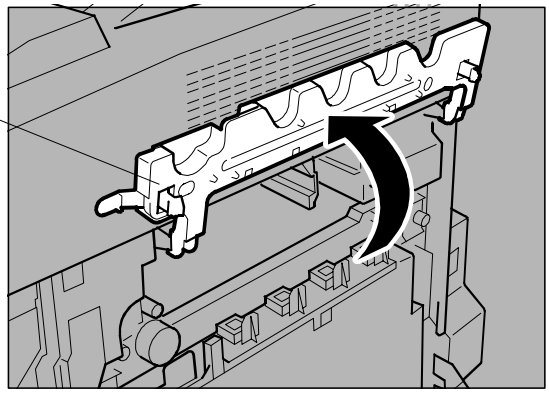
   NOTE: The machine should NOT be plugged into the power outlet during installation.



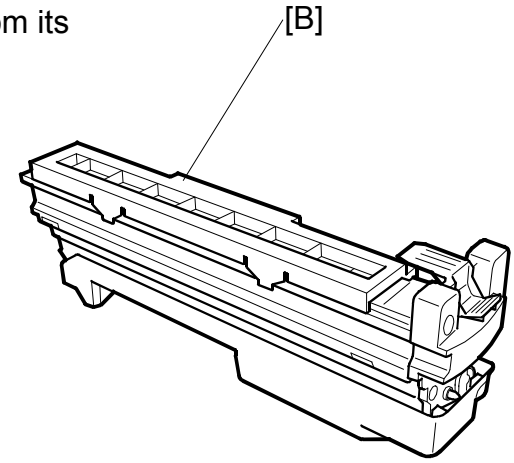
2. Pull out the green levers on the left and right that are fastening the inner cover [B].



3. Lift the inner cover [A] until it stays up.

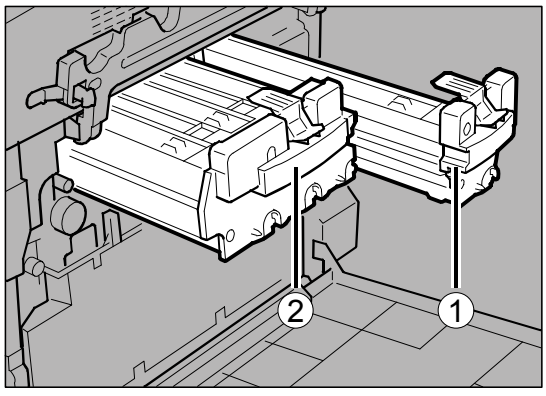


4. Remove the black photoconductor unit from its packing materials.
5. Peel off the tape surrounding the photoconductor unit, and remove the top cover [B] on the unit.
   NOTE: Do not remove the cover attached to the bottom of the photoconductor unit at this time.

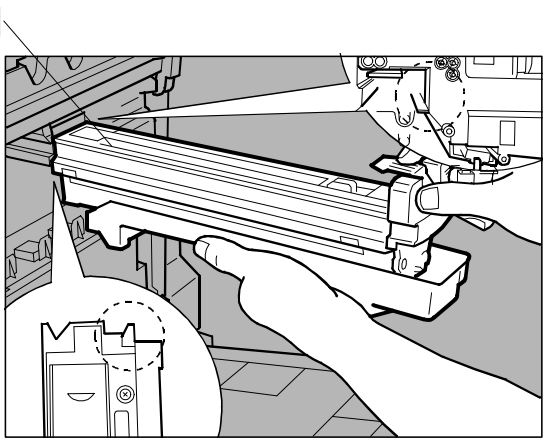


NOTE: After taking the new photoconductor unit out of the bag, immediately install it. Do not expose it to ambient light for prolonged periods.

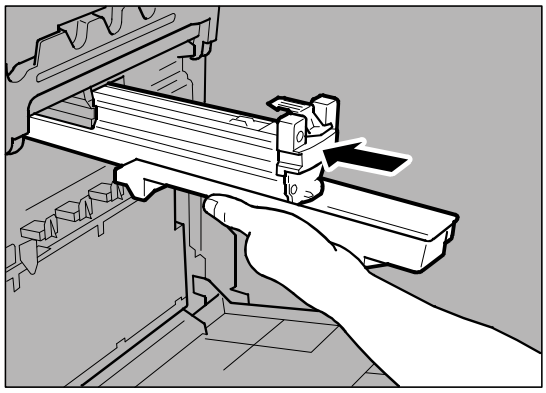
NOTE: Before proceeding with the actual installation of the development units, observe the locations for each photoconductor unit as shown in this illustration.
when ready, continue to step 6 on the following page.
① Photoconductor unit (black)
② Photoconductor unit (color)



6. While holding the photoconductor unit from the bottom cover in your left hand, match the green arrow at the tip of the photoconductor unit [A] to the rail inside the printer.
   NOTE: Make sure the green arrow fits securely on the rail before proceeding to the next step. Do not touch the surface of the OPC drum(s) with your hands.

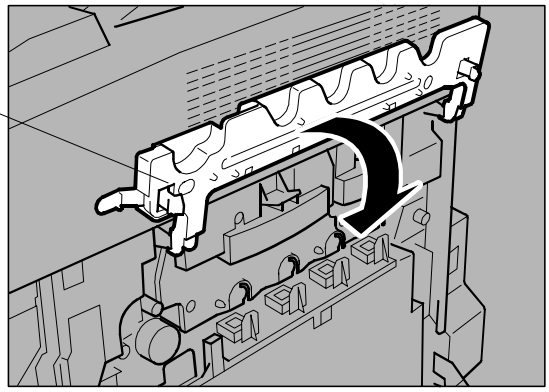


7. Slide the front of the photoconductor carefully in. Slide the unit on the cover, and then push the unit in until it stops.
   NOTE: If you do not properly attach the green arrow of the photoconductor unit securely to the rail, you may damage the photoconductor unit.

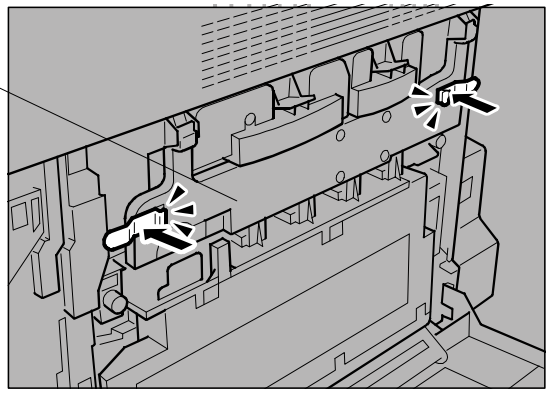


8. Repeat steps 4 through 7 to install the color photoconductor unit.

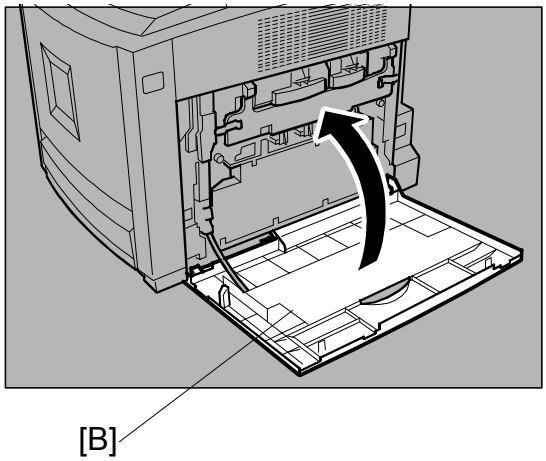
9. Lower the inner cover [B] slowly, applying even pressure.



10. Push the green lever to fasten the inner cover [A].
11. Locate and remove the Waste Toner Bottle from its shipping materials.
12. Install the Waste Toner Bottle in the appropriate location below the photoconductor units (label-side out).
13. Slide the green locking lever to the locked position.
    NOTE: Refer to the Operating Instructions Maintenance Guide, page 32, for added details.

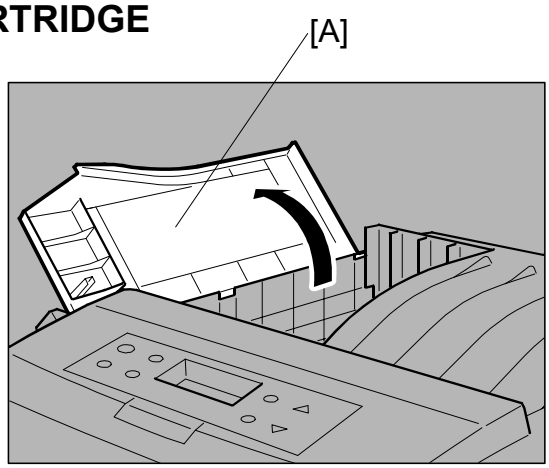


14. Close the right cover [B] of the printer slowly. The Waste Toner Bottle will automatically be pushed upwards into its proper position.
    NOTE: You may wish to save the lower photoconductor unit covers and “light-proof” photoconductor unit shipping bags to use should removal of these units become necessary for servicing.



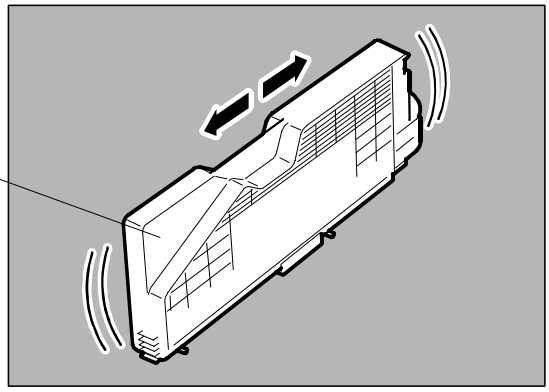
1.2.2 INSTALLING THE TONER CARTRIDGE

1. Open the upper left cover [A] of the printer.
2. Remove the packing tape and foam strips, attached to the tape, located inside.

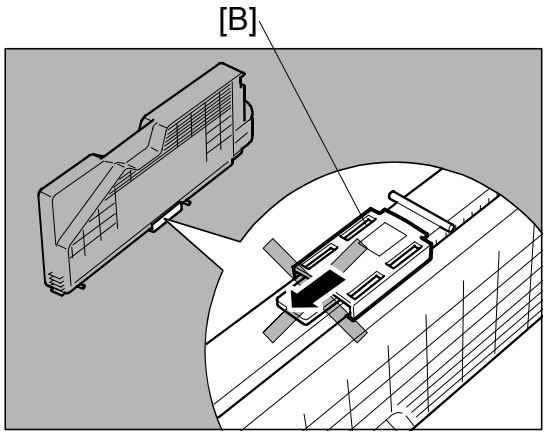


3. Locate and remove from the packing materials one of the toner cartridges. Hold the cartridge [A] horizontally as illustrated, and shake it back and forth about 10 times.

   NOTE: Be careful of any loose toner that may be present in the toner's shipping bag. If a large amount of toner is present inside the bag, check to ensure that the cartridge's shutter is properly closed.

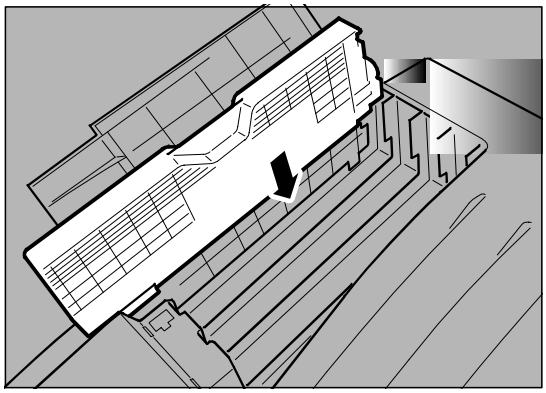


   NOTE: Do not open the shutter [B] on the bottom of the toner cartridge. Toner may spill out.

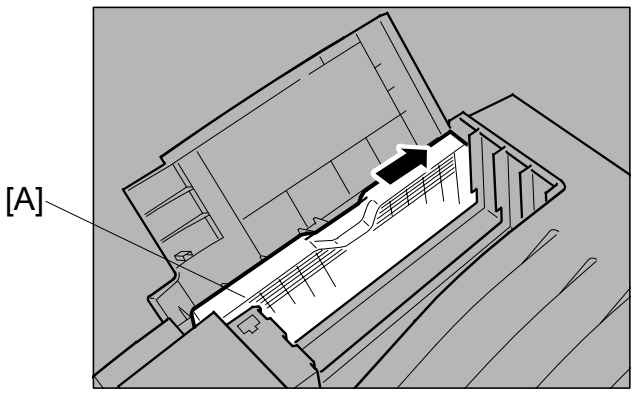


4. Check that the toner color and location are correct, and then insert the toner cartridge vertically and slowly.

   NOTE: Reading the labels on the printer, you can check the location for each cartridge.

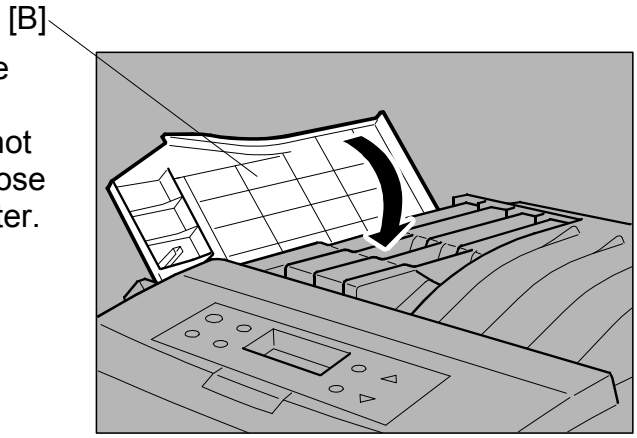


5. Push the toner cartridge [A] in the direction of the arrow to fasten the toner cartridge.



6. Repeat steps 2 through 5 to install the other cartridges.

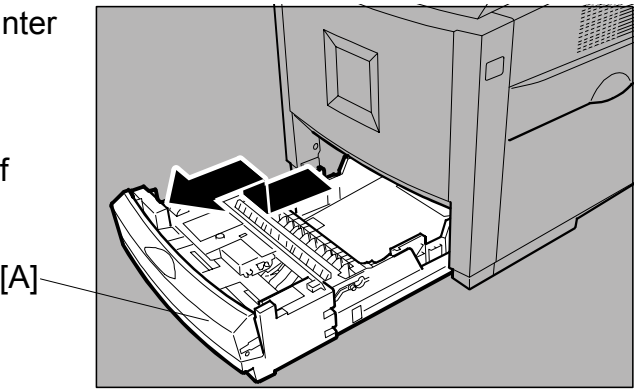
7. Close the upper left cover [B] of the printer.
   NOTE: If the toner cartridges are not set properly, you cannot close the upper cover of the printer.



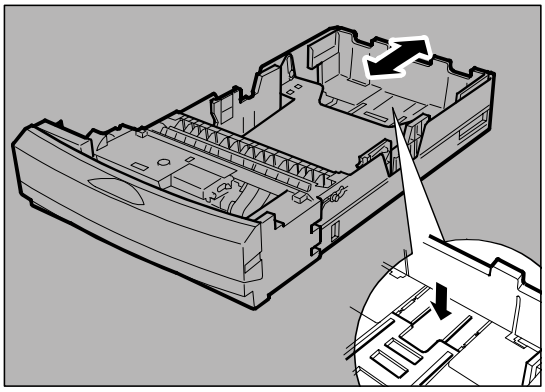
1.2.3 LOADING PAPER

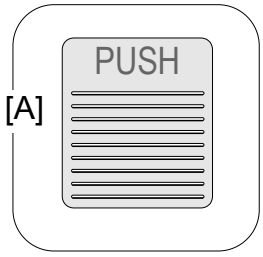
CAUTION: When pulling the paper tray out, be careful not to pull it strongly. Doing so may cause the tray to fall causing personal injury.

1. Pull the paper tray [A] out of the printer until it stops. Then tilt it upwards slightly, and remove it completely. Place it on a flat surface.
   NOTE: You cannot pull tray 1 out if the by-pass tray is open.

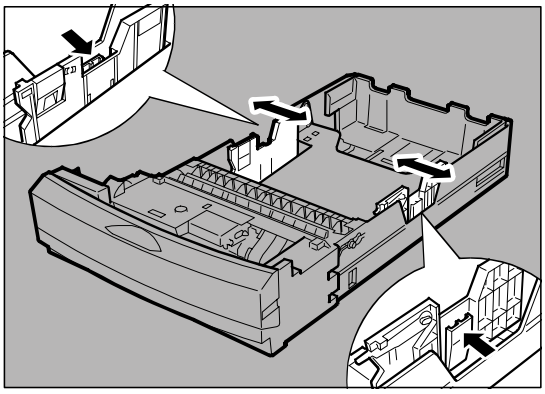


2. Remove any and all shipping tape and shipping materials.
3. Press the PUSH sign [A], and adjust the rear guide to the paper size you want to load.



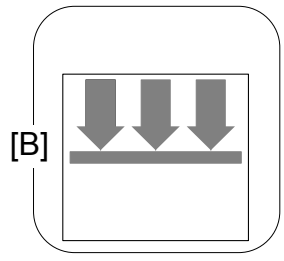


4. Adjust the side guides to the paper size you want to load.



5. Load paper into the paper tray with the paper manufacture's indicated print-side up.

   NOTE: 1) Make sure that the top of the stack does not exceed the limit mark [B] inside the tray.
   2) To avoid paper misfeeds, the front and side guides should be set exactly to the paper size.
   3) Do not load different kinds of paper in the tray.



6. Slide the paper tray completely into the printer.
   NOTE: Be sure to insert the paper tray correctly. Otherwise, misfeeds may occur, or the front cover may touch the paper tray.
   Also remember to only use quality and "fresh" laser paper that is suitable for color laser printing. Doing this will help ensure quality and consistent color print results.

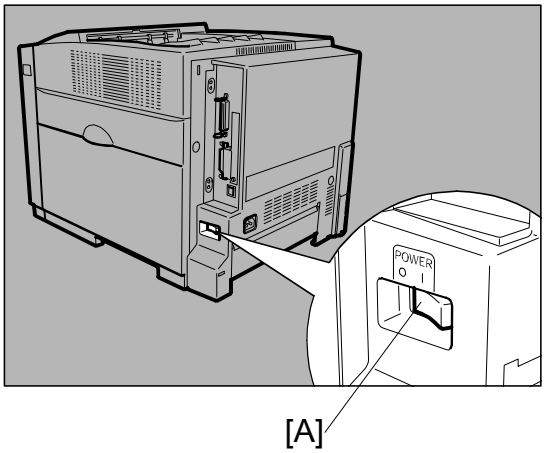
1.2.4 CONNECTING THE POWER CORD

⚠CAUTION

1. **It is dangerous to handle the plug with wet hands. Doing this may result in receiving an electric shock.**
2. **When you pull the plug out of the socket, grip the plug, not the cord, to avoid damaging the cord and causing a fire or an electric shock.**

NOTE: 1) Be sure to firmly connect the power plug to the socket outlet.
2) The printer must be off when you plug-in or unplug the power cord.

1. Confirm that the printer's power switch [A] is off.

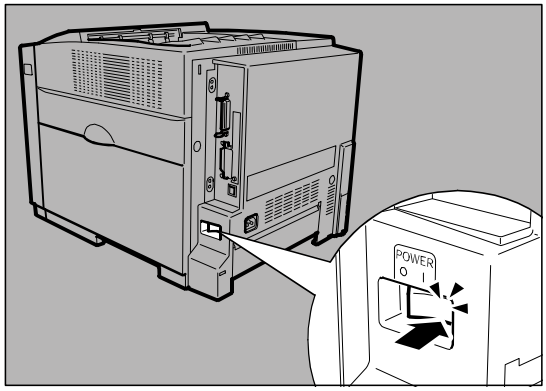


2. Locate and remove the power cord from the machines packing materials.
3. Attach the power cord to the socket on the back of the printer.
4. Plug the other end securely into the socket outlet.

1.2.5 SELECTING THE PANEL DISPLAY LANGUAGE

NOTE: 1) You can select one of the following languages (the default is English): English, German, French, Italian, Dutch, Swedish, Norwegian, Danish, Spanish, Finnish, Portuguese, Czech, Polish or Hungarian.
2) If you use the English panel display, it is not necessary to do the following procedure.

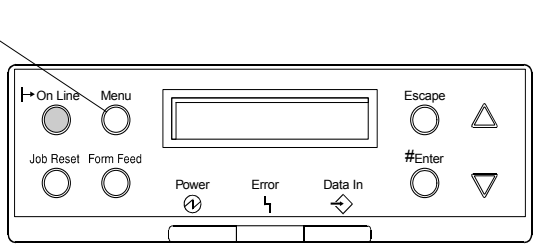
1. Turn on the printer.



NOTE: After the machine warms up, "Ready" appears on the panel display.

```
Ready
```

2. Press the Menu key [A].



NOTE: The message appears on the panel display.

```
Menu:
 Paper Input
```

3. Press the "▲" or "▼" key to display "Language."

```
Menu:
 Language
```

4. Press the Enter key. The message appears on the panel display.
   NOTE: English is the default

```
Language:
*English
```

5. Press the "▲" or "▼" key to display the language you want to select.

6. Press the Enter key to select. An asterisk (*) will be displayed next to the selected language.

```
Menu:
 Language
```

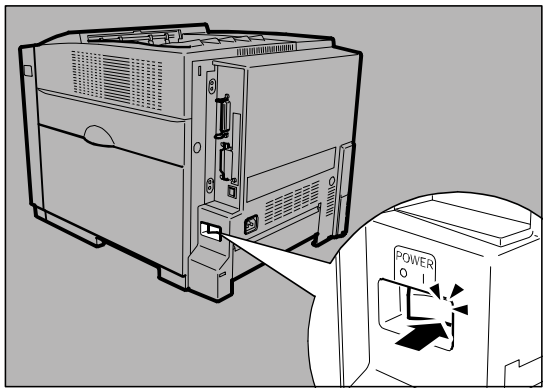
7. Press the On Line key or "Menu" key. "Ready" (in the language you selected) appears on the panel display.

```
Ready
```

1.2.6 PRINTING THE TEST PAGE

NOTE: You can check if the printer works properly by printing a test page such as the configuration page. However, you cannot check the connection between the printer and the computer by printing the test page.

1. Turn on the printer.



NOTE: After the machine warms up, “Ready” appears on the panel display.

```
Ready
```

2. Press the Menu key.

```
Menu:
 Paper Input
```

3. Press the “▲” or “▼” key to display "List/Test Print."

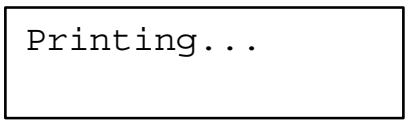
```
Language:
 List/Test Print
```

4. Press the Enter key. The message appears on the panel display.

```
List/Test Print:
 Config. Page
```

5. Confirm that “Config. Page” is on the display, and then press the Enter key.

6. The test printing starts shortly after.



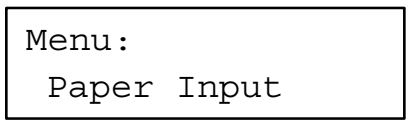
NOTE: If you cannot complete the test print, check if an error message appears on the panel display. For more information about error messages, see Section 5 "Troubleshooting" in the Operating Instructions Maintenance Guide and Section 4 in this support documentation.

7. Press the “On Line” key. “Ready” appears on the panel display.

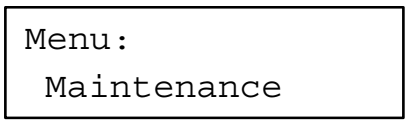
8. Turn off the printer's power switch.
9. At this point in the installation, you may wish to check and ensure that the firmware level is current. The firmware version is indicated on the top (third item under “System Reference”) on the Configuration page.
   Refer to the “Firmware Update Procedure” located in Section 5 of this manual. Update the firmware if necessary. After completing the firmware update return to this section and continue.
10. Next press the “▲" or “▼" key to display the “Color Demo Page.” Press the Enter key. Check to ensure that this page appears as expected (all colors present)

1.2.7 ADJUSTING THE IMAGE DENSITY

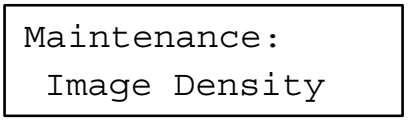
1. Press the “Menu” key. “Menu” appears on the panel display.



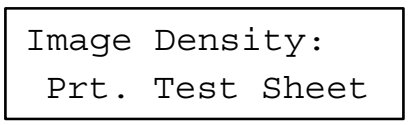
2. Press the “▲” or “▼” key to display "Maintenance," then press the Enter key.



3. Press the “▲” or “▼” key to display “Image Density”, then press the Enter key.



NOTE: The message appears on the panel display.



4. Press the Enter key. When the message appears on the panel display, press the Enter key.

```
Prt. Test Sheet
 Press # to Start
```

NOTE: The test printing will start shortly after.

```
Printing...
```

5. Compare the colors on the printed image density test sheet with those on the Image Density Adjusting Card.

6. Press the "▲" or "▼" key to select the color you want to adjust, then press the Enter key.

```
Image Density:
 Black
```

7. Press the "▲" or "▼" key to set the image density value, and press the Enter key. To adjust another color, repeat steps 6 and 7.

```
Black:
 (-10 +10)       0
```

NOTE: 1) You can adjust the image density from -10 to +10. Increasing the value darkens the printouts and decreasing the value lightens the printouts.
2) Pressing the "▲" or "▼" key increases or decreases the value by one.

8. Print another image density test sheet and check if the colors on the test sheet now mach those on the Image Density Adjusting Card. If they still do not match, adjust the image density again.
9. Press the On Line key. "Ready" appears on the panel display.

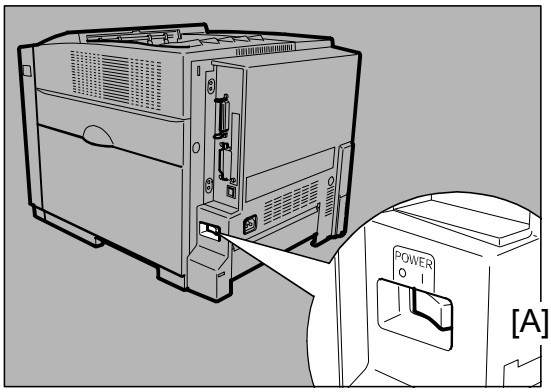
```
Ready
```

10. At this point in the installation turn to section 1.3 "Optional Unit Installation" in this manual. Perform any option installation necessary then return to this section and continue to section 1.2.8 "Connecting the Printer to a Computer" found on the following page.

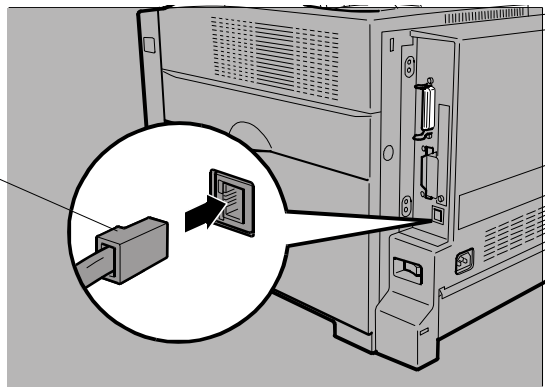
1.2.8 CONNECTING THE PRINTER TO A COMPUTER

Connecting the printer to a computer using a network interface cable

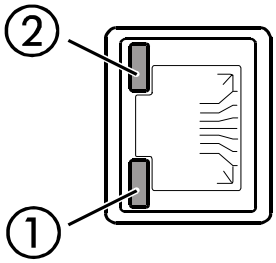
1. Confirm that the printer's power switch [A] is off.



2. Connect the network interface cable [B] to the Ethernet port on the back of the printer.



3. Connect the other end of the cable to the network (for example, to a hub).
4. Turn on the printer.
5. Check the LEDs on the Ethernet port.
   ① Lights when 100 BASE-TX is in use and does not light when 10 BASE-T is in use
   ② Lights when the printer is securely connected to the network

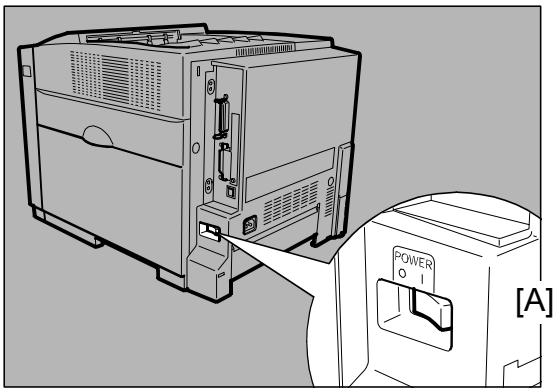


6. Go to section 1.2.9.

Connecting the printer to a computer using a parallel cable

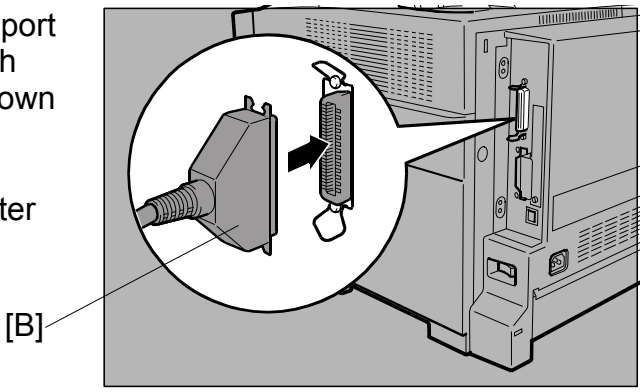
NOTE: 1) The parallel cable is not provided with the printer.
2) You must provide the appropriate parallel cable for the computer that you are using.
3) The printer's parallel connection is a standard bi-directional interface. It requires a standard 36-pin parallel cable compliant with IEEE1284 and the parallel port on the computer.
4) To avoid electrical interference, use a shielded cable.
5) Do not use a parallel cable longer than 2.5 meters (8.2 feet).

1. Confirm that the printer's power switch [A] is off.



2. Turn the computer off.

3. Attach the parallel cable [B] to the port of the printer. Secure the cable with the metal fittings (bale-clips) as shown in the illustration.
NOTE: The Voltage rating of the parallel port for the computer is: Max. DC 5 V.



4. Attach the other end of the parallel cable to the parallel port of the computer. Secure the cable. (2 screws)
5. Turn on the printer and the computer.
6. Proceed to 1.2.10.

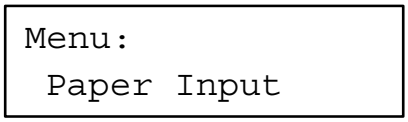
1.2.9 CONFIGURING THE PRINTER FOR THE NETWORK

When using the printer in a network environment, you must configure the printer settings using the printer's operation panel. The following list is the items you can set and their default settings.

IP Address	011.022.033.044
Subnet Mask	000.000.000.000
Gateway Address	000.000.000.000
Network Boot	None
Frame Type (NW)	Auto
Active Protocol	TCP/IP
Ethernet	Auto

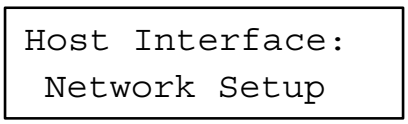
The procedure below shows an example to specify TCP/IP as the active protocol.

1. Press the Menu key. "Menu" appears on the panel display.

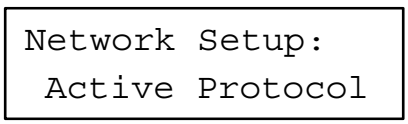


2. Press the "▲" or "▼" key to display "Host Interface," and then press the Enter key. The interface setting menu appears.

3. Start the protocol for use.
   1) Press the "▲" or "▼" key to display "Network Setup," and then press the Enter key.



   2) Press the "▲" or "▼" key to display "Active Protocol," and then press the Enter key.



   3) Press the "▲" or "▼" key to display "TCP/IP," and then press the Enter key.

4) Press the "▲" or "▼" key to display "Active," and then press the Enter key. In about two seconds, the display returns to the "Active Protocol" setting screen.

```
TCP/IP:
 *Active
```

NOTE: * shows the current setting.

5) Set the rest of the protocols for use.
6) When all settings for the protocol are done, press the Escape key. The "Network Setup" setting screen appears.

NOTE: 1) The default settings for all of the protocols are "Active."
2) It is recommended to set all the unused protocols to "Not Active."

4. Set the IP address for the printer.

NOTE: Check the IP address with the network administrator.

1) Press the "▲" or "▼" key to display "IP Address," and then press the Enter key. The currently selected IP address appears.

```
Network Setup:
 IP Address
```

NOTE: 1) When the Enter key is pressed, the cursor moves to the next field.
2) When the "▲" or "▼" key is kept pressed for a few seconds, the value changes by 10.
3) If DHCP is assigned the IP address can not be changed. Turn DHCP off, then assign IP address.

2) Press the "▲" or "▼" key to set the value for the field.

```
IP Address:
 199.022.033.044
```

3) Press the Enter key. The cursor moves to the next field.
4) Repeat 2) and 3) to set the value for the rest of the fields.

5. Set "Subnet Mask" and "Gateway Address" by following the same procedure as for setting the IP address.

NOTE: 1) Check the subnet mask value with the network administrator.
2) The gateway address is the address of the host or router that acts as a gateway when interacting with work stations in another network. Check the value with the network administrator.
3) If you are not sure of the addresses, do not set them.

6. When using DHCP with TCP/IP protocol, set network boot, as follows.
   1) From within Network Setups press the "▲" or "▼" key to display to display "DHCP," and then press the Enter key. In about two seconds, the display returns to the "Network Setup" setting screen.

```
Network Setup:
*DHCP
```

   NOTE: * shows the current setting.
   Depending upon the firmware this setting may be located under "Network Boot."

7. When all of the settings are done, press the On Line key. "Ready" appears on the panel display.

```
Ready
```

8. Print the configuration page to confirm the settings made. See 1.2.6 for printing the configuration page.

1.2.10 INSTALLING THE PRINTER DRIVERS AND UTILITIES

Install the printer drivers and software using the CD-ROM labeled “Printer Drivers and Utilities.” The supported operating systems are Windows 95/98/Me, Windows 2000, Windows XP and Windows NT 4.0. (The procedure below may vary slightly from the procedure you experience based on software version.)

Click Quick Install to install PCL5c and RPCS printer drivers.

When the TCP/IP protocol is used, SmartNet-Monitor for Client will be installed as well. When using with TCP/IP protocol, confirm the following:

- The printer is connected to a network with the network interface cable.
- TCP/IP protocol is set up.
- The IP address is set for the printer and the computer.

To install the PostScript3 printer driver, click the PostScript3 printer driver button. For more information about the PostScript3 printer driver, see the Administrator Reference or the Client Reference manual included on the CD-ROM labeled “Operating Instructions”.

1. Insert the CD-ROM labeled “Printer Drivers and Utilities” into the CD-ROM drive. Auto Run will start the installer.
2. Select a language, then click [OK]. The following languages are available: Cestina (Czech), Dansk (Danish), Deutsch (German), English (English), Espanol (Spanish), Francais (French), Italiano (Italian), Magyar (Hungarian), Nederlands (Dutch), Norsk (Norwegian), Polski (Polish), Portugues (Portuguese), Suomi (Finnish), Svenska (Swedish). The default interface language is English.
3. Select Quick Install. The software license agreement appears in the License Agreement dialog box.
4. After reading the contents, click “I accept the agreement”, then click Next.
5. In the “Select Printer” dialog box, select the printer model you want to install.

   NOTE: 1) For a network connection with TCP/IP, select the printer whose IP address is displayed in “Connect to”.
   2) For parallel connection, select the printer whose printer port is displayed in “Connect to”.

6. Click [Install]. When finished, the Installation Completion dialog box appears.

   NOTE: 1) Under Windows 2000, the Digital Signature Not Found dialog box may appear when installing the printer driver. In this case, click Yes to continue the installation.
   2) Under Windows XP, the Hardware Installation dialog box may appear. In this case, click Continue Anyway to continue the installation.

7. Click [Finish].
   NOTE: A message telling you to restart the computer may appear. In this case, restart your computer to complete the installation. If no message appears, go to step 5.
8. Click Exit. The installation is now complete.

1.2.11 METER CHARGE (MACHINE INSTALLATION)

If the customer has a service contract, change the settings of the following SP modes depending on the contract type.

Item	SP No.	Function	Default
Meter charge	SP5-930-1	Specifies whether the meter charge mode is enabled or disabled. **Meter charge mode enabled:** • The Counter menu appears immediately after the Menu key is pressed. • The counter type selected by the counting method (SP5-045-1) can be displayed with the Counter menu. • The counter values can also be printed with the Counter menu. • The selected counter starts from a negative number. • The PM warning is not displayed when the replacement time arrives. **Meter charge mode disabled:** • The Counter menu is not displayed. • The total counter starts from 0.	Off
Counting method	SP5-045-1	Specifies whether the counting method used in meter charge mode is based on developments or prints. **Important:** This SP can only be done before the negative counters are reset with SP7-825-001	Developments
Fax No. setting	SP5-812-2	Programs the service station fax number. The number is printed on the counter list when the meter charge mode is selected, so that the user can fax the counter data to the service station.	
Counter reset	SP7-825-1	Resets the counters to 0. **Important:** This must be done at installation after all the above settings have been finished. The negative counters used in meter charge mode will be reset to zero.	

NOTE: 1) The default setting for this machine is meter-charge mode off.
2) The meter-charge counter cannot be reset.

1.3 OPTIONAL UNIT INSTALLATION

The following options are available for this machine. Refer to the appropriate unit's Operating Instructions (Option Setup Guide) for how to install these options.

- Paper Feed Unit Type 3000 Unit (G342)
- AD440 Duplex Unit (G343)
- Printer Hard Disk Type 3000 (G345)
- IEEE802.11b Interface Unit Type A (Wireless LAN: G628)
- IEEE1394 Interface Unit Type 4510 (G336)
- Bluetooth Interface Unit Type A (G350)
- 128 MB DIMM Memory Unit Type C (G331)
- 256 MB DIMM Memory Unit Type C (G332)
- NVRAM (User Account Enhancement Unit Type B G311)
- Ethernet LAN option for G092 (G355)

NOTE: The model G092 is not available in the U.S. market

PREVENTIVE MAINTENANCE

2. PREVENTATIVE MAINTENANCE

2.1 USER REPLACEABLE ITEMS

If the service contract requires that the user performs some of the PM, the user will replace the following items.

Item	Remarks
Toner	5K (C,M,Y,K)
PCU	13K (CMY,K)
Transfer Belt Unit	83K
Waste Toner Cartridge	36K
Fusing Unit	100K

NOTE: The transfer roller is supplied with the fusing unit.

Chart: A4 (LT), 5%
Mode: Three pages per print job
Environment: Normal temperature and humidity
Yield may change depending on circumstances and print conditions.

When the machine's default settings are used, a message is displayed when a maintenance counter reaches the value in the PM table shown on the next page.

Important: The customer must clear the maintenance counters for the above items, except the PCUs (the machine automatically detects new PCUs).

2.2 SERVICE MAINTENANCE

2.2.1 PM TABLE

The following table lists the PM items that must always be done by the technician.

NOTE: The technician may also have to do the PM listed on the previous page, if it is specified by the service contract.

Symbol C: Clean

Item	50K	EM	Remarks
Main unit			
Registration Roller	C	C	Clean with water
Paper feed unit			
Pickup Roller	C	C	Clean with water
By-pass tray			
Pickup Roller	C	C	Clean with water
Separation pad	C	C	Clean with water

NOTE: Cleaning the inside of the machine is recommended when replacing the PCUs and transfer belt unit.

2.2.2 RECOMMENDED CLEANING PROCEDURE

1. Turn off the main switch.
2. Remove the waste toner bottle.
3. Remove the PCUs.
4. Remove the transfer belt unit. Do not touch the transfer belt surface.
5. Remove the fusing unit.
6. Slide out the standard paper cassette.
7. Clean the paper path.
8. Clean all printer rollers with a dampened cloth. Never apply alcohol to the transfer roller.
9. Clean the laser unit windows with a blower brush.
10. Vacuum the interior of the printer.
11. Carefully clean the area surrounding the transfer roller.

REPLACEMENT AND ADJUSTMENT

3. REPLACEMENT AND ADJUSTMENT

⚠CAUTION
Turn off the main power switch and unplug the machine before attempting any of the procedures in this section.

Important: Before performing the following steps, layout several sheets of clean paper and remove the 4 toner cartridges (cyan, magenta, yellow, and black), waste toner bottle, and standard paper cassette from the printer. Place the toner cartridge and waste toner bottle on the sheets of paper.

NOTE: This manual uses the following symbols.
☛ : See or Refer to : Screws : Connector

3.1 SPECIAL TOOLS AND LUBRICANTS

3.1.1 TOOLS

Part Number	Description	Described Section	Q'ty
N8036701	PCMCIA "Flash" Memory Card - 4MB	5.4	1
G0219350	Loop-back connector - parallel	5.5	1
G0819310	Color PCU Skew Adjustment Knob	3.12	1

The following are also recommended.

- PCU shipping cover (for Black and Color); supplied with the PCU

3.1.2 LUBRICATION

Area	Part	Lubricant Part Number	Type of Lubricant
Main Drive Unit	Gear and Gear Shafts	52039501	Grease G501
	Grounding Spring Plate	G0049668	Grease KS-660
Transfer Belt Drive Unit	Transfer Cam (4 pieces) Planetary Gear Base – B	52039501	Grease G501
Paper Exit Roller	Roller Supporting Portion	52039501	Grease G501

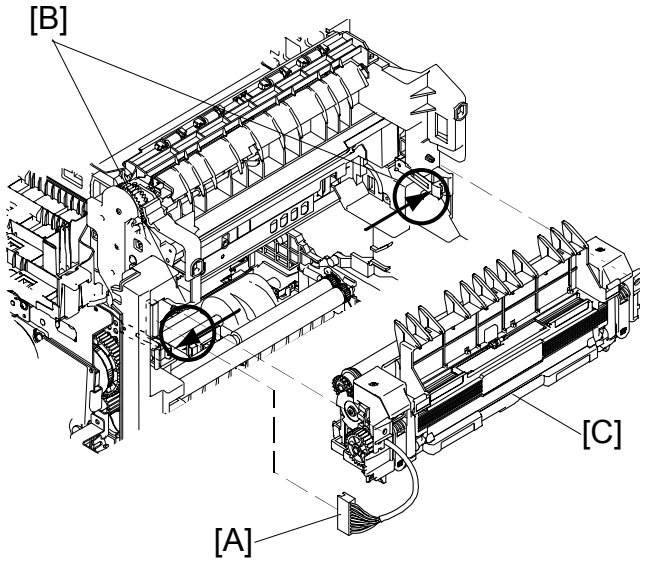
3.2 FUSING UNIT

⚠CAUTION

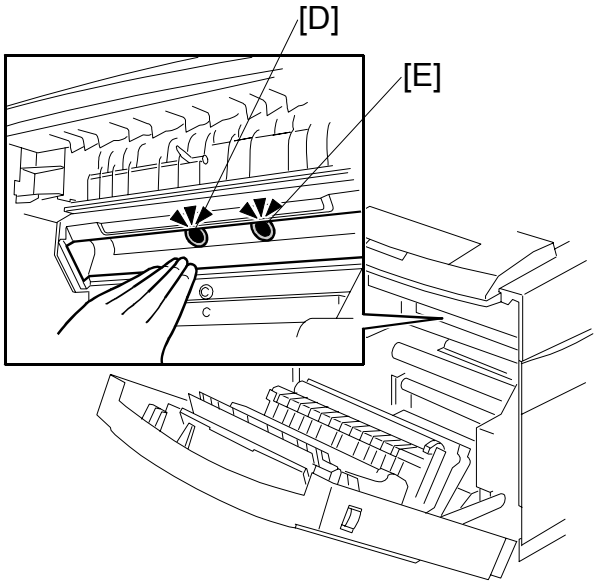
1. **The fusing unit is hot. To avoid personal injury, wait 1 hour for the fusing unit to cool after turning the power off.**
2. **When replacing parts, use only the manufacturer's specified components.**
3. **After servicing, be sure to restore the insulators, shields, etc.**

- Open the front door.

[A]: Fusing unit connector
[B]: Release the two fusing unit levers.
[C]: Fusing unit.



NOTE: After removing the fusing unit, use caution not to push the thermostat [D][E]. The thermostat is easily broken.

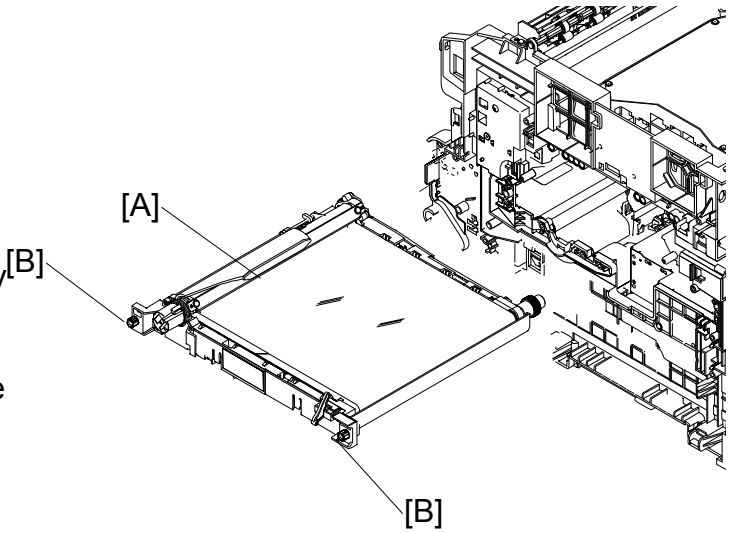


3.3 TRANSFER BELT UNIT

- Open the right cover.
- Waste toner cartridge
- Release the PCU holder.
- Remove the black photoconductor unit then the color photoconductor unit. (Press the green locking tab down on the color PCU to fully remove.)

[A]: Transfer belt unit (🖉 x 2)

NOTE: The two screws are the green thumb-screws located at either side of the transfer unit [B]. When removing the transfer belt unit, take care not to damage the transfer belt.



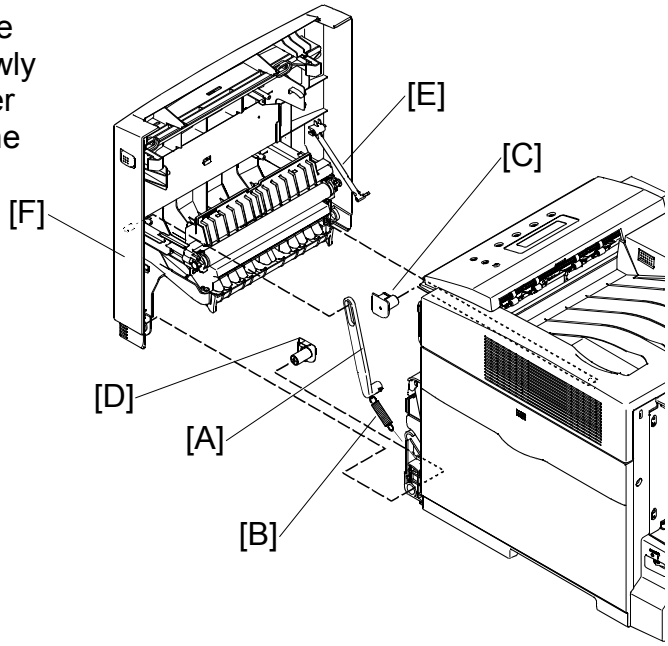
3.4 EXTERIOR COVERS

3.4.1 FRONT DOOR WITH TRANSFER ROLLER UNIT

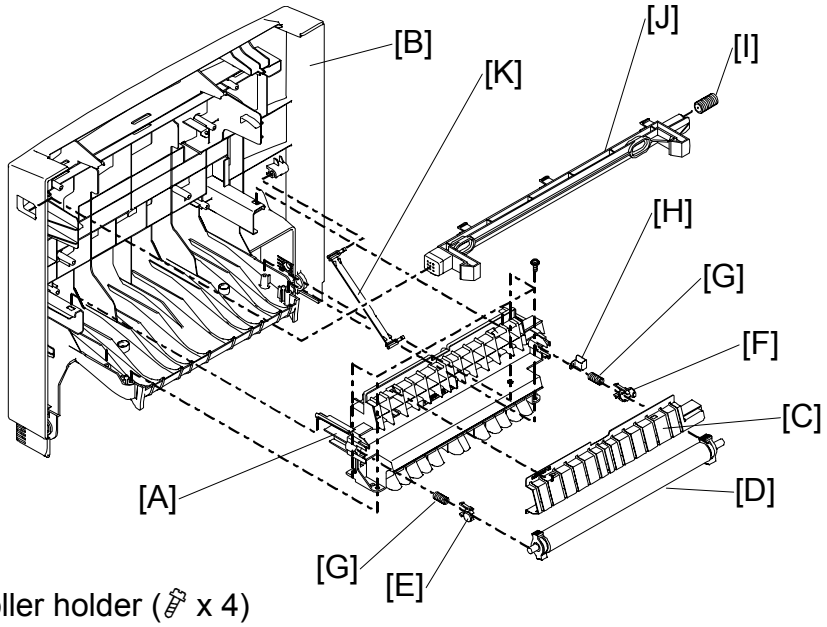
[A]: Front support lever

NOTE: Open the front door. Hold the bottom end of the lever. Slowly close the door, and the upper end of the lever comes off the door.

[B]: Lever spring
[C]: Left door-hinge (1 hook)
[D]: Right door-hinge (1 hook)
[E]: Plastic belt
[F]: Front door



3.4.2 TRANSFER ROLLER ASSEMBLY



[A]: Transfer roller holder (🔩 x 4)
[B]: Front door cover
[C]: Transfer roller paper guide
[D]: Transfer roller

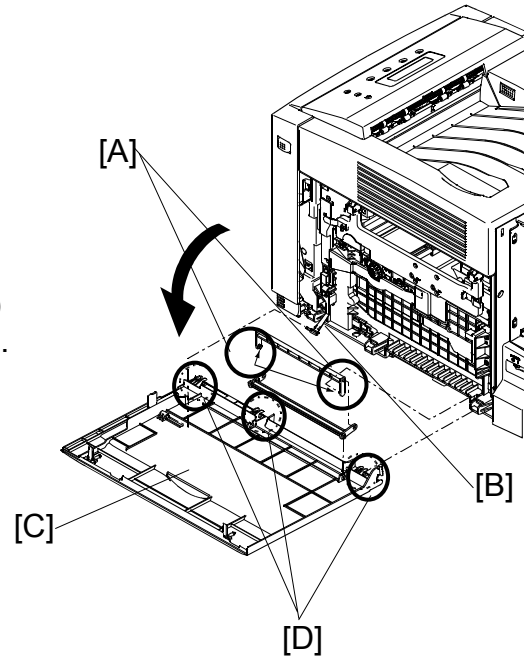
NOTE: Using the provided green levers the transfer roller can be easily unclipped from the bushings.
It is not necessary to remove the front door to replace the transfer roller. Avoid touching the transfer roller's surface with your hands.

[E]: Transfer roller right bushing
[F]: Transfer roller left bushing
[G]: Transfer roller spring
[H]: Transfer roller plate
[I]: Lock lever spring
[J]: Front door lock lever
[K]: Plastic belt

3.4.3 RIGHT COVER

[A]: Cartridge lever (1 hook, 🔩 x 1)
[B]: Plastic strap
[C]: Right cover (1 hook at the rear end)

NOTE: Release the three hinges [D].



3.4.4 REAR COVER

- Unplug the optional paper feed unit's harness connector (if present).
- Open the right cover

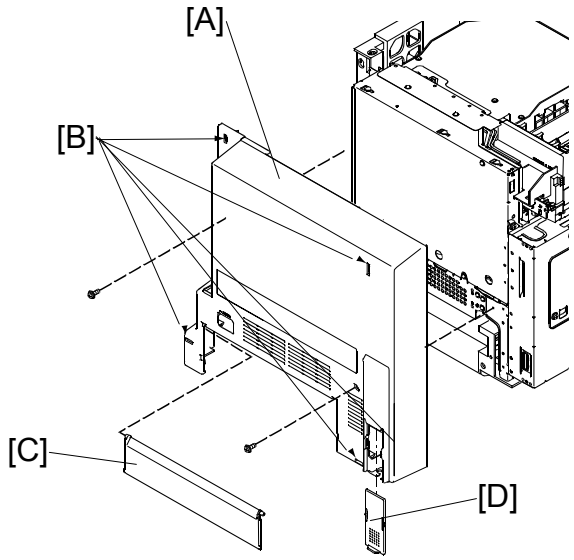
[A]: Rear cover (🔩 x 2 (self-tapping), 5 hooks [B])

NOTE: Use a small flat blade screw driver to assist unclipping the hooks. Be careful not to damage the hooks or the cover.

[C]: Cassette cover

[D]: Harness cover

NOTE: Use a penlight or other suitable light source to view how each cover hook is clipped to the mainframe before prying the clip to release.



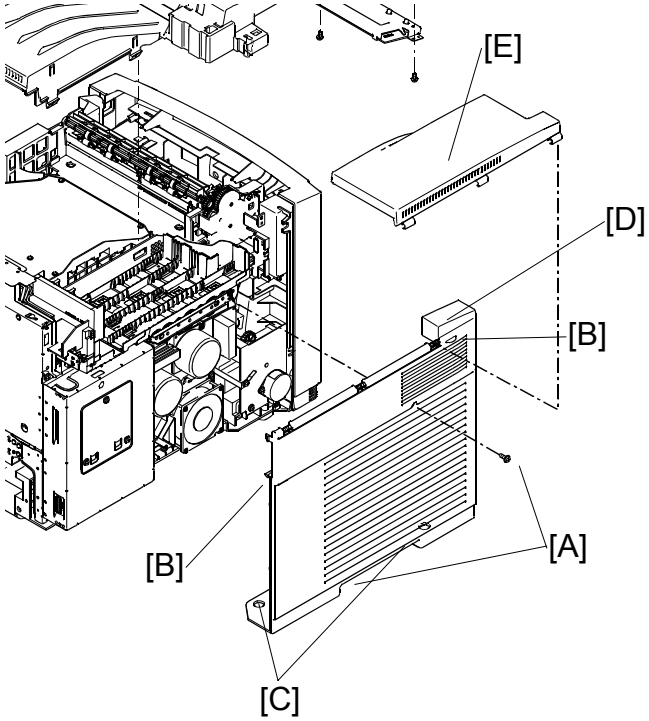
3.4.5 LEFT COVER

[A]: 🔩 x 2

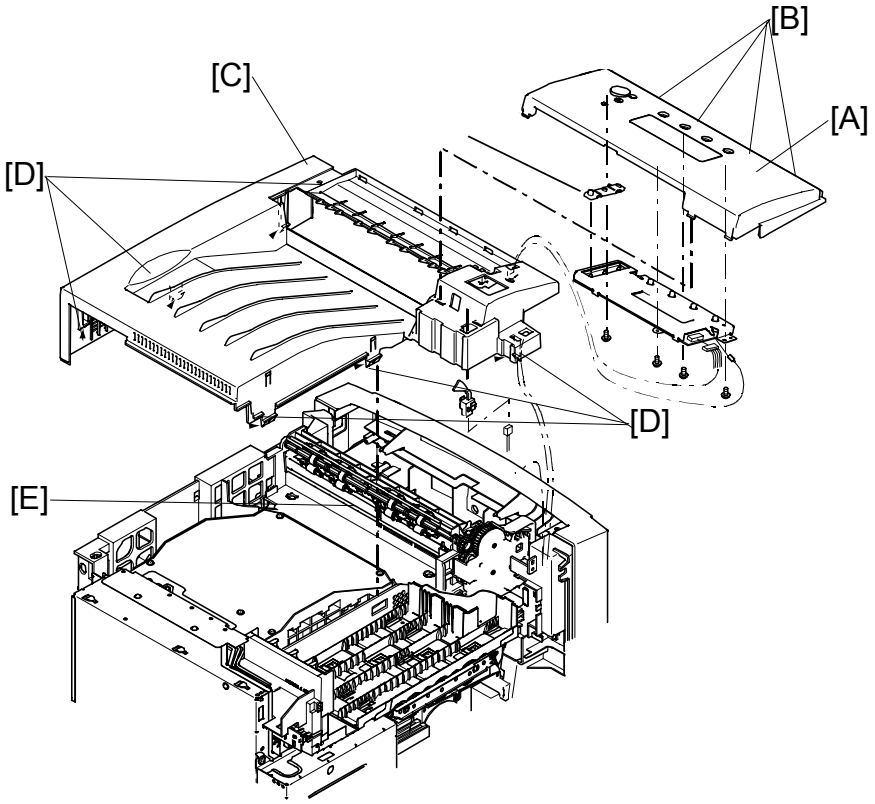
[B]: Release the two hooks.

[C]: Release the openings from the two projections.

[D]: Left cover with the toner cartridge cover [E]



3.4.6 TOP COVER AND LCD PANEL



[A]: LCD panel (4 hooks [B], ☞ x 2)
[C]: Top cover (7 hooks [D])

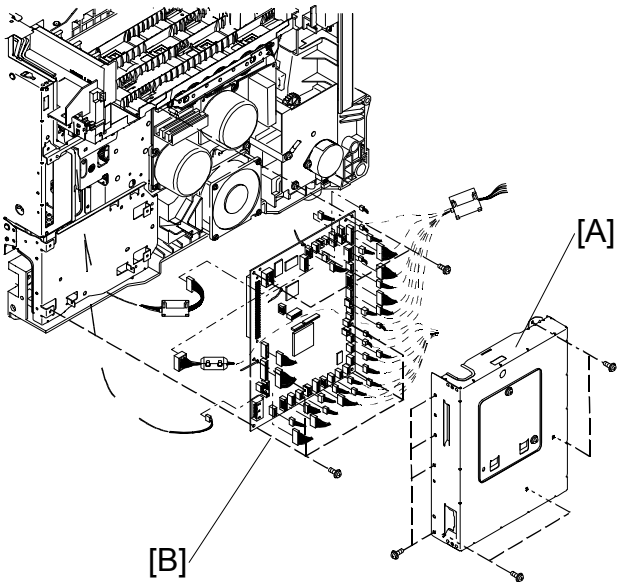
NOTE: Use caution not to damage the paper exit sensor [E].
This cover is a very precise fit. Use extra caution and work alternately from the right and left sides of the top cover to gradually release the cover from the printer.

3.5 ECB AND DRIVE UNITS

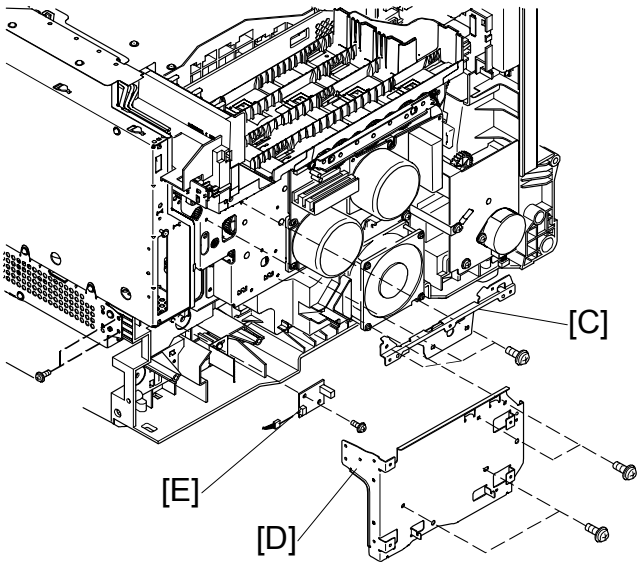
3.5.1 ECB (ENGINE CONTROL BOARD) AND TEMPERATURE/HUMIDITY SENSOR BOARDS

- Rear covers (☛ 3.4.4)
- Left cover (☛ 3.4.5)
- Top cover (☛ 3.4.4)

[A]: Engine board shield cover (x 8)
[B]: Engine control board (All , x 7)

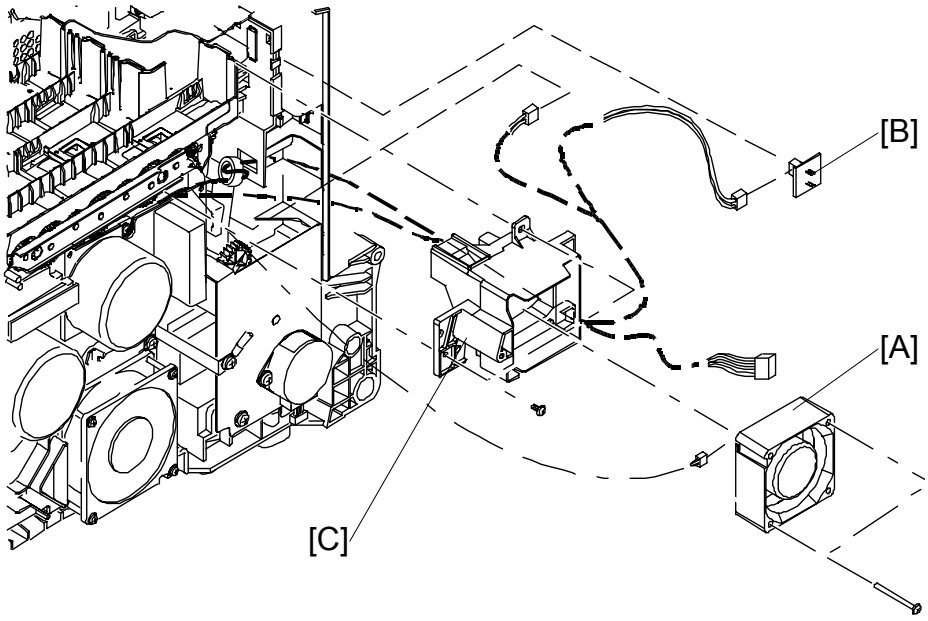


NOTE: After replacing the ECB, remove the EEPROM from the old board and install it on the new board. (If the EEPROM on the old board is defective, replace the EEPROM (☛ 3.10.4).)



[C]: Engine board small bracket (x 3, x 1)
[D]: Engine board large bracket (x 6)
[E]: Temperature/humidity sensor board (x 1)

3.5.2 SUB FUSING-FAN AND SUB FUSING-FAN DUCT



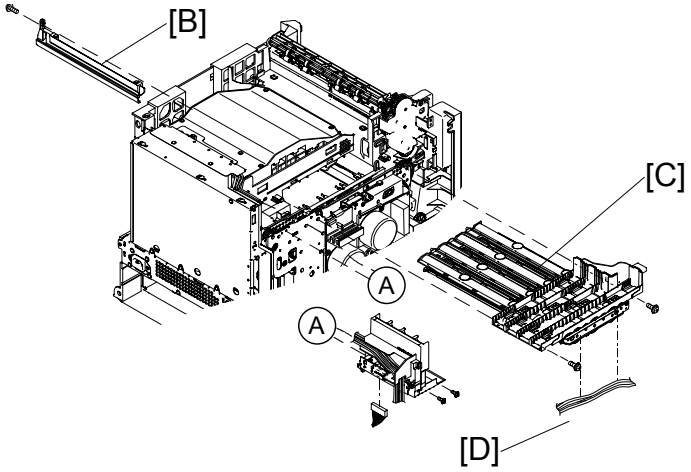
- Rear covers (☛ 3.4.4)
- Left cover (☛ 3.4.5)
- Top cover (☛ 3.4.4)

[A]: Sub fusing-fan (x 2, x 1)
[B]: Jam detection sensor board (x 1)
[C]: Sub fusing-fan duct (x 2, x 2)

3.5.3 TONER CARTRIDGE HOLDER

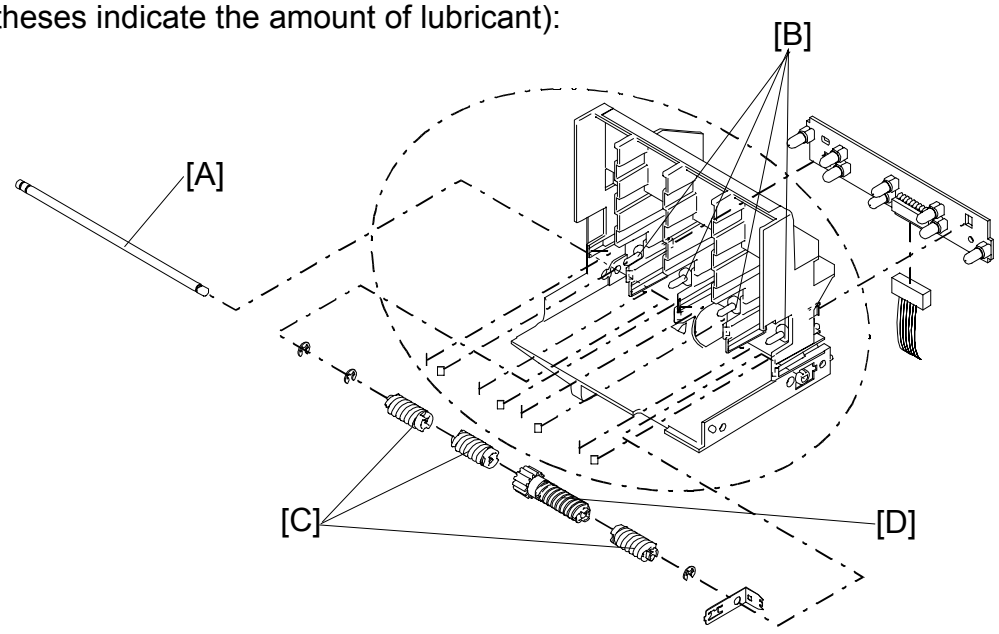
CAUTION: The toner cartridge holder assembly contains toner. Take care not to spill toner when handling the toner cartridge holder assembly.

[A]: Toner cartridge drive unit (🔩 x 2, ✋ x 1)
[B]: PC guide (🔩 x 1)
[C]: Toner cartridge holder assembly (🔩 x 2, ✋ x 1 [D])



Lubricating

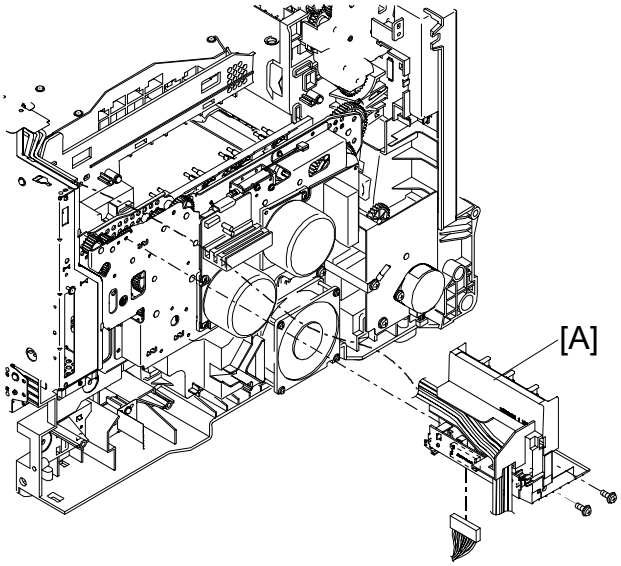
Lubricate the following parts (Grease G501) when replacing them (values in parentheses indicate the amount of lubricant):



[A]: Shaft excluding both ends (0.1 cc)
[B]: Toner cartridge drive base (indicated with arrows) (0.05 cc x 4)
[C]: Gear (0.1 cc x 3)
[D]: Gear (0.1 cc)

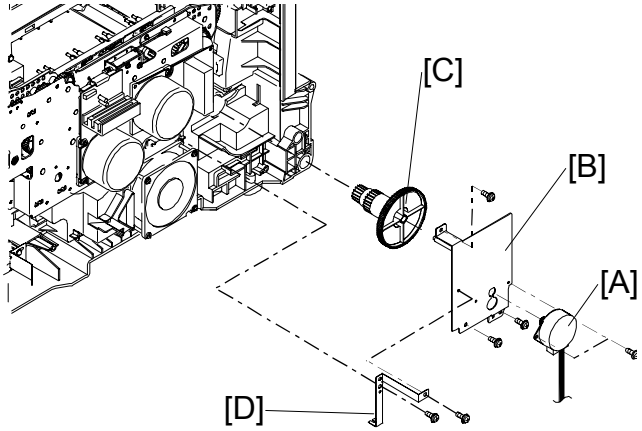
3.5.4 TONER CARTRIDGE DRIVE UNIT

[A]: Toner cartridge drive unit (🔩 x 2, ✋ x 1)



3.5.5 PAPER PICKUP MOTOR AND MOTOR BRACKET

[A]: Paper pickup motor (✋ x 1, 🔩 x 2)
NOTE: The connector is at CN22 on the engine board.
[B]: Paper pickup motor bracket (🔩 x 4)
[C]: Paper pickup drive gear
[D]: Grounding plate (🔩 x 1)

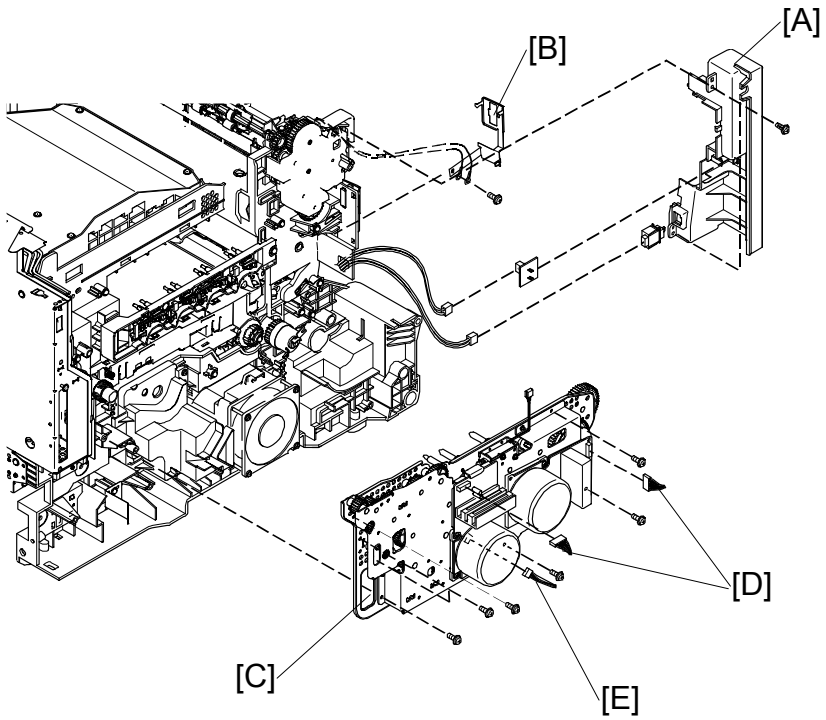


Lubricating

Lubricate the following parts (Grease G501) when replacing them (values in parentheses indicate the amount of lubricant):

- The outer cogs on the paper pickup drive gear [C] (0.1 cc)
- The shaft on the paper pickup motor bracket [B] (0.05 cc)

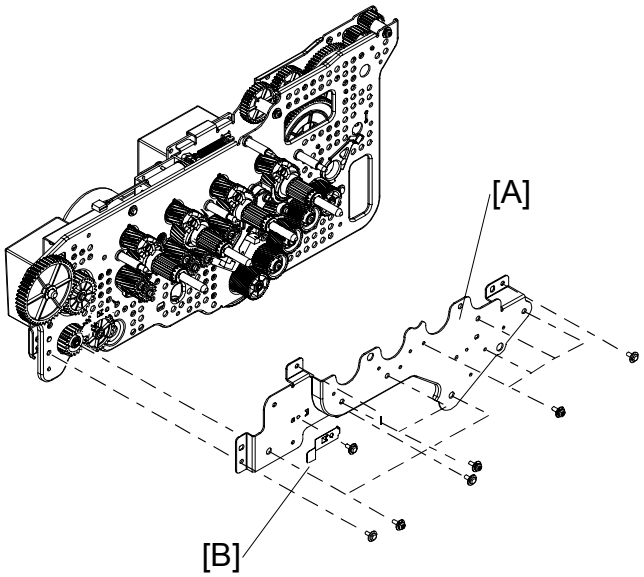
3.5.6 MAIN DRIVE UNIT



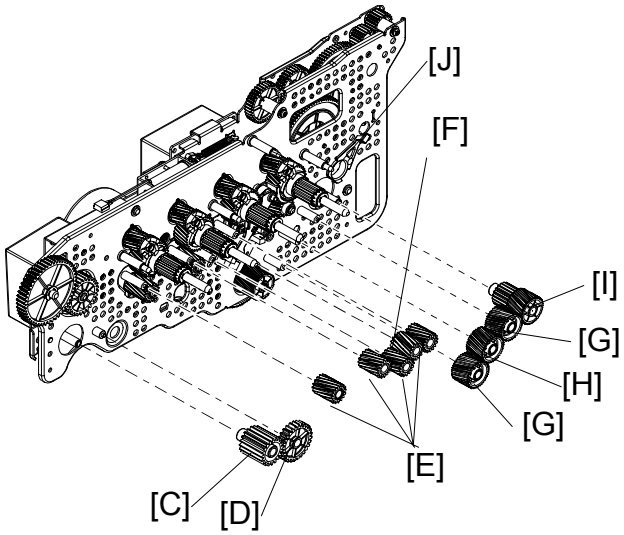
- Fusing unit (☛ 3.2)
- Toner cartridge holder (☛ 3.5.2)
- Engine control board, engine board small bracket, engine board large bracket (☛ 3.5.1)
- Toner cartridge drive unit (☛ 3.5.4)
- Paper pickup drive motor bracket (☛ 3.5.5)

[A]: Inner cover (x 2, x 2)
[B]: Fusing unit grounding plate
[C]: Main drive unit (x 7, x 3)
NOTE: There are 2 motor cables [D] and 1 sensor cable [E].

[A]: Drive unit bracket (🔩 x 8)
[B]: Grounding plate (🔩 x 1).



[C]: Feed idle gear
[D]: Cam gear
[E]: Left PC idle gears
[F]: Right PC idle gear
[G]: Left transfer-unit idle gears
[H]: Right transfer-unit idle gear
[I]: Joint gear

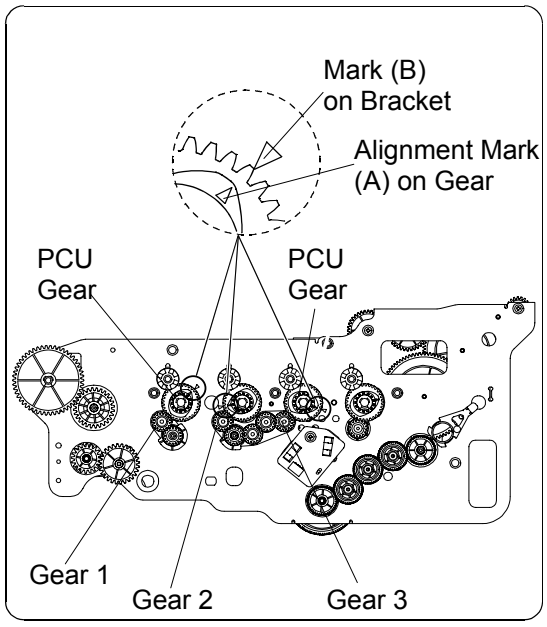


Lubricating

Lubricate the following parts (Grease 501) when replacing them (values in parentheses indicate the amount of lubricant):

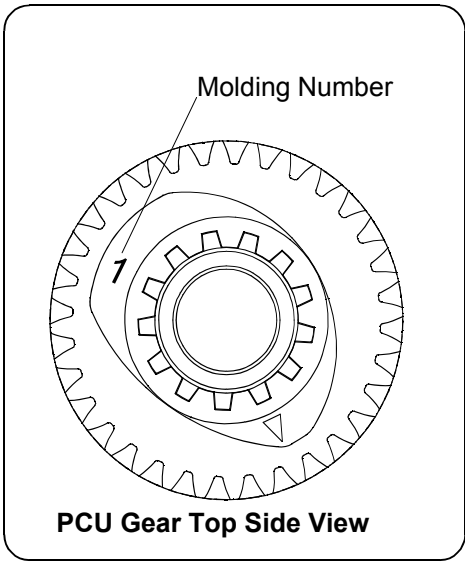
- The shaft of the feed idle gear [C] (0.05 cc)
- The shaft of the cam gear [D] (0.05 cc)
- The shafts of the left PC idle gears [E] (0.05 cc x 4)
- The shaft of the right PC idle gear [F] (0.05 cc)
- The shafts of the left transfer-unit idle gears [G] (0.05 cc x 2)
- The shaft of the right transfer-unit idle gear [H] (0.05 cc)
- The inside of the PC bushing [J] (0.1 cc)

CAUTION: When reinstalling the PCU idle gears, perform the following steps, and make sure that each alignment mark (A) on the PCU gear is aligned with the mark (B) as shown.



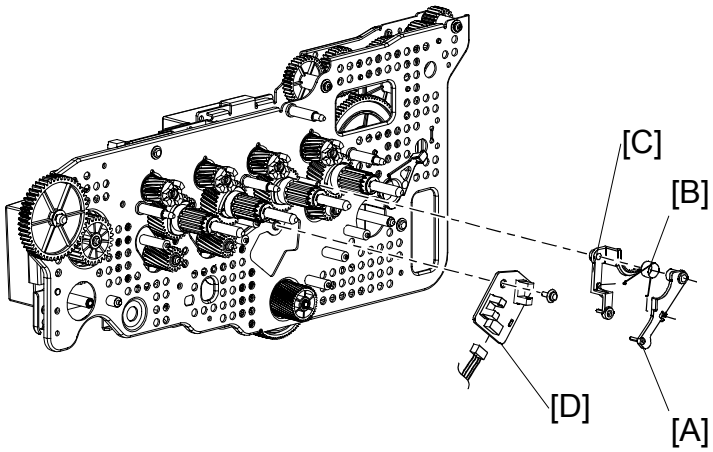
1) If gears 1 – 3 are installed, remove them.
2) Align each mark (A) with the mark (B) by rotating the PCU gear.
3) Install gears 1 – 3 in order of gears 1, 2, and 3.
4) Make sure that each alignment mark (A) is aligned with the mark (B).

CAUTION: Replace all PCU gears at the same time with the gears provided in the replacement package. Make sure the gears have the same molding number (see the illustration below). Print quality will be poor if gears of different molding numbers are used.

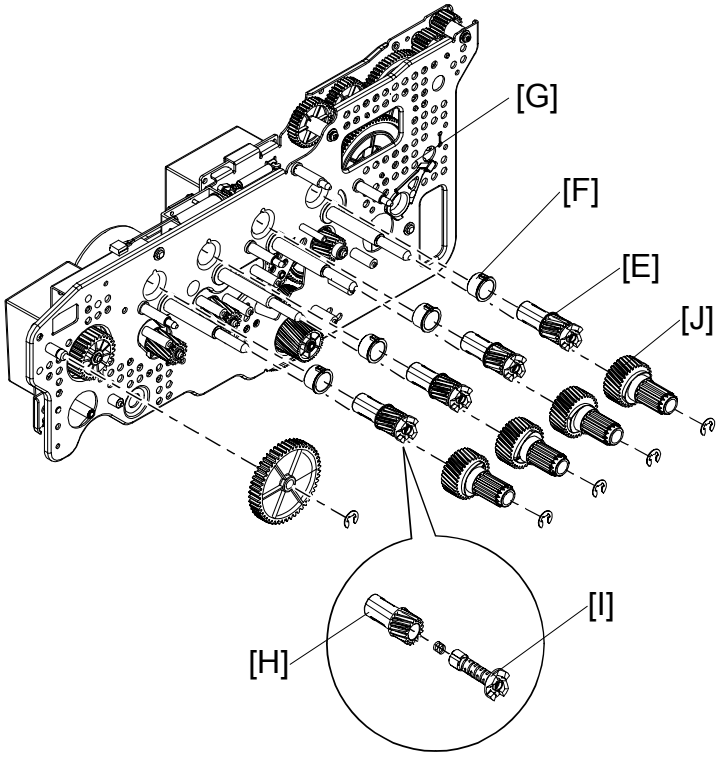


PCU Gear Top Side View

[A]: CMY home lever
[B]: PC home spring
[C]: PC home lever
[D]: PC home position sensor (☞ x 1)



[E]: Four PCU gears (☾ x 4)
[F]: Four development gear assemblies
[G]: Four bushings
[H]: Fusing unit idle gear (☾ x 1)

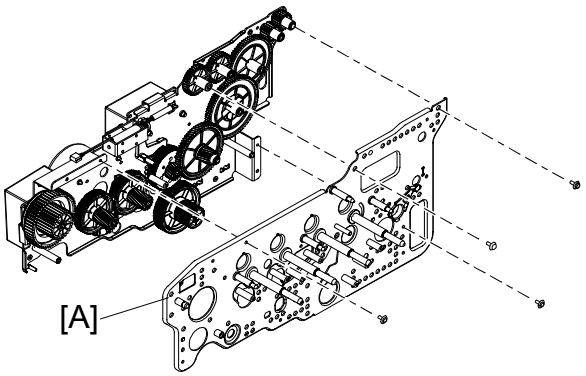


Lubricating

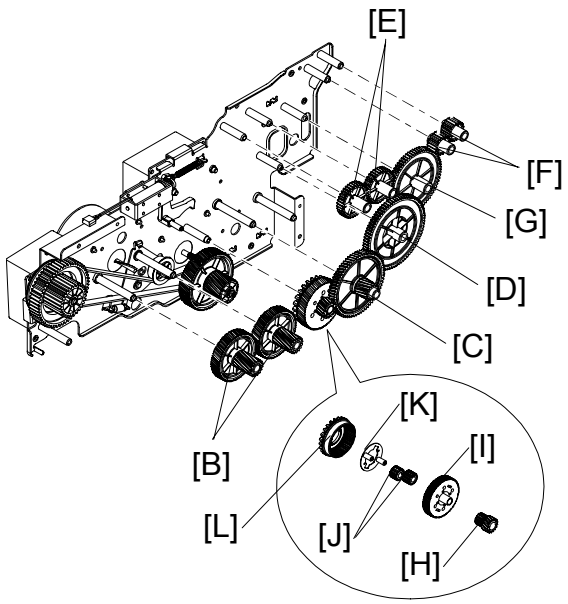
Lubricate the following parts (Grease 501) when replacing them (values in parentheses indicate the amount of lubricant):

- The shaft of the CMY home lever [A] (0.05 cc)
- The shafts of the PCU gears [E] (0.05 cc)
- The inside of the bushing [G] (0.1 cc x 4)
- The interface with the bushing [G] of the development gear [I] (0.05 cc x 4)
- The shaft of the fusing unit idle gear [H] (0.05 cc)
- The skirt of the left end of the development coupling [J] (0.05 cc x 4)
- The inside of the PC bushing [K] (0.1 cc x 1)

[A]: Drive unit bracket (🔩 x 4)



[B]: CMY change gears
[C]: BK change gear
[D]: Hopper change gear
[E]: Hopper gears (A)
[F]: Hopper gears (B)
[G]: Hopper gear (C)
[H]: Coupling gear
[I]: Outer gear
[J]: Planetary gears
[K]: Planetary gear bracket
[L]: Inner gear

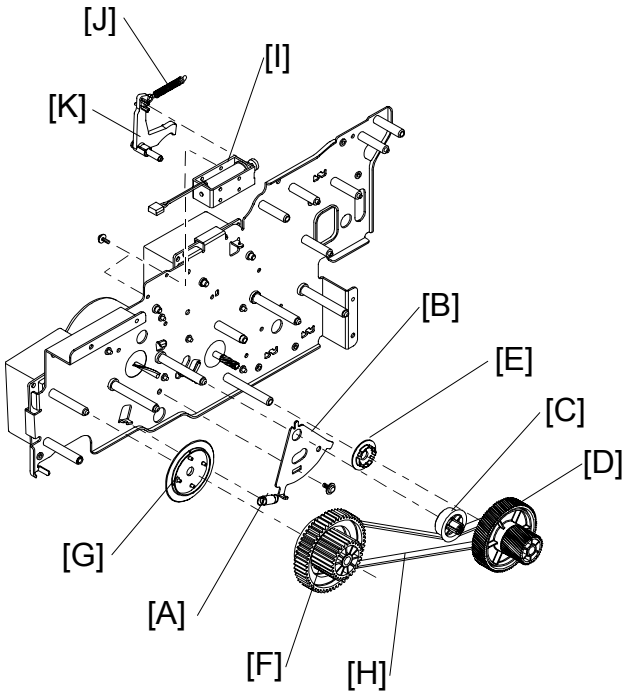


Lubricating

Lubricate the following parts (Grease 501) when replacing them (values in parentheses indicate the amount of lubricant):

- The inner cogs (0.1 cc x 2) and outer cogs (0.1 cc x 2) on the CMY change gears [B]
- The shafts of the CMY change gears [B] (0.05 cc)
- The inner cogs (0.1 cc) and outer cogs (0.1 cc) on the BK change gear [C]
- The shaft of the BK change gear [C] (0.05 cc)
- The shaft of the hopper change gear [D] (0.05 cc)
- The shafts of the hopper gears (A) [E] (0.05 cc x 2)
- The shafts of the hopper gears (B) [F] (0.05 cc x 2)
- The shaft of the hopper gear (C) [G] (0.05 cc)
- The inner cogs on the left side of the coupling gear [H] (0.1 cc)
- The cogs on the outer gear [I] (0.1 cc)
- The shaft of the outer gear [I] (0.05 cc)
- The shafts of the planetary gears [J] (0.05 cc x 2)
- The inside (0.1 cc) and outside (0.1 cc) of the right end and the inside (0.1 cc) of the left end of the inner gear [L]

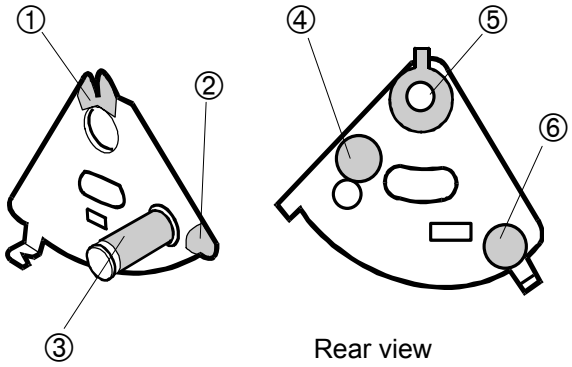
[A]: Tension roller spring
[B]: Tension roller bracket (x 1)
[C]: Tension roller
[D]: Transfer pulley gear
[E]: Transfer pulley gear flange
[F]: Feed pulley gear
[G]: Feed pulley gear flange
[H]: Feed belt
[I]: BK solenoid (x 2)
[J]: BK clutch spring
[K]: BK clutch arm



Lubricating

Lubricate the following parts (Grease 501) when replacing them (values in parentheses indicate the amount of lubricant):

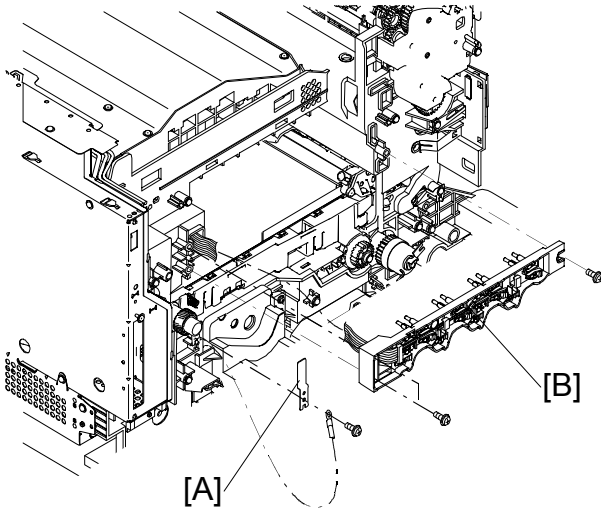
- The shaft of the transfer pulley gear flange [E] (0.05 cc)
- The points ① through ⑥ (0.05 cc x 6) on the tension roller bracket [N]



3.5.7 BIAS UNIT

- Fusing unit (☛ 3.2)
- Engine control board (☛ 3.5.1)
- Toner cartridge holder (☛ 3.5.2)
- Toner cartridge drive unit (☛ 3.5.4)
- Paper pickup motor bracket (☛ 3.5.5)
- Main drive unit (☛ 3.5.6)

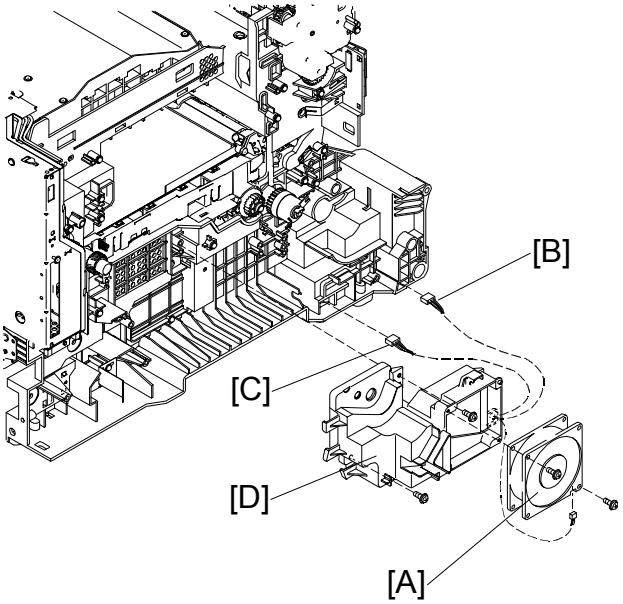
[A]: Grounding plate (x 1)
[B]: Bias unit (x 2, x 2)
NOTE: The connectors are at CN2 and CN3 on the high voltage board (☛ 3.10.6).



3.5.8 POWER SUPPLY FAN MOTOR AND PSU FAN MOTOR DUCT

- Fusing unit (☛ 3.2)
- Engine control board (☛ 3.5.1)
- Toner cartridge holder (☛ 3.5.2)
- Toner cartridge drive unit (☛ 3.5.4)
- Paper pickup motor bracket (☛ 3.5.5)
- Main drive unit (☛ 3.5.6)

[A]: Fan motor (x 1, x 2)
[B]: By-pass tray paper detection sensor cable
[C]: By-pass tray home position sensor cable
[D]: Fan motor duct (x 3)



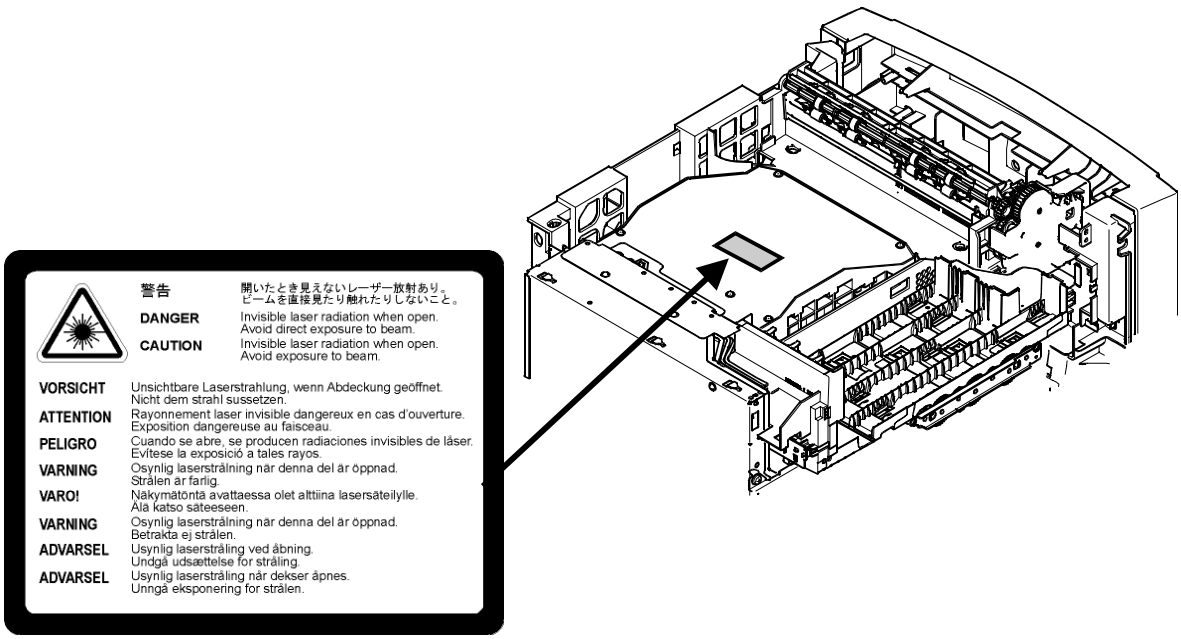
3.6 LASER SCANNING UNIT

⚠WARNING

Turn off the main switch and unplug the machine before beginning any of the procedures in this section. Laser beams can cause serious eye injury.

3.6.1 CAUTION DECAL LOCATIONS

The caution decal is located as shown below.



⚠ WARNING

Be sure to turn off the main switch and disconnect the power plug from the power outlet before beginning any disassembly or adjustment of the laser unit. This printer uses a class IIIb laser beam with a wavelength of 655 nm and an output of 7 mW. The laser can cause serious eye injury.

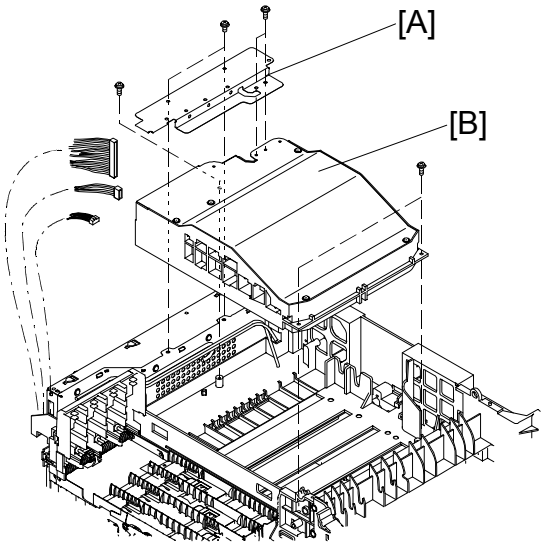
3.6.2 LASER SCANNING UNIT

- Rear cover (☛ 3.4.4)
- Left cover (☛ 3.4.5)
- Top cover (☛ 3.4.4)

[A]: Laser scanning unit grounding plate (x 4)

NOTE: When reassembling, arrange the wires correctly. The laser scanning unit wires (shielded cable) go under the plate; the other wires go over the plate. Be sure to re-install using the exact same screws as removed.

[B]: Laser scanning unit (x 3, x 3)



NOTE: 1) To avoid dust, do not disassemble the laser scanning unit.
2) When reassembling, adjust the position of the CMY PCU (☛ 3.12).

3.7 PAPER FEED

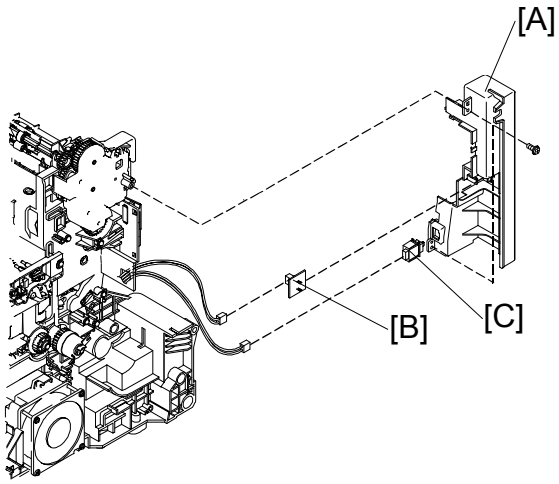
3.7.1 PAPER EXIT

- All covers (☛ 3.4)
- Paper pickup motor bracket (☛ 3.5.5)

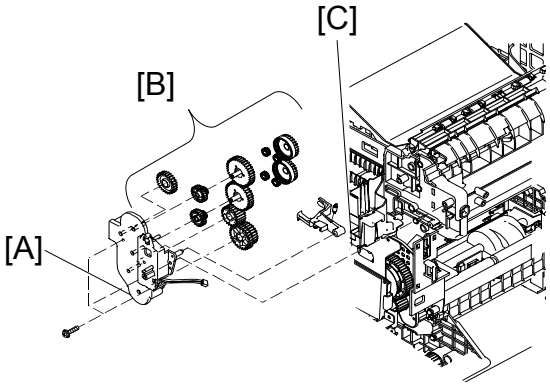
[A]: Inner cover (x 2, x 2)

[B]: Duplex unit detection sensor

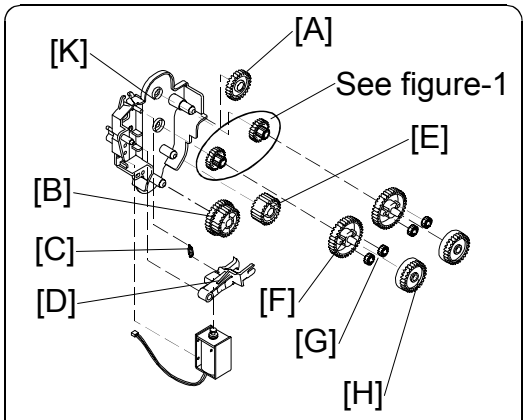
[C]: Duplex unit jam detection sensor board



[A]: Paper exit gear cover
(x 3, x 1)
NOTE: The connector is at CN26 on the engine board (☛ 3.5.1).
[B]: Gears
[C]: Switching lever

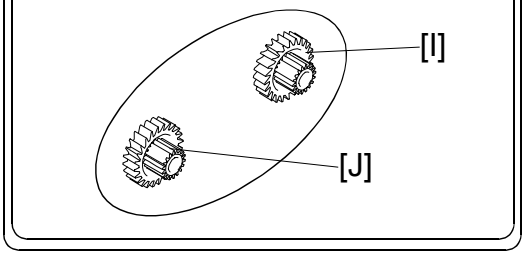


NOTE: When reinstalling the gears on the paper exit gear cover, reassemble them as shown in the illustration.
[A]: Paper exit roller joint gear
[B]: Double gear
[C]: Switching lever spring
[D]: Rotation switching solenoid
[E]: Intermediate gear
[F]: Outer gear x 2
[G]: Inner gear x 4
[H]: Coupling gear x 2



CAUTION: The rotation switching gear [I] differs from the other gear [J] in the direction of the gear teeth (see Figure-1).

Figure-1

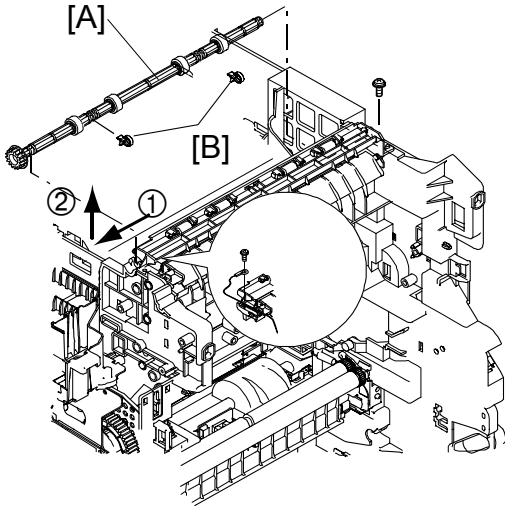


Lubricating

Lubricate the following parts (Grease 501) when replacing them (values in parentheses indicate the amount of lubricant):

- The shafts on the outer gears [F] (0.05 cc x 6); the cogs on the outer gears [F] (0.1 cc x 2)
- The cogs on the coupling gears [H] (0.1 cc x 2)
- The shafts on the paper exit gear cover [K] (0.05 cc x 3)

[A]: Paper exit roller (with the paper stoppers [B])
NOTE: Move it in the direction of the arrows [①, ②].

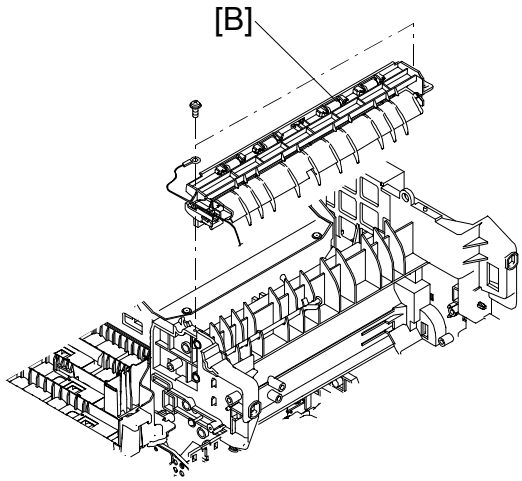


Lubricating

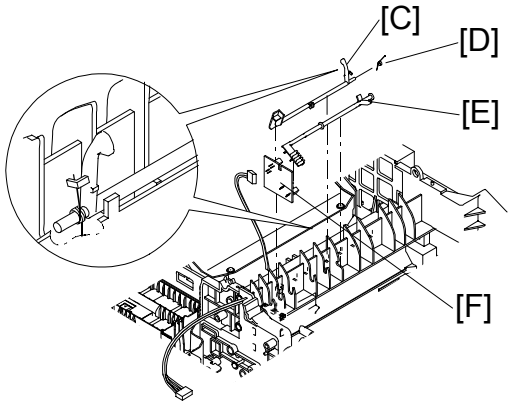
Lubricate the following parts (Grease 501) when replacing them (values in parentheses indicate the amount of lubricant):

- The right and left ends of the paper exit roller [A] (0.1 cc x 2) excluding the gear on the left end

[B]: Paper exit sub assembly (x 2)

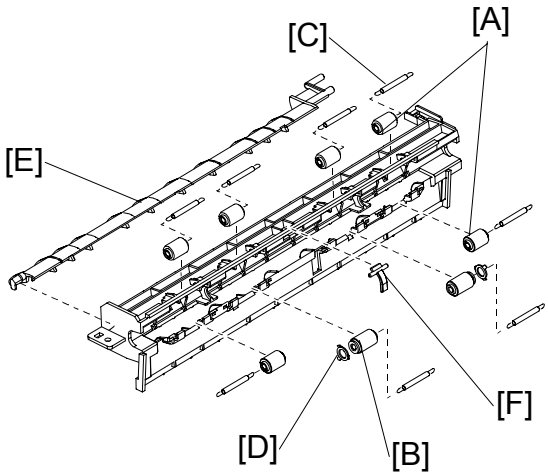


[C]: Paper full sensor actuator
[D]: Sensor lever spring
[E]: Paper jam sensor levers
[F]: Paper full/Jam sensor board (x 1)



3.7.2 DISASSEMBLY OF PAPER EXIT SUB ASSEMBLY

[A]: Pinch roller (A) x 6
[B]: Pinch roller (B) x 2
[C]: Pinch roller spring x 8
[D]: "Star" rubber x 2
[E]: Paper guide
[F]: Paper stopper

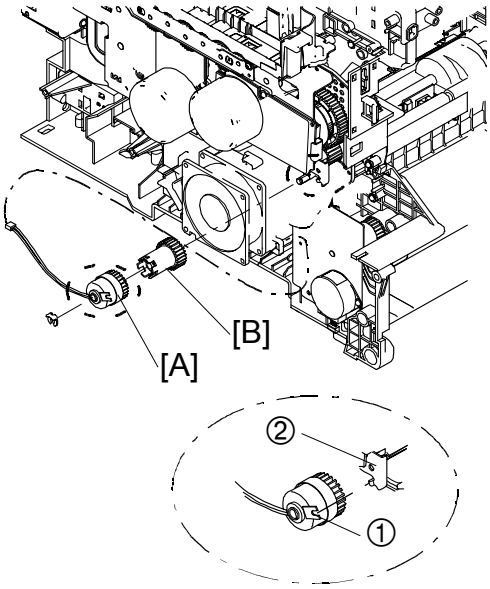


3.8 PAPER FEED UNIT

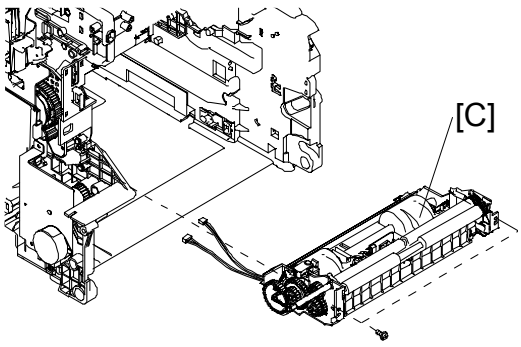
- Fusing unit (☛ 3.2)
- Front door (☛ 3.4.1)
- Right cover (☛ 3.4.3)
- Rear cover (☛ 3.4.4)
- Left cover (☛ 3.4.5)

[A]: Registration clutch (⟲ x 1)
[B]: Registration roller coupling gear (✋ x 1)
NOTE: The connector is at CN20 on the engine board (☛ 3.5).

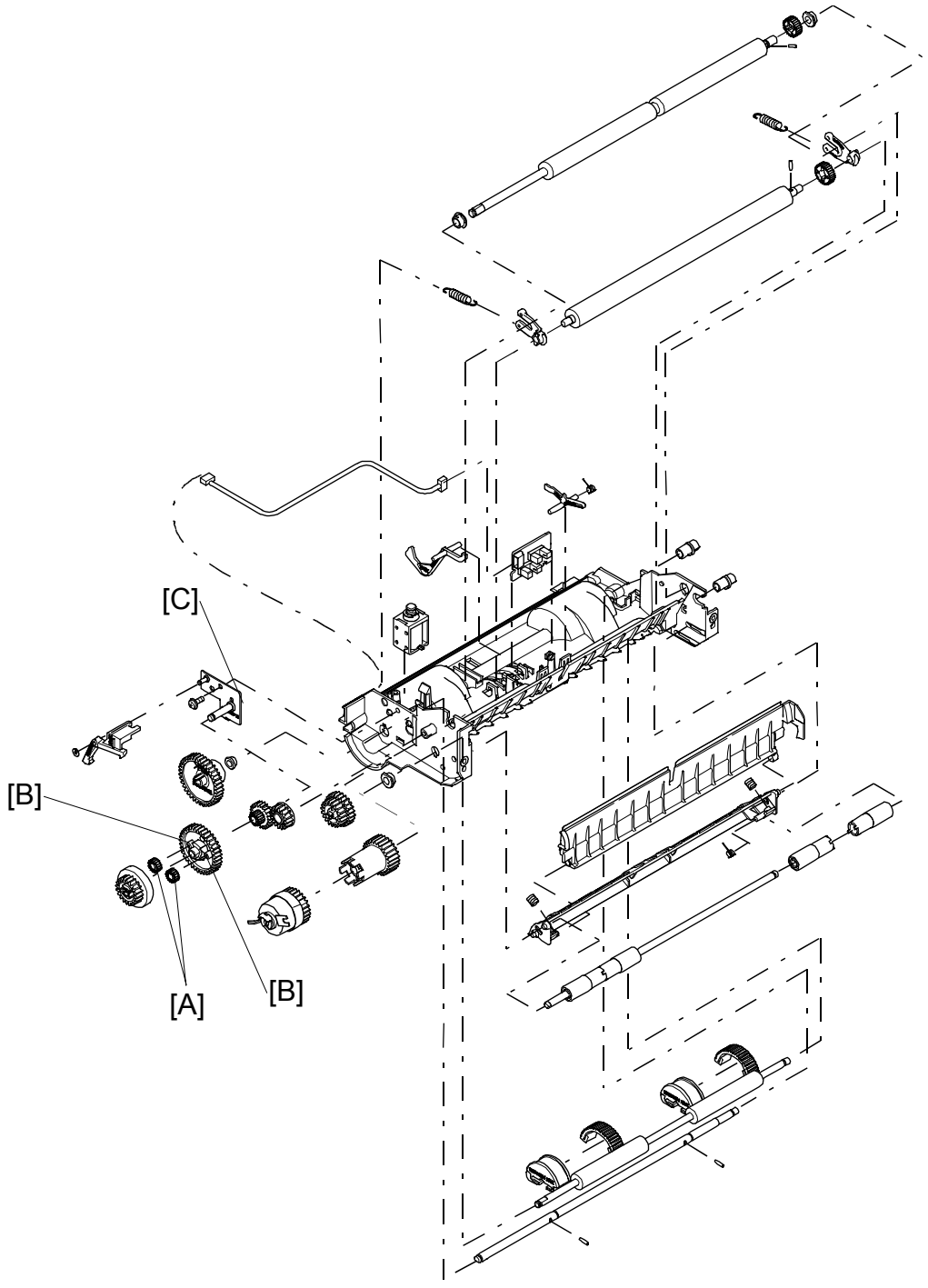
NOTE: When reinstalling the registration clutch, tab ① of the registration clutch must be fit over hook ②.



[C]: Paper feed unit (🔧 x 2, ✋ x 2)
NOTE: The connectors are at CN18 and CN19 on the engine board.



Lubricating

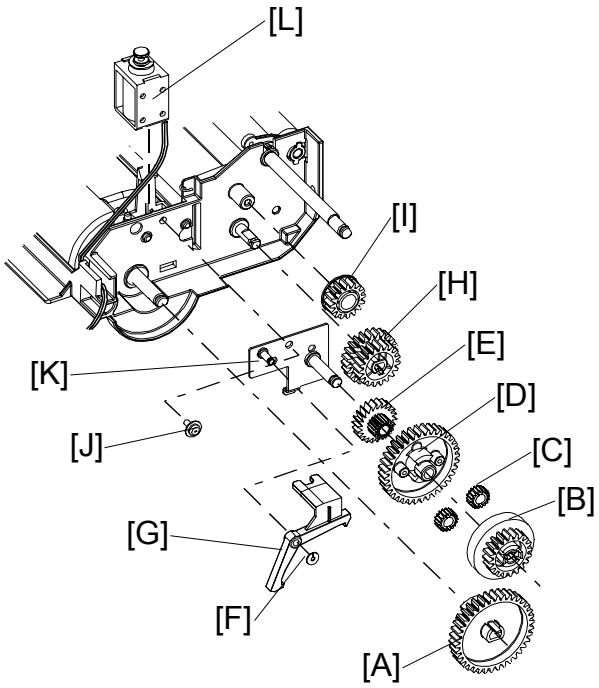


Lubricate the following parts (Grease 501) when replacing them (values in parentheses indicate the amount of lubricant):

[A]: The cogs on the inner gear (0.1 cc x 2)
[B]: The shafts on the outer gear (0.05 cc x 2)
[C]: The shaft on the gear bracket (0.05 cc x 1)

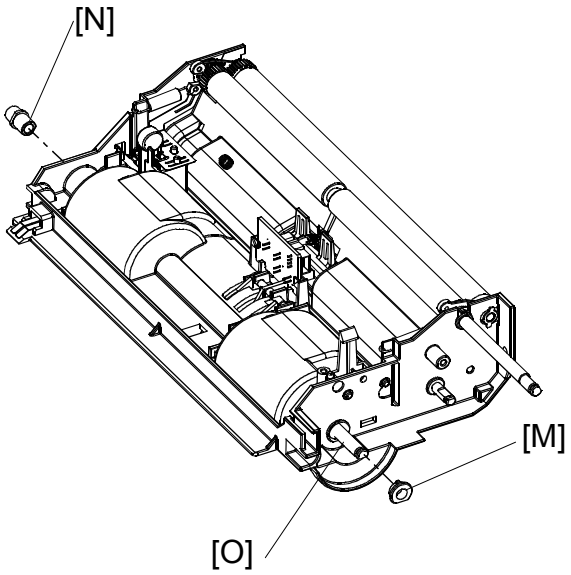
3.8.2 PAPER FEED UNIT DISASSEMBLY

[A]: Pickup gear
[B]: Inner gear (1 hook)
[C]: Inner gears
[D]: Outer gear
[E]: Gear
[F]: Plastic washer
[G]: Ratchet arm
[H]: Feed gear
[I]: Idle gear
[J]: Screw
[K]: Gear bracket
[L]: Pickup solenoid

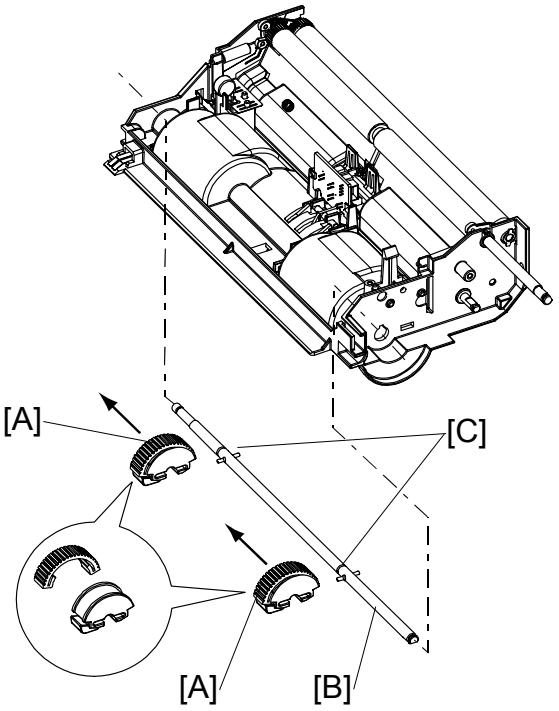


[M]: Bushing
[N]: Bushing

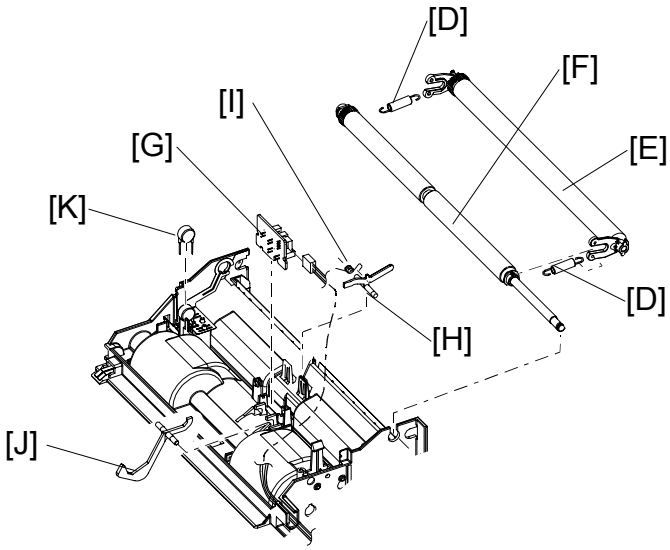
NOTE: Unlatch the bushing hook from the pickup roller shaft [O].



[A]: Two pickup roller assemblies
NOTE: Unlatch the hook from the groove in the pickup roller shaft.
[B]: Pickup roller shaft with the two pins [C]

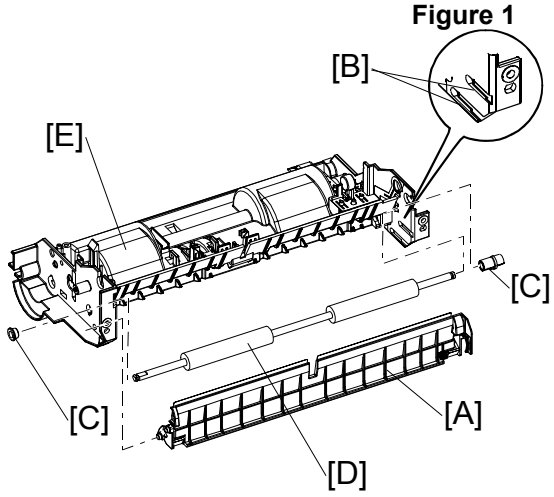


[D]: Spring x 2
[E]: Registration roller
[F]: Registration pinch roller
[G]: Paper empty/registration sensor board
[H]: Registration sensor lever
[I]: Lever spring
[J]: Paper empty sensor actuator
[K]: Varistor

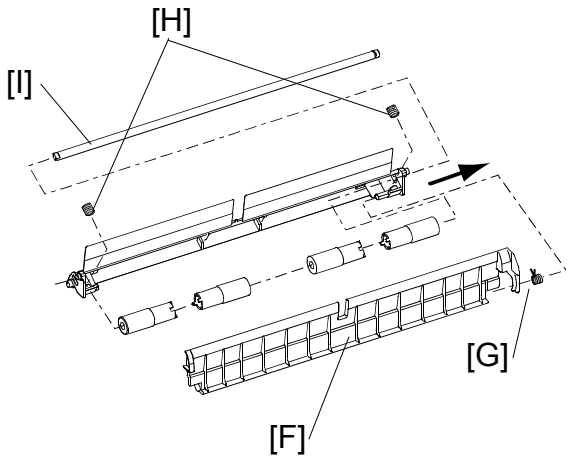


[A]: Registration paper guide assembly
NOTE: The registration paper guide assembly [A] is held in place by the two support tabs [B] (see Figure-1). While unlatching the registration paper guide assembly from the support tabs, remove it from the paper feed unit frame.
[C]: Two bushings
[D]: Paper feed roller
[E]: Paper feed unit frame

Figure 1

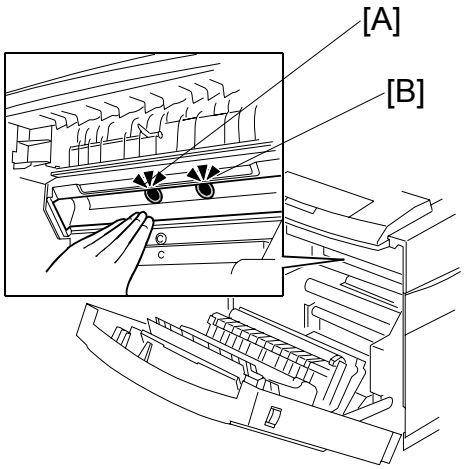


[F]: Registration paper guide
[G]: Paper guide spring
[H]: Pinch roller spring x 2
[I]: Pinch roller shaft
NOTE: Slide out the pinch roller shaft in the direction of the arrow shown in this illustration.



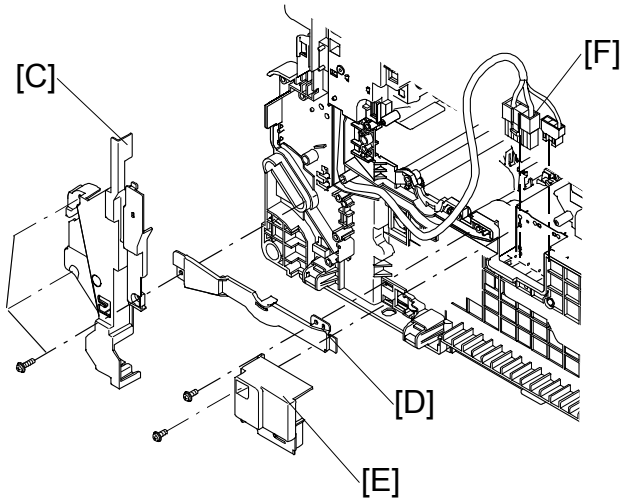
3.9 IH (INDUCTIVE HEATER) UNIT

NOTE: After removing the fusing unit, use caution not to push the thermostat [A][B]. The thermostat can be easily broken.

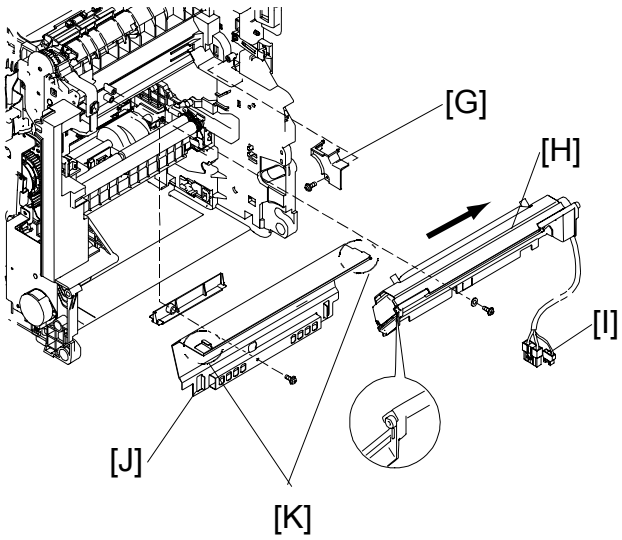


- Fusing unit (☛ 3.2)
- All covers (☛ 3.4)

[C]: Interlock switch cover (☞ x 3)
[D]: IH cable shield cover (☞ x 1)
[E]: Cover (☞ x 1)
[F]: 🖐 x 2 (pink+white, black)

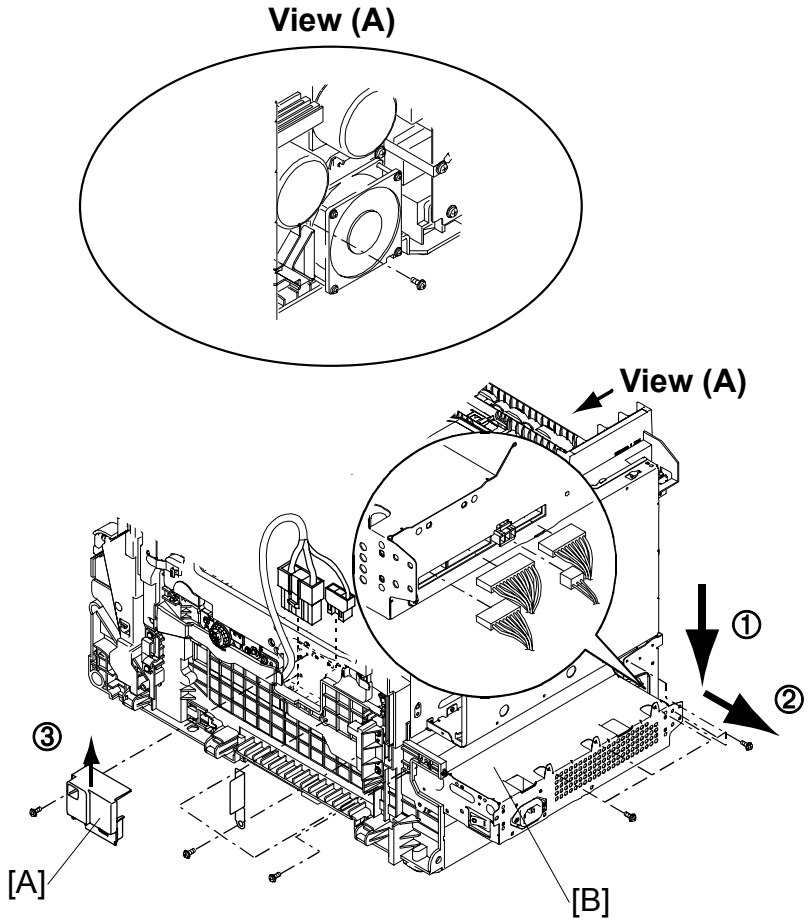


[G]: IH harness cover (☞ x 1)
[H]: IH unit (☞ x 1, 1 washer)
NOTE: Pull out the IH harness cable [I] through the opening in cover [J].
[J]: IH shield cover (☞ x 1, 2 hooks [K])



3.10 ELECTRICAL COMPONENTS

3.10.1 POWER SUPPLY UNIT



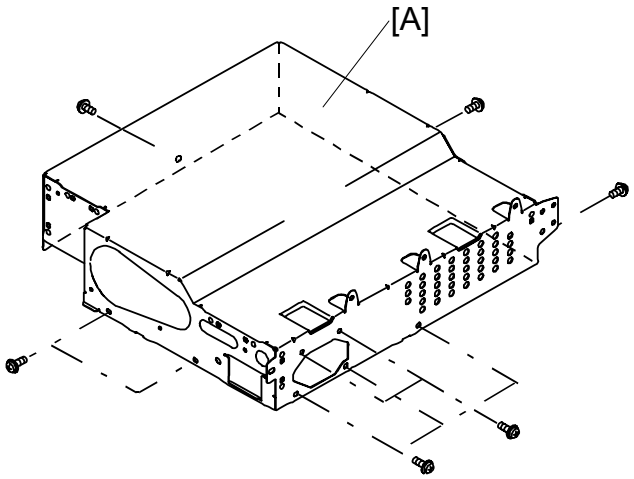
- All covers (☛ 3.4)
- IH unit (☛ 3.9)

[A]: Cover (🔩 x 1)
NOTE: Slide out the cover in the arrow ③ direction.

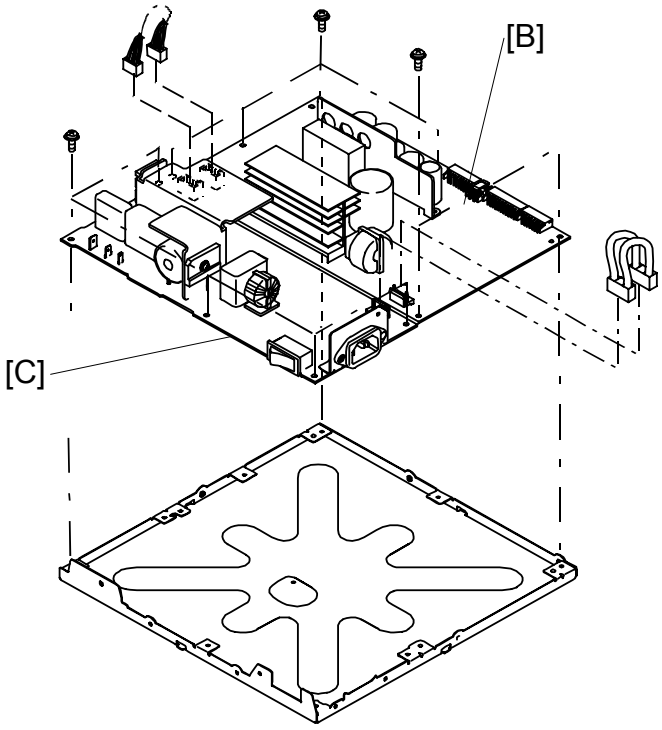
[B]: Power supply unit (🔩 x 11, ✋ x 4)
NOTE: Move the power supply unit in the arrow ① direction, and slide it out in the direction of the arrow ②.

3.10.2 POWER SUPPLY UNIT DISASSEMBLY

[A]: Power supply shield cover
(🔩 x 10)



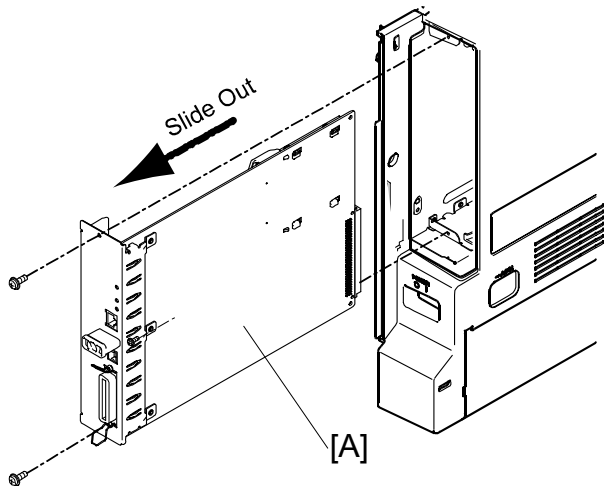
[B]: Power supply board
(🔌 x 2, 🔩 x 6)
[C]: IH power supply board
(🔌 x 1, 🔩 x 5)



3.10.3 MAIN CONTROL BOARD

NOTE: After replacing the controller, remove the NVRAM on the old board and install it on the new board. If the NVRAM on the old board is defective, replace the NVRAM (☛ 3.10.4).

[A]: Main control board (🖉 x 2)



3.10.4 NVRAM/EEPROM REPLACEMENT PROCEDURES

Before beginning the following procedures, make sure you have the printer's original SMC report (factory settings) available.

EEPROM on the ECB

1. Enter SP mode and print out the SMC reports with SP5-990 if possible.
2. Turn off the main switch and unplug the power cord.
3. Replace the EEPROM (IC5) on the ECB and reassemble the machine.
4. Execute the RAM clear for the engine settings with SP5-801-2.
5. Enter the SP mode changes from the factory in the field.
6. Input the engine serial number with SP-5-811-4.

NVRAM on the Controller

1. Enter SP mode and print out the SMC reports with SP5-990 if possible.
2. Turn off the main switch and unplug the power cord.
3. Replace the NVRAM on the controller and reassemble the machine.
4. Execute the RAM clear for the controller settings and counters with SP5-801-3, -8, -11, and SP7-808-1.
5. Contact your regional representative to enter the machine's serial number and destination code.
   NOTE: The destination code can only be entered using a secured access procedure. This is necessary to prevent unauthorized changing of the product's destination code.
6. Enter the SP mode data (changes as) indicated on the printer's original SMC report and the current SMC report printed in Step 1 of this procedure.

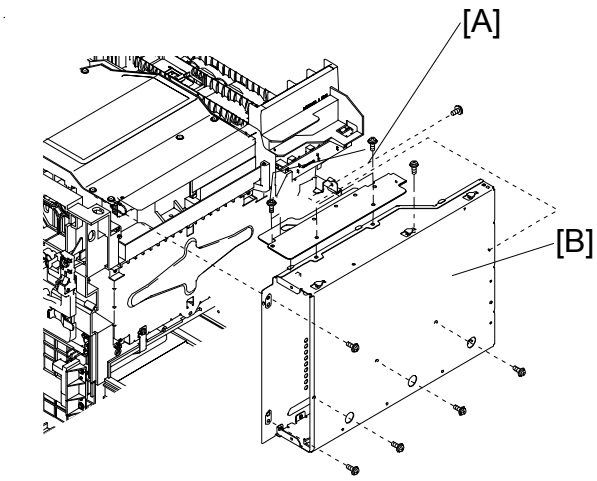
EEPROM on the ECB and the NVRAM on the Controller

1. Enter SP mode and print out the SMC reports with SP5-990 if possible.
2. Turn off the main switch and unplug the power cord.
3. Replace the EEPROM on the ECB and the NVRAM on the controller, and reassemble the machine.
4. Execute the RAM clear with SP5-801-1 and SP7-808-1.
5. Contact your regional representative to enter the machine's serial number and destination code.
   NOTE: The destination code can only be entered using a secured access procedure. This is necessary to prevent unauthorized changing of the product's destination code.
6. Enter the SP mode data (changes) as indicated on the printer's original SMC report and the current SMC report printed in Step 1 of this procedure.

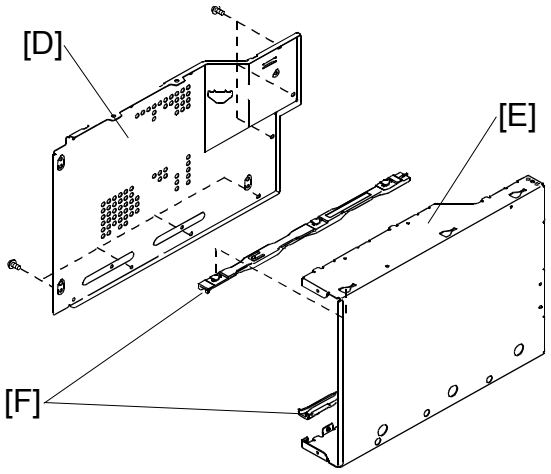
3.10.5 MAIN CONTROL BOARD SHIELD COVERS

- All covers (☛ 3.4)
- Power supply unit (☛ 3.10.1)
- Engine control board (☛ 3.5.1)

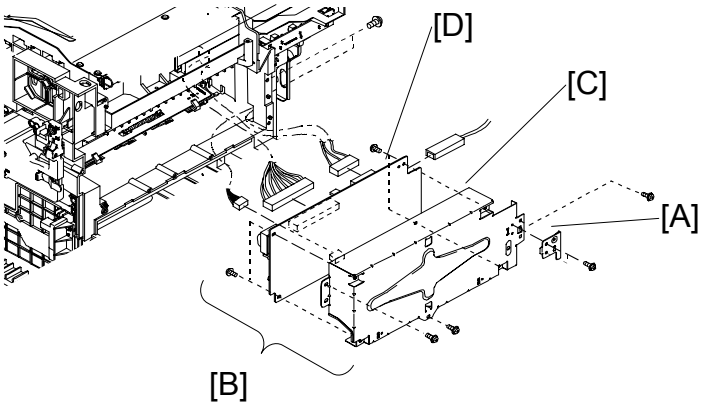
[A]: Laser scanning unit grounding plate (x 4)
[B]: Main control board shield cover assembly (x 7)



[C]: Main board shield cover (x 7)
[D]: Main board shield base cover
[F]: Main board guide rail

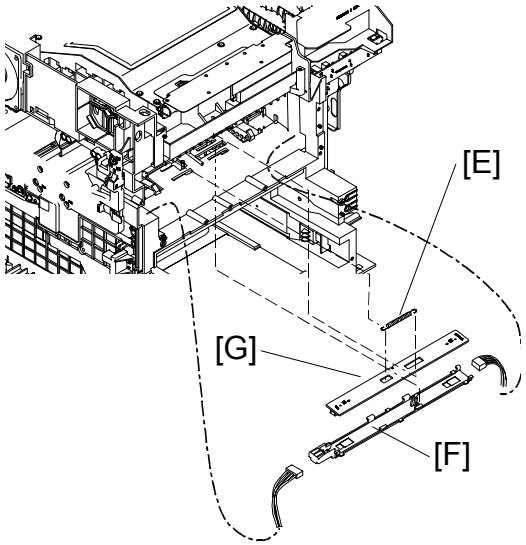


3.10.6 HIGH VOLTAGE BOARD AND REGISTRATION SENSOR BOARD



- All covers (☛ 3.4)
- Power supply unit (☛ 3.10.1)
- Main control shield cover assembly (☛ 3.10.5)
- Main drive unit (☛ 3.5.6)

[A]: HV earth plate (x 1)
[B]: High voltage unit with high voltage board (x 6, x 4)
[C]: High voltage board shield cover (x 4)

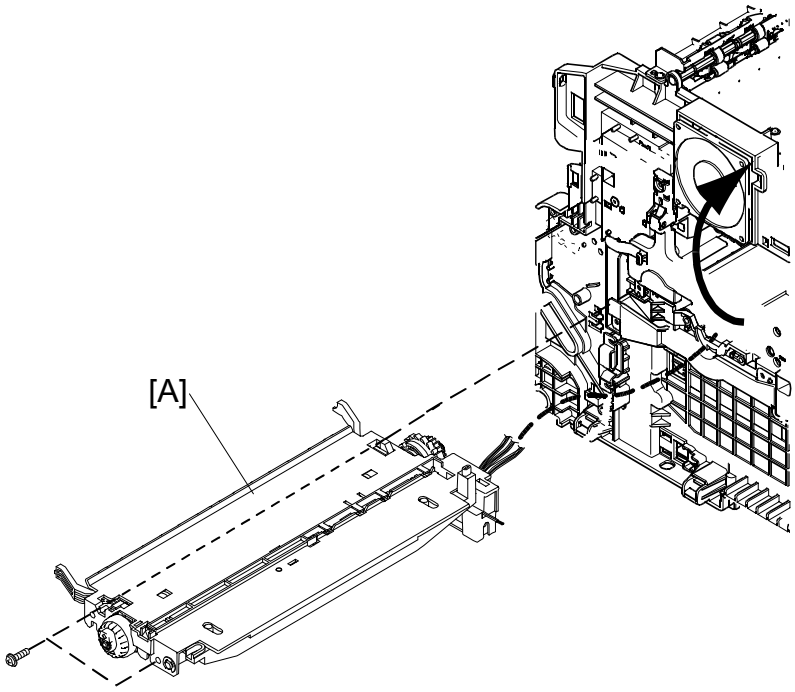


[D]: High voltage board
[E]: Spring
[F]: Color registration sensor board (x 2)
[G]: Waste toner bottle sensor actuator

NOTE: After replacing the color registration sensor board, the color registration values must be reset (SP5-998-002).

3.11 TRANSFER BELT TENSION UNIT

3.11.1 TRANSFER BELT TENSION UNIT REMOVAL

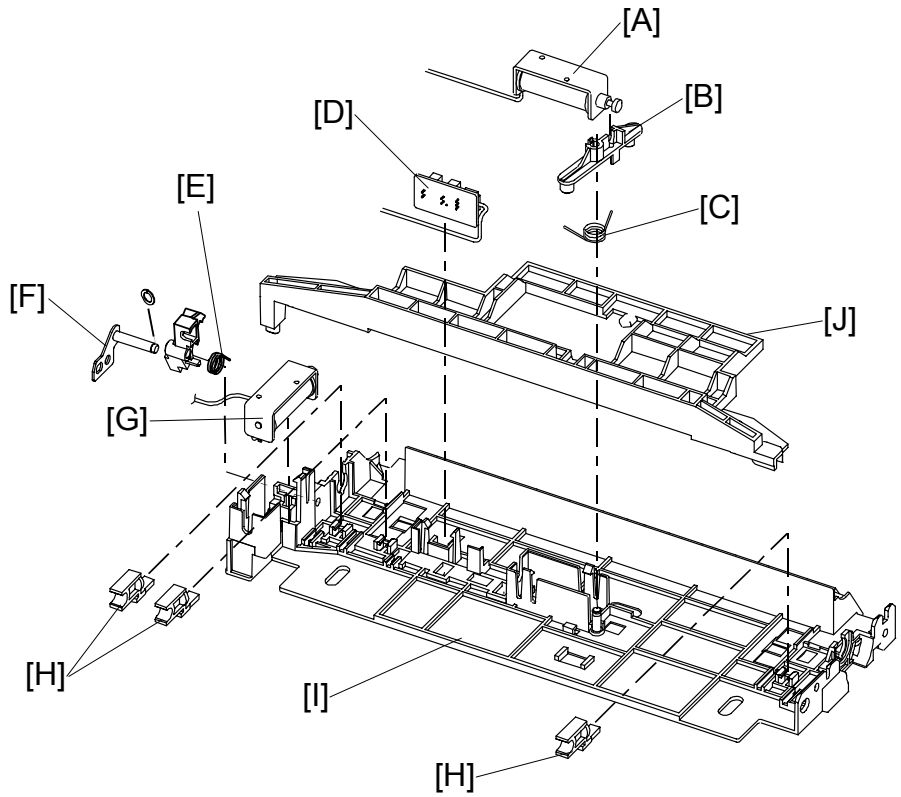


- Transfer belt unit (☛ 3.2)
- Rear cover (☛ 3.4.4)
- Left cover (☛ 3.4.5)
- Top cover (☛ 3.4.4)
- Open the right cover.

[A]: Transfer belt tension unit (🔩 x 2, ✋ x 3)

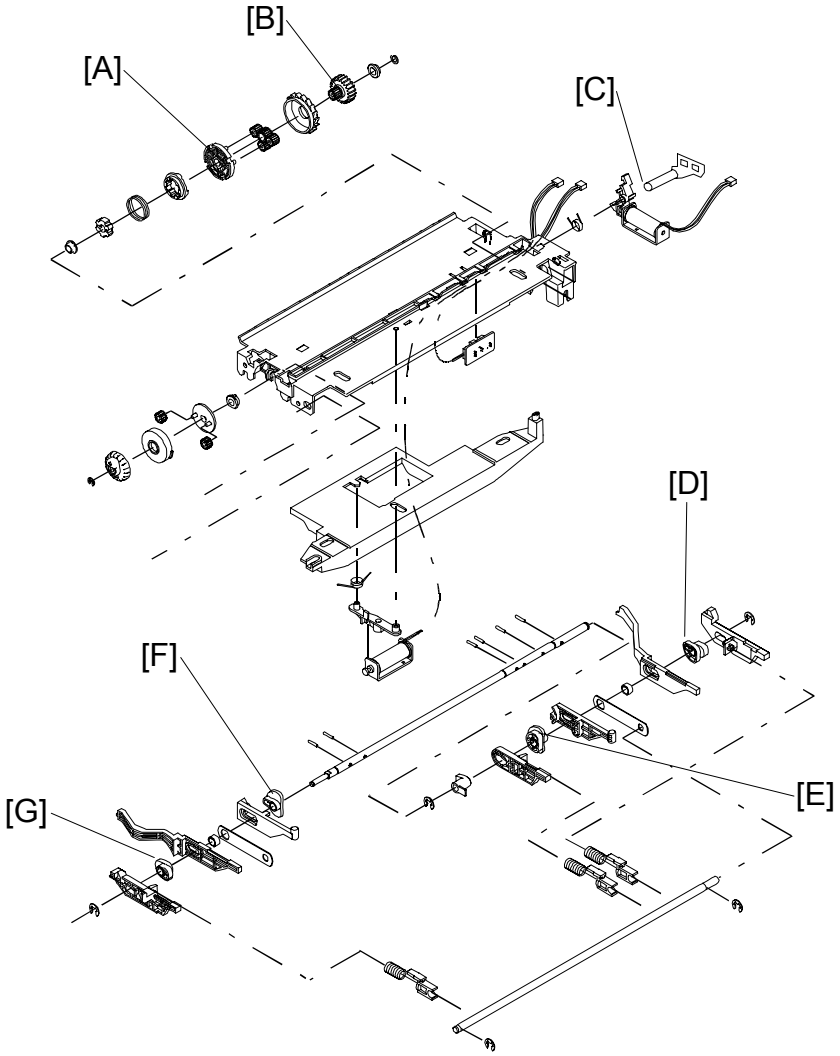
NOTE: The cables are wired through the opening of the frame and connected to the 3 connectors CN14, 24, and 25 on the engine control board. Take care not to damage the cables when removing the transfer belt tension unit.

3.11.2 CHANGER SOLENOID AND CAM RATCHET SOLENOID



[A]: Changer solenoid
[B]: Changer lever
[C]: Changer lever spring
[D]: Transfer cam home position sensor
[E]: Cam solenoid spring
[F]: Cam ratchet (with the washer)
[G]: Cam ratchet solenoid
[H]: Spring supports
[I]: Transfer belt tension unit base
[J]: Bracket

Lubricating



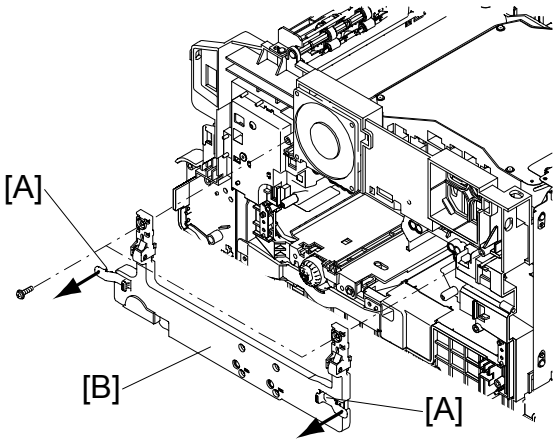
Lubricate the following parts (Grease 501) when replacing them (values in parentheses indicate the amount of lubricant):

[A]: The shafts on the planetary gear base (0.05 cc x 4); the inside edge (0.05 cc) and outside edge (0.05 cc) of the planetary gear base
[B]: The inside of the double teeth gear (0.05 cc)
[C]: The shaft on the cam ratchet bracket (0.05 cc)
[D]: The outside of the paper transfer cam (left) (0.2 cc)
[E]: The outside of the belt transfer cam (left) (0.2 cc)
[F]: The outside of the belt transfer cam (right) (0.2 cc)
[G]: The outside of the paper transfer cam (right) (0.2 cc)

3.12 PCU HOLDER

- Rear cover (☛ 3.4.4)
- Left cover (☛ 3.4.5)
- Top covers (☛ 3.4.4)
- Open the right cover.

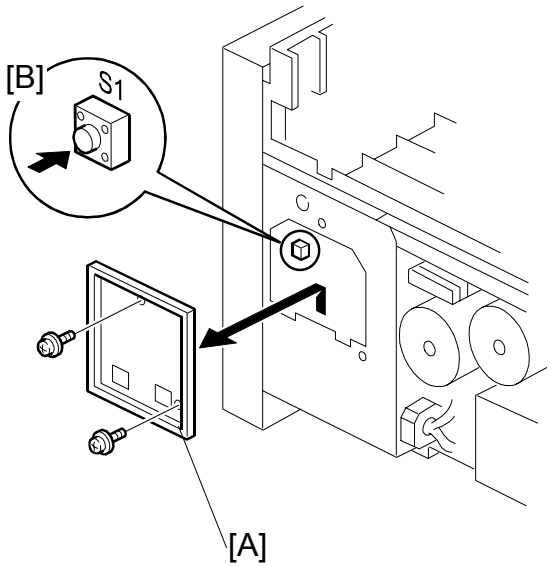
[A]: 2 tabs
NOTE: Move in the arrow direction.
[B]: PCU holder assembly (🔩 x 2)



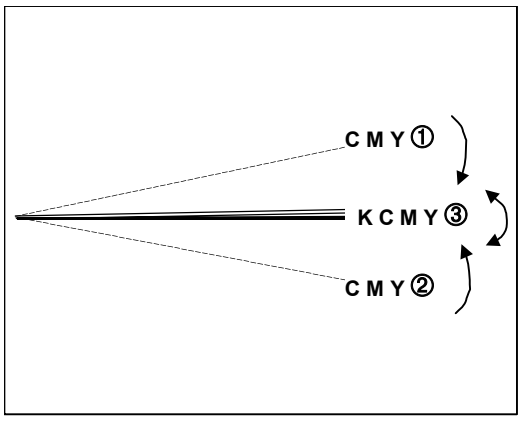
Adjustment

After replacing the PCU holder, adjust the position of the CMY PCU as follows.

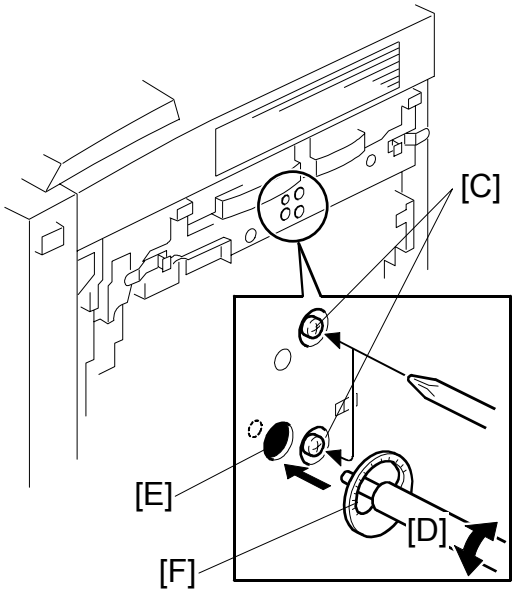
1. Remove the left cover (☛ 3.4.5).
2. Remove the board cover [A] (🔩 x 2).
3. Push the free-run button [B] and hold it down. One or more sheet of the test pattern is output.
   NOTE: The number of sheets depends on how long you hold the button down.
4. Check that the lines produced by the K PCU and CMY PCU are aligned properly.
   NOTE: Normally, the color lines (C, M, and Y) produced by the CMY PCU are aligned so closely that they appear as dark-gray lines.



5. Confirm that the color lines ① or ② are aligned to the black lines. If they are not aligned, go on to the next step. If they are aligned ③, adjustment is not required.
   NOTE: This procedure ensures that the black photoconductor unit is aligned properly (test lines parallel to paper's feed edge) and the color photoconductor unit is aligned properly to the black unit. By performing this adjustment the black PCU and color PCU are angled (skewed) to ensure that each color horizontal line on the test print overlaps (as close as possible) each black horizontal line on the test print. Do not power off the printer during this procedure.



6. Open the front cover, and make sure the PCU holder is correctly installed.
7. Loosen the screws [C].
   NOTE: You may wish to only loosen one set of screws at a time. This way you can adjust the skew of either the black or color PCUs individually.
8. Put the Color PCU Skew Adjustment Knob (G0819310) [D] in the opening [E], and turn it clockwise or counterclockwise.
   NOTE: The scale [F] indicates 20- to 30-µ steps on the paper.
9. Tighten the screws [C], and close the right cover.

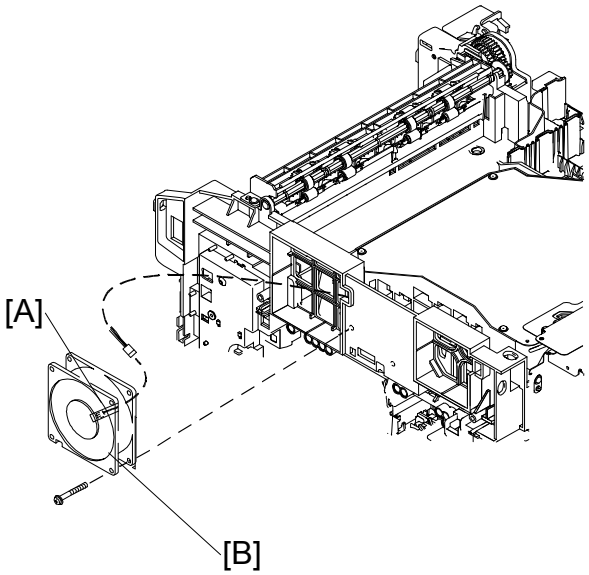


10. Repeat the steps above until the lines become as aligned as possible (see step 5).
    NOTE: When repeating the adjustment, place the special tool in the opening first, then loosen the screws [C]. If you loosen the screws first, the previous adjustment may be lost.
11. Power off the printer, wait several seconds, then power the printer back on. Confirm adjustment.

3.13 FUSING FAN MOTOR

- Rear cover (☛ 3.4.4)
- Left cover (☛ 3.4.5)
- Top cover (☛ 3.4.4)
- Open the right cover.

[A]: Insulation sheet (if present)
[B]: Fusing fan motor (🔩 x 1, 🔌 x 1)



3.14 SENSORS

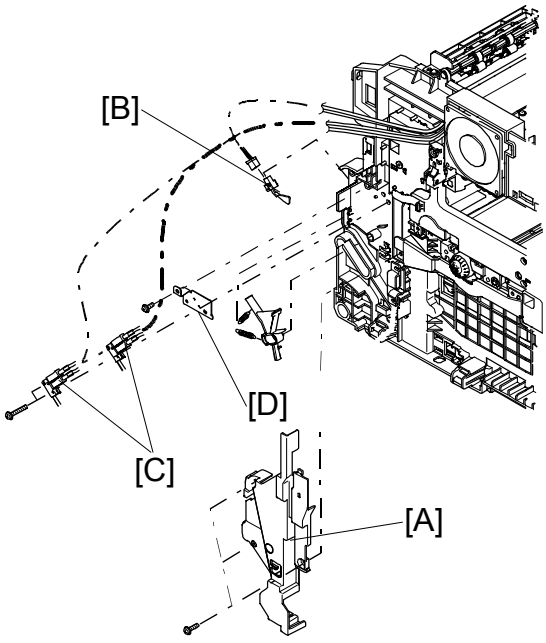
3.14.1 FRONT AND RIGHT COVER OPEN DETECTION SWITCHES

- Front door (☛ 3.4.1)
- Rear cover (☛ 3.4.4)
- Right cover (☛ 3.4.3)
- Top cover (☛ 3.4.4)

[A]: Interlock switch cover (🔩 x 3)
[B]: Front door open detection sensor (🔌 x 1)
[C]: Safety interlock switches (🔌 x 2, 🔩 x 2)

NOTE: The connectors are from the power supply unit and CN35 on the engine control board.

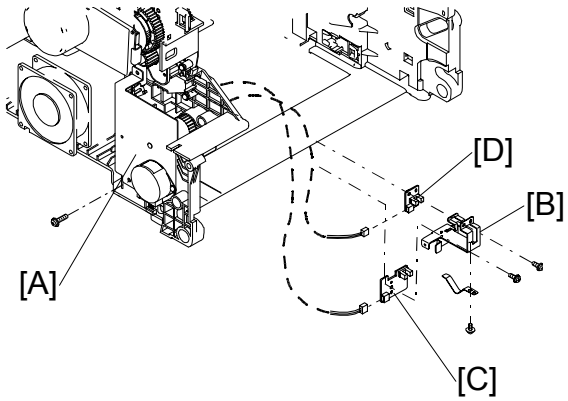
[D]: Interlock switch bracket (🔩 x 1)



3.14.2 BY-PASS TRAY HOME POSITION SENSOR AND BY-PASS TRAY PAPER DETECTION SENSOR BOARDS

- Left cover (☛ 3.4.5)
- Top cover (☛ 3.4.4)
- Rear covers (☛ 3.2)

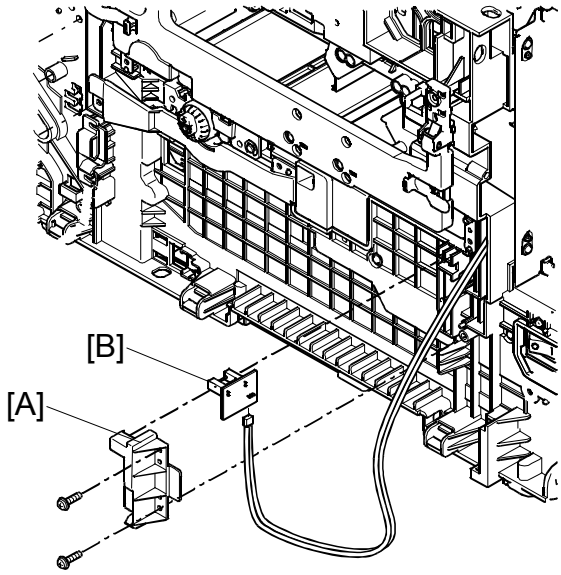
[A]: Paper pickup motor bracket (☞ x 1)
[B]: Bypass tray sensor cover (☞ x 2)
[C]: Bypass tray home position sensor board (✋ x 1)
[D]: Bypass tray paper detection sensor board (✋ x 1)



3.14.3 WASTE TONER CARTRIDGE FULL SENSOR

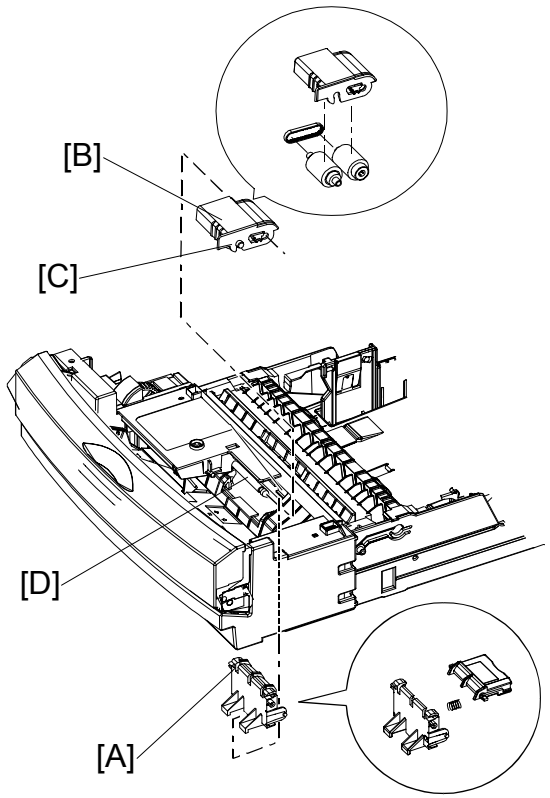
- Open the right cover.
- Waste toner cartridge

[A]: Waste toner cartridge right holder (☞ x 2)
[B]: Waste toner cartridge full sensor board (✋ x 1)

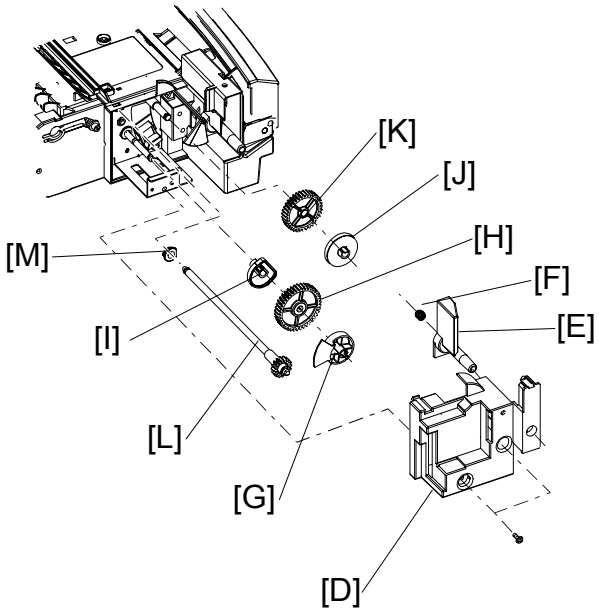


3.15 STANDARD PAPER CASSETTE

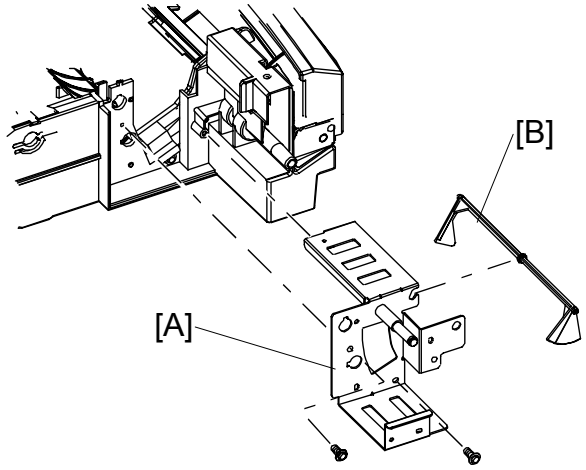
[A]: Separation pad unit
NOTE: See the bottom of the paper cassette.
[B]: Pickup roller unit
NOTE: Unlatch the pickup roller hook [C] and slide the pickup roller unit from the pickup roller shaft [B].



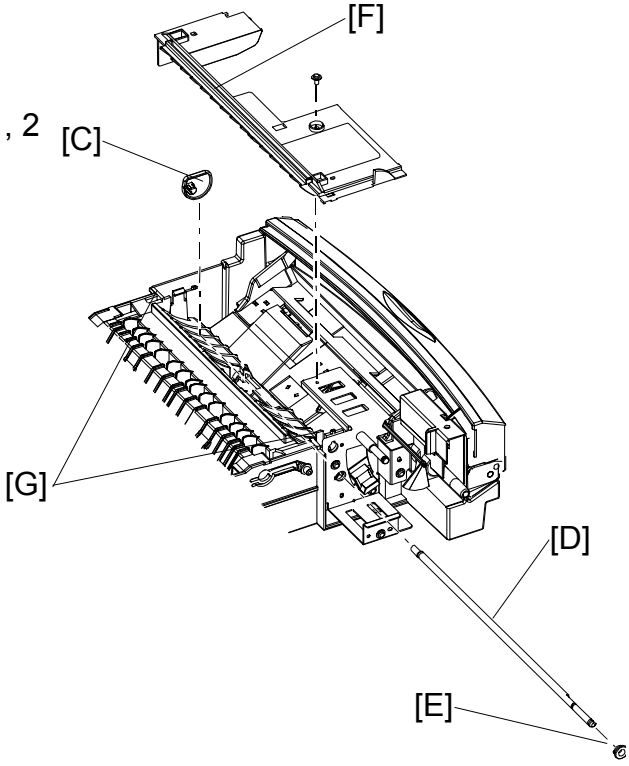
[D]: Gear cover (with the sub tray protector [E] and protector spring [F]) (🔩 x 2)
[G]: Roller position arm
[H]: Cam gear
[I]: Right cam
[J]: Gear spacer
[K]: Idle gear
[L]: Pickup roller with gear
[M]: Bushing

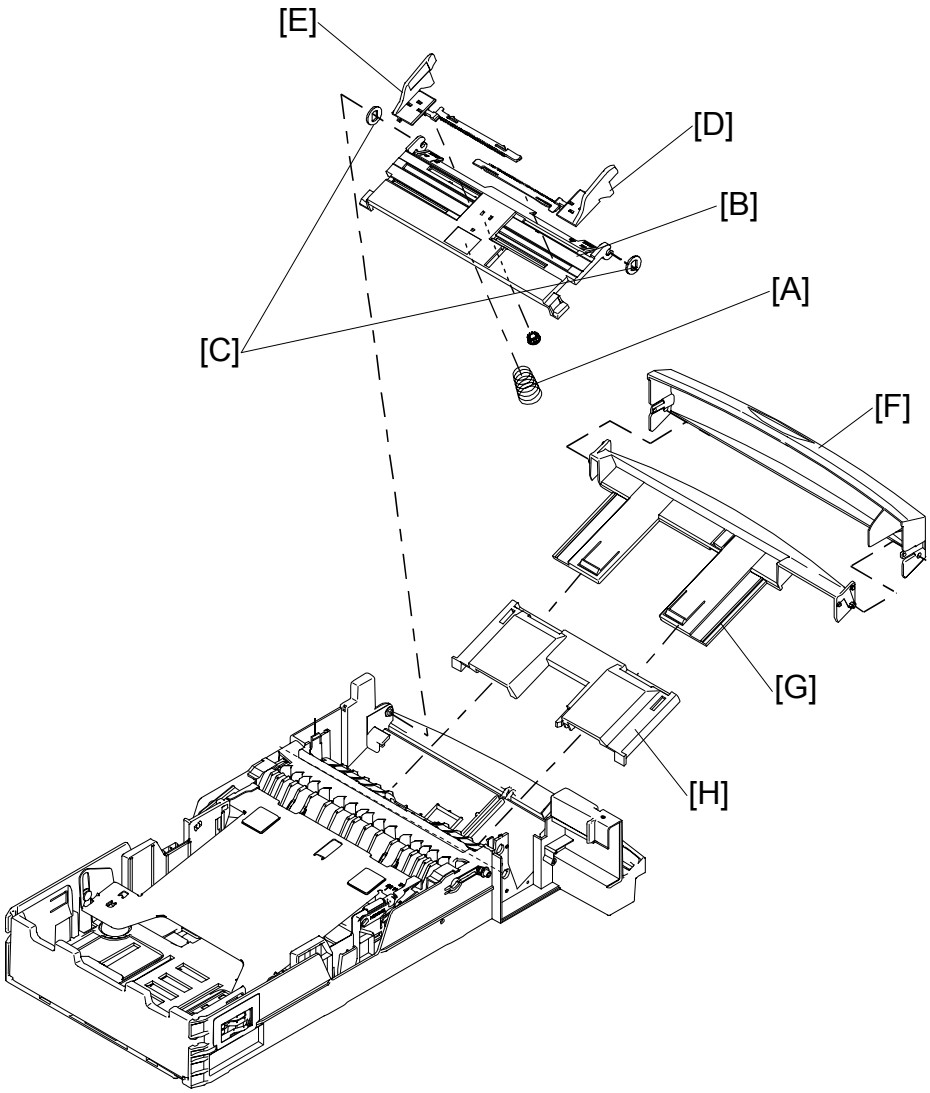


[A]: Cassette gear bracket
[B]: Paper exit sensor lever



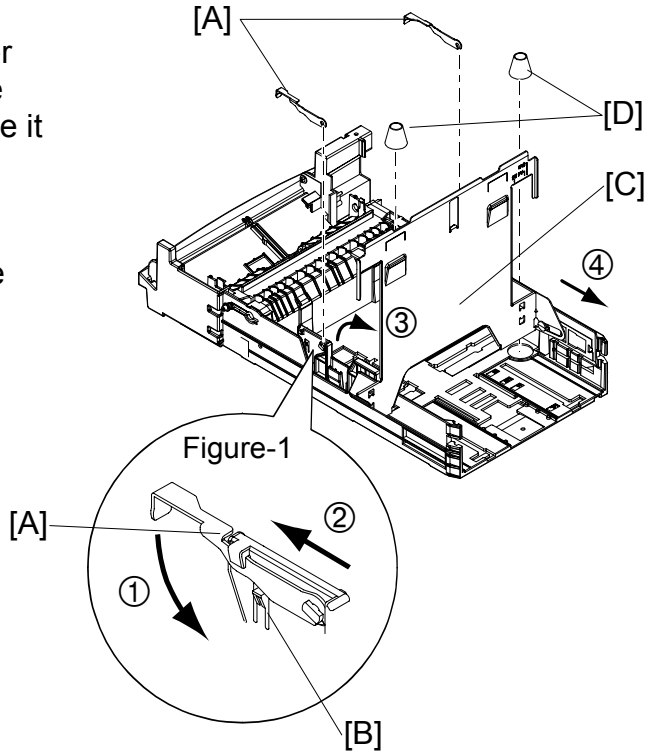
[C]: Left cam (1 hook)
[D]: Cam shaft
[E]: Bushing
[F]: Upper cassette paper guide (x 1, 2 hooks [E])



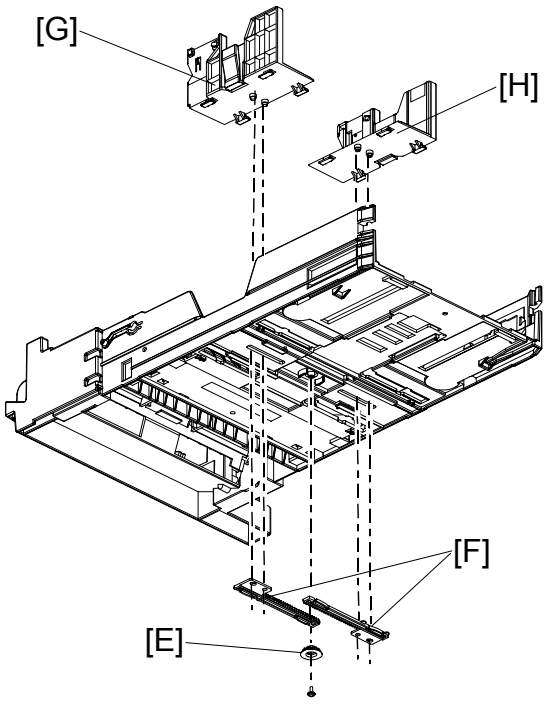


[A]: Holder spring
[B]: Bypass tray paper holder
[C]: Friction pad
[D]: Left paper guide
[E]: Right paper guide
[F]: Tray cover
[G]: Paper tray
[H]: Paper tray base

[A]: Corner separator
NOTE: Release the corner separator from the hook [B], and move it as shown by the arrows.
[C]: Cassette base plate
NOTE: Raise the cassette base plate in the arrow ③ direction, and slide it in the arrow ④ direction.
[D]: Two springs



[E]: Pinion gear with 2 racks [F] (🔩 x 1)
[G]: Right paper guide
[H]: Left paper guide



TROUBLESHOOTING

4. TROUBLESHOOTING

4.1 SERVICE CALL CONDITIONS

4.1.1 SUMMARY

1. All SCs are logged.
2. If the problem is related to an electrical circuit board, first disconnect then reconnect the connectors before replacing the PCBs.
3. If the problem is related to a motor lock, first check the mechanical load before replacing motors or sensors.

4.1.2 SC CODE DESCRIPTIONS

NOTE: When replacing the engine control board, remove the EEPROM from the original engine control board and install it on the new one.

SC	Symptom	Possible Cause/Required Action
201	Polygon motor error	
	After the main switch turns on, the polygon motor is not phase-locked in several seconds.	• Incorrect cable connection • Defective engine control board 1. Connect the cable correctly. 2. Replace the engine control board. 3. Replace the laser scanning unit. 4. Check or replace the cable.
230	V-Sync error	
	Subscan signals are not asserted.	See SC201.
302	Charge or transfer bias error	
	Charge bias in out of the normal range.	• Defective PCU charge terminal • Defective transfer belt unit bias terminal • Defective terminal springs on bias terminal unit • Incorrect cable connection between high voltage supply and engine control board • Defective high voltage board 1. Replace the PCU. 2. Replace the transfer belt unit. 3. Replace the bias terminal unit. 4. Connect the cable correctly. 5. Replace the high voltage board.
440	PCU BK motor error	
	The drive motor of the black PCU is not locked.	• Defective gear • Defective gear on transfer belt unit • Voltage between pins 1 and 13 (CN12 on engine control board) abnormal (not +24V), or pin 11 (CN12 on engine control board) unable to send motor clock • Defective black PCU drive motor 1. Replace the black PCU. 2. Replace the transfer belt unit. 3. Replace the engine control board. 4. Replace the main drive unit assembly.
441	PCU (CMY) motor error	
	The drive motor of the CMY PCU is not locked.	• Defective gear • Voltage between pins 2 and 14 (CN12 on engine control board) abnormal (not +24V), or pin 12 (CN12 on engine control board) unable to send motor clock • Defective CMY PCU drive motor 1. Replace the CMY PCU. 2. Replace the engine control board. 3. Replace the main drive unit assembly.

SC	Symptom	Possible Cause/Required Action
471	Belt tension unit cam error	
	Even though the belt tension unit tries to return to its home position several times, the home position sensor is not activated.	• Defective transfer belt unit • Pin 3 (CN25 on engine control board) unable to send signal • Defective transfer belt tension unit 1. Replace the transfer belt unit. 2. Replace the engine control board. 3. Replace the transfer belt tension unit.
486	BK solenoid error	
	The BK solenoid cannot drive the black PCU.	• Defective connection between engine control board (CN21) and BK solenoid • Pin 1 (CN21 on engine control board) unable to send solenoid control signal • Defective drive unit 1. Connect the cable between the engine control board (CN21) and BK solenoid correctly. 2. Replace the engine board. 3. Replace the drive unit.
487	Solenoid error	
	Any of the following solenoids has caused a short circuit: changer solenoid, paper feed solenoid, toner supply solenoid.	• Solenoid drive transistor short-circuited 1. Replace the engine controller board. 2. Replace the defective solenoid.
530	Fusing fan motor error	
	The fusing unit fan motor does not operate.	• Voltage between pins 2 and 3 (CN9 on engine control board) abnormal (not +24V) • Defective fusing unit fan 1. Replace the engine control board. 2. Replace the fusing unit fan.
531	PSU cooling fan error	
	The PSU cooling fan does not operate.	• Voltage between pins 1 and 2 (CN8 on engine control board) abnormal (not +24V) • Defective PSU cooling fan 1. Replace the engine control board. 2. Replace the PSU cooling fan.
532	Fusing unit sub-cooling fan (left) error	
	The fusing unit sub-cooling fan does not operate.	• Voltage between pins 1 and 2 (CN9 on engine control board) abnormal (not +24V) • Defective sub-cooling fan 1. Replace the engine control board. 2. Replace the sub-cooling fan.

SERVICE CALL CONDITIONS

SC	Symptom	Possible Cause/Required Action
543	Heating belt overheat	
	The temperature of the heating belt is out of the normal range.	• Pin 1 (IC6) unable to turns to lower level • Defective IH power supply board • Thermistor short-circuited • Defective cable connection between CN15 and thermistor 1. Replace the control board. 2. Replace the IH power supply board. 3. Replace the fusing unit. 4. Connect the cable between CN15 and the thermistor correctly.
544	Heating belt low temperature error (1)	
	The fusing unit thermistor in the middle of the unit has detected low temperature.	• Defective connection between engine control board (CN15) and fusing unit • Defective thermistor • Defective connection between fusing unit and thermistor • Pin 7 (CN32 on engine control board) unable to send signal • Defective IH unit or IH power supply board 5. Replace the IH unit or IH power supply board. 6. Connect the cable between the engine board and fusing unit correctly. 7. Replace the thermistor. 8. Connect the cable between fusing unit and thermistor correctly. 9. Replace the engine control board.
554	Heating roller low temperature error (2)	
	The fusing unit thermistor at the left end of the unit has detected much lower temperature than the other fusing unit thermistor does.	See SC544.
580	Fusing belt rotation error	
	The rotation of the fusing unit is not normal.	• Defective fusing belt, gear, or rotation plate • Defective connection between engine control board (CN15) and fusing unit • Defective connection of fusing unit connector • Pin 4 (CN15) unable to send 1.4-second (or less) encoder pulse 1. Replace the fusing unit. 2. Connect the cable between the engine control board (CN15) and fusing unit correctly. 3. Connect the fusing unit connector correctly. 4. Replace the engine control board.
581	Fusing unit low voltage error	
	The voltage applied to the fusing unit is out of the normal range.	• Defective IH power supply board • Defective thermostat 1. Replace the IH power supply board. 2. Replace the IH unit.

SC	Symptom	Possible Cause/Required Action
622	Option paper unit communication error	
	After the system starts, the communication with the paper tray is unexpectedly interrupted.	• Defective cable connection 1. Connect the cable to the paper tray correctly.
680	EEPROM error	
	Data is not write to or read from the EEPROM.	• Defective EEPROM (IC5) • Defective engine control board 1. Replace the EEPROM. 2. Replace the engine control board.

4.2 CONTROLLER ERROR

The following table describes the controller error codes. These codes are displayed at power-on, or after the power-on self diagnostic test, if an error occurs.

Important: Always try turning the main switch off waiting several seconds and then on and check if the problem persists.

SC	Symptom	Possible Cause/Required Action
640	Controller to engine communication error.	
	Checksum error detected between the controller and the engine board.	• Defective controller • Defective engine board 1. Check the connection between the controller and the engine board. 2. Replace the engine board if the error is frequent. 3. Replace the controller board if the error is frequent.
641	Controller to engine communication error.	
	The controller receives no response from the engine board.	• Defective controller • Defective engine board 1. Check the connection between the controller and the engine board. 2. Replace the engine board if the error is frequent. 3. Replace the controller board if the error is frequent.
670	Engine start-up error	
	The ready signal from the engine board is not detected.	• Defective engine board. Replace the engine board.
818	System timeout error	
	System program timeout error detected.	• Defective controller Replace the controller if it occurs frequently.
819	Kernel stop error	
	Unexpected CPU error by the ASIC/ RAM full detected.	• Defective controller Replace the controller if it occurs frequently.
820	Self-diagnostic error – CPU	
	CPU error detected during self-diagnostic.	• Defective controller Replace the controller if the error is frequent.
821	Self-diagnostic error - ASIC/CPU	
	ASIC and CPU timer error detected during self-diagnostic.	• Defective controller Replace the controller if the error is frequent.
822	Self-diagnostic error – HDD	
	HDD timeout error detected during self-diagnostic.	• Poor HDD connection • Defective HDD 1. Check the HDD connection. 2. Replace the HDD.
823	Self-diagnostic error – NIB	
	NIB error detected during self-diagnostic.	• Defective controller Replace the controller.

SC	Symptom	Possible Cause/Required Action
824	Self-diagnostic error – NVRAM	
	NVRAM error detected during self-diagnostic.	• Poor NVRAM connection 1. Check if the NVRAM is properly installed. 2. Replace the NVRAM
827	Self-diagnostic error - standard SDRAM	
	Standard SDRAM (memory) error detected during self-diagnostic.	• Defective controller Replace the controller if the error is frequent.
828	Self-diagnostic error - Flash ROM	
	Flash ROM error detected during self-diagnostic.	• Defective controller Replace the controller if the error is frequent.
829	Self-diagnostic error - Optional RAM	
	Memory RAM error detected during self-diagnostic.	• Poor connection of the optional memory • Defective memory RAM 1. Check the connection of the optional memory. 2. Replace the memory DIMM.
835	Self-diagnostic error - Parallel interface	
	Parallel interface error detected during self-diagnostic.	• Defective controller Replace the controller.
836	Self-diagnostic error - Font ROM	
	The data in the font ROM on board is damaged.	• Defective font ROM. 1. Turn the main switch off and on. 2. Replace the controller board.
837	Self-diagnostic error - Optional font ROM	
	The data in the font ROM (optional ROM-DIMM) is damaged.	• Defective optional ROM-DIMM. 1. Turn the main switch off and on. 2. Replace the optional ROM-DIMM.
850	NIB interface error	
	NIB interface error detected.	• Defective controller Replace the controller.
851	IEEE1394 interface error	
	IEEE1394 interface error detected.	• Defective controller Replace the controller.
853	IEEE802.11b error - card not detected (power-on)	
	Wireless LAN card not detected at power-on.	• Poor connection • Defective wireless LAN card • Defective controller 1. Check the wireless LAN card connection. 2. Replace the wireless LAN card.
854	IEEE802.11b error - card not detected (during operation)	
	Wireless LAN card not detected during operation.	• Poor connection • Defective wireless LAN card • Defective controller 1. Check the wireless LAN card connection. 2. Replace the wireless LAN card.

CONTROLLER ERROR

SC	Symptom	Possible Cause/Required Action
855	IEEE802.11b error	
	Wireless LAN card error detected.	• Poor connection • Defective wireless LAN card • Defective controller 1. Check the wireless LAN card connection. 2. Replace the wireless LAN card.
856	IEEE802.11b interface board error	
	Wireless LAN interface board error detected.	• Poor connection • Defective wireless LAN interface board 1. Check the wireless LAN interface board connection. 2. Replace the interface board.
857	USB I/F Error	
	USB interface error detected.	• Defective controller 1. Check the USB connections, make sure that they are securely connected. 2. Replace the controller board.
860	HDD start-up error	
	HDD initialization error detected.	• Defective HDD 1. Check the HDD connection. 2. Reformat the HDD. 3. Replace the HDD.
861	HDD: Reboot error	
	The HDD does not become ready within 30 seconds after the power is supplied to the HDD.	• Loose connection • Defective HDD • Defective controller 1. Turn the main switch off and on. 2. Check the connection between the HDD and controller. 3. Replace the HDD. 4. Replace the controller.
863	HDD data unable to read	
	Data stored in the HDD cannot be properly read.	• Defective HDD 1. Check the HDD connection. 2. Reformat the HDD. 3. Replace the HDD.
864	HDD data access error	
	HDD access error detected.	• Defective HDD Replace the HDD.
865	HDD access error	
	An error detected during HDD operation.	• Defective HDD Replace the HDD.
900	Electric counter error	
	Abnormal data is stored in the counters.	• Defective NVRAM • Defective controller 1. Turn the main switch off and on. 2. Check the connection between the NVRAM and controller. 3. Replace the NVRAM. 4. Replace the controller.

SC	Symptom	Possible Cause/Required Action
990	Unexpected software error	
	Unexpected software error detected.	• Defective controller Replace the controller if the error is frequent.
991	Unexpected software error	
	Unexpected software error detected, which does not affect operation of the machine.	The machine does not stop and the SC code is not displayed. The machine automatically recovers. However, the SC code is logged in the engine summary sheet (SMC).
998	Application start error	
	No applications start within 60 seconds after the power is turned on.	• Loose connection of RAM-DIMM, ROM-DIMM • Defective controller • Software problem 1. Turn the main switch off and on. 2. Check if the RAM-DIMM and ROM-DIMM are properly connected. 3. Reinstall the controller system firmware. 4. Replace the controller.
999	Software update error	
	Software updating failed.	• Controller DIP SW1 setting incorrect. • Defective software on IC card. • Controller software download error. 1. Try downloading the controller firmware again. 2. Replace the controller.

NOTE: If a problem always occurs in a specific situation (for example, same printer driver settings, same image file), the problem may be caused by a software error. In this case, send the following data and information to your product specialist or regional representative.

- Symptom/Possible causes/Action taken
- Summary sheet (SP mode “1 Service”, [Print Summary])
- SMC All (SP5-990-002)
- Logged data (SP5-990-004)
- Printer driver settings used when the problem occurs
- All data displayed on the screen (SC code, error code, and program address where the problem is logged.)
- Image file which causes the problem, if possible

4.3 TROUBLESHOOTING GUIDE

NOTE: When replacing the engine control board, remove the NVRAM from the original engine control board and install it on the new one.

4.3.1 BLANK PRINT

Symptom	Possible cause	Necessary actions
No image is printed.	Defective laser scanning unit	Replace the laser scanning unit.
	Defective PCU	Replace the PCU.
	Defective transfer belt unit	Replace the transfer belt unit.
	Defective transfer belt tension unit	Replace the transfer belt tension unit.
	Defective toner cartridge drive unit	Replace the toner cartridge drive unit.
	Defective toner cartridge agitator	Replace the toner cartridge.
	Incorrect action of transfer roller	Check the guide and the transfer roller.
	Defective high voltage supply board	Replace the high voltage supply board.
	Defective engine control board	Replace the engine control board.

4.3.2 ALL-BLACK PRINT

Symptom	Possible cause	Necessary actions
All the paper is black.	Incorrectly installed PCU	Install the PCU correctly.
	Defective PCU	Replace the PCU.
	Defective high voltage supply board	Replace the high voltage supply board.
	Defective laser scanning unit	Replace the laser scanning unit.
	Defective engine control board	Replace the engine control board.
	Defective main board	Replace the main board.

4.3.3 MISSING CMY COLOR

Symptom	Possible cause	Necessary actions
C, M, or Y is missing.	Defective PCU	Replace the PCU.
	Loose connection between printer cartridge and engine control board	Replace the connection spring.
	Transfer belt not contacting PCU	Check the belt tension unit.
	Defective cable on belt tension unit	Replace the belt tension unit.
	Defective PCU motor	Replace the PCU motor.
	Defective engine control board	Replace the engine control board.

4.3.4 LIGHT PRINT

Symptom	Possible cause	Necessary actions
Printed images are too weak.	Loose connection between transfer roller and high voltage supply unit	Check the connection between the transfer roller and the high voltage supply unit.
	Dust in the laser beam path	Clean the laser beam path.
	Transfer belt not contacting PCU	Check the belt tension unit.
	Defective PCU	Replace the PCU.
	Defective transfer roller	Repair the transfer roller.
	Defective fusing unit	Replace the fusing unit.
	Defective engine control board	Replace the engine control board.

4.3.5 REPEATED SPOTS OR LINES ON PRINTS

Symptom	Possible cause	Necessary actions
The same spots or lines appear at regular intervals.		
At intervals of 31.4 mm (1.236 inches)	Defective charge roller	Replace the PCU.
At intervals of 36.0 mm (1.417 inches)	Defective belt transfer roller	Replace the transfer belt unit.
At intervals of 38 mm (1.496 inches)	Defective development roller	Replace the PCU
At intervals of 44.7 mm (1.759 inches)	Defective transfer belt drive roller	Replace the transfer belt unit.
At intervals of 45.6 mm (1.795 inches)	Defective waste toner disposal screw	Replace the PCU.
At intervals of 46.2 mm (1.82 inches)	Defective registration roller	Replace the registration roller.
At intervals of 69.1 mm (2.721 inches)	Defective transfer roller	Replace the transfer roller.
At intervals of 75.4 mm (2.968 inches)	Defective OPC drum	Replace the PCU.
At intervals of 75.4 mm (2.968 inches)	Defective belt tension roller	Replace the transfer belt unit.
At intervals of 63.5 mm (2.5 inches)	Defective toner supply roller	Replace the PCU.
At intervals of 95.0 mm (3.740 inches)	Defective pressure roller	Replace the fusing unit.
At intervals of 142 mm (5.6 inches)	Defective fusing belt	Replace the fusing unit.

4.3.6 DARK VERTICAL LINE IN PRINT

Symptom	Possible cause	Necessary actions
A dark line appears. The line is parallel to the paper feed direction.		
Of one CMY color	Defective PCU	Replace the PCU.
Of any color (not C, M, or Y)	Dust in the laser beam path	Clean the laser beam path.
	Defective transfer belt unit	Replace the transfer belt unit.
	Defective fusing unit	Replace the fusing unit.

4.3.7 WHITE HORIZONTAL LINES OR BANDS

Symptom	Possible cause	Necessary actions
White lines or bands appear in images of all toner colors. They are vertical to the paper feed direction.	Defective PCU	Replace the PCU.
	Defective transfer belt unit	Replace the transfer belt unit.
	Defective transfer roller	Replace the transfer roller.

4.3.8 MISSING PARTS OF IMAGES

Symptom	Possible cause	Necessary actions
Some parts of images are missing.	Defective PCU	Replace the PCU.
	Defective transfer belt unit	Replace the transfer belt unit.
	Defective transfer roller	Replace the transfer roller.
	Defective fusing unit	Replace the fusing unit.

4.3.9 DIRTY BACKGROUND

Symptom	Possible cause	Necessary actions
Backgrounds are too dense.		
Of one CMYK color	Defective PCU	Replace the PCU.
Of more than one CMYK color	Defective high voltage supply board	Replace the high voltage supply board.

4.3.10 PARTIAL CMY COLOR DOTS

Symptom	Possible cause	Necessary actions
Unexpected dots of the same color appear at irregular intervals.	Defective PCU	Replace the PCU.
	Defective transfer belt unit	Replace the transfer belt unit.
	Defective fusing unit	Replace the fusing unit.

4.3.11 DARK IRREGULAR STREAKS ON PRINTS

Symptom	Possible cause	Necessary actions
Unexpected streaks appear at irregular intervals.	Defective transfer belt	Replace the transfer belt unit.

4.3.12 CMY COLOR IRREGULAR STREAKS

Symptom	Possible cause	Necessary actions
Unexpected streaks of the same color appear at irregular intervals.	Defective PCU	Replace the PCU.
	Defective transfer belt unit	Replace the transfer belt unit.

4.3.13 GHOSTING

Symptom	Possible cause	Necessary actions
The same or similar image appears two or more times. They get weaker and weaker.	Defective PCU	Replace the PCU.

NOTE: 1) “Ghosting” is sometimes unavoidable. This is because the charge is not completely quenched while the transfer belt makes one rotation.
2) Older toner cartridges can result in ghosting issues.

4.3.14 UNFUSED OR PARTIALLY FUSED PRINTS

Symptom	Possible cause	Necessary actions
Some parts of images are not fused very well.	Nonstandard paper in use	Use recommended paper.
	Incorrect media type mode	Select an appropriate media mode.
	Defective fusing unit	Replace the fusing unit.

4.3.15 IMAGE SKEW

Symptom	Possible cause	Necessary actions
Images are skewed	Incorrect installation of paper	Install the paper correctly.
	Incorrect paper guide position	Adjust the paper guide correctly.
	Defective intermediate or registration roller	Repair the paper feed unit.
	Incorrect action of transfer roller	Check the transfer roller.
	Defective engine control board	Replace the engine control board.
	Defective corner separator	Replace the corner separator
	Defective spring	Replace the spring

4.3.16 BACKGROUND STAIN

Symptom	Possible cause	Necessary actions
The reverse side of the paper is not clean.	Unclean transfer roller	Clean the transfer roller.
	Unclean paper path	Clean the paper path.
	Unclean intermediate or registration roller	Clean the intermediate or registration roller.
	Unclean fusing unit exit	Clean the fusing unit exit.
	Defective fusing unit	Replace the fusing unit.

4.3.17 NO PRINTING ON PAPER EDGE

Symptom	Possible cause	Necessary actions
Images are not printed in the areas around the paper edges.	Defective PCU	Replace the PCU.
	Defective toner cartridge	Replace the toner cartridge.
	Defective transfer belt unit	Replace the transfer belt unit.
	Transfer belt not contacting PCU	Check the belt tension unit.

4.3.18 IMAGE NOT CENTERED WHEN IT SHOULD BE

Symptom	Possible cause	Necessary actions
Images do not come to the center.	Incorrect installation of paper	Install the paper correctly.
	Incorrect paper guide position	Adjust the paper guide correctly.
	Incorrect margin setting	Adjust the margin setting.
	Defective engine control board	Replace the engine control board.

4.4 ELECTRICAL COMPONENT DEFECTS

4.4.1 SENSORS

No.	Sensor Name/ Sensor Board Name	Signal Name	Active	CN No./ Pin No. (Switch)	Position
1	BK PCU Virgin Sensor Board	PIKFUSEK	Analog	CN6/1	Black PCU
2	CMY PCU Virgin Sensor Board	PIKFUSEYMC	Analog	CN6/3	CMY PCU
3	Front/Right Door Open Detection Switch	DOPEN	H	CN7/1	Right side of Chassis (front side)
4	Black Toner Empty Sensor	NEMPK	L	CN10/1	Toner Empty Sensor Board on Toner Cartridge Drive Unit
5	Cyan Toner Empty Sensor	NEMPC	L	CN10/2	
6	Yellow Toner Empty Sensor	NEMPY	L	CN10/7	
7	Magenta Toner Empty Sensor	NEMPM	L	CN10/8	
8	Toner Cartridge Access Cover Detection Switch	TCDOPEN	H	CN11/1	Top Cover
9	CMY PC Home Position Sensor	YMCZPH	H	CN13/2	OPC Cam Home Position Sensor Board on Main Drive Unit
10	Black PC Home Position Sensor	KZPH	H	CN13/3	
11	Accumulator Cam Home Position Sensor	ITHOME1	H	CN14/2	Accumulator Tension Unit
12	Fusing Unit Detection Sensor	FSRFUSE	L	CN15/1	Fusing Unit
13	Thermistor 1	TH1HIGH	Analog	CN15/2	
14	Thermistor 2	TH2HIGH	Analog	CN15/3	
15	Heat Roller Rotation Sensor	ROTATE	H	CN15/5	
16	Fusing Jam (Paper Ejection) Sensor	NFSRJAM	L	CN15/6	
18	Paper Full Sensor	EXITFULL	H	CN17/1	Paper Full/Jam Sensor Board in paper exit block
19	Paper Jam Sensor	NEXTJAM	L	CN17/2	
20	Paper Empty Sensor	STPNON	H	CN18/2	Paper Empty/Registration Sensor Board on Paper Feed Unit
21	Registration Sensor	NREGSEN	L	CN18/3	
22	MPT Home Position Sensor	MPTHOME	H	CN23/3	Left side of Chassis (front side)
23	MPT Paper Empty Sensor	MPPSEN	H	CN23/5	
24	Waste Toner Full Sensor	TBFUL	H	CN27/1	By Power Switch
25	Left Side Color Registration Sensor	SNS_L	L	CN27/4	Color Registration Sensor Board

No.	Sensor Name/ Sensor Board Name	Signal Name	Active	CN No./ Pin No. (Switch)	Position
26	Waste Toner Detection Sensor	WTB_NON	H	CN27/6	
27	Right Side Color Registration Sensor	SNS_R	L	CN27/8	
28	Paper Size Size 1 Switch	STPSZ1	L	CN28/1	Rear side of Chassis (paper size detector)
29	Paper Size Size 2 Switch	STPSZ2	L	CN28/2	
30	Paper Cassette Detection Switch	STNON	H	CN28/4	
31	Temperature Sensor	TEMP	Analog	CN29/1	Humidity/Temperature Sensor Board at left side of Chassis
32	Humidity Sensor	HUM	Analog	CN29/3	
33	Front Door/Right Cover Open Sensor (interlock switch)	+5VLD	H	CN35/1	Right side of Chassis (front)
34	ADU Detection Sensor	ADUNON	H	CN39/2	Inner Cover (at Front side of Chassis)
35	ADU Jam Detection Sensor	NADUJAM	L	CN39/5	
36	Paper Jam Sensor	ACFJAM	H	CN3201/2	Option Feeder
37	Paper Empty Sensor	ACFPNON	H	CN3201/3	
38	Option Cassette Paper Size 1 Switch	STPSZ1	L	SW1	
39	Option Cassette Paper Size 2 Switch	STPSZ2	L	SW2	
40	Option Cassette Detection Switch	STNON	H	SW3	

NOTE: The “Active” column refers to the voltage-state present when the device (sensor, switch, etc…) is performing its intended function.
For example: item 3 – Front/Right Door Open Detection Switch – Active H. This indicates that when the Right Door is Open this device is active and the voltage state at CN7/1 will be “High,” in this case 5 volts dc.
If you require the “Ready” condition values refer to the G081/G092 Connector Layout Tables located on the back of your Point-to-Point.

4.5 BLOWN FUSE CONDITIONS

Power supply unit

Fuse	Rating		Symptom when turning on the main switch
	120 V	220 – 240 V	
F1	8 A/125 V	4 A/250 V	No response
F2	4 A/125 V	4 A/250 V	No response
F3	4 A/125 V	4 A/250 V	No response
F4	4 A/125 V	4 A/250 V	No response
F5	4 A/125 V	4 A/250 V	No response
F6	4 A/125 V	4 A/250 V	No response
F7	4 A/125 V	4 A/250 V	No response

High voltage unit

Fuse	Rating		Symptom when turning on the main switch
	120 V	220 – 240 V	
IP101	1.5 A/50 V	1.5 A/50 V	No response

4.6 LEDS

No LEDs are used for this model (except for the Network Interface).

SERVICE TABLES

5. SERVICE TABLES

5.1 SERVICE PROGRAM MODE

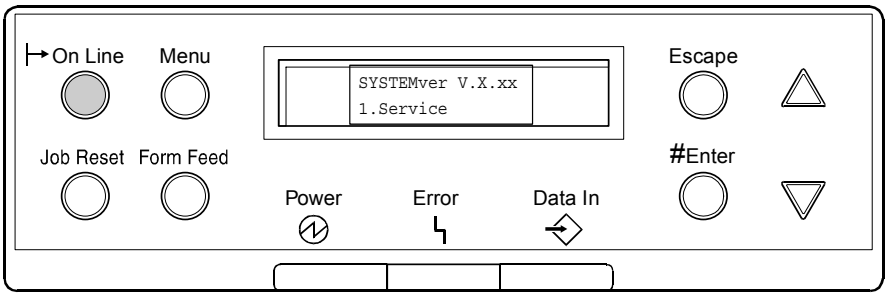
⚠CAUTION

Before accessing the service menu, do the following:

Confirm that there is no print data in the printer buffer (the Data In LED must not be lit or blinking).
If there is some data in the buffer, wait until all data has been printed.

5.1.1 SERVICE MODE OPERATION

NOTE: The Service Program Mode is for use by service representatives only so that they can properly maintain product quality. If this mode is used by anyone other than service representatives for any reason, data might be deleted or settings might be changed. In such case, product quality cannot be guaranteed any more.



Entering the Service Mode

There are two ways to enter the service mode.

Method 1: Turn the machine on while pressing the “On Line” key and “Escape” key together until “SYSTEMver V.X.xx 1. Service” appears on the display.

NOTE: If you switch the machine off, any jobs stored on the hard disk using the sample print and protected print features will be deleted.
Check first with the user tools to see if there are any jobs stored using these features
(Menu key - Sample Print, or Protected Print).

Method 2: Press the “Up/Down arrow” keys together for about 5 seconds, release, then immediately press the “Enter” key.
The same message as described in Method 1 is displayed.

NOTE: The machine automatically goes off line when you enter the service mode.

Accessing the Required Program

Use the “Up/Down arrow” keys to scroll through the menu listing.

1. Service Menu: Controller service modes
2. Engine Maintenance: Engine service modes
3: End: Exit service mode

To select an item, press the “Enter” key. Then the sub-menu will appear.
Scroll through the sub menu items using the “Up/Down arrow” keys.
To go back to a higher menu level, press the “Escape” key.

NOTE: Certain SP modes can also be selected (accessed) from the operation panel by pressing: “Enter,” “Escape,” then the “Menu” key in sequence, (not together). These certain SP modes are generally related to the various communication options. For Example: SP5-851-1 [Bluetooth] and SP5-844-1 [USB] can be accessed using the procedure described here.

Inputting a Value or Setting for a Service Program

Access the required program mode as explained above. The setting appearing on the display is the current setting.
Select the required setting using the “Up/Down arrow” keys, then press the “Enter” key. The previous value remains if the “Enter” key is not pressed.

Exiting Service Mode

Select “3. End” from the service mode main menu, then press the “Enter” key.

NOTE: To make the settings effective, turn the main switch off and on after exiting service mode.

5.2 PRINTER CONTROLLER SERVICE MODE

NOTE: In the Function/[Setting] column:

- The related pop-up screen name and function name (if any) appear in parenthesis following the function description.
- Comments are in *italics*.
- The setting range is enclosed in brackets, with the default setting written in **bold**.
- An asterisk (*) after the mode number means that this mode's value is stored in the NVRAM. If you do a RAM reset, all these SP modes will be returned to their factory settings.
- **DFU** stands for **D**esign/**F**actory **U**se only. Values marked **DFU** should not be changed.
- **FA** stands for **F**actory **A**djustment only. Values marked **FA** should not be changed.
- The Printer Controller is referred to as the Main Control Board.

5.2.1 SERVICE MENU-CONTROLLER SERVICE MODES ("1. SERVICE")

Mode No. (Class 1 and 2)		Function / [Setting]
[Bit Switch] – SP1001		
1	Bit Switch 1	(See "Bit Switch Settings".)
⇒ 2	Bit Switch 2	
3	Bit Switch 3	
4	Bit Switch 4	
5	Bit Switch 5	
6	Bit Switch 6	
7	Bit Switch 7	
8	Bit Switch 8	
[Clear Setting] – SP1003		
1	Clear Setting	Initializes the settings in the "System" menu of the user tools.
[Print Summary] – SP1004		
1	Print Summary	Prints the service summary sheet (a summary of all the controller settings).
[DispVersion] Display Version – SP1005		
1	Disp Version	Displays the version of the controller firmware.
[ToneCtlSet] Toner Control Setting – SP1101		
1	Tone (Factory)	Recalls the gamma settings. Select the factory, previous, or current setting.
2	Tone (Prev.)	
3	Tone (Current)	
[ToneCtlSet] Toner Control Setting – SP1102		
1	*1200 x 1200 Photo	Selects the printing mode (resolution) for the printer gamma adjustment. When selecting a print mode, an asterisk (*) is displayed in the front of the mode.
2	600 x 600 Text	
3	1200 x 600 Text	
4	600 x 600 Photo	
5	1200 x 600 Photo	

Mode No. (Class 1 and 2)		Function / [Setting]
[PrnColorSheet] Print Color Sheet – SP1103		
1	ToneCtlSheet	Prints the test page to check the color balance before and after the gamma adjustment.
2	ColorChart	
[TonerCtlValue] Toner Control Value – SP1104		
1	Black/Cyan/Magenta/Yellow 1	Adjusts the printer gamma for the mode selected with the “Tone Ctl Set” setting. [0 to 255 / 16 / 1/step]
2	Black/Cyan/Magenta/Yellow 2	[0 to 255 / 32 / 1/step]
3	Black/Cyan/Magenta/Yellow 3	[0 to 255 / 48 / 1/step]
4	Black/Cyan/Magenta/Yellow 4	[0 to 255 / 64 / 1/step]
5	Black/Cyan/Magenta/Yellow 5	[0 to 255 / 80 / 1/step]
6	Black/Cyan/Magenta/Yellow 6	[0 to 255 / 96 / 1/step]
7	Black/Cyan/Magenta/Yellow 7	[0 to 255 / 112 / 1/step]
8	Black/Cyan/Magenta/Yellow 8	[0 to 255 / 128 / 1/step]
9	Black/Cyan/Magenta/Yellow 9	[0 to 255 / 144 / 1/step]
10	Black/Cyan/Magenta/Yellow 10	[0 to 255 / 160 / 1/step]
11	Black/Cyan/Magenta/Yellow 11	[0 to 255 / 176 / 1/step]
12	Black/Cyan/Magenta/Yellow 12	[0 to 255 / 192 / 1/step]
13	Black/Cyan/Magenta/Yellow 13	[0 to 255 / 208 / 1/step]
14	Black/Cyan/Magenta/Yellow 14	[0 to 255 / 224 / 1/step]
15	Black/Cyan/Magenta/Yellow 15	[0 to 255 / 240 / 1/step]
[ToneCtlSave] Toner Control Value Save – SP1105		
1	ToneCtlSave	Stores the print gamma adjusted with the “Toner Ctl Value” menu item as the current setting. Before the machine stores the new “current setting”, it moves the data currently stored as the “current setting” to the “previous setting” memory storage location.
[Toner Limit] – SP1106		
1	TonerLimitPhot	Adjusts the maximum toner amount for image development. [100 to 400 / 260 / 1%/step]
2	TonerLimitText	[100 to 400 / 260 / 1%/step]
[FactoryTestPrt] Factory Test Page Print – SP1107		
1	Image Density	Prints the image density test page for the factory line.

Bit Switch Settings

NOTE: These bit switches are all for use in Japan only.

How to Change Bit Switch Settings

1. Select “1. Service”.
   NOTE: “ver V.x.xx.” indicates the machine’s firmware version.

```
SYSTEMver V.X.xx
1.Service
```

2. Press the Enter key 2 times.

```
SP1001-001
Bit Switch 1
```

3. Press the up arrow key or down arrow key to display bit switches 1 through 4.

```
SP1001-004
Bit Switch 4
```

4. Press the Enter key.

```
Sw#4    00000000
bit0             _
```

5. Press the up arrow key or down arrow key to select a column.

```
Sw#4    00000000
bit3             _
```

6. Press the Enter key. The current value appears in the column.

```
Sw#4    00000000
bit3             0
```

7. Press the up arrow key or down arrow key to change the value.

```
Sw#4    00000000
bit3             1
```

8. Press the Enter key. The changed value is stored.

```
Sw#4    00001000
bit3             _
```

9. Press the escape key 3 times.

```
SYSTEMver V.0.24
1.Service
```

10. Select “3. End.”

```
SYSTEMver V.X.xx
3.End
```

11. Power the printer off, and after several seconds, power back on, in order to activate settings.

Bit Switch 1 (Japan only)

Bit	Function	Default
0	Key protect [0: Not activated, 1: Activated] **DFU**	0
1	(Not used.) **DFU**	0
2	(Not used.) **DFU**	0
3	(Not used.) **DFU**	0
4	(Not used.) **DFU**	0
5	(Not used.) **DFU**	0
6	(Not used.) **DFU**	0
7	Emulation print area (RPCS only). [0: Not printed, 1: Printed]**DFU**	0

Bit Switch 2

Bit	Function	Default
1	Overlap job mode (njob) [0: Not activated, 1: Activated] **DFU**	0
3	PDL Sniffing - See PUB(C)-051 for details. [**0: Enabled**, 1: Disabled]	0

Bit Switch 3

Not used

Bit Switch 4 (Japan only)

Bit	Function	Default
0	Background areas of simple graphics (RPDL, R16, R55, R98) [0: Not painted, 1: Painted] **DFU**	0
1	Unknown 2-byte characters (R98) [0: Cleared, 1: Not cleared] **DFU**	0
2	Specifies portrait/landscape reset (R16) [0: Reset by the reset command, 1: Not reset by the reset command] **DFU**	0
3	Changes line thickness adjustment mode [0: Mode 1, 1: Mode 2] **DFU**	0
4	Displays or not displays error messages No. 84 through DF (RPDL, R16, R55, R98, GL/GL2). [0: Displays, 1: Not displays] **DFU**	0
5	Displays or not displays error messages No. E1 and higher (RPDL, R16, R55, R98, GL/GL2). [0: Displays, 1: Not displays] **DFU**	0
6	Changes the tray setting (GL/GL2). [0: LP, 1: MFP] **DFU**	0
7	Changes the default tray. [0: LP (Tray 1), 1: MFP (System default)] **DFU**	0

Gamma Adjustment

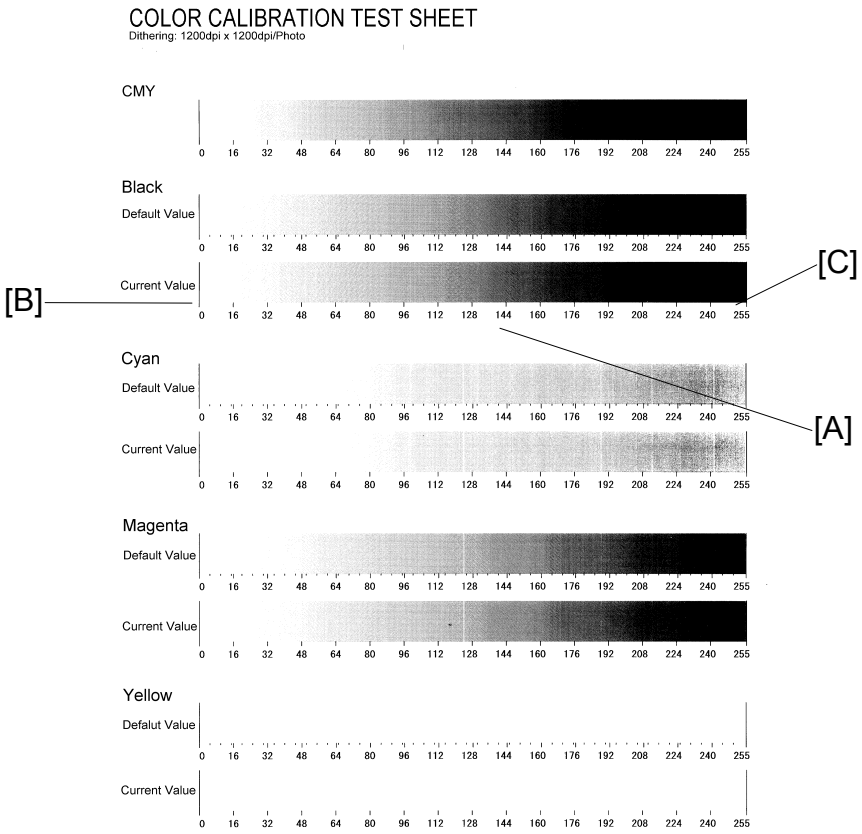
NOTE: To correct color quality problems, clean and/or replace related parts first. Then, if adjustments are required, follow the procedure in this section.

Overview

To adjust the printer gamma:

- Select the print mode that needs calibrating
- Print a color calibration test sheet
- Make the gradation scales on the printout smooth from the lowest to the highest density. Adjust the CMY gradation scale at the top of the chart by balancing the density of the C, M, and Y gradation scales – the CMY gray scale should change smoothly from minimum to maximum, and there should be no coloration.

The color adjustment sheet is as follows.



For each color, you can adjust 15 density levels (adjustment points) (example [A]) between 0 (lowest density) [B] and 255 (highest density) [C]. For each adjustment point, you can adjust the density between values 0 and 255.

The gradation scales marked “Default” are printed according to the default gamma settings in the flash ROM in the controller. The gamma adjustment changes the densities at the adjustable points within the gradation scale. The gradation scale marked “Current” shows the current settings.

During the adjustment procedure, compare the “Current” gradation scale with the “Default”. Select the density for each of the 15 adjustable points, excluding points 0 and 255, from the “Default” gradation scale.

The NVRAM holds three sets of controller gamma settings:

- Those saved this time: ToneCtlSet - Tone (Current)
- Those saved in the previous adjustment: ToneCtlSet - Tone (Prev)
- The factory settings: ToneCtlSet - Tone (Factory)

Adjustment Procedure

1. Enter the controller service mode.
2. Use the down arrow key to select “ToneCtlSet” (there are two of these in the menu; select the second one SP1102) and press the Enter key.
3. Use the up/down key to select the mode that requires calibrating (Press the Enter key to select), then press the Escape key until you get back to the controller service mode menu.
4. Use the down arrow key to select “SP1103 PrnColorSheet” and press the Enter key.
5. Use the up/down key to select “SP1103-001 ToneCtlSheet” (normally this is displayed by default) and press the Enter key.
6. When “Execute?” is displayed, press the Enter key to print out the “color calibration test sheet.”
7. When “Execute OK” is displayed, press the Escape key 2 times to exit from the menu. (You are then returned to the “PrnColorSheet” in the controller service menu.)
8. Use the down arrow key to select “ToneCtlValue” and press the Enter key.

9. Carefully examine the printed “Color Calibration Test Sheet” and determine where along the test sheets 15 adjustment points an adjustment is necessary. Use the up/down arrow key to select the setting you are adjusting, then press the enter key. The three digits in the display (example “016”) indicate a position on the color calibration test sheet.

Operation Panel Display	Color Calibration Test Sheet
Set Black 1	Adjustment Point 16
Set Black 2	Adjustment Point 32
Set Black 3	Adjustment Point 48
:	:
:	:
Set Black 13	Adjustment Point 208
Set Black 14	Adjustment Point 224
Set Black 15	Adjustment Point 240
Set Cyan 1 ~ 15	See Set Black 1 ~ 15
Set Magenta 1 ~ 15	See Set Black 1 ~ 15
Set Yellow 1 ~ 15	See Set Black 1 ~ 15

NOTE: The indicated Adjustment Points on the gradation scale are also the “Default Values.”

Adjust the color density at each of the 15 adjustment points (default values 16 to 240) for each of the four colors.

NOTE: To decide what density value to input, do the following.
1) Look at the color adjustment sheet.
2) For the color you are adjusting, look at the gradation scale entitled “Default”.
3) Go along the scale until you reach the density that you wish to adjust.
4) Read off the value on the scale and store it in the machine.
   a) Use the up/down key to move the cursor along the three-digit display, then press the Enter key.
   b) Use the up/down key to change the digit at the cursor, then press the Enter key.
   c) Press the Escape key to exit from the menu.
5) If necessary, repeat this procedure for all 15 adjustment points for each color and black.

10. When the density setting is complete for all colors, print out a color adjustment sheet again and make sure that the gradation scale for each printed color is smooth and that the CMY gradation scale is gray. Repeat the adjustment if there is an anomaly (normally, repeat this procedure 3 to 5 times).

NOTE: Adding a new value (0 to 255) to any of the adjustment points will not change the calibration sheets scale. In other words, the density value entered for any adjustment point is not shown numerically on the gradation scale.

11. When the adjustment results are satisfactory, do the following:
    1) Use “SP1105 ToneCtlSave” in the controller service menu, to store the new settings in the controller.

2) Reset the controller (press the **[Job Reset]** key when the machine is off line") to use the new settings.

NOTE: The new settings will not be saved in the controller NVRAM unless you reset the controller.
Entering SP1101 ToneCtlSet allows you to select the "Factory" (SP1101-001), "Previous" (SP1101-002) or "Current" (SP1101-001) controller settings.

5.3 PRINTER ENGINE SERVICE MODE

An asterisk (*) after the mode number means that this mode's value is stored in the NVRAM. A numeral or pound symbol (#) means that this mode's value is stored in the EEPROM. If you do a RAM reset, all these SP modes will be returned to their factory settings.

5.3.1 SERVICE MODE TABLE ("2. ENGINE")

SP1-XXX (Feed)

1	Mode No. (Class 1, 2, and 3)		Function / [Setting]
001 #	**[Lead Edge Reg.]** Leading Edge Registration Process Speed		
	1	TOP 100	Adjusts the leading edge registration by changing the registration clutch operation timing for each mode. [0 ~ 60 / **30** / 2 line/step]
	2	TOP 124	
	3	TOP 50	
002 #	**[S-to-S Reg.]** Side-to-Side Registration		
	1	Paper Tray 1	Adjusts the side-to-side registration by changing the laser main scan start position for each mode. [0 ~ 30 / **15** / 2 pixel/step]
	2	By-pass Table	
	3	Paper Tray 2	
	4	Paper Tray 3	
	5	Duplex	
003 #	**[Paper Buckle]** Paper Buckle (Process Speed, Tray)		
	1	100 Tray1	Adjusts the amount of paper buckle at the registration roller by changing the paper feed timing. [0 ~ 10 / **5** / 1 mm/step]
	2	100 Bypass	
	3	100 Tray2	
	4	100 Tray3	
	5	100 Dpx	
	6	124 Tray1	[0 ~ 10 / **5** / 1.24 mm/step]
	7	124 Bypass	
	8	124 Tray2	
	9	124 Tray3	
	10	124 Dpx	
	11	50 Tray1	[0 ~ 10 / **5** / 1 mm/step]
	12	50 Bypass	
	13	50 Tray2	
	14	50 Tray3	
	15	50 Dpx	
105 #	**[Fusing Temp.]** Fusing Temperature (Paper Type, Process Speed) Paper Type → N: Normal, Thin OHP. Card Envelope Label Coated Paper Japanese PostCard(**DFU**)		
	1	N 100	Adjusts the fusing belt temperature for the printing ready condition. The fusing temperature is depended on the paper type. Ready temperature = (Fusing temperature + Temperature specified in this SP mode. [0 ~ 20 / **10** / 1°C/step] 1-105-12, 13: **DFU (used in Japan only)**
	2	N 124	
	3	N 50	
	4	Thin 100	
	5	Thin 124	
	6	Thin 50	
	7	OHP	
	8	Card	
	9	Envelope	
	10	Coated Paper	

1	Mode No. (Class 1, 2, and 3)		Function / [Setting]
105 #	11	Label	Adjusts the fusing belt temperature for the printing ready condition. The fusing temperature is depended on the paper type. Ready temperature = (Fusing temperature + Temperature specified in this SP mode. [0 ~ 20 / **10** / 1°C/step] 1-105-12, 13: **DFU (used in Japan only)**
	12	PostCard Doc	
	13	PostCard Adr	

SP2-XXX (Drum)

2	Mode No. (Class 1, 2, and 3)		Function / [Setting]
201 #	**[Dev. Bias]** Development Bias ([Color], Process Speed)		
	1	[K] Over All	Adjusts the development bias. [0 ~ 20 / **10** / 1 V/step] **DFU**
	2	[C] Over All	
	3	[M] Over All	
	4	[Y] Over All	
	5	[K] 100	
	6	[C] 100	
	7	[M] 100	
	8	[Y] 100	
	9	[K] 124	
	10	[K] 50 600dpi	
	11	[C] 50 600dpi	
	12	[M] 50 600dpi	
	13	[Y] 50 600dpi	
	14	[K] 50 1200dpi	
	15	[C] 50 1200dpi	
	16	[M] 50 1200dpi	
	17	[Y] 50 1200dpi	
	18	OHP [K] 50	
	19	OHP [C] 50	
	20	OHP [M] 50	
	21	OHP [Y] 50	
208 #	**[Toner Control]**		
	1	Set Flag	Sets the toner control flag. The flag having been set, the toner is supplied to the development unit when the main power switch is turned off and on, or the machine recovers from the energy saver mode. *After the toner has been supplied to the development unit, the toner control flag is reset (the flag is turned off).*
310 #	**[Transfer Bias]** Transfer Bias (Paper Type, Process Speed, Tray) Paper Type → N: Normal, Thin, OHP, Card, Envelope, Coated Paper, Label, PostCard Tray → B: By-pass Tray Postcard DFU (used in Japan only)		
	1	N 100	Adjusts the transfer roller bias for paper type and each print mode. [0 ~ 30 / **15** / 63.16 V/step]
	2	N 124	
	3	N 50	
	4	Thin 100	
	5	Thin 124	
	6	Thin 50	
	7	OHP B	
	8	Card B	
	9	Envelop 1 B	
	10	Coated Paper B	
	11	Label B	
	12	PostCard Doc (Postcard Document)	
	13	PostCard Adr (Postcard address)	
	30	Other 1 100	
	31	Other 1 124	
	32	Other 1 50	

2	Mode No. (Class 1, 2, and 3)		Function / [Setting]
310 #	33	Other 2 100	
	34	Other 2 124	
	35	Other 2 50	
	36	Envelop 2 B	

SP5-XXX (Mode)

5	Mode No. (Class 1, 2, and 3)		Function / [Setting]
009*	**[Language]**		
	1	Display Language	Selects the language for the operation panel. After changing the setting, turn the main switch off and on for initialization. [2 ~ 16 / **2** / 1 /step] • *2: British* • *3: American* • *4: French* • *5: German* • *6: Italian* • *7: Spanish* • *8: Dutch* • *9: Norwegian* • *10: Danish* • *11: Swedish* • *12: Polish* • *13: Portuguese* • *14: Hungarian* • *15: Czech* • *16: Finnish*
024*	**[mm/inch display]**		
	1	mm/inch display	Display units (mm or inch) for custom paper sizes. 0: mm (Europe/Asia) 1: inch (USA)
045*	**[Counter Method]**		
	1	Counter Method	Switches the counter display. The setting can only be changed once. [0 ~ 1 / **0** / 1/step] • *0: Developments* • *1: Prints*
046*	**[RomUpdate]** ROM Update		
	1	ROM Update	Enables or disables the ROM Update utility. When enabled, this utility will be displayed in the user program mode. **DFU** [0 or 1 / **1** / –] • *0: Enabled* • *1: Disabled*
049*	**[LCDcontrast]**		
	1	LCD contrast	Adjusts the contrast of LCD. [10 ~ 1F / **25** / 1/step]
305*	**[Energy Saver]**		
	1	Enable/Disable	Activates energy saver level 2. [0 ~ 1 / **0** / 1/step] • *0: Enables* • *1: Disables*
	2	Auto Off Time	[180 ~ 14400 / **3600** / 60 s/step]

5	Mode No. (Class 1, 2, and 3)		Function / [Setting]
401*	**[ULimitAutoSet]** User Limited Auto Set		
	14	ULimitAutoSet	Activates the auto user code registration function (prints are counted and logged for each user code and the counts can be viewed with SmartNetMonitor). [0 ~ 1 / **1** / 1/step]*0: Inactivated* • *1: Activated*
404	**[UCodeCtrClr]** Use Code Counter Clear		
	UcodeCtrClr		Clear all counters for users. [0 ~ 0 / **0** / 0/step]
801	**[Memory Clear]**		
	1	All	Clears the settings from the NVRAM and initializes the settings. [0 ~ 0 / **0** / 0/step]
	2	Engine Setting	Clears all the engine settings and counters. Engine settings and engine counters can be cleared independently with SP5-998-001 and 002. [0 ~ 0 / **0** / 0/step]
	3	SCS (System Control Service)	Clears the system settings. [0 ~ 0 / **0** / 0/step]
	4	IMH (Image Memory Handler)	Clears IMH data. **DFU** [0 ~ 0 / **0** / 0/step]
	5	MCS (Memory Control Service)	Clears MCS data. **DFU** [0 ~ 0 / 0 / 0/step] • *MCS is for network settings.*
	8	PRT	Clears the user tool settings. [0 ~ 0 / **0** / 0/step]
	11	NCS	Clears the network settings. [0 ~ 0 / **0** / 0/step]
803	**[Input Check]**		See section 5.3.2.
804	**[Output Check]**		See section 5.3.3.
808	**[Destination]** Destination Code Display		
	1	Destination	Displays the destination code. [0 = JP, 1 = NA, 2 = EU, 3 = AS]
811	**[Serial Number]** Serial Number Display		
	2	DispCntl SN (Display Controller Serial Number)	Display the machine serial number
	3	DisEng SN (Display Engine Serial Number)	Display the mechanical engine serial number
	4 #	SetEng SN (Set Engine Serial Number)	Set the mechanical engine serial number when the EEPROM on the engine control board is replaced.
812*	**[FAX TEL No.]**		
	2	FAX TEL No.	Sets the fax or telephone number for a service representative by using the enter key and the down arrow key. [0 ~ 0 / **0** / 0/step] *Both numbers and alphabetic characters can be input.*

5	Mode No. (Class 1, 2, and 3)		Function / [Setting]
828*	**[Network]** Job spool settings/ Interface selection for Ethernet and wireless LAN		
	66	HD Job Clear	Treatment of the job when a spooled job exists at power on. 0: Data is cleared **1: Automatically printed**
	67	Job Spool (LPR)	Job spool on/off (LPR). 0: Job spool off **1: Job spool on**
	68	Job Spool (IPP)	Job spool on/off (IPP). 0: Job spool off **1: Job spool on**
	71	Primary I/F	Interface selection for the Ethernet or wireless LAN when both interfaces are available. **0: Ethernet** 1: IEEE802.11b (wireless LAN) Note: This setting is same as the user mode setting "LAN Type" in the Network Setup of the Host Interface menu.
	72	Current I/F	Displays the current interface setting (Ethernet or wireless LAN).
832	**[HDD Init]** HDD Initialization		
	1	HDD Init.	Initializes the hard disk. [0 ~ 0 / **0** / 0 /step] *Use this SP mode only for hard disk error recovery.*
833	**[Job log ON/OFF]**		
	1	Job log ON/OFF	Saves the result of the jobs in the job log. If this mode is enabled, the result is written on the HDD. If no HDD is installed, this feature is disabled even if this SP is set to "enabled." [0 or 1 / **0** / -] 0: Disabled 1: Enabled
839	**[IEEE1394]**		
	7	Cycle Master	**DFU**
	8	BCR mode	**DFU**
	9	IRM 1394a Check	**DFU**
	10	Unique ID	**DFU**
	11	Logout	**DFU**
	12	Login	**DFU**
	13	Login MAX	**DFU**
840	**[IEEE802.11b]**		
	6	Channel Max	Sets the maximum value for the wireless LAN channel adjustment. **DFU** [1 ~ 11 or 13 / **1** / 1 /step] Europe/Asia: 1 to 13 USA: 1 to 11 **Note:** Do not change the setting, or the machine may be out of compliance with local regulations.

5	Mode No. (Class 1, 2, and 3)		Function / [Setting]
840	7	Channel Min	Sets the minimum value for the wireless LAN channel adjustment. **DFU** [1 ~ 11 or 13 / **1** / 1 /step] Europe/Asia: 1 to 13 USA: 1 to 11 **Note:** Do not change the setting, or the machine may be out of compliance with local regulations.
	11	WEP key number	Selects the WEP key. [0 ~ 3 / 0 / 1 /step]
844	**[USB]** USB settings		
	1	Transfer Rate	Adjusts the USB transfer rate. **HS/FS: High speed/Full speed auto adjust** (480Mbps/12Mbps) FS Fixation: Full speed (12Mbps fixed) Do not change the setting unless there is a data transfer error using the USB high speed mode.
	2	Vendor ID	Displays the vendor ID. **DFU**
	3	Product ID	Displays the product ID. **DFU**
	4	Dev Release Num	Displays the development release version number. **DFU**
851	**[Bluetooth]**		
	1	Mode	Select the Bluetooth mode. 0: Public Mode 1: Private Mode [0 or 1 / **0** / -]
907*	**[Plug/Play] Plug and Play**		
	1	Plug/Play	Specifies the Plug and Play setting. [0 ~ 6 / **0** / 1 /step] • *0: RICOH* • *1: SAVIN* • *2: GESTETNER* • *3: NRG* • *4: LANIER*
917 #	**[Printable Area]**		
	1	Extended	Enlarges the width of the printable area. The sides of images are sometimes not printed even if "Wide-A4" is selected with PCL. Set this SP mode to 1 to enlarge the printable area, but the quality of the image will be slightly poorer. [0 or 1 / **0** / –] 0: Off, 1: On
920 #	**[Pre Heat Mode]**		
	1	Pre Heat Mode	This feature warms the fusing belt when in standby mode to reduce the first page print time. [0 or 1 / **0** / –] 0: On, 1: Off

5	Mode No. (Class 1, 2, and 3)		Function / [Setting]
930	**[Meter Charge]**		
	1	On/Off	Enable or disable meter-charge mode. **Important:** Turn the main switch off/on after changing this setting. On: Enabled OFF: Disabled **Meter charge mode enabled:** • "Replace Maintenance Kit" is <u>not</u> displayed on the operation panel when the PM counter runs out (the technician replaces the maintenance kit items) • The meter charge counter is shown immediately after the Menu key is pressed. • The technician must reset the PM counter after replacing the fusing unit. **Meter charge mode disabled:** • "Replace Maintenance Kit" is displayed on the operation panel when the PM counter runs out (the user replaces the maintenance kit items) • The meter charge counter is not shown when the Menu key is pressed. • The PM counter resets automatically after the user replaces the fusing unit.
	2	MenteStyle (Maintenance Style)	Year Contract / Click Charge / M-Pac
945	**[PlainPaperType]**		
	1	Tray1	Defines whether a tray contains “normal” or “thin” paper, when the user tool setting for the tray is set to “plain”. [0 ~ 1 / **1** / 1 /step] • *0: Yes (Thin)* • *1: No (Normal)* • *The user tool setting defines whether each tray contains “normal”, thin, or OHP. SP5-945 defines what “normal” means for each tray (either “normal” or “thin”).* • *The paper thickness terminology reflects Japanese market conditions.* *Normal (plain): Use this for thin paper* *Middle thick: Use this for normal paper* *Thick: Use this for paper heavier than 105 g/m2 (28 lb)*
	2	Tray2	
	3	Tray3	
	6	Bypass tray	
946	[EnvelopeType]		
	1	Bypass Tray	Selects the default envelope type from "Envelope 1 (default)" or "Envelope 2".
970	**[DebugSerial]**		
	1	DebugSerial	[0 ~ 0xff / **0x00** / 0 /step] **DFU**

Service Tables

5	Mode No. (Class 1, 2, and 3)		Function / [Setting]
990*	**[SMC print]**		
	1	All	Prints SP setting data. [0 ~ 255 / **0** / 0 /step] • SP all print: All items printed out with SPs 5-990-2, -4, -6, and -7. • All: All SP mode settings • Non-Default: SP settings that have been changed from the defaults
	2	SP Mode	
	4	Logging	
	6	Non-Default	
	7	NIB Summary	
991	**[Jam OFF]** Jam ON/OFF		
	1	Jam OFF	Enables or disables jam detection. [0 or 1 / **0** / –] 0: Enable 1: Disable
993	**[Line Adj.]** Line Point Adjustment		
	1 #	Timing(pages)	The automatic line position adjustment is done after printing the number of pages that is set with this SP. [0 ~ 2000 / **250** / 1/page] **NOTE:** 0: Never done
	2	Manual	Use to make a line position adjustment.
994	**[Eng Err Stat]** Engine Error Status		
	1	(7) 00000000 (0)	Display the engine error status. Bit 7: The fuse did not blow after installing a new PCU(K) Bit 6: The fuse did not blow after installing a new PCU(YMC) Bit 5: By-pass tray and duplex unit motor error Bit 4: The color registration sensor cannot be calibrated. Bit 3: Cannot measure the color registration sensor value. Bit 2: Cannot correct the color registration. Bit 1: PCU(YMC) home position error. Bit 0: Not used
995 #	**[Skew Adj.]** Skew Adjustment		
	1	Skew Adj.	Select color skew correction ON or OFF. [0 or 1 / **1** / -] 0: Off, 1: On
998	**[ENG Mem Clear]** Engine Memory Clear		
	2	Color Mis-Reg	Clears the correction values for the color registration. Do this SP mode after replacing the color registration board. The correction values are set after the main power has been turned on.

SP7-XXX (Data Log)

7	Mode No. (Class 1, 2, and 3)		Function / [Setting]
003	**[M/C Counter]** Mono/Color Counter		
	1	P: Total	Displays the values of the color counters. [–9999 to 9999999 / **0** / 1/step]
	7	P: B&W	
	8	P: Full Color	
	10	D: Color	• *These SP modes are development counters for meter charge mode.*
	11	D: B&W	
	20	P: Full Color	• *These SP modes are used for the Japanese market only.*
	21	P: B&W/Single	
	22	P: Single	
	23	P: B&W	
	25	P: Full Color	
	28	P: Color (except for B&W)	• *These SP modes are print counters for meter charge mode.* • *These SP modes are used in all markets.*
	29	P: B&W	
	30	P: Color Total	
007*	**[Other Counter]**		
	1	Duplex	Displays counter values. [–9999 ~ 9999999 / **0** / 0 sheet/step]
101*	**[Size Counter]**		
	5	A4	Displays the counter values for each paper size. [0 ~ 9999999 / **0** / 0 sheet/step]
	6	A5	
	14	B5	
	36	8 1/2" x 14" (LG)	
	38	8 1/2" x 11" (LT)	
	44	5 1/2" x 8 1/2" (HLT)	
	128	Others	
204*	**[Feed Counter]**		
	1	Tray 1	Displays the number of sheets fed from each paper feed station. [0 ~ 9999999 / **0** / 0 sheet/step]
	2	Tray 2	
	3	Tray 3	
	5	By-pass	
401*	**[SC Counter]**		
	1	SC Counter	Displays how many times SC codes have been output. [0 ~ 9999 / **0** / 0 time/step]
502*	**[Total Jam]**		
	1	Total Jam	Displays the total number of jams detected. [0 ~ 9999 / **0** / 0 /step]
504*	**[Jam Location]**		
	Displays the number of jams according to the location where they were detected. [0 ~ 9999 / **0** / 0 /step]		
	16	Tray 1 : ON	Paper does not reach the registration sensor.
	17	Regist. : ON	Paper does not pass the registration roller.
	18	Fuser : ON	Paper does not reach the fusing exit sensor.
	19	Fuser : OFF1	Paper reached the fusing exit sensor and then paper returned to the fusing unit.
	20	Fuser : OFF2	Paper does not pass the fusing exit sensor.
	21	Exit : ON	Paper does not reach the exit sensor.
	22	Exit : OFF1	Paper reached the exit sensor and then paper backed the fusing unit.

7	Mode No. (Class 1, 2, and 3)		Function / [Setting]
504*	23	Exit : OFF2	Paper does not pass the exit sensor.
	24	PaperSizeErr (Paper Size Error)	The registration sensor recognized that paper was too short.
	25	Tray 2 : ON	Paper does not reach the gate sensor of tray 2.
	26	Tray 3 : ON	Paper does not reach the gate sensor of tray 3.
	27	Duplex : ON	Paper does not reach the duplex unit sensor.
506*	**[Jam Paper Size]**		
	5	A4	Displays the number of jams according to paper size. [0 ~ 9999 / **0** / 1 /step]
	14	B5	
	36	8 1/2" x 14" (LG)	
	38	8 1/2" x 11" (LT)	
	44	5 1/2" x 8 1/2" (HLT)	
	128	Others	
803 #	**[PM Counter]** Displays the number of pages printed for each current maintenance unit.		
	1	Page Total	Display the actual total number of pages printed. [0 ~ 99999999 / **0** / 1 page]
	2	Page Mono	Display the actual total number of monochrome pages printed. [0 ~ 99999999 / **0** / 1 page]
	3	PC(K) Page	Display the number of pages that is calculated from drum rotation. [0 ~ 99999999 / **0** / 1 page]
	4	PC(YMC) Page	
	5	Toner(K) Pixel	[0 ~ 9999999999 / 0 / 1/1024 pixel]
	6	Toner(C) Pixel	
	7	Toner(M) Pixel	
	8	Toner(Y) Pixel	
	9	Fusing Page	[0 ~ 99999999 / **0** / 1 page]
	12	Trans Page	Display the number of pages that is calculated from the transfer belt rotation. [0 ~ 99999999 / **0** / 1 page]
804	**[PM Counter Clear]** (Unit [Color])		
	1	PC [K]	Clears the PM counter. Press the Enter key after the machine asks “Execute?”. When a unit is replaced, the machine automatically detects that the new unit is installed. Then, the current PM counter value is automatically reset to “0”.
	2	PC [YMC]	
	15	Fusing	Clears the PM counter.
	17	Accumulator	
	30	Toner:BK	
	31	Toner:C	
	32	Toner:M	
	33	Toner:Y	
805	**[TonerBotolInfo]** Toner Bottle Information		
	17	TonerRest:BK	Displays how much toner remains in the bottle. [0 ~ 1 / **100** / 1 %]
	18	TonerRest:C	
	19	TonerRest:M	
	20	TonerRest:Y	
807	**[SC/Jam Clear]**		
	1	SC/Jam Clear	Clears the counters related to SC codes and paper jams. [0 ~ 1 / **0** / 0 /step]

7	Mode No. (Class 1, 2, and 3)		Function / [Setting]
808	**[Counter Clear]**		
	1	Counter Clear	Clears all counters except for SP7-003 and –007. [0 ~ 1 / **0** / 0 /step]
816	**[Tray Clear]**		
	1	Tray 1	Clears the tray counters (SP7-204). [0 ~ 1 / **0** / 0 /step]
	2	Tray 2	
	3	Tray 3	
825	**[Counter Reset]**		
	1	Counter Reset	Resets the total counter values to "0." [0 ~ 0 / **0** / 0 /step]
832*	**[Diag. Result]** Diagnosis Result		
	1	Diag. Result	Displays the result of the diagnostics. Refer to section 4.2 for the error codes.
833 #	**[Covrage]** Pixel Coverage Ratio		
	1	Last: BK	Displays the pixel coverage ratio for each color of the last output. [0 ~ 100.00 / - / 0.01 %/step]
	2	Last: C	
	3	Last: M	
	4	Last: Y	
	5	Average: BK	Displays accumulated average value of pixel coverage ratio for each color. [0 ~ 100.00 / - / 0.01 %/step]
	6	Average: C	
	7	Average: M	
	8	Average: Y	
836	**[Total Memory]**		
	1	Total Memory	Displays the capacity of memory on the main controller board.
901	**[Assert Info]** Assert Information		
	1	File Name	Records the location where the last problem (SC990) was detected in the program. The data stored in this SP is used for problem analysis. [0 ~ 0 / **0** / 0 /step]
	2	# of Lines (Number of lines)	
	3	Location	
905 #	**[Alert Display]**		
	51	PC(K) Page	Displays the threshold of the number of pages for the alert display for each maintenance unit.
	52	PC(YMC) Page	
	53	TC(K) starter	
	54	TC(K) option	
	55	TC(CMY) starter	
	56	TC(CMY) option	
	57	Fusing Page	
	60	Trans Page	
910	**[Firmware PN]** Firmware Part Number display		
	1	Controller	Displays the part number.
	18	NIB	
	131	Bluetooth	
	150	RPCS	
	151	PS	
	152	RPDL	
	153	R98	
	154	R16	
	156	R55	
	158	PCL	
	159	PCLXL	

7	Mode No. (Class 1, 2, and 3)		Function / [Setting]
910	160	MSIS	
	161	MSIS (OPTION)	
	204	Printer	
	210	MIB	
911	**[Firmware Ver.]** Firmware Version display		
	1	Controller	Displays the firmware version.
	2	Engine	
	18	NIB	
	131	Bluetooth	
	150	RPCS	
	151	PS	
	152	RPDL	
	153	R98	
	154	R16	
	156	R55	
	158	PCL	
	159	PCLXL	
	160	MSIS	
	161	MSIS (OPTION)	
	204	Printer	
	210	MIB	

5.3.2 INPUT CHECK TABLE

When entering the Input Check mode, 8 digits display the result for a section. Each digit corresponds to a different device as shown in the table. Refer to 5.1 Service Program Mode for access information.

Bit No.	7	6	5	4	3	2	1	0
Result	0 or 1	0 or 1	0 or 1	0 or 1	0 or 1	0 or 1	0 or 1	0 or 1

SP5-803 -XXX	Bit	Description	Reading	
			0	1
1	**[Tray 1 Paper] Paper End Sensor (Tray 1)**			
	0	Paper End Sensor	Paper detected	Paper end
2	**[Regist] Registration Sensor**			
	0	Registration Sensor	Paper detected	No paper
3	**[Paper Tray 1] Cassette Sensor (Tray 1)**			
	0	Tray set	Not set	Set
	1	Paper Size Switch 1	See Table 1. 1: Pushed	
	2	Paper Size Switch 2		
4	**[By-pass Paper] By-pass Paper Sensor**			
	0	By-pass Paper Sensor	Paper detected	No paper
5	**[By-pass Home] By-pass Home Position Sensor**			
	0	By-pass Home Position Sensor	Not home position	Home position
6	**[Tray 2 Paper] Paper End Sensor (Tray 2)**			
		Paper End Sensor	Paper detected	Paper end
7	**[Tray 2 Jam] Jam Sensor (Tray 2)**			
	0	Jam Sensor	Paper detected	No paper
8	**[Paper Tray 2] Cassette Sensor (Tray 2)**			
	0	Tray set	Not set	Set
	1	Paper Size Switch 1	See Table 1. 1: Pushed	
	2	Paper Size Switch 2		
9	**[Tray 3 Paper] Paper End Sensor (Tray 3)**			
		Paper End Sensor	Paper detected	Paper end
10	**[Tray 3 Jam] Jam Sensor (Tray 3)**			
	0	Jam Sensor	Paper detected	No paper
11	**[Paper Tray 3] Cassette Sensor (Tray 3)**			
	0	Tray set	Not set	Set
	1	Paper Size Switch 1	See Table 1. 1: Pushed	
	2	Paper Size Switch 2		
12	**[P Exit Full] Exit Paper Full Sensor**			
	0	Exit Paper Full Sensor	Not full	Paper full
13	**[Paper Exit] Exit Sensor**			
	0	Exit Sensor	Paper detected	No paper
14	**[Dpx Jam] Duplex Jam Sensor**			
	0	Duplex Jam Sensor	Paper detected	No paper
15	**[Dpx Unit] Duplex Unit Sensor**			
	0	Duplex Unit Sensor	No unit	Duplex unit detected
16	**[Fusing JAM] Fusing Exit Sensor**			
	0	Fusing Exit Sensor	Paper detected	No paper
17	**[Fusing Roller] Fusing Roller Rotation Sensor**			
	0	Fusing Roller Rotation Sensor	Not rotating	Rotating

SP5-803 -XXX	Bit	Description	Reading	
			0	1
18	**[F Temp. Center] Fusing Temperature (Center)**			
	0-7	Fusing Temperature	Data range: 0 to 250, Unit: 1°C	
19	**[F Temp. Left] Fusing Temperature (Side)**			
	0-7	Fusing Temperature	Data range: 0 to 250, Unit: 1°C	
20	**[WstToner Full] Waste Toner Full Sensor**			
	0	Waste Toner Full Sensor	Not full	Near full
21	**[Toner Empty[Y]] Toner Empty Sensor (Y)**			
	0	Toner Empty Sensor (Y)	Empty	Not empty
22	**[Toner Empty[M]] Toner Empty Sensor (M)**			
	0	Toner Empty Sensor (M)	Empty	Not empty
23	**[Toner Empty[C]] Toner Empty Sensor (C)**			
	0	Toner Empty Sensor (C)	Empty	Not empty
24	**[Toner Empty[K]] Toner Empty Sensor (K)**			
	0	Toner Empty Sensor (K)	Empty	Not empty
25	**[Front/SideDoor] Front/Side Door Switch**			
	0	Front/Side Door Switch	Open	Closed
26	**[Toner Door] Top Cover Switch**			
	0	Top Cover Switch	Open	Closed
27	**[Mis-regist. 1] Color Registration Sensor 1**			
	0-10	Color Registration Sensor 1	Data range: 0 to 1024, Unit:3.3/1024V	
28	**[Mis-regist. 2] Color Registration Sensor 2**			
	0-10	Color Registration Sensor 2	Data range: 0 to 1024, Unit:3.3/1024V	
29	**[Temperature] Temperature Sensor**			
	0-7	**Temperature Sensor**	Data range: 0 to 60, Unit: 1°C	
30	**[Humidity] Humidity Sensor**			
	0-7	Humidity Sensor	Data range: 0 to 99, Unit:1%	
31	**[Skew [K]] Mechanical Skew (K)**			
	0	Mechanical Skew (K)	Not used.	
32	**[Skew [YMC]] Mechanical Skew (YMC)**			
	0	Mechanical Skew (YMC)	Not used.	
33	**[Accumulator] Transfer Belt Unit**			
	0	Cam Home Position Sensor	Not home position	Home position
34	**[PC(K) First]**			
	0-10	Resistance of new PCU detection	Data range: 0 to 1024, Unit:3.3/1024V	
35	**[PC(YMC) First]**			
	0-10	Resistance of new PCU detection	Data range: 0 to 1024, Unit:3.3/1024V	
36	**[PC_Temp]**			
	0-7	PCU Temperature Sensor	Data range: 0 to 60, unit: 1°C	

Table 1: Paper Size Switch

0: Not pushed, 1: pushed

Models	Switch Location	
North America	**1**	**2**
Letter SEF	1	1
A4 SEF	1	0
B5 SEF	0	1
Legal SEF	0	0

1: Pushed

5.3.3 OUTPUT CHECK TABLE

SP5-804-XXX		Description
1	Initialize mechanical position	After finishing the output checks, execute this SP mode before printing.
2	Pickup Solenoid (Tray1)	Turns the paper pickup solenoid for paper tray 1 ON for 1 second.
3	Registration Clutch	Turns the registration clutch ON for 1 second.
4	By-pass Pickup Motor (100mm/s)	Turns the by-pass pickup motor ON with the process speed of 100 mm/s.
5	By-pass Pickup Motor (124mm/s)	Turns the by-pass pickup motor ON with the process speed of 124 mm/s.
6	By-pass Pickup Motor (50mm/s)	Turns the by-pass pickup motor ON with the process speed of 50 mm/s.
7	By-pass Pickup Motor (OFF)	Turns the by-pass pickup motor OFF.
8	Pickup Solenoid (Tray2)	Turns the paper pickup solenoid for paper tray 2 ON for 1 second.
9	Tray 2 Feed Motor (100mm/s)	Turns the tray 2 feed motor ON with the process speed of 100 mm/s.
10	Tray 2 Feed Motor (124mm/s)	Turns the tray 2 feed motor ON with the process speed of 124 mm/s.
11	Tray 2 Feed Motor (50mm/s)	Turns the tray 2 feed motor ON with the process speed of 50 mm/s.
12	Tray 2 Feed Motor (OFF)	Turns the tray 2 feed motor OFF.
13	Pickup Solenoid (Tray3)	Turns the paper pickup solenoid for paper tray 3 ON for 1 second.
14	Tray 3 Feed Motor (100mm/s)	Turns the tray 3 feed motor ON with the process speed of 100 mm/s.
15	Tray 3 Feed Motor (124mm/s)	Turns the tray 3 feed motor ON with the process speed of 124 mm/s.
16	Tray 3 Feed Motor (50mm/s)	Turns the tray 3 feed motor ON with the process speed of 50 mm/s.
17	Tray 3 Feed Motor (OFF)	Turns the tray 3 feed motor OFF.

SP5-804-XXX		Description
18	Duplex Exit Solenoid	Turns the duplex unit paper exit solenoid ON for 1 second.
19	Transfer Unit Cam Solenoid	Turns the transfer unit cam solenoid ON for 1 second.
20	Transfer Unit Changer Solenoid	Turns the transfer unit changer solenoid ON for 1 second.
21	BK Solenoid	Turns the PC(K) drive solenoid ON for 1 second.
22	BK Motor (100mm/s)	Turns the BK motor ON with the process speed of 100 mm/s.
23	BK Motor (124mm/s)	Turns the BK motor ON with the process speed of 124 mm/s.
24	BK Motor (50mm/s)	Turns the BK motor ON with the process speed of 50 mm/s.
25	BK Motor (OFF)	Turns the BK motor OFF
26	CMY Motor (100mm/s)	Turns the CMY motor ON with the process speed of 100 mm/s.
27	CMY Motor (50mm/s)	Turns the CMY motor ON with the process speed of 50 mm/s.
28	CMY Motor (OFF)	Turns the CMY motor OFF.
29	Toner Supply Solenoid	Turns the toner supply solenoid on.
30	Toner Supply Solenoid	Turns the toner supply solenoid off.

5.4 FIRMWARE UPDATE PROCEDURE

5.4.1 TYPE OF FIRMWARE

There are two types of firmware, requiring four cards, as shown below.

Type of firmware		Function	Number of PCMCIA Memory cards required
Printer Engine	1. Main	Printer engine control	1 card
Printer Controller	2. System	Printer system firmware	3 cards

Refer to “5.4.3 Controller/Engine Firmware Upgrade” for the procedure.

NOTE: When upgrading both types of firmware at the same time, you can upgrade them in any order.

However, when upgrading the controller system firmware, use the PCMCIA cards in the correct order (see the procedure as detailed on “5.4.3 Controller/Engine Firmware Upgrade” on the following page).

Its is recommended to first print-out the printer’s “Configuration Page” prior to updating the firmware. Then, when the firmware has been successfully updated, print a second “Configuration Page” and confirm the results.

5.4.2 ERROR RECOVERY

Engine Firmware

If a download attempt failed, try downloading the new firmware again using the procedure in section “5.4.3 Controller/Engine Update.”

NOTE: When a download fails, the error is logged in the NVRAM on the controller and the machine asks you to insert the appropriate PCMCIA memory card. Even after replacing the ECB board to fix the problem, the same message will continue to be displayed. Turning off and on the main switch while holding down the Menu and Enter keys clears the error condition logged in the NVRAM on the controller.

Controller System Firmware:

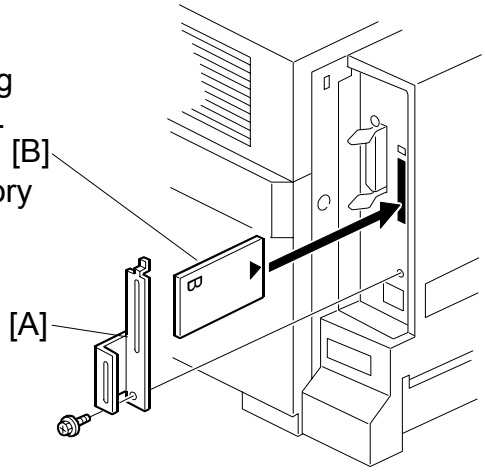
If a download attempt failed, you must boot up the machine from the PCMCIA memory card. To do this, DIP SW 1 on the controller board needs to be ON. The machine automatically starts upgrading the firmware.

5.4.3 CONTROLLER/ENGINE FIRMWARE UPGRADE

⚠CAUTION

1. Turn off the main switch whenever inserting or removing the PCMCIA Memory card (IC card).
2. Open the front cover or right cover whenever updating the firmware.
3. Do not turn off the machine while downloading the firmware.

Engine Firmware



1. Prepare the PCMCIA memory card containing the engine controller firmware (Engine ROM).
   NOTE: The PCMCIA memory Card is also referred to as an IC card, flash memory card and memory card. Be certain to only use the recommended card (N803 6701).
2. Turn the main switch off.
3. Remove the cover [A].
4. Insert the PCMCIA memory card [B].
5. Open the front cover or right cover.
6. Turn the main switch on.
7. Wait until "Engine ROM." is displayed.

```
Engine ROM
```

NOTE: 1) If you did not insert the correct PCMCIA memory card, the correct message is not displayed. In this case, press the up-arrow key ("Exit" is displayed), press the enter key ("Close Front and/or Right Cover" is displayed), and turn the main switch off. After this, insert the correct PCMCIA card and resume upgrading.
2) If you have not fully inserted the PCMCIA memory card, the message "Close Front and/or Right Cover" is displayed. In this case, turn the main switch off, and fully insert the PCMCIA memory card. After this, resume upgrading.

8. Press the On Line Key. "Updating" is displayed, followed by underscores.

```
Updating...
----------------
```

9. Check that the asterisks replace underscores one by one.

```
Updating...
***-------------
```

10. Wait until the message "Updated Power Off On" is displayed.

```
Updated
Power Off On
```

11. Turn the main switch off.
12. Remove the PCMCIA memory card.
13. Attach the cover [A] if you have completed the firmware update procedures.
14. Close the front door.

Controller System Firmware

1. Prepare three PCMCIA memory cards that contain the system firmware (Onboard System 1/2, Onboard System 2/2, Network Support).
2. Turn the main switch off.
3. Remove the cover [A].
4. Insert the PCMCIA memory card [B] that contains "Onboard System 1/2."
5. Open the front cover or right cover.
6. Turn the main switch on.
7. Wait until the message "Onboard Sys. 1/2" is displayed.

```
Onboard Sys. 1/2
```

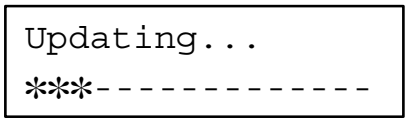
NOTE: 1) If you did not insert the correct PCMCIA memory card, the proper message is not displayed. In this case, press the up-arrow key ("Exit" is displayed), press the enter key ("Close Front and/or Right Cover" is displayed), and turn the main switch off. After this, insert the correct IC card and resume upgrading.
2) If you have not fully inserted the PCMCIA memory card, the message "Close Front and/or Right Cover" is displayed. In this case, turn the main switch off, and fully insert the PCMCIA memory card. When completed, resume upgrading.

8. Press the On Line key. "Verifying Data" is displayed. Next, "Checking Controller" is displayed.

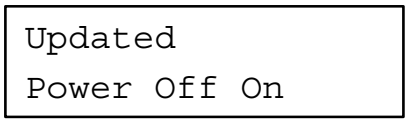
```
Verifying Data
```

```
Checking
Controller
```

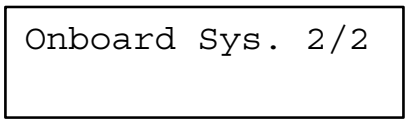
9. Check that "Updating" is displayed, and that asterisks replace underscores one by one.



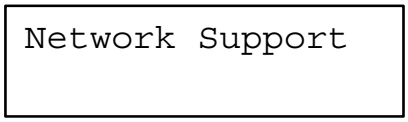
10. Wait until "Upgraded Power Off On" is displayed.



11. Turn the main switch off.
12. Remove the PCMCIA memory card and insert the PCMCIA card that contains "Onboard System 2/2."
13. Repeat steps 6 through 11. When the main switch is turned on (step 6), "Onboard Sys. 2/2" is displayed (step 7).



14. Remove the PCMCIA memory card and insert the PCMCIA card that contains "Network Support."
15. Repeat steps 6 through 11. When the main switch is turned on (step 6), "Network Support" is displayed (step 7).



16. Remove the PCMCIA memory card.
17. Attach the cover [A].
18. Close the front door.

5.5 POWER ON SELF-TEST

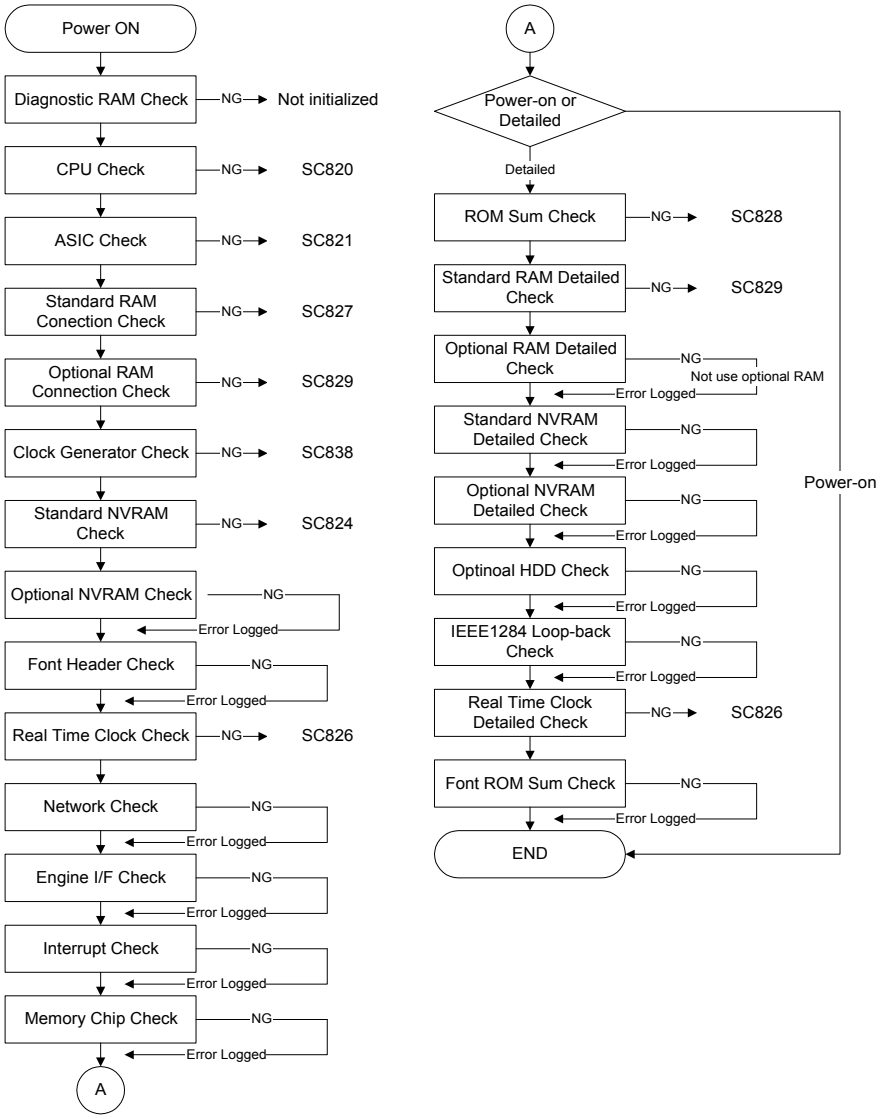
5.5.1 CONTROLLER SELF-DIAGNOSTIC

Overview

There are three types of self-diagnostics for the controller.

- Power-on self-diagnostics: The machine automatically starts the self-diagnostics just after the power has been turned on.
- Detailed self-diagnostics: The machine does the detailed self-diagnostics by using a loop-back connector (P/N G0219350)
- SC detection: The machine automatically detects SC conditions at power-on or during operation.

The following shows the workflow of the power-on and detailed self-diagnostics.

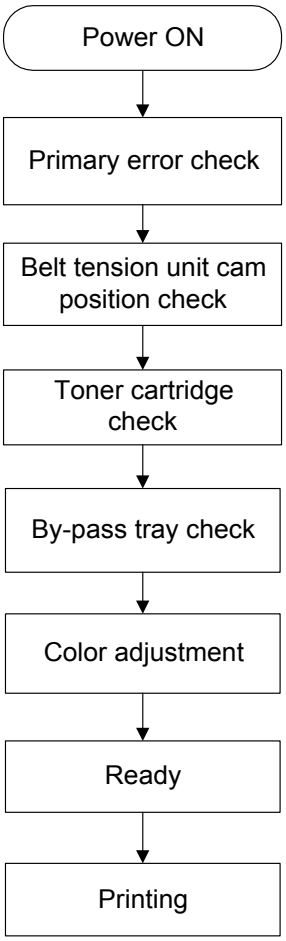


Detailed self-diagnostics

This detailed self-diagnostic test requires a loop-back connector (P/N: G0219350).

1. Turn off the machine and attach the loop-back connector to the parallel interface.
2. Turn on the machine while pressing the “Online” key and “Enter” key together.
3. The machine automatically starts the self-diagnostics and prints the diagnostic report after completing the test.
   - Refer to the diagnostics report for the detected errors. The errors detected during self-diagnostics can be checked with SP7-832-001 (Diag. Result).
   - Refer to section “4.2 Controller Error,” for details about the error codes.

5.5.2 ENGINE SELF-DIAGNOSTIC



Some processes of the engine self-diagnostic test are executed whenever the main power switch is turned on, until the printer goes in to the ready status. Others are executed only when a printing job is coming in to the printer, when the printer goes in to the printing status.

5.6 USER PROGRAM MODE

Press the “Menu” button and use the “Up/Down arrow” keys to scroll through the menu listing. To go back to a higher level, press the “Escape” key. After changing the settings, press the “On Line” key. The user menu list can be printed using “Menu List” in the “List/Test Print” user mode. (For those functions shown with an asterisk and number, refer to the “Notes” shown below.)

User Menu Chart

Category	Function Menu	Category	Function Menu
Counter	*1	System	Auto Continue
Sample Print	*2		Memory Overflow
Locked Print	*2		Copies
Paper Input	Bypass Size		Printer Lang.
	Paper Type		Sub Paper Size
	Tray Locking		Page Size
	Tray Priority		Duplex *6
List/ Test Print	Config. Page		Energy Saver 1
	Menu List		Energy Saver 2
	Color Demo Page		Unit of Measure
	PS Config. Page		Resolution
	PCL Config. Page		B& W Detect
	Hex Dump		Spool Printing *2
Maintenance	Color Regist.	Host Interface	I/ O Buffer
	Image Density		I/ O Timeout
	Registration		Network Setup
	Plain Paper Type		IEEE 1394 Setup *7
	Maint. Reset		IEEE 802.11b *4
	HDD Format *2		USB Setup
	ROM Update *3	PCL Menu	Orientation
	4C. Graphic Mode		Form Lines
	WL. LAN Signal *4		Font Source
	WL. LAN Defaults *4		Font Number
	Print Area		Point Size
	Key Repeat		Font Pitch
	Menu Protect *5		Symbol Set
	Series Print. Job *5		Ext. A4 Width
System	MisfeedRecovery		Append CR to LF
	Prt. Err Report	Language	

NOTE: *1. Meter charge mode must be ON in SP mode.
*2. Option HDD required
*3. ROM Update is not currently used.
*4. IEEE802.11b option required
*5. Displayed after pressing [Enter], [Escape] and then [Menu]
*6. Duplex unit option required.
*7. IEEE1394 option required.

5.7 DIP SWITCHES

Controller Board

DIP SW No.	OFF	ON
1	Boot-up from machine	Boot-up from PCMCIA memory card
2 to 4	Factory Use Only: Keep these switches OFF.	

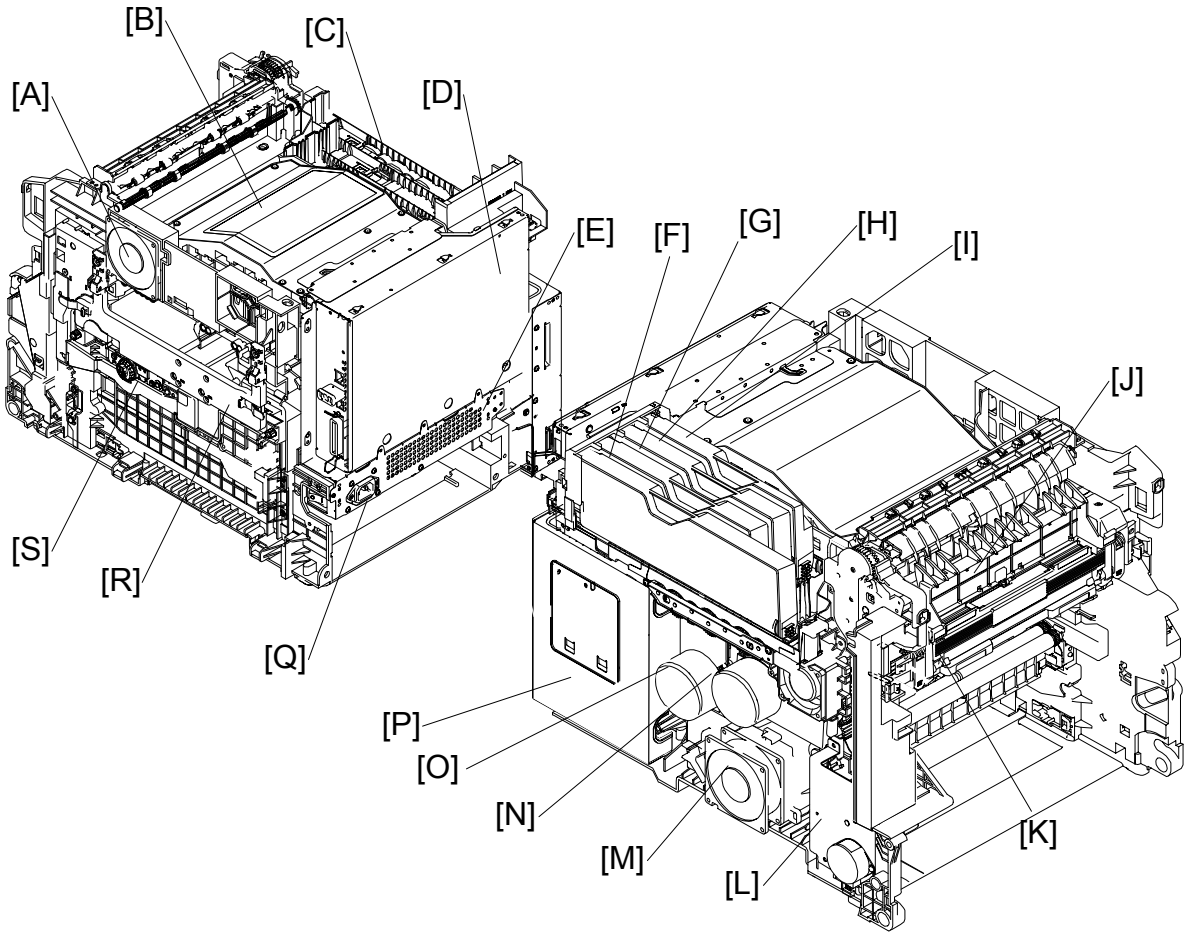
If a download attempt failed, you must boot the machine from the PCMCIA memory card. To do this, set DIP SW 1 on the controller board to ON.

DETAILED DESCRIPTIONS

6. DETAILED SECTION DESCRIPTIONS

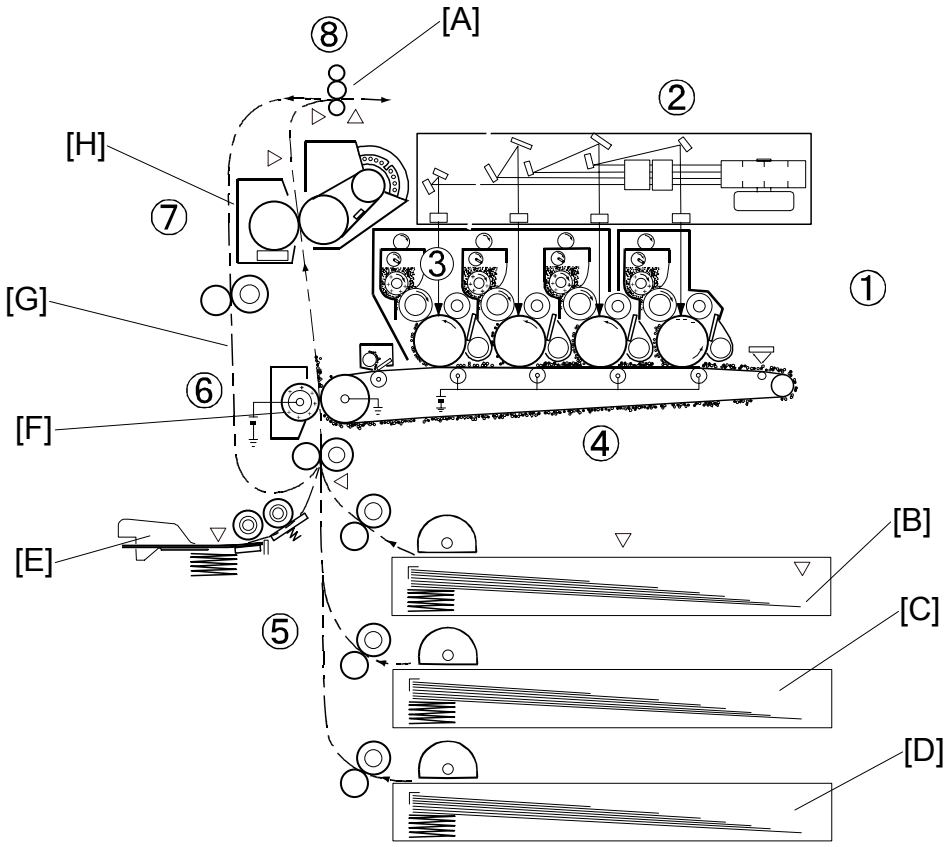
6.1 OVERVIEW

6.1.1 COMPONENT LAYOUT



[A]: Fusing fan
[B]: Laser scanning unit
[C]: Toner cartridge holder
[D]: Printer control box (Main Control Board)
[E]: Power supply unit
[F]: Y toner cartridge
[G]: M toner cartridge
[H]: C toner cartridge
[I]: BK toner cartridge
[J]: Fusing unit
[K]: Paper feed unit
[L]: Paper feed motor
[M]: Power supply fan
[N]: CMY motor
[O]: BK motor
[P]: Engine control box
[Q]: AC inlet
[R]: Transfer belt unit
[S]: Transfer belt tension unit

6.1.2 PAPER PATH



[A]: Paper exit
[B]: Paper tray (main unit)
[C]: Paper tray (optional unit)
[D]: Paper tray (optional unit)
[E]: Bypass tray (main unit)
[F]: Transfer roller
[G]: Paper path in the duplex unit (optional unit)
[H]: Fusing unit

The bypass tray [E] is built into the paper tray [B] of the main unit. The duplex unit is installed on the inside of the front cover.

When fed from the paper trays (including the bypass tray), paper is sent to the transfer roller [F], fusing unit [H], and paper exit tray.

During duplex printing, paper is sent to the paper exit [A], and fed into the duplex unit. Having passed through the paper path in the duplex unit [G], the paper goes to the transfer roller, fusing unit, and paper exit.

6.2 DRIVE MECHANISM

6.2.1 GENERAL DESCRIPTION

The CMY motor drives the following:

- CMY PCUs

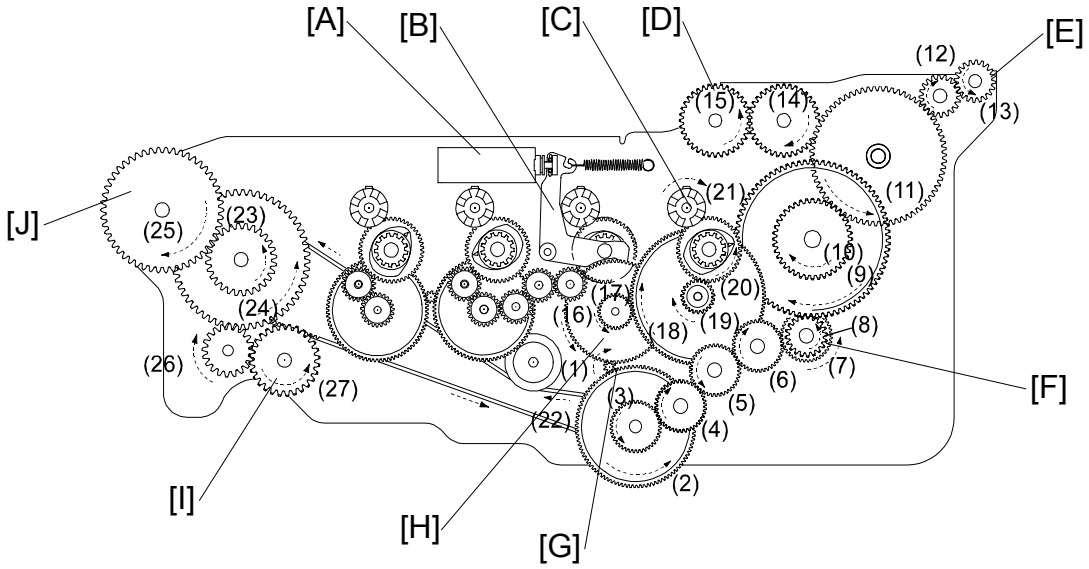
The BK motor drives the following:

- Black PCU
- All four toner cartridges
- Transfer belt unit
- Transfer belt tension unit
- Paper feed (standard cassette)
- Fusing unit

The by-pass feed motor (stepper motor) drives the following

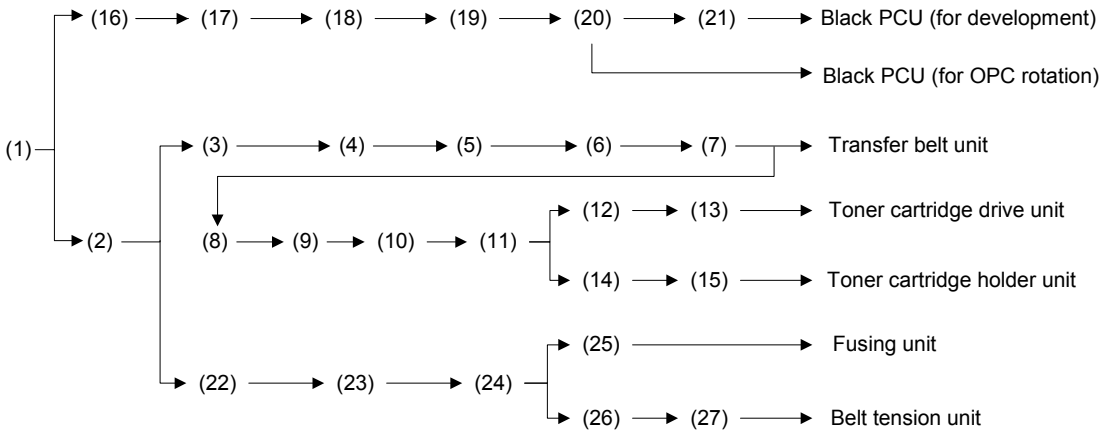
- Bypass tray
- Optional duplex unit

6.2.2 BK MOTOR DRIVE



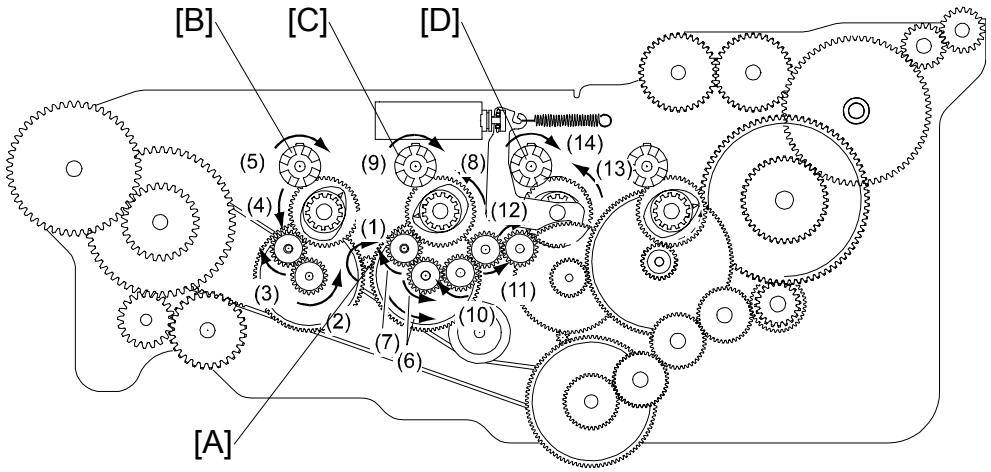
[A]: BK solenoid
[B]: BK clutch arm
[C]: Black PCU gear
[D]: Toner cartridge holder unit gear
[E]: Toner cartridge drive unit gear
[F]: Transfer belt unit gear
[G]: BK motor gear
[H]: Switching gear unit
[I]: Transfer belt tension unit gear
[J]: Fusing unit gear

The BK motor rotation is transmitted through the following gears to the following units:



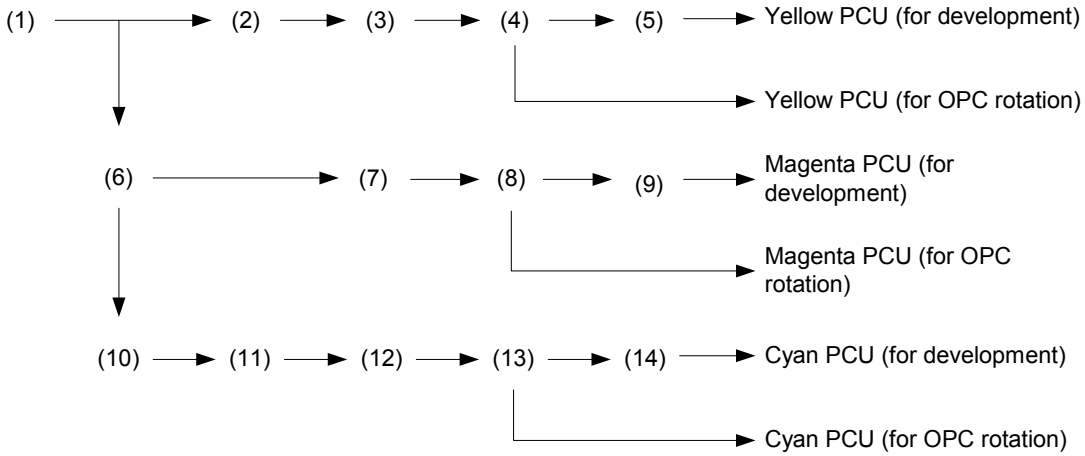
Rotation to the black PCU is controlled by the BK solenoid [A]. When the BK solenoid is turned on, the BK clutch arm [B] unlatches from the gear in the switching gear unit [H], and BK motor rotation is not transmitted from the switching gear unit to the black PCU.

6.2.3 CMY MOTOR DRIVE



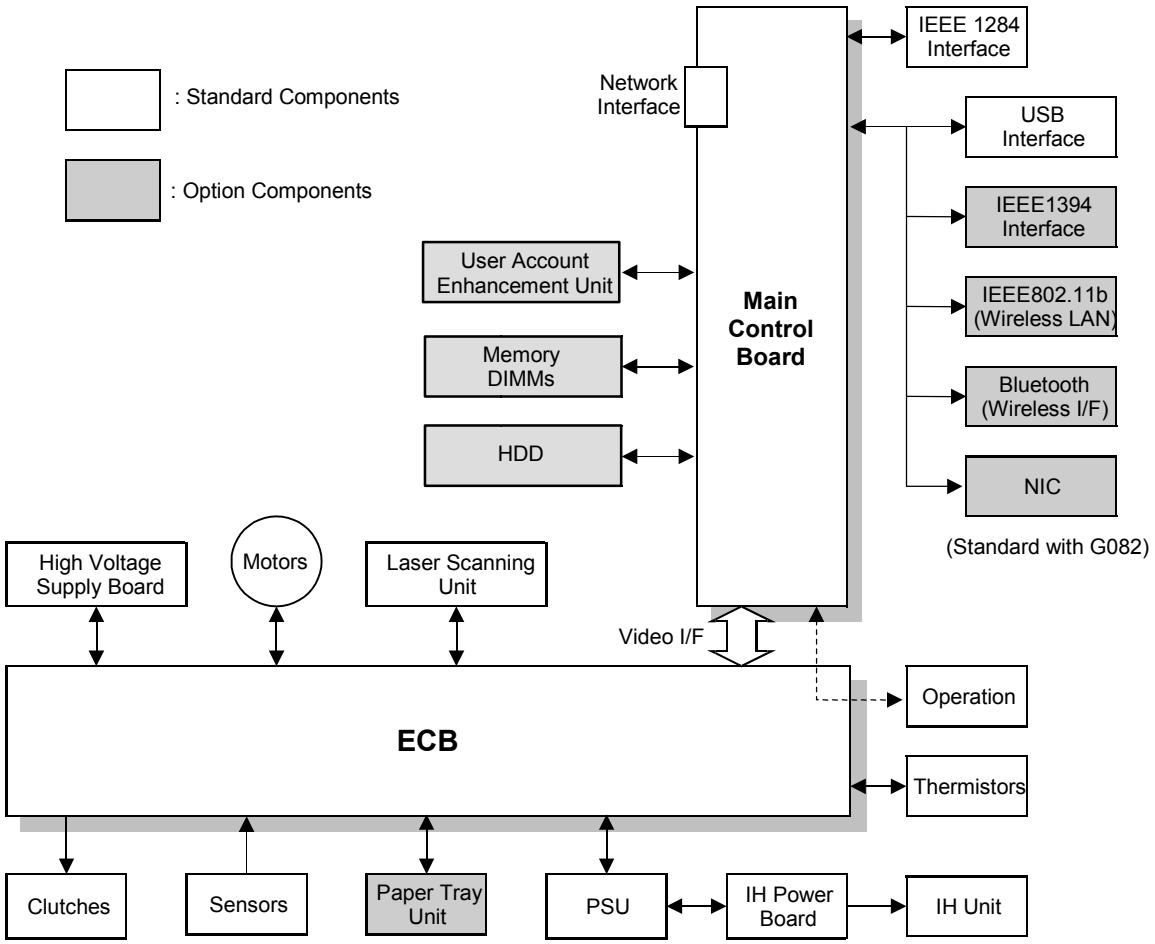
[A]: CMY motor gear
[B]: Yellow PCU drive gear
[C]: Magenta PCU drive gear
[D]: Cyan PCU drive gear

The CMY motor drives the following gears:



6.2.4 BOARD STRUCTURE

Overview



The ECB (Engine Control Board) controls all mechanical components. The IEEE1394 interface board, IEEE802.11b wireless LAN board, Bluetooth wireless interface board memory DIMM, the HDD and User Account Enhancement Unit can be installed on the main control board.

Only one of the IEEE1394 interface board, IEEE802.11b wireless LAN board, and Bluetooth wireless interface can be installed. If any of these are installed, the USB2.0 board must be removed.

The main control board (controller) connects to the ECB through the video interface bus.

Descriptions

1. ECB (Engine Control Board)

The ECB handles the following functions.

- Engine sequence
- Timing for peripherals
- High voltage supply and IH (fusing) power supply
- Laser and fusing
- Sensors, motors, and solenoids

2. Main Control Board (Controller)

The controller handles the following functions.

- Printer-to-host interface
- Operation panel interface
- Network interface
- Interfacing and control of the optional IEEE1394, IEEE802.11b, Bluetooth, HDD and DRAM DIMM

3. Standard interface boards (IEEE1284, USB, Ethernet LAN)

These allow computers to connect to the printer using IEEE1284 (parallel printer port) and USB.

4. Optional interface boards (IEEE1394, IEEE802.11b, Bluetooth)

These allow computers to connect to the printer using an IEEE1394 interface, IEEE802.11b wireless LAN, or a Bluetooth wireless interface. Only one of these can be installed at any one time. To install these, the USB interface must be removed.

5. HDD Unit (Option)

The HDD unit stores data for the following.

- Additional soft fonts
- Collation
- Locked print
- Sample print
- Downloading forms for form overlay

6. Memory DIMM (Standard: 64MB DRAM, Option: 64/128/256MB DRAM)

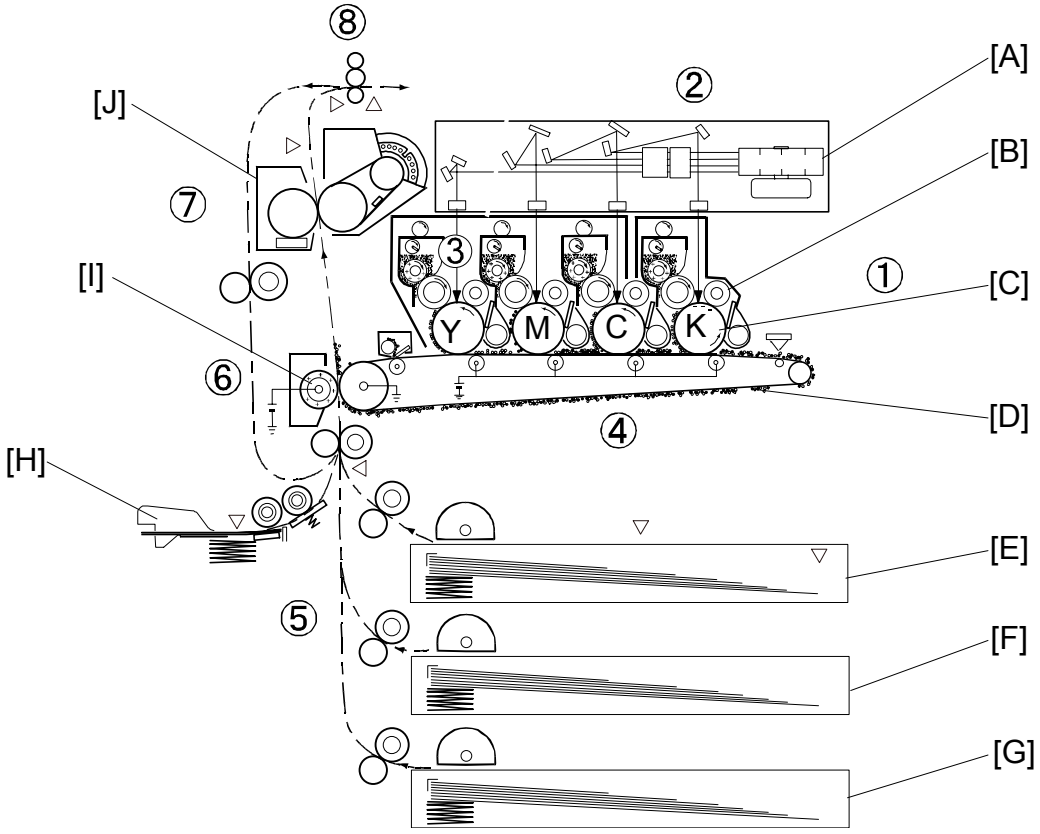
This is for additional printer processing memory, used for collation and for soft fonts.

7. Operation Panel Board

This controls the display panel, the LED, and the keypad.

6.3 PRINT PROCESS

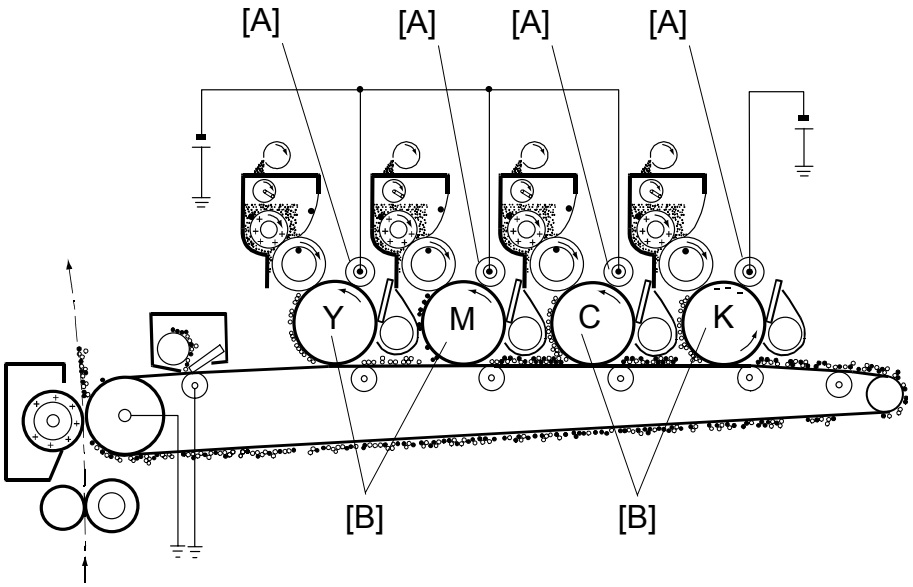
6.3.1 OVERVIEW



[A]: Polygon mirror
[B]: Charge roller Y, M, C, K
[C]: OPC drum Y, M, C, K
[D]: Transfer belt
[E]: Paper tray (main unit)
[F]: Paper tray (optional unit)
[G]: Paper tray (optional unit)
[H]: By-pass tray
[I]: Transfer roller
[J]: Fusing unit

①Drum charge	The charge rollers [B], one for each color development, apply a negative charge to the OPC drums [C]. There are four drums, one for each toner color.
② Laser optics	The polygon mirror [A] and other mirrors reflect the laser beams. There are four beams, one for each toner color.
③ Laser exposure and toner transfer	The laser beams create (write) the image to be developed (latent image) on the OPC drums. Then, toner is transferred to areas that were exposed to the laser beam.
④Belt transfer	A transfer belt [D] rotates past the drums, and the toner on the drum is transferred to this belt in the order Y, M, C, K. All four colors transfer to the belt in one belt rotation.
⑤Paper feed	After all colors have transferred to the belt, a sheet of paper is fed up from below the transfer belt to the transfer roller [I].
⑥Paper transfer	The transfer applies a positive bias to the “back” of the paper which transfers the toner to the paper.
⑦Fusing	The paper advances to the fusing unit [J], where heat and pressure permanently bond the toner to the paper.
⑧Paper exit	The paper is then fed out of the machine.

6.3.2 CHARGE



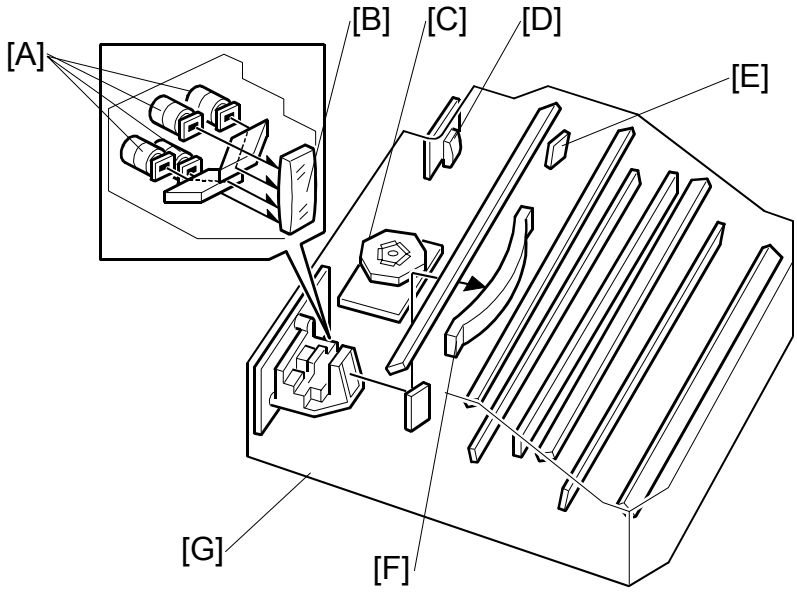
[A]: Charge roller Y, M, C, K
[B]: OPC drum Y, M, C, K

The charge rollers [A] contact the OPC drum [B] surfaces.

The charge on the roller is about –1100 V, (depending on the ambient temperature and selected print resolution). This applies a uniform negative charge of about -600 volts to the photoconductive drums.

6.3.3 LASER EXPOSURE

Laser scanning



[A]: Laser diodes
[B]: Collimator lens
[C]: Polygon mirror
[D]: Synchronization sensor
[E]: Horizontal synchronization mirror
[F]: Toroidal correction lens
[G]: Laser optics housing unit

Laser path

The laser diodes [A] (one for each color and black) generate the laser beams used to “expose” the OPC’s surface.

The collimator lens [B] ensures the beams are parallel, and directs them to the polygon mirror [C].

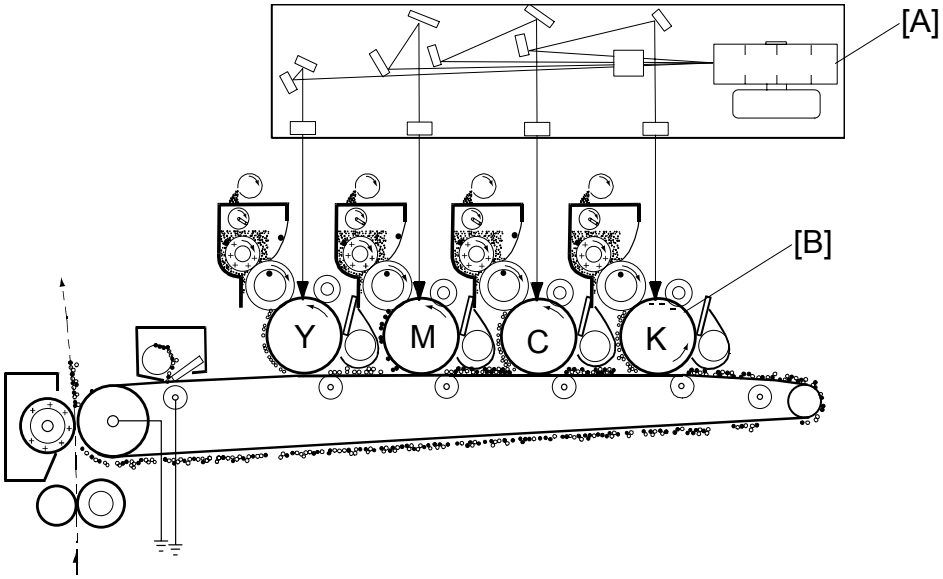
The toroidal correction lens [F] corrects the vertical registration errors of the beams.

Mirrors direct the beams to the primary lenses (at the bottom of the unit). The lenses ensure that each beam scans across the drum at a constant speed.

Laser synchronization

At the start of each horizontal scan, the horizontal synchronization mirror [F] deflects the laser beam to the horizontal synchronization sensor [D]. Synchronization is done for the black laser beam only. The other lines depend on the line position adjustment.

Polygon motor and laser exposure



[A]: Polygon mirror
[B]: OPC drums Y, M, C, K

The octagonal polygon mirror [A] reflects the laser beams. The beams “write” the latent images on the OPC drums [B]. The charge on exposed areas of the drum falls to about –50 V. Unexposed areas of the drum remain charged at approximately –600 V.

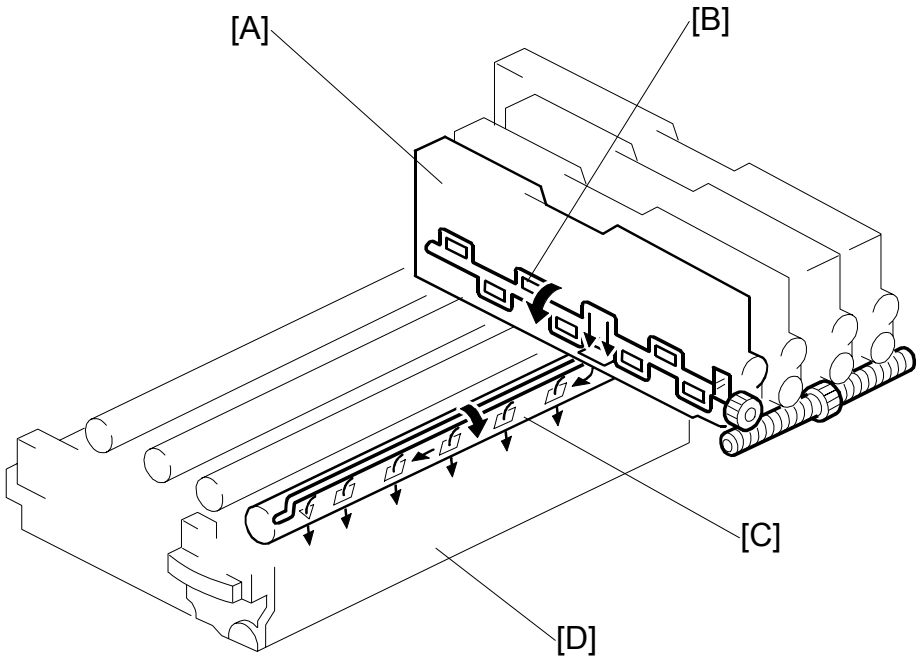
Laser output power is either 0.25 mW or 0.4 mW depending on whether the printer is printing the 1200-dpi mode or 600-dpi mode.

Safety switch

The LSU safety interlock switch interrupts power to the laser if either the front or right cover is open.

6.3.4 TONER SUPPLY

Toner cartridge



[A]: Toner cartridge
[B]: Agitator
[C]: Toner supply paddle shaft
[D]: PCU

Cartridge shape

Although the toner cartridges contain the same amount of toner, their dimensions are different. This prevents users from installing the cartridges in the wrong positions.

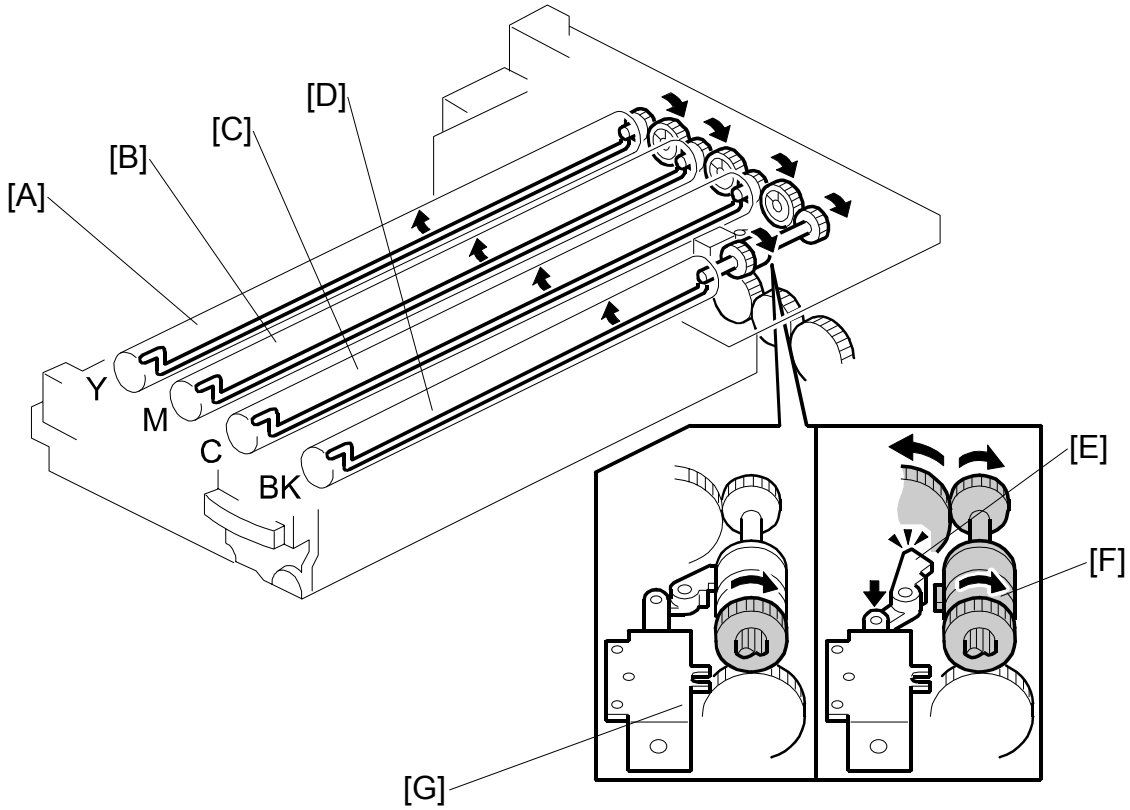
Toner supply

When the toner cartridge has been installed in the holder, a gate (“shutter”) on the bottom of the toner cartridge [A] is pushed open.

The toner is agitated by the agitator [B] in the cartridge, and goes out to the PCU [D].

In the PCU, the toner supply paddle shafts [C] agitates the toner, and an auger is used to distribute the toner evenly.

Paddle shaft switching mechanism



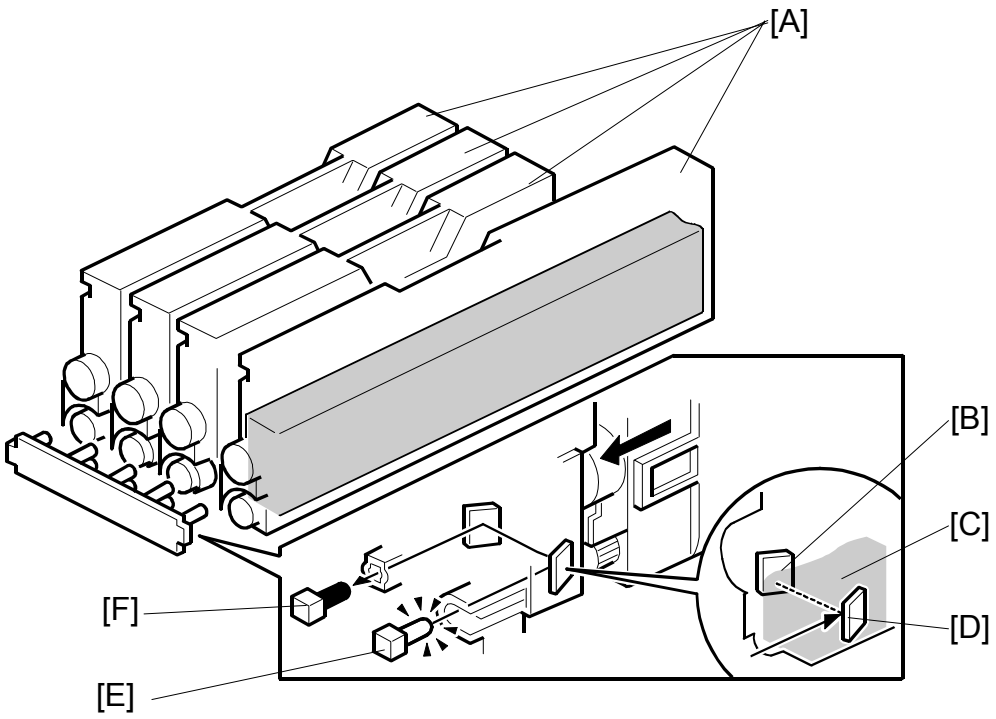
[A]: Toner supply paddle shaft (Y)
[B]: Toner supply paddle shaft (M)
[C]: Toner supply paddle shaft (C)
[D]: Toner supply paddle shaft (BK)
[E]: Ratchet mechanism
[F]: Gear (clutch)
[G]: Toner supply solenoid

There is a solenoid [G] on the bottom of the toner cartridge holder.

During monochrome printing, a ratchet mechanism [E] linked to the solenoid holds the gear [F] which is linked to the toner supply paddle shafts of the C [A], M [B] and Y [C] PCUs preventing these paddle shafts from moving.

During color printing, the ratchet releases the gear, and the paddle shafts in the C, M, and Y PCUs are allowed to operate. The toner supply paddle shaft [D] in the black PCU operates during both monochrome and color printing.

Toner cartridge and toner end detection



[A]: Toner cartridge
[B]: Toner detection mirror 2
[C]: Toner
[D]: Toner detection mirror 1
[E]: LED
[F]: Receptor

Toner cartridge detection

When the main switch is turned on, the LED [E] emits light. If the toner cartridge is not in the holder, the light goes to toner detection mirror 1 [D] and to the receptor [F].

If the toner cartridge is in the holder, the light is blocked by the toner (when the cartridge contains sufficient toner) or is momentarily blocked by the mylar in the cartridge (when the cartridge is empty).

When the toner cartridge is not in the holder, the message “Reset Toner Xxxxxx” is displayed (where “Xxxxxx” indicates the color). If two toner cartridges are not in the holders, the message “Reset Toner Xxxxxx/Yyyyyy” is displayed.

NOTE: If three toner cartridges are not in the holder, “Reset Toner Xxxxxx/Yyyyyy” and “Reset Toner Zzzzzz” blink one after another. If all four toner cartridges are not in the holder, “Reset Toner Yellow/Cyan” and “Reset Toner Magenta/Black” blink one after another.

The message(s) is/are cleared after the toner cartridge(s) is/are set and the upper left cover is closed. Once the message(s) is/are cleared, toner cartridge detection is not resumed until the upper left cover is opened and closed or until the main switch is turned off and on.

Toner end detection

Toner detection mirror 1 [D] reflects light emitted from the LED [E]. If there is only a small amount of toner remaining in the toner cartridge [C] some of the light passes through the toner cartridge [A] and is reflected by the detection mirror 2 [B], the light is then detected by the receptor [F]. A small “wiper” is incorporated in each toner cartridge that will “clean” the inside of the toner cartridge in the area where the LED light passes through. This ensures that the light is not blocked by toner adhering to the inside of the toner cartridge when the cartridge is out of toner and momentarily interrupts the LED light path

After the receptor has detected this pulsing light, the machine starts to count pixels.

When 0.26-billion pixels have been printed, “Toner is Almost Empty: Xxxxxx” is displayed (where “Xxxxxx” indicates the color).

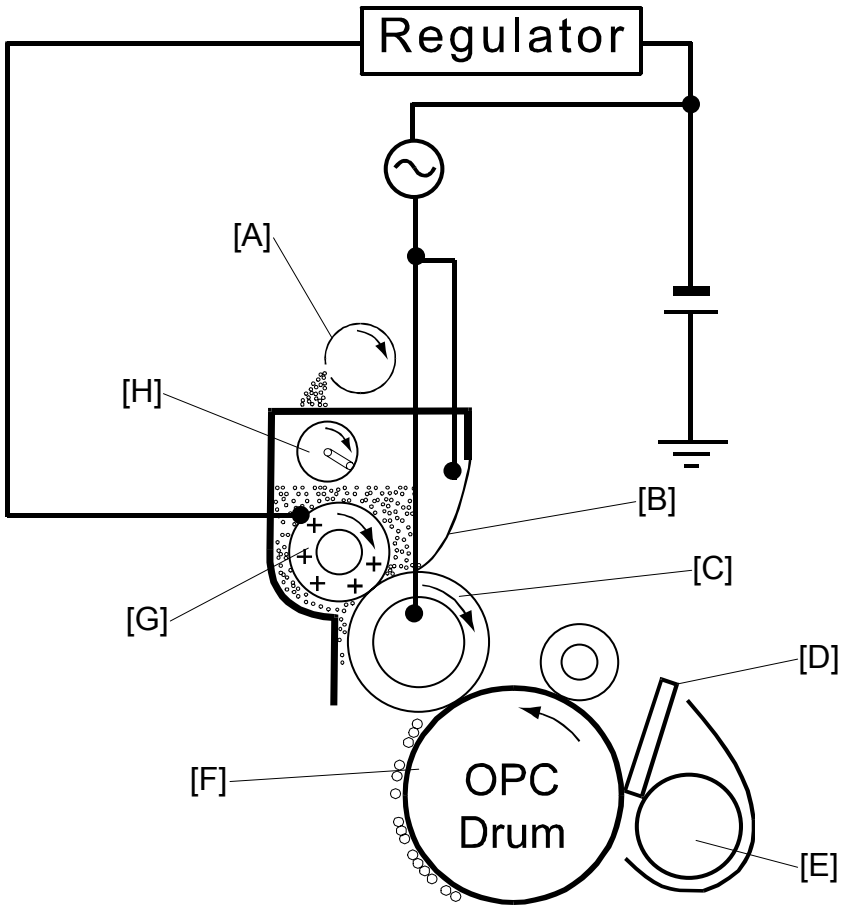
When 1.17-billion pixels have been printed, “Add Toner Xxxxxx” is displayed and the machine stops printing.

If all three color toners are empty, the machine will continue to print in monochrome. The machine will not print if the monochrome toner cartridge is empty even if the color cartridges contain toner.

NOTE: 0.26-billion pixels are equivalent to 154 sheets of A4/LT paper (at 5% coverage); 1.17-billion pixels are equivalent to 695 sheets of A4/LT paper (at 5% coverage).

6.3.5 DEVELOPMENT

PCU and OPC drum



[A]: Toner supply paddle shaft
[B]: Doctor blade
[C]: Development roller
[D]: Cleaning blade
[E]: Spiral paddle shaft
[F]: OPC drum
[G]: Toner supply roller
[H]: Gear-driven wire paddle

Development mechanism

The development roller [C] is activated and charged to about -250 volts (400 VAC p-p). The toner supply roller is charged to –300 volts.

The development roller rotates at 1.33 times the speed of the OPC drum [F] to ensure a sufficient supply of toner. Both the toner supply roller [G] and the development roller rotate clockwise.

The toner supply roller supplies a layer of toner to the development roller.

The doctor blade [B] smoothes the toner, ensuring the toner is evenly distributed on the development roller surface.

A gear-driven wire paddle [H] agitates the toner and keeps it moving towards the development roller.

OPC drum cleaning

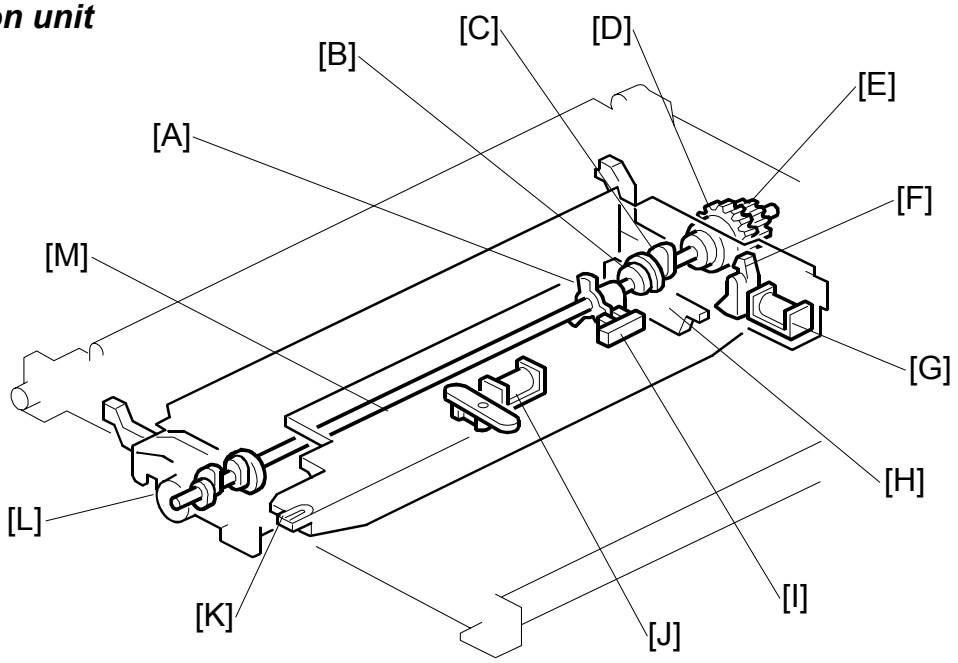
The OPC drum-cleaning blade [D] (which is always in contact with the OPC drum) removes excess toner remaining on the OPC drum after the toner is transferred to the transfer belt. The spiral paddle shaft [E] carries the removed toner to the waste toner bottle (☛ 6).

New PCU detection

The K PCU has a fuse as does the YMC PCU. When electricity flows through the fuse for the first time, the PCU is seen as a new one and the PCU counter is set to "0." The fuse automatically opens when 250 sheets are printed out. If the fuse does not open, this symptom is regarded as an error (bits 6 and 7, SP5-994).

6.3.6 TRANSFER BELT UNIT DRIVE

Belt tension unit



[A]: Sensor actuator
[B]: Cam 1
[C]: Cam 2
[D]: Ratchet mechanism
[E]: Drive gear
[F]: Pawl
[G]: Cam solenoid
[H]: Cam slider
[I]: Belt home position sensor
[J]: Changer solenoid
[K]: Belt-transfer-roller changer
[L]: Interface roller
[M]: Shaft

During monochrome printing, the transfer belt contacts the black OPC drum only. During color printing, the belt contacts all OPC drums. When not required, the belt is moved away from all OPC drums. These actions are made possible by the belt tension unit. The unit is driven by the BK motor.

When the cam solenoid [G] turns on, the pawl [F] holds the ratchet mechanism [D] (and the solenoid turns off). This action enables the shaft [M] to start revolving. When the shaft has made a quarter revolution, the pawl releases the ratchet mechanism. During a job, the shaft makes one complete revolution, in four 90-degree steps. The position of the shaft depends on the current phase of the job.

- Phase 1–Home position (0-degree position – this is the home position
- Phase 2–Belt cleaning (90-degree position) – the belt is cleaned at the start of the job
- Phase 3–Continuous printing (180-degree position) – the belt stays in this position during the job
- Phase 4–Last-page printing (270-degree position) – this phase begins after the toner images for the final page have been transferred from the OPCs

Four phases

Phase 1—Home position (0-degree position)

This is the position during standby mode. The transfer belt is away from all OPC drums. The paper transfer roller is away from the transfer belt.

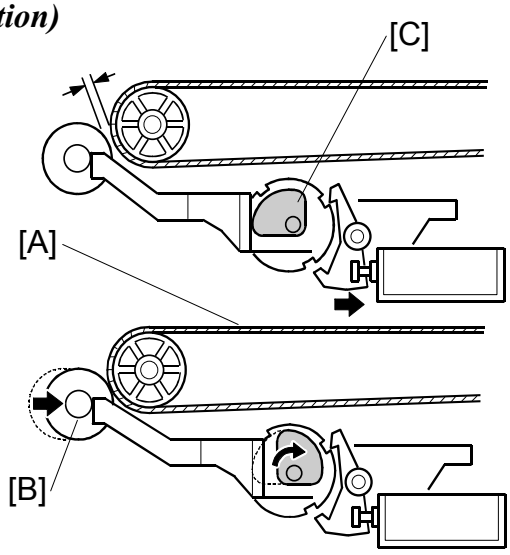
Phase 2—Belt cleaning (90-degree position)

Before printing starts, the transfer belt is cleaned. The belt tension unit pushes the left roller of the transfer belt to the left, taking up the slack in the belt. This then pulls the transfer belt into contact with the cleaning unit which is located just above the belt (see bottom of next page for location). The transfer-belt cleaning-blade then cleans the belt surface.

NOTE: The transfer belt "slack" is not very noticeable during a visual inspection.

Phase 3—Continuous printing (180-degree position)

[A]: Transfer belt
[B]: Transfer roller



The transfer belt moves to the 180-degree position for all pages except the final one. Cam 1 ["B" on the previous page] causes the cam slider ["H" on the previous page] to slide to the right. This action lifts the belt transfer roller(s), so the transfer belt contacts the OPC drum(s). Cam 2 [C] lets the transfer roller [B] move to the right. The roller then contacts the transfer belt [A].

Phase 4—Last-page printing (270-degree position)

For printing the last page of the job, after the toner images have been transferred from the OPC drums, the transfer belt comes down to the initial position away from all OPC drums. However, the paper transfer roller still contacts the transfer belt.

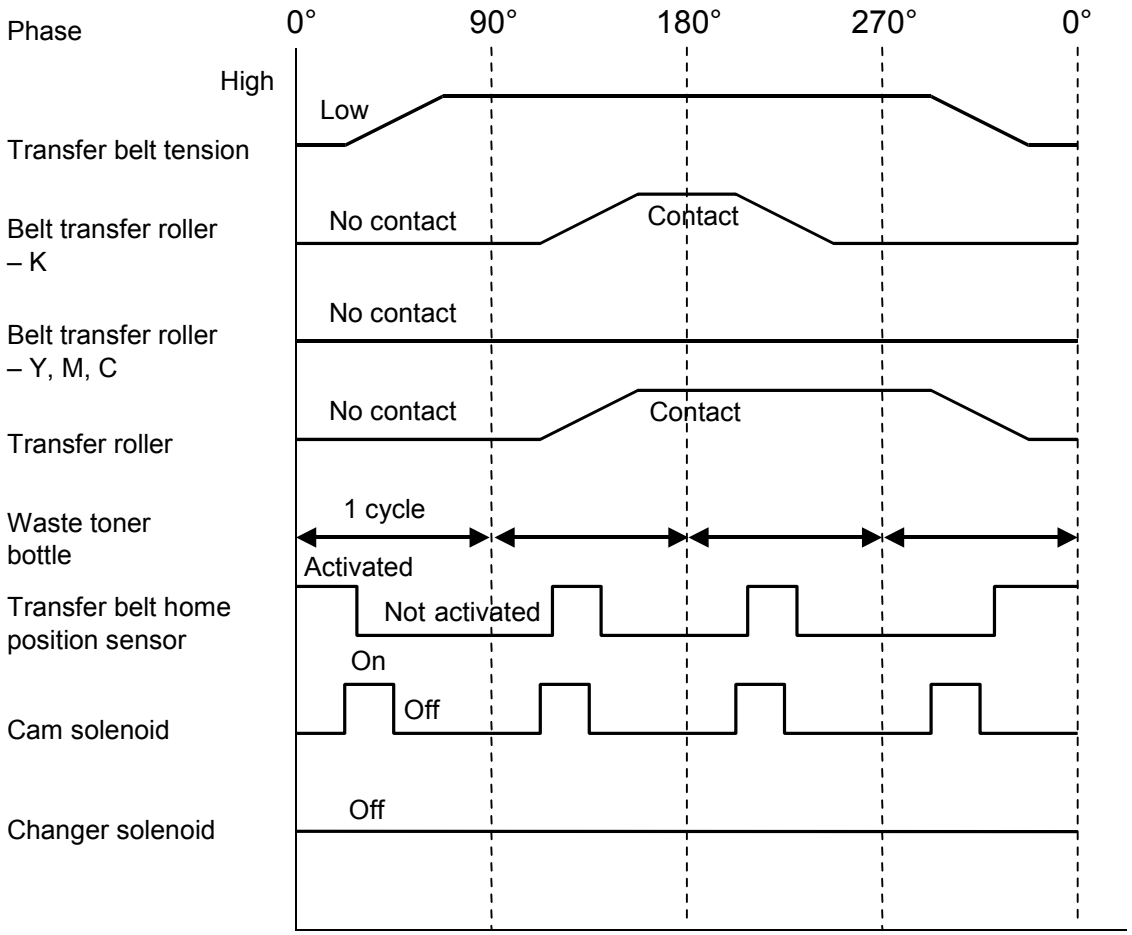
Belt home position sensor

The belt home position sensor ["I" on the previous page] detects the revolution of the shaft. When the shaft does not return to its home position, the cam solenoid turns on (and off) several times, transferring the BK motor power to the shaft. If this action does not return the shaft to its home position, "SC 471" appears on the operation panel.

Monochrome printing and color printing

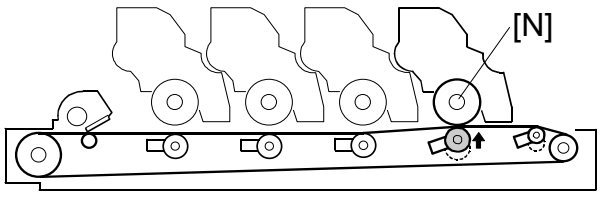
NOTE: Monochrome and full color printing can be switched between pages.

Monochrome printing



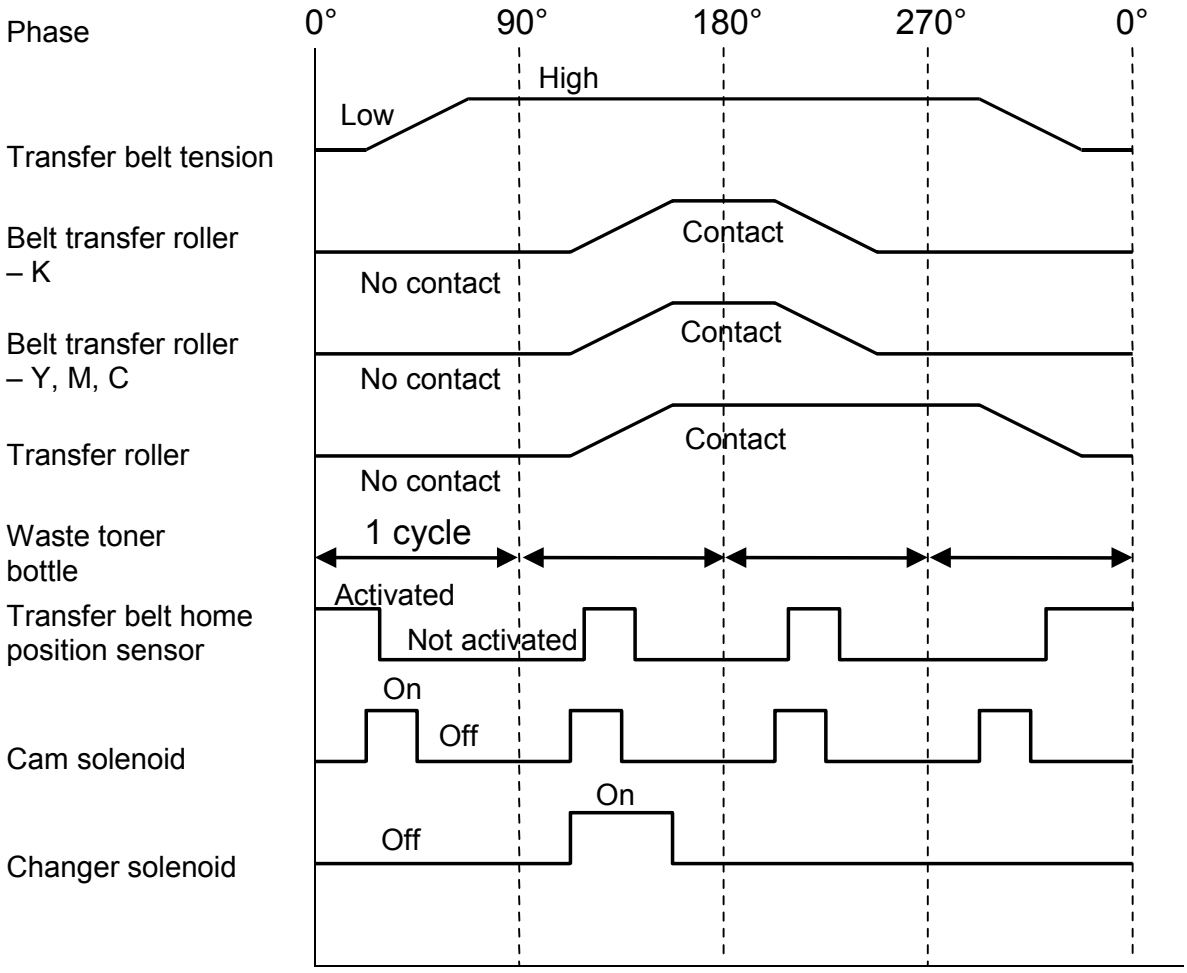
Waste toner bottle “1 cycle”: When the shaft rotates 90 degrees to change the operation phase, the interface roller mechanism shakes the waste toner bottle in order to make the waste toner level.

During monochrome printing, the changer solenoid [“J” on page 6-19] stays off, so the belt-transfer-roller changer [“K” on page 6-19] does not slide forward. Only the belt transfer roller below the black OPC belt is lifted, and the transfer belt contacts the black OPC drum [N] only.

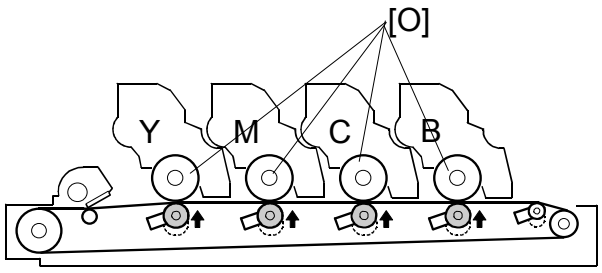


[N]: Black OPC drum

Color printing



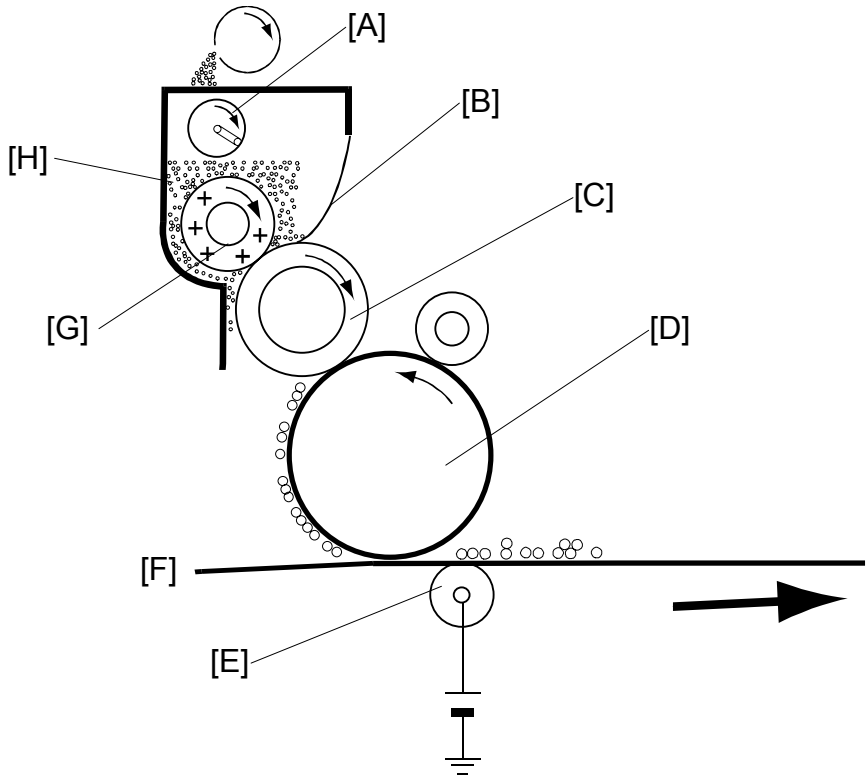
During color printing, the changer solenoid is on, so the belt transfer-roller changer slides forward. The belt transfer rollers below all OPC drums [O] are lifted, and the transfer belt contacts all OPC drums.



[O]: Yellow, magenta, and cyan OPC drums

6.3.7 BELT TRANSFER AND CLEANING

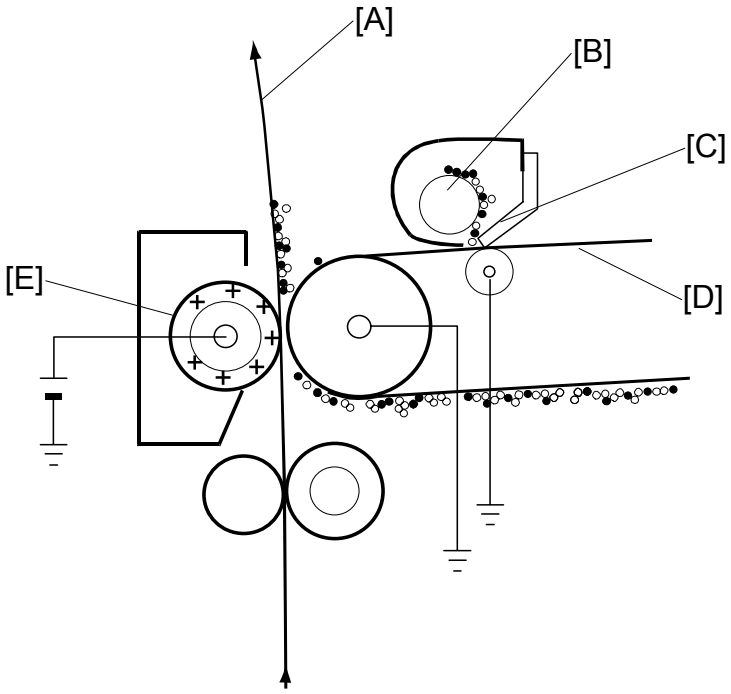
Transfer from drum to belt



[A]: Gear-driven wire paddle
[B]: Doctor blade
[C]: Development roller
[D]: OPC drum
[E]: Belt transfer roller
[F]: Transfer belt
[G]: Toner supply roller
[H]: Toner

The transfer belt [F] contacts the OPC drums [D], and moves at the same speed as the drum's rotation. Under the transfer belt at the contact point with each OPC drum, there is a belt transfer roller [E] charged to about +700 volts (belt transfer voltage). This roller transfers the toner from the OPC drum to the transfer belt. All color layers are transferred in one rotation of the transfer belt.

Transfer from belt to paper



[A]: Paper
[B]: Spiral paddle shaft
[C]: Cleaning blade
[D]: Transfer belt
[E]: Transfer roller

Belt transfer

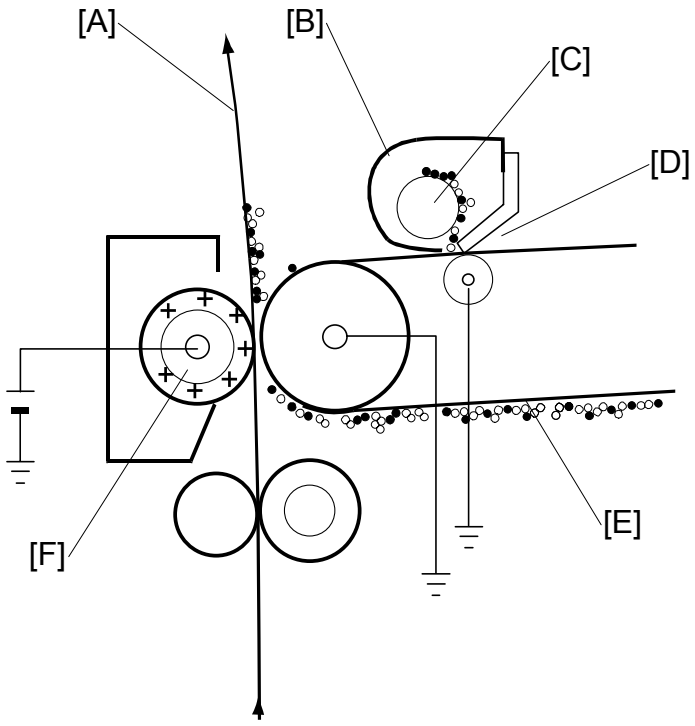
When all four layers of toner have transferred to the transfer belt [D], the registration clutch turns on and feeds the paper [A] to the transfer roller [E]. Paper feed is timed so that the leading edge of the toner image on the belt is aligned to 4 mm from the leading edge of the paper. The paper advances at the same speed as the transfer belt.

NOTE: OPC film can be used instead of paper.

Transfer roller bias

Charged with a positive voltage (about +1400 volts), the transfer roller attracts the toner from the transfer belt to the paper. This voltage depends on the ambient temperature and humidity, print speed, and paper type.

Belt cleaning

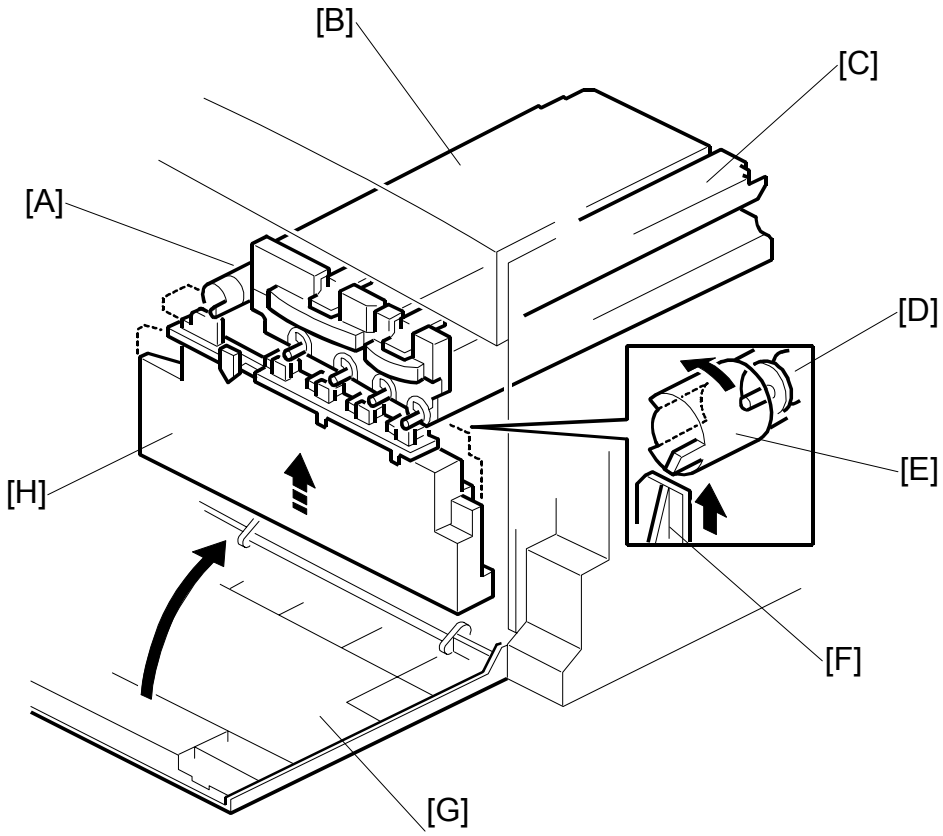


[A]: Paper
[B]: Belt cleaning unit
[C]: Spiral paddle shaft
[D]: Cleaning blade
[E]: Transfer belt
[F]: Transfer roller

The belt cleaning unit [B] consists of the cleaning blade [D] and spiral shaft [C]. The cleaning blade removes residual toner from the transfer belt [E] to prevent "ghosting" on the next print. The removed toner (waste toner) is transported through the cleaning unit by the spiral shaft, and is collected in the waste toner bottle (☛ 6.3.8).

6.3.8 WASTE TONER BOTTLE

Mechanism

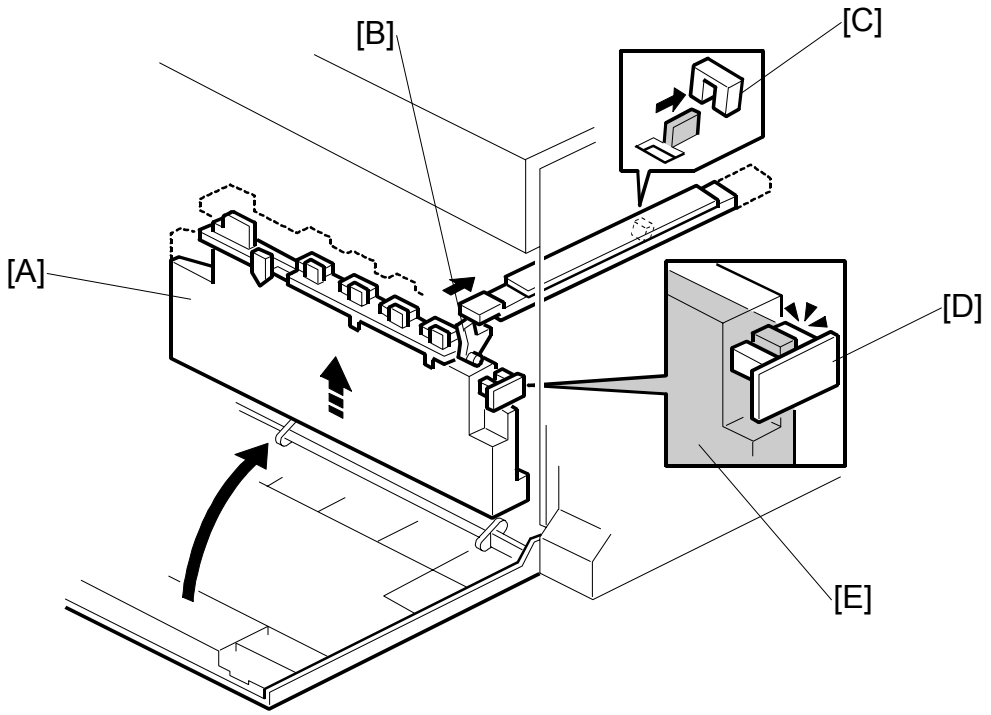


[A]: Transfer belt cleaning unit
[B]: CMY PCU
[C]: Black PCU
[D]: Spiral paddle shaft
[E]: Waste toner gate
[F]: Contact blade
[G]: Right cover
[H]: Waste toner bottle

The spiral paddle shaft [D] transports removed toner (waste toner) to the waste toner bottle [H]. The waste bottle has five openings: one for the transfer-belt cleaning unit (☛ 6.3.6), the others for the PCUs [B][C].

The waste toner bottle is lifted by a mechanical link when the right cover [G] is closed. The cartridge has five contact blades [F]. Each contact blade pushes open one waste toner gate [E], releasing the waste toner.

Sensor



[A]: Waste toner bottle
[B]: Bottle feeler
[C]: Bottle detection sensor
[D]: Waste toner full sensor
[E]: Waste toner

Waste toner bottle detection

When lifted (☛ *Mechanism*), the waste toner bottle [A] pushes against the bottle feeler [B]. The feeler pushes the actuator of the bottle detection sensor [C].

Waste toner full sensor

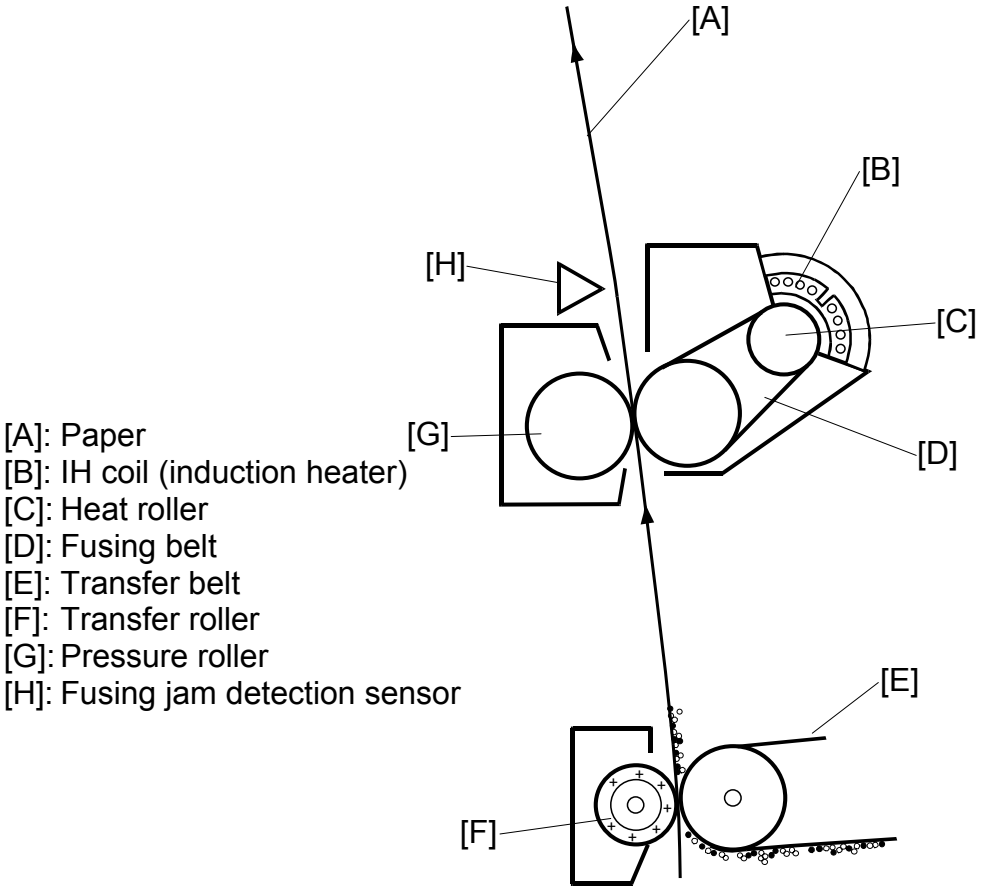
The waste toner full sensor [D] emits light. The light goes through the bottle if the waste toner level is low. When the waste toner level is high [E], the light path is blocked, and “Waste Toner is Almost Full” is displayed. After this, when 4.58-billion pixels have been printed, “Replace Waste Toner” is displayed. In this case, the machine continues printing until the job ends (or the right cover is opened). When the job ends, the machine does not process any more jobs until the waste toner bottle is emptied.

NOTE: 4.58-billion pixels are equivalent to 2,721 sheets of LT/A4 paper (5% coverage)

To keep the waste toner level, the waste toner bottle vibrates each time the transfer belt drive unit turns 90 degrees. The interface roller on the belt tension unit (☛ 6.3.6) creates this vibration when it turns.

6.3.9 FUSING

Fusing process

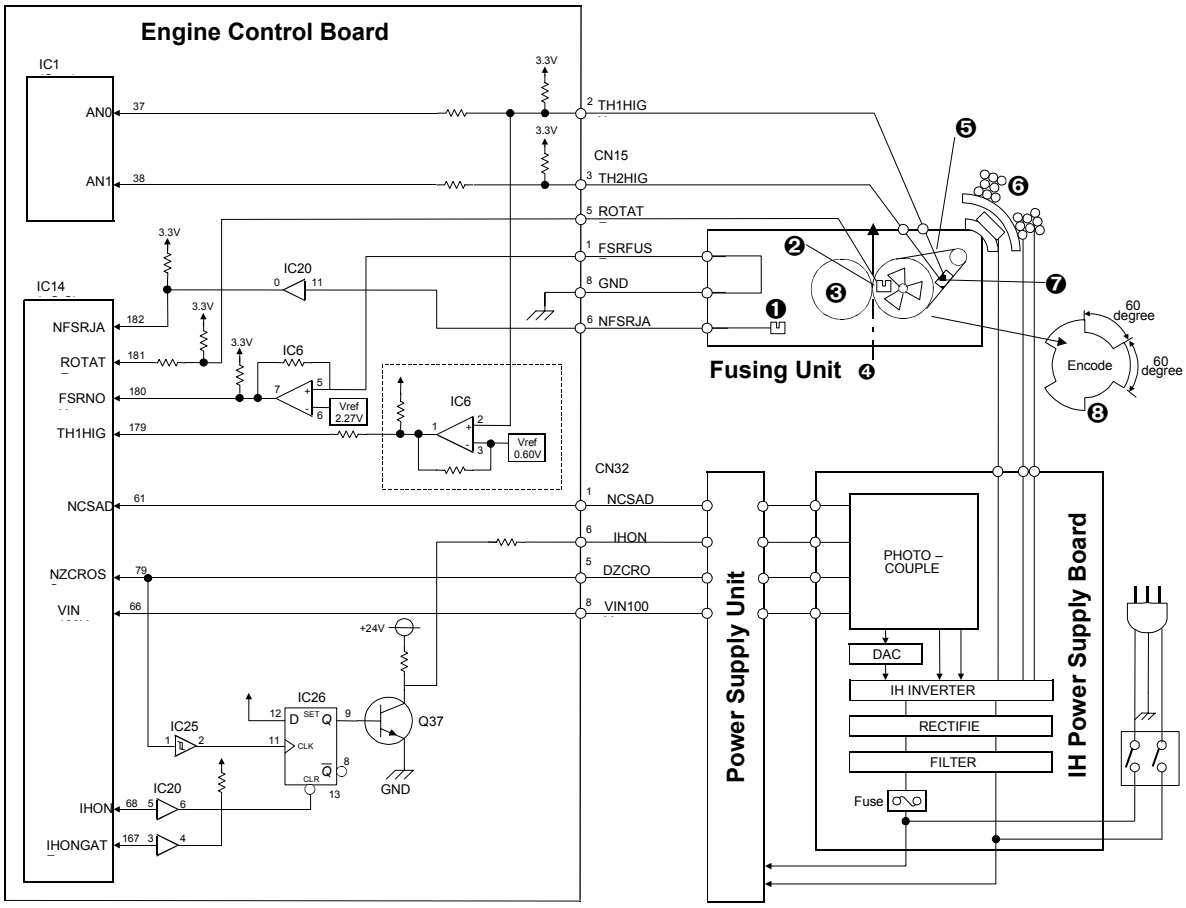


[A]: Paper
[B]: IH coil (induction heater)
[C]: Heat roller
[D]: Fusing belt
[E]: Transfer belt
[F]: Transfer roller
[G]: Pressure roller
[H]: Fusing jam detection sensor

After the toner image has been applied to the paper [A], it passes through the fusing unit. The fusing unit contains the heat roller [C]. The IH coil [B] heats the heat roller. The heat roller heats the fusing belt [D] which is responsible for melting the toner on the paper. Additionally, the paper is pressed between the fusing belt and the pressure roller [G], and the melted toner is bonded to the paper.

When the paper exits the fusing unit, it advances to the exit tray. The fusing jam detection sensor [H] detects the paper. A heat roller rotation sensor is used to ensure that the heat roller is rotating.

Circuit board



❶ Paper jam detection sensor

❷ Rotation sensor

❸ Pressure roller

❹ Paper

❺ Fusing belt

❻ IH unit

❼ Thermistor 1 and thermistor 2

❽ Encoder

NOTE: Thermistor 1 is located in the middle of the fusing belt; thermistor 2 is located towards the rear of the fusing belt. Both Thermistors open at 185 °C.

Fusing unit detection

The fusing unit detection signal FSRFUSE indicates that the fusing unit is installed. The circuit closes when the fusing unit connector is properly seated. The table below lists the pin location.

Signal Name	Pin No.	In/Out	Remarks
	CN15	CN15	
FSRFUSE	1	In	Detects the fusing unit

CN15: On engine control board

Paper jam detection

The paper jam detection signal NFSRJAM indicates that a paper jam has occurred in the fusing unit. The circuit is closed if the paper jam detection sensor [❶] in the fusing unit detects a sheet of paper [❹]. The table lists the pin locations. (Refer to illustration on pg. 6-29.)

Signal Name	Pin No.		In/Out		Remarks
	CN15	CN1601	CN15	CN1601	
NFSRJAM	6	2	In	Out	Detects paper jams in the fusing unit

CN15: On engine control board
CN1601: On fusing unit

Rotation detection

The encoder monitors whether the fusing belt is rotating. If the fusing belt breaks, the encoder will not detect any rotation. The fusing belt rotation signal ROTATE indicates whether the fusing belt [❺] is rotating. While the encoder [❽] is rotating, the signal from the rotation sensor [❷] on the fusing unit alternates. The encoder is linked to the fusing belt shaft via gears. The table lists the pin locations. (Refer to illustration on pg. 6-29.)

Signal Name	Pin No.		In/Out		Remarks
	CN15	CN1601	CN15	CN1601	
ROTATE	5	3	In	Out	Detects the fusing unit rotation

CN15: On engine control board
CN1601: On fusing unit

Temperature detection

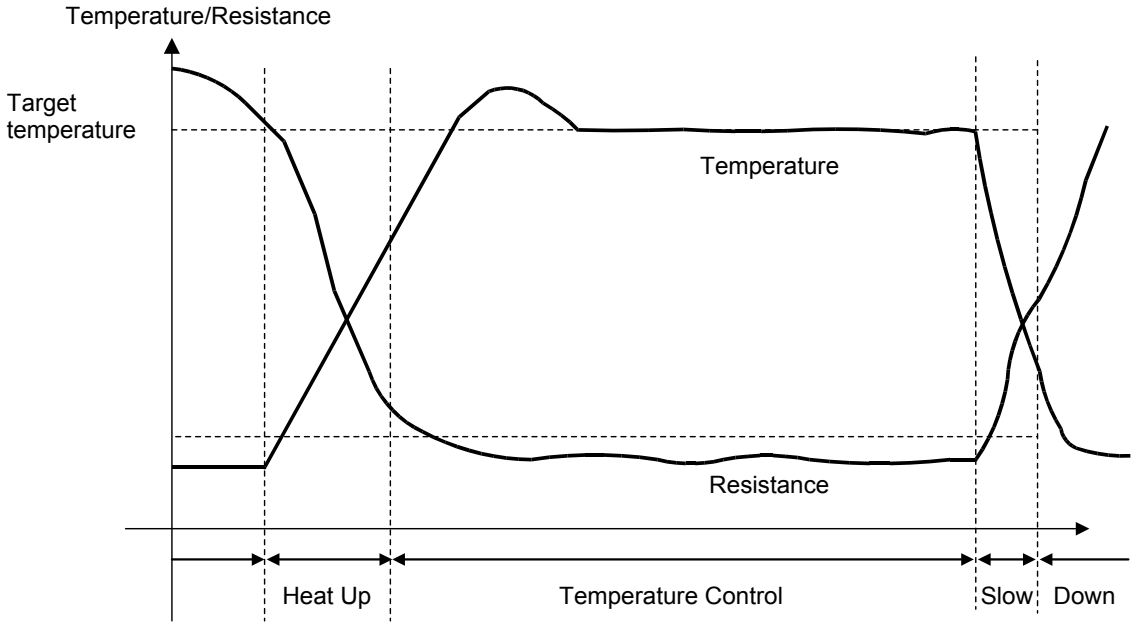
The thermistor signals, TH1HIGH and TH2HIGH, indicate that the temperature of the fusing belt has become too high. The TH1HIGH circuit is closed when thermistor 1 [❼] detects high temperature in the middle of the fusing belt. The TH2HIGH circuit is closed when thermistor 2 [❼] detects high temperature at the far side (rear) of the fusing belt. The signal TH1HIGH is used to control the fusing temperature (☛ *Fusing temperature control*). The table lists the pin locations. (Refer to illustration on pg. 6-29.)

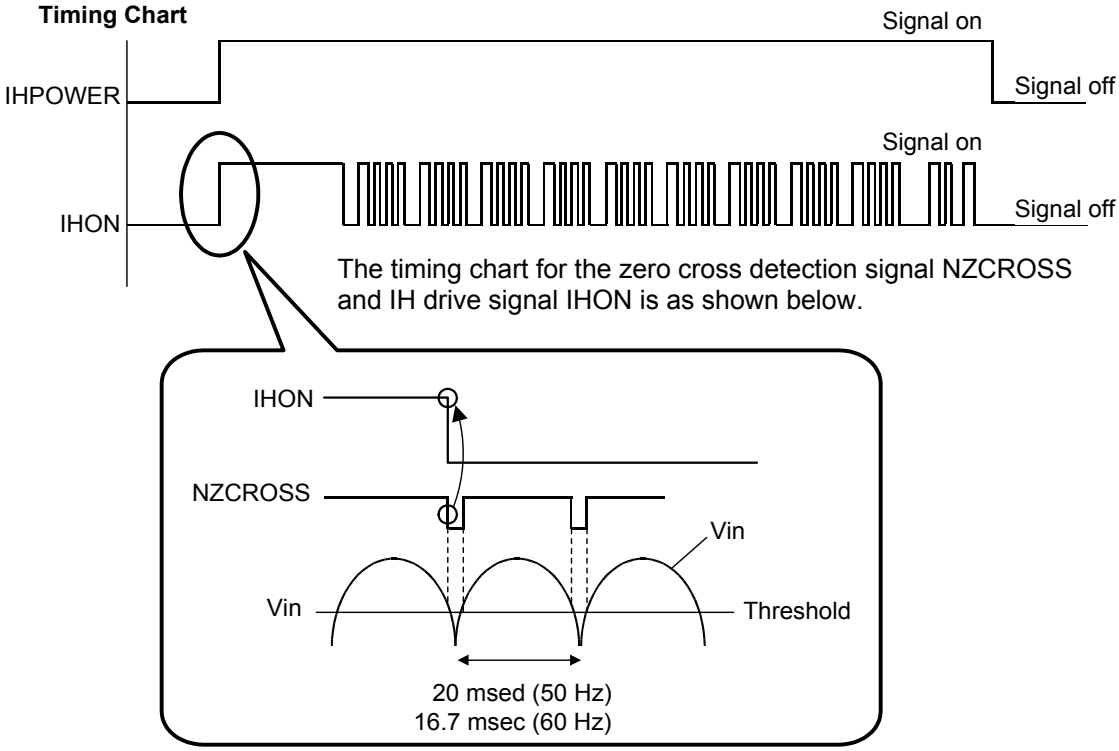
Signal Name	Pin No.		In/Out		Remarks
	CN15	CN1601	CN15	CN1601	
TH1HIGH	2	6	In	Out	Detects high temperature in the middle of the belt
TH2HIGH	3	5	In	Out	Detects high temperature at the rear end of the belt

CN15: On engine control board
CN1601: On fusing unit

NOTE: If several sheets of narrow-width paper are continuously fed, the temperature at the ends of the belt become much higher than the temperature in the middle. Thermistor 2 (TH2HIGH) prevents the ends of the belt from overheating.

Fusing temperature control





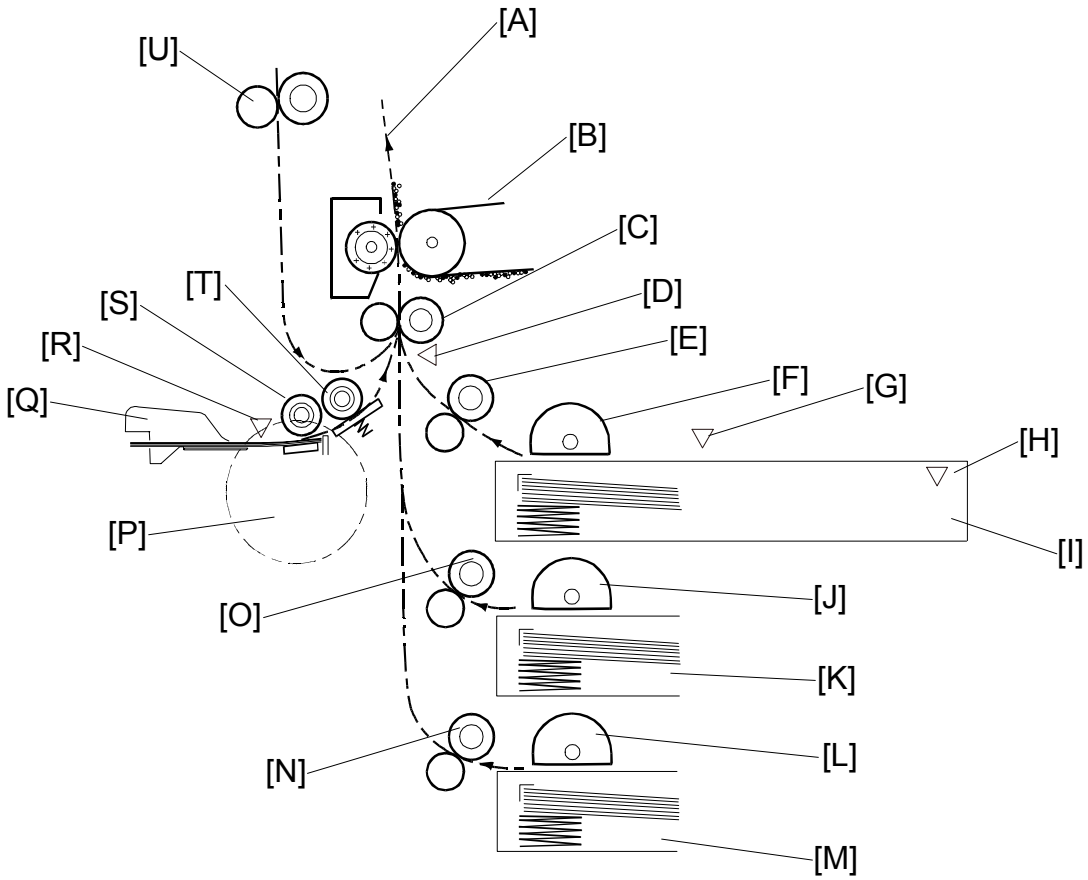
The IH power control signals IHPOWER and IHON are used to provide the IH unit [⓺] with electric power. The on/off timing of IHON is adjusted in accordance with the zero cross detection signal NZCROSS. The table lists the pin locations.(Refer to illustration on pg 6-29.)

Signal Name	Pin No.		In/Out		Remarks
	CN32	CN2503	CN32	CN2503	
IHPOWER	7	3	—	—	Closes the +24V circuit
IHON	6	4	Out	In	Provides the IH unit with electricity

CN32: On engine control board
CN2503: On power supply board

T indicates the target fusing temperature. In the 600-dpi printing mode, T is about 175°C. The fusing belt temperature is different for the 1200-dpi printing mode, thick-paper printing mode and transparency-printing mode. When the printer is idle, IHPOWER is off, and the fusing belt is not heated.

6.3.10 PAPER FEED



[A]: Paper
[B]: Transfer belt
[C]: Registration roller
[D]: Registration sensor
[E]: Paper feed roller (main unit)
[F]: Pickup roller (main unit)
[G]: Paper end sensor (main unit)
[H]: Paper size detection switch
[I]: Standard tray (main unit)
[J]: Pickup roller (optional unit)
[K]: Paper tray (optional unit)
[L]: Pickup roller (optional unit)
[M]: Paper tray (optional unit)
[N]: Paper feed roller (optional unit)
[O]: Paper feed roller (optional unit)
[P]: By-pass feed motor
[Q]: By-pass tray
[R]: Paper end sensor (by-pass tray)
[S]: Pickup roller (by-pass tray)
[T]: One-way roller
[U]: Duplex paper feed roller (located on optional duplex unit)

Drive motors

The table below lists the motors that drive the feed rollers (standard [I] and optional [K][M] trays) and the one-way roller (by-pass tray [Q]).

Feed roller	Motor
Standard tray [I]	BK motor
By-pass tray [Q]	By-pass feed motor [P]
Optional tray [K][[M]	Paper feed motor (optional tray unit)

Sensors

The table lists the switch and sensors and their functions.

Sensor/switch	Function
Registration sensor [D]	Detects paper arriving at the registration roller
Paper end sensor [G]	Detects whether there is paper in the tray
Paper size detection switch [H]	Detects the tray and the paper size
By-pass paper end sensor [R]	Detects whether there is paper in the tray

NOTE: The paper tray detection switch is mechanically linked to the paper size detection lever [H].

Paper size detection switch combination

The paper size detection switch is composed of three toggle switches: toggles 1, 2, and 3. The combination of toggles 1 and 2 indicates the size of the paper in the tray while toggle 3 works as a paper tray detection sensor. The table lists the detected paper sizes and the combination of the toggle switches. Note that toggle 3 is always pushed when the tray is set.

Toggle switch	Letter	A4	B5	Legal
Toggle 1	L	H	L	H
Toggle 2	L	L	H	H
Toggle 3	L	L	L	L

NOTE: H (=high) indicates the switch is not pushed; L (=low) indicates the switch is pushed.

Registration clutch

The DC BK motor supplies drive to the registration roller [C], which is under rotational control of the registration clutch. This roller feeds paper to the transfer roller when the image is ready to be printed.

Feeding envelopes

The by-pass tray can feed envelopes.

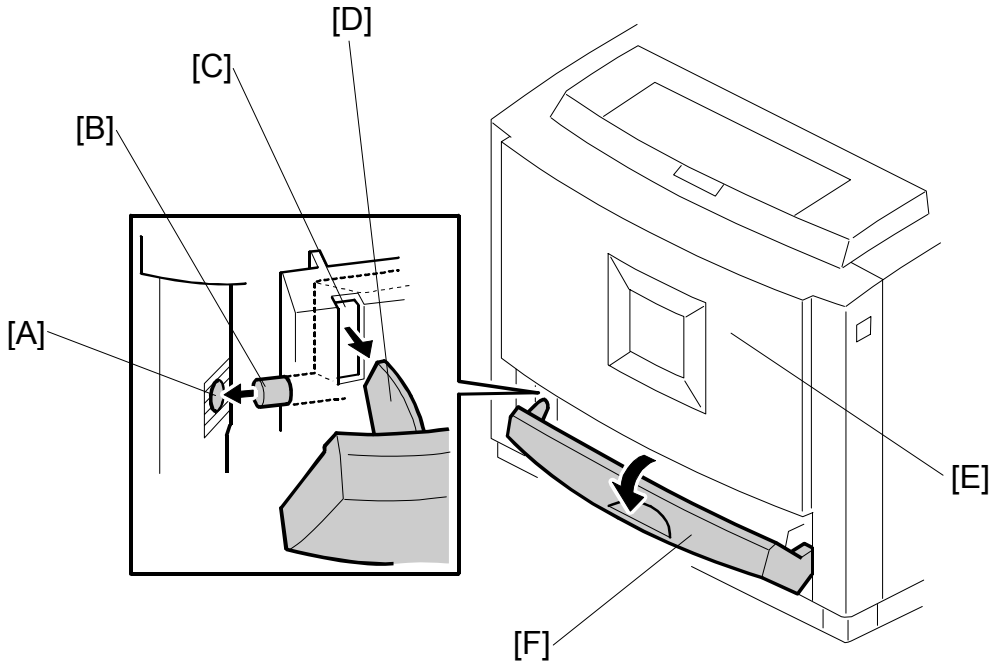
Paper feed speed

This machine has three paper feed speeds (for feed from registration roller to fusing unit) depending on the selected resolution.

Mode	Resolution (dpi)	Feed speed (mm/s)	Print speed (ppm)
B/W	300 x 300 600 x 600 1,200 x 600	124	20
	1,200 x 1,200	50	8
Color	600 x 600 1,200 x 600	100	16
	1,200 x 1,200	100	16
OHP/Thick	600 x 600 1,200 x 600 1,200 x 1,200	50	8

During a monochrome print job, the machine changes the speed if there is a page with color in the middle of the job. However, it will not change the speed if there is a monochrome page in the middle of a color print job.

6.3.11 STANDARD TRAY LOCK MECHANISM

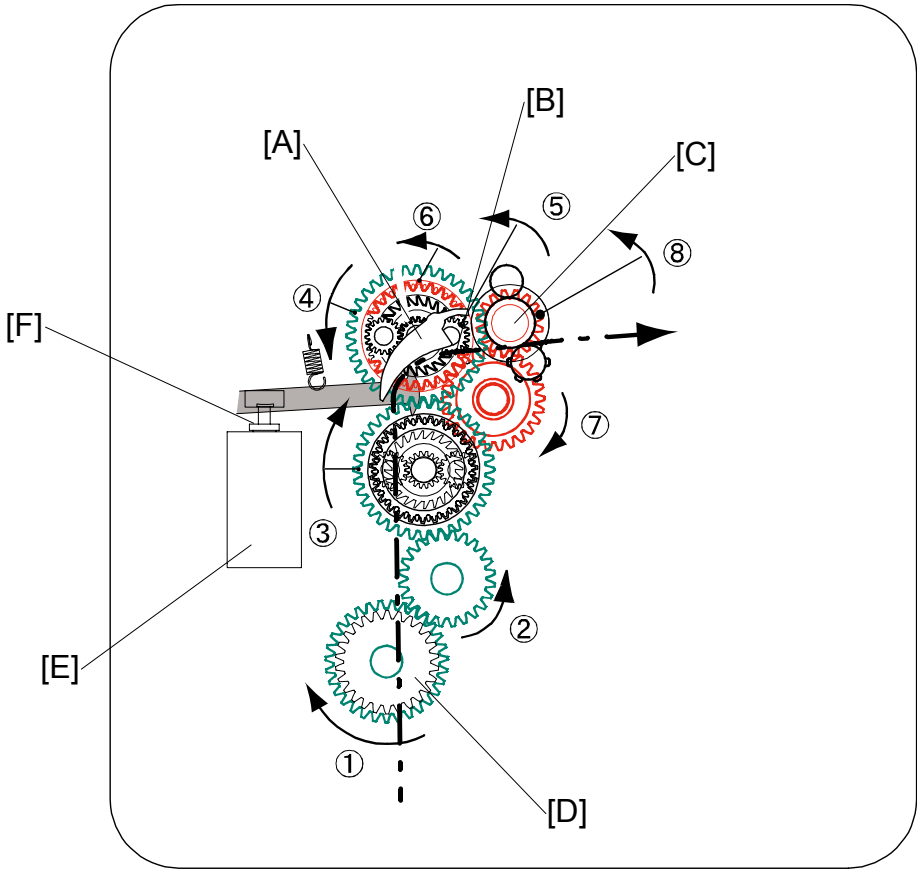


[A]: Opening (front door)
[B]: Bar (standard tray)
[C]: Mechanical link (standard tray)
[D]: Actuator (by-pass tray cover)
[E]: Front door
[F]: By-pass tray cover

The standard tray and the front door [E] are locked when the by-pass tray cover [F] is open. There is an actuator [D] located on the left inside part of the by-pass tray cover. As the actuator releases the mechanical link [C], the bar [B] on the tray goes through the opening [A] of the front door, and engages with the frame. This prevents the paper tray from being pulled-out of the machine while the by-pass tray cover is open.

6.3.12 PAPER EXIT AND PAPER SWITCHBACK

Normal Printing Mode (Non-Duplex Printing Mode)



[A]: Paper path switching guide
[B]: Switching lever
[C]: Paper exit roller
[D]: Double teeth gear
[E]: Switchback solenoid
[F]: Switching lever

Paper transport

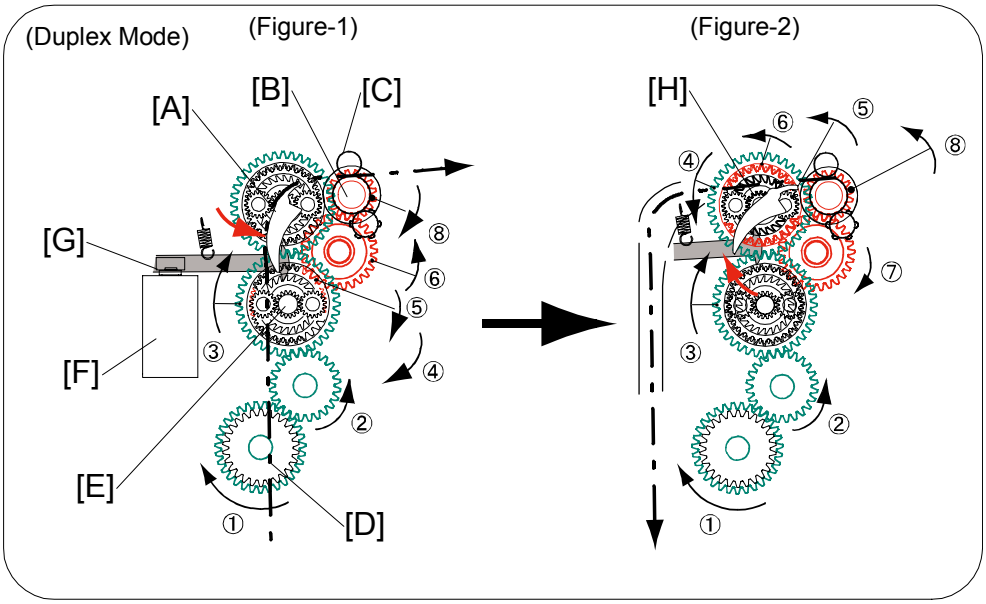
After fusing, the paper exit roller [C] feeds the printed paper to the exit tray. The BK motor drives the double teeth gear [D], which drives the paper exit roller gear. The arrows indicate the rotation direction of the gears.

Sensors

The paper actuates the paper exit sensor when it reaches the paper exit roller. If the paper does not actuate the sensor at the correct time, an error message appears. If the paper continues to actuate the sensor for an extended time, another message appears.

The printed paper is sent to the exit tray face down. The paper overflow sensor is below the paper exit roller. This sensor detects whether the output tray is full. If the tray is full, a message appears on the display.

Duplex Printing Mode (Paper Switchback)



[A]: Paper path switching guide
[B]: Paper exit roller
[C]: Switchback pinch roller
[D]: Double teeth gear
[E]: Rotation switching gear B
[F]: Switchback solenoid
[G]: Switching lever
[H]: Rotation switching gear A

The switchback solenoid [F] turns on before the leading edge of the paper passes the paper exit sensor (Figure 1).

- The switching lever [G] engages and locks the switching gear B [E].
- The BK motor drives the paper exit roller [B].
- The switching lever shifts the paper path switching guide [A] to the right. This feeds the paper between the paper exit roller and the switchback pinch roller [C]. The paper is sent to the exit tray, but is not released. Next, the switchback solenoid turns off (Figure 2).
- The switching lever returns to its home position, and locks switching gear A [H].
- The BK motor drives the paper exit roller. As the paper is positioned above the exit roller, it is fed through in the opposite direction.
- The junction gate moves back to its home position. The paper passes through the duplex unit, which then feeds the paper to the registration roller.

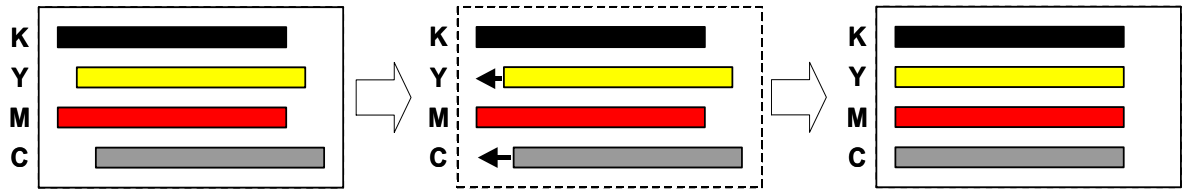
6.3.13 COLOR POINT ADJUSTMENT

Adjustment types

Using the color registration sensor board, the machine's software corrects the toner image positions on the transfer belt. During the adjustment, black, yellow, magenta, and cyan lines are produced on the transfer belt, and read by the color registration sensor. Based on the information from the sensor, any of the following four different types of adjustments is automatically conducted.

Main-scan start position control

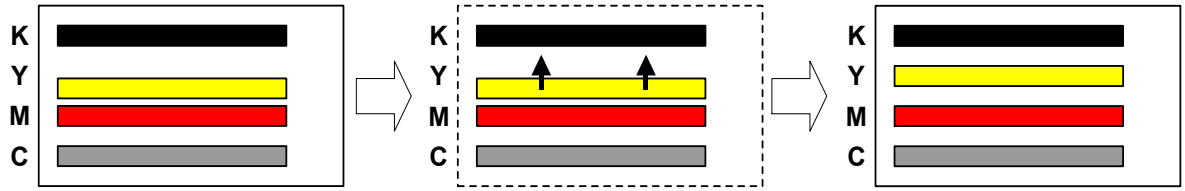
This adjustment is done when the main-scan start positions of the four colors are not aligned. One or more main-scan start positions are shifted.



Before **After**

Sub-scan start position control

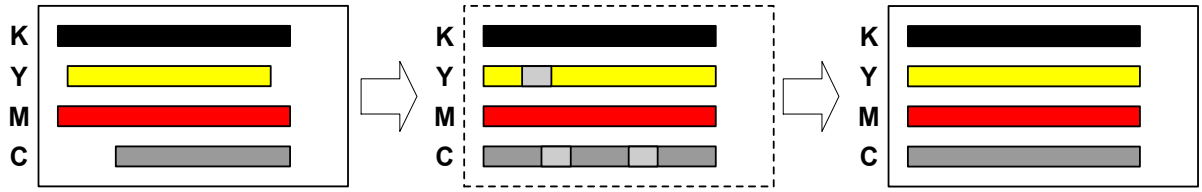
This adjustment is done when the sub-scan positions of the four colors are not arranged at regular intervals. One or more sub-scan start positions are shifted.



Before **After**

Dot insertion

This adjustment is done when the main scan length for each color is different, which produces lines of different lengths. The longest of the four lines is taken as the base-line (target), and dots are inserted into any shorter lines to make them all the same length as the longest one.

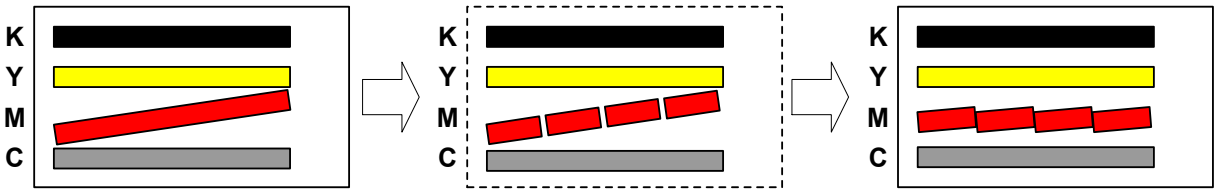


Before **After**

Image data shift

This adjustment is done when the lines of the four colors are not parallel. One or more of the yellow, magenta, and cyan lines is divided into segments. The segments are arranged into one zigzag line that is parallel with the other lines. If this adjustment adversely effects the output images, deactivate SP5-995-1 (☛ 5.3.1).

NOTE: Strictly speaking, the four lines are rarely parallel. This adjustment is conducted automatically if one or more lines are significantly skewed.



Before **After**

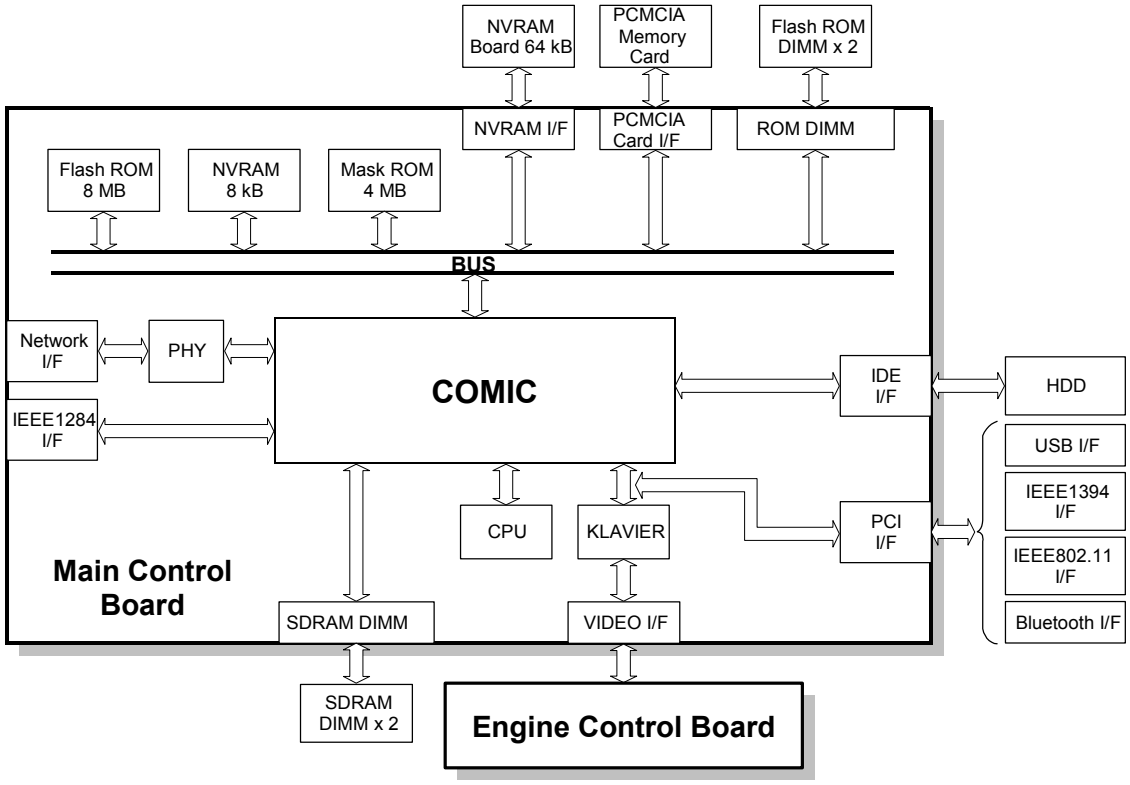
Adjustment timing

Color point adjustment is done under either of the following conditions.

- Just after the main switch is turned on.
- The number of output sheets has reached the value specified with SP5–993 (default: 250 sheets) during or at the end of the preceding job. (The adjustment is done before the next job starts.)

6.4 CONTROLLER

6.4.1 OVERVIEW



The controller uses GW (Grand Workware) architecture. GW architecture is also referred to as “Next Generation” architcture.

1. **CPU**: QED RM7000 (300 MHz)
2. **COMIC (Color Model IC)**: Next Generation (GW) architecture ASIC. This uses a 120 MHz bus (64 bit) for interfacing with CPU and memory. It controls the interface with the CPU and controls the following functions: memory, local bus, interrupts, PCI bus, video data, HDD, network, operation panel, IEEE1284, and image processing.
3. **KLAVIER:** This ASIC is the interface with the engine controller board.
4. **SDRAM DIMM (2 slots)**: 64 MB SDRAM (resident), expandable up to 384 MB with a 64 MB, 128 MB, or 256 MB SDRAM
5. **Flash ROM**: 8 MB flash ROM programmed for the system and network applications; 4 MB mask ROM for storing internal printer fonts
6. **ROM DIMM (2 slots)**: The DIMM installed in the machine includes 8 MB flash ROM programmed for system, printer, PCL5c, PS3, and RPCS applications. The remaining DIMM slot is used for the Bluetooth Option.

7. **NVRAM**: 8 KB NVRAM for storing the printer parameters and logged data
8. **IEEE1284 Interface**: Supports compatible, nibble, and ECP modes
9. **Network Interface**: 100BASE-TX/10BASE-T
10. **NVRAM board (option)**: 64 KB NVRAM used for storing a record of the number of pages printed under each “User Code”.
11. **USB Interface**: See the USB Interface section.
12. **IEEE1394 Interface (option)**: See the IEEE1394 Interface section.
13. **IEEE 802.11b Interface (option):** See the IEEE 802.11b Interface section.
14. **Bluetooth Interface (option):** See the Bluetooth Interface section.
15. **HDD (option)**: A 3.5" HDD (20.5 GB) can be connected using the IDE interface. The hard disk is partitioned as shown below. The partition sizes cannot be adjusted.

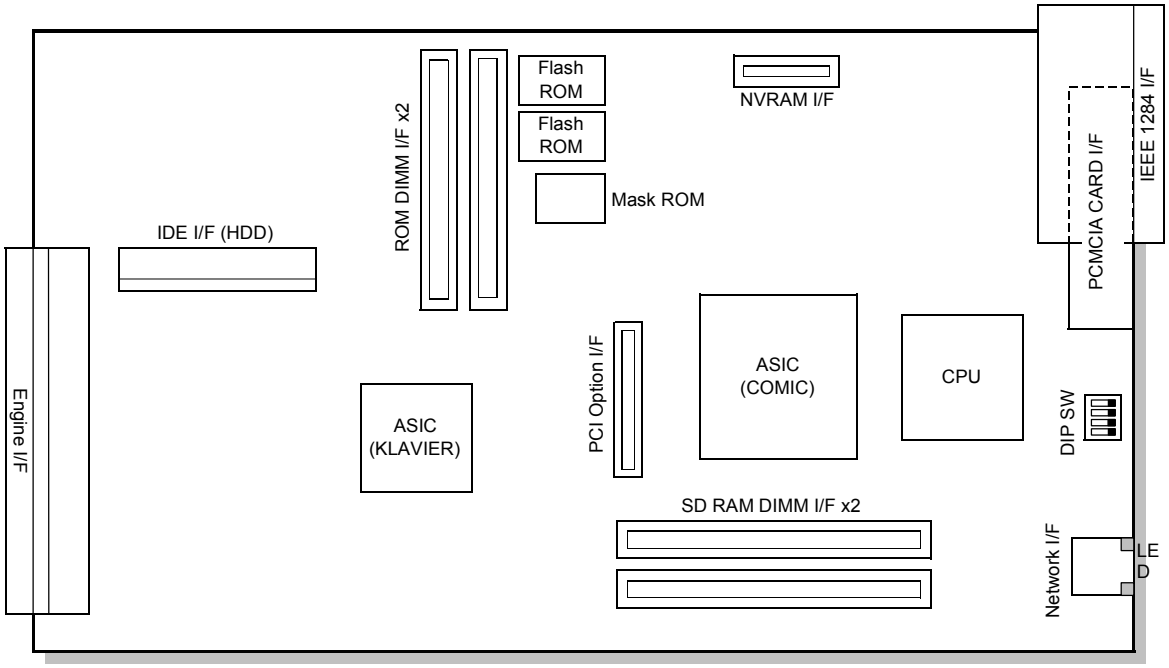
Partition	Size	Function	Comment
File System 1	500 MB	Downloaded fonts, forms.	Remain stored even after cycling power off/on.
Image TMP	9800 MB	Collation, sample print, locked print.	Commonly used area for applications, erased after power off.
Job Log	10 MB	Job log.	Remains stored even after cycling power off/on.

The system and application software for the following boards can be downloaded from the Controller PCMCIA memory card.

- Controller (Flash ROM and flash ROM DIMM)
- Engine

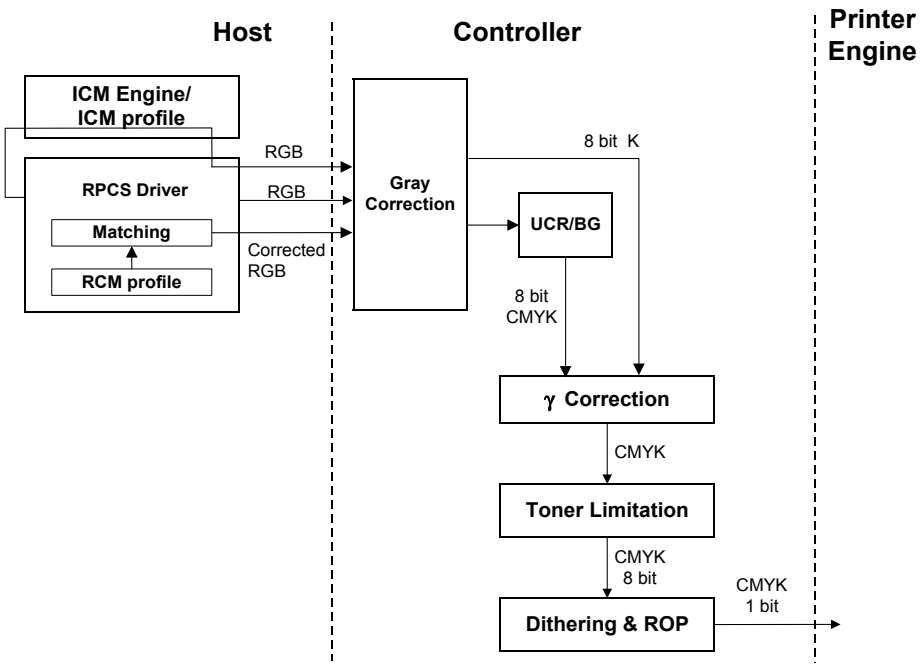
For details on downloading software from an PCMCIA memory card, see Service Tables – Firmware Update Procedure.

6.4.2 BOARD LAYOUT

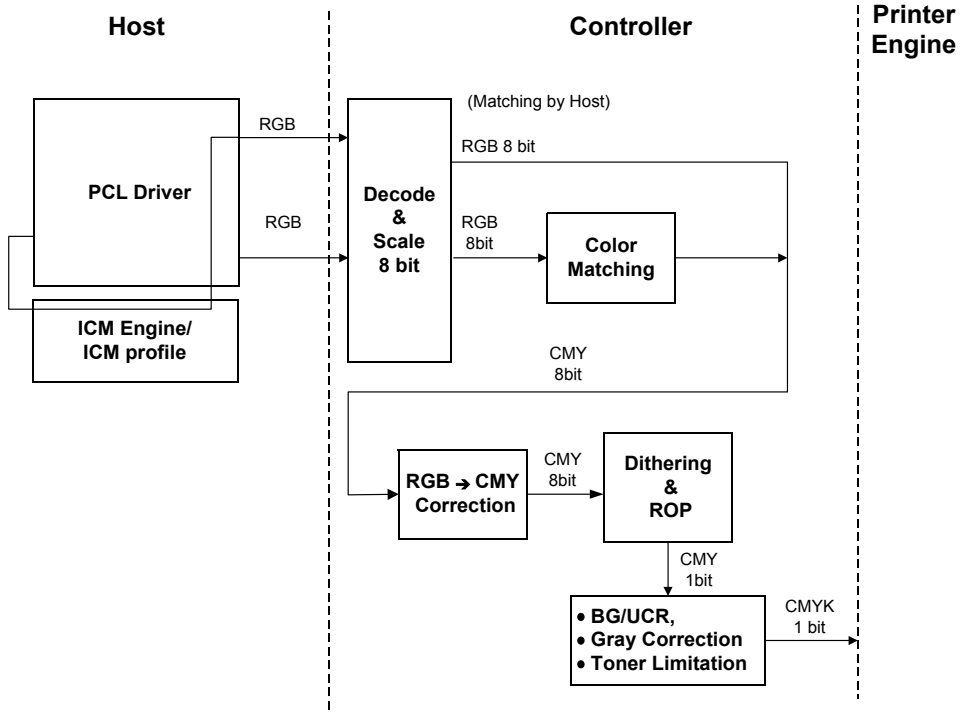


6.4.3 PRINT DATA PROCESSING

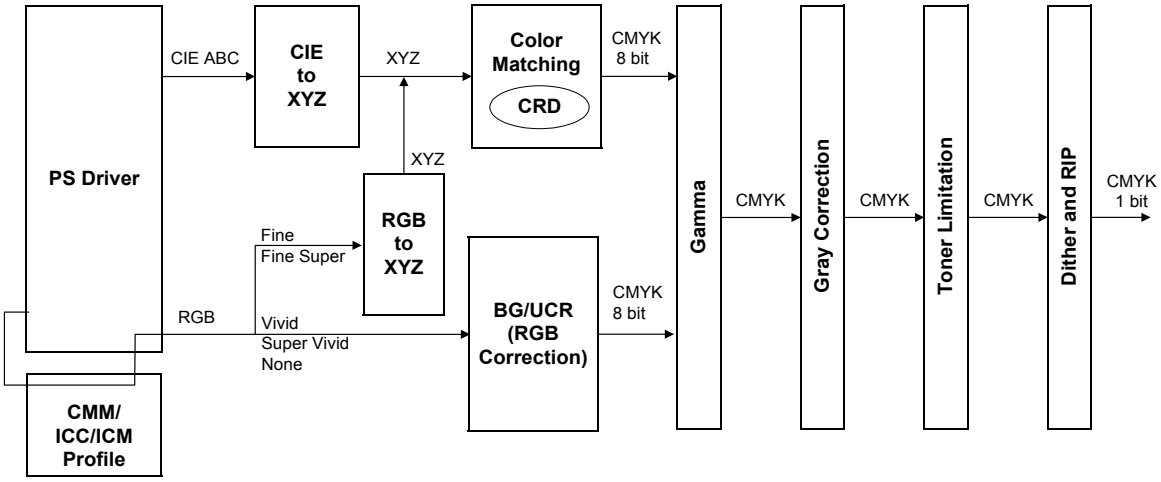
RPCS Driver



PCL5c Driver



PS3 Driver



CMS (Color Management System)

CMS optimizes the color print quality using a color profile based on the characteristics of the printer. With RPCS, the color profile is applied by the driver. With PS3 and PCL5c, the color profile is applied in the matching/CRD module on the controller except when using CMM/ICC/ICM profiles.

CMS is not used when the color profile setting in the printer driver is set to “Off.”

Gray Correction

Gray correction processes gray with K or CMYK toner depending on the driver settings.

BG/UCR (Black Generation/Under Color Removal)

The RGB data is converted to CMYK data with BG/UCR. During CMYK conversion, some CMY data is replaced with K data by the BG/UCR algorithm.

Gamma Correction

The printer gamma can be adjusted using a controller SP mode (Gamma Adj.). For CMYK, their are15 adjustment points between 0 and 100%. The corrected gamma data is stored in NVRAM.

Toner Limitation

Toner limitation prevents toner from being scattered around text or printed lines.

Maximum values have been prepared independently for text and photo. They can be adjusted with controller SP mode (Toner Limit).

- Default: 190% for text, 260% for photo
- Adjustable range: 100% to 400%

Dither Processing and ROP/RIP

Dither patterns have been prepared for photo and text independently. Dithering converts the 8-bit data to 1-bit data. However, these dither patterns create the illusion of 256 gradations for high quality prints. The optimum dither pattern is selected depending on the selected resolution.

RIP: Raster Image Processing
ROP: Raster Operation

6.5 CONTROLLER FUNCTIONS

6.5.1 SAMPLE PRINT

This feature requires installing the optional HDD. This function gives users a chance to check the print results before starting a multiple-set print run.

- The size of the hard disk partition for the sample print feature is 6.0 GB. This partition is also used by the collation and locked print features.
- The partition can hold up to 30 files, including files stored using locked print.
- The partition can hold a log containing up to 20 errors, excluding jobs stored using locked print.
- The maximum number of pages is 1,000. This number includes those jobs using locked print and collation.

6.5.2 LOCKED PRINT

This feature requires installing the optional HDD. When using this feature, the print job is stored in the machine but will not be printed until the user inputs an ID at the machine's operation panel. This ID must match the ID that was input with the printer driver.

- Stored data is automatically deleted after it is printed.
- Stored data can be manually deleted at the operation panel.
- The partition can hold up to 30 files, including files stored using sample print.
- The partition can hold a log containing up to 20 errors, excluding logs stored using locked print.
- The maximum number of pages is 1,000. This number includes those jobs using sample print and collation.
- Locked print uses the same hard disk partition as sample print and collation, which is 6.0 GB.

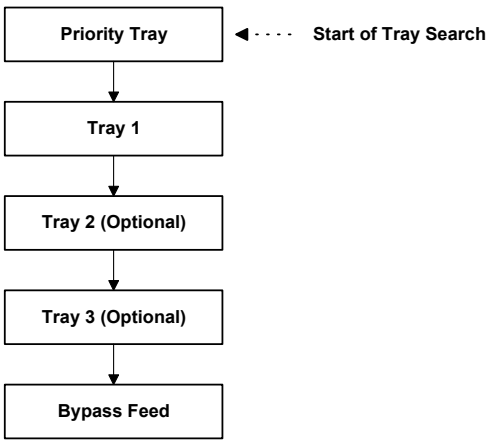
6.5.3 PAPER SOURCE SELECTION

Tray Priority (Auto Tray Select)

The Tray Priority setting determines the start of the tray search when the user selects "Auto Tray Select" with the driver.
The machine searches for a paper tray with the specified paper size and type.

When no tray contains paper that matches the paper size and type specified by the driver, the controller stops printing until the user loads the correct paper.

The Tray Priority setting can be specified using the Paper Input menu of the user tools.



Tray Lock

If Tray Lock is enabled for a tray, the controller skips the "locked" tray in the tray search process.

NOTE: In this machine, each paper source can be "locked," including by-pass feed. If all paper sources are locked and "Auto Tray Select" is specified from the driver, the machine displays an error and stops printing.

Manual Tray Select

If the selected tray does not have the paper size and type specified by the driver, the controller stops printing until the user loads the correct paper.

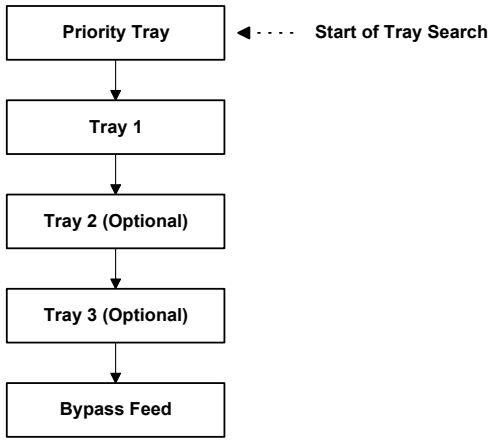
6.5.4 AUTO CONTINUE

When this function is enabled, the machine continues printing even if there is no paper tray which matches the paper size and paper type specified by the driver. The machine searches for a paper tray in the following way.

NOTE: The default setting for this feature is “disabled.”

Auto Tray Select

When there is no paper tray that matches the paper size and type specified by the driver, the machine searches for any tray that has paper, and prints from the first tray it finds. The start of the tray search is the tray selected as the “Priority Tray.”

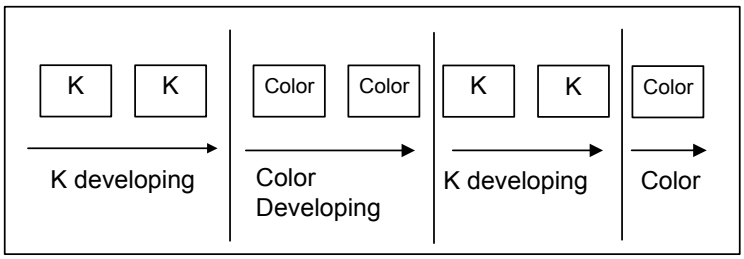


Manual Tray Select

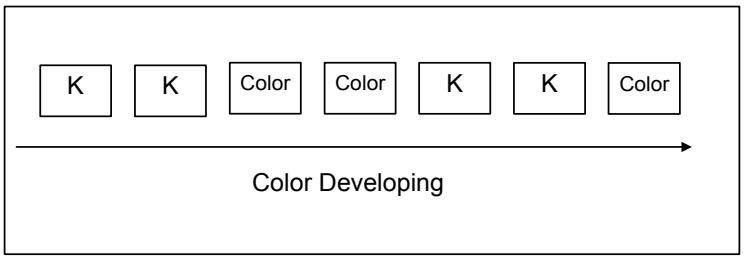
The machine prints from the selected tray even if the paper size and type do not match the setting specified within the driver’s settings.

ACS (Auto Color Sensing) Mode

ACS: On



ACS: Off



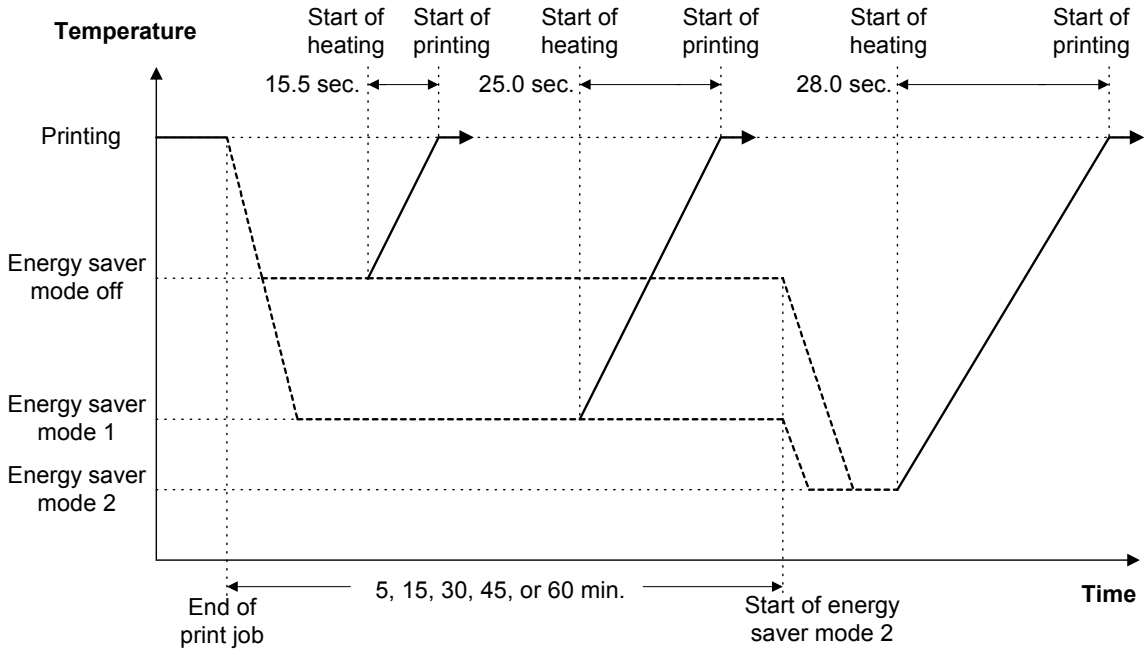
The machine can print in color or monochrome mode (selected via the printer driver's interface). In color mode, ACS can be switched on or off using a user tool (default: on).

If ACS is on, the transfer belt remains fixed against the K drum only for pages with black and white data. If any pages with color data appear, the transfer belt lifts against all drums. If the pages following a color print page are black and white pages, the transfer belts position changes to contact to the K drum only. It takes approximately 15 seconds to switch modes.

If ACS is off and color mode is selected, all data is printed with the transfer belt positioned against all four drums. The belt does not move even if a K only page appears.

Energy saver mode

Activate the user mode to set energy saver modes 1 and 2. You can set On/Off for energy saver mode 1. This is the Preheat mode. The default is “on”. When the printer switches to energy saver mode, the power indicator turns off, while the “on line” indicator stays on. With energy saver 2, you can set how many minutes the printer waits before switching to energy saver mode (5, 15, 30, 45, 60). In energy saver 2, the default is “on” (60 minutes).



6.6 IEEE1394 INTERFACE

6.6.1 SPECIFICATIONS

Hardware Specification

Interface: IEEE1394 (6 pins)
(non-power supply, cable power repeated-IEEE1394a-2000 compliant)
Ports: 2 ports
Data rates: 400Mbps/200Mbps/100Mbps

System Requirements

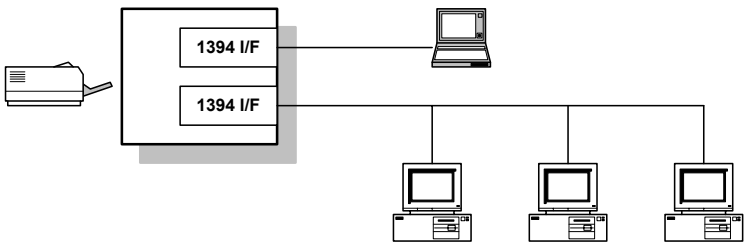
PC: IBM PC/AT with IEEE1394 port
OS: MS Windows 2000 upgraded with Service Pack 1 (minimum)
Cable length: 4.5m (15ft)

6.6.2 IEEE1394 SCSI PRINT

IEEE1394, also known as FireWire (a name patented by Apple), is an easy-to-use peer-to-peer networking technology allowing speeds of up to 400 Mbps.

The current standard contains the following features, which are supported in most devices:

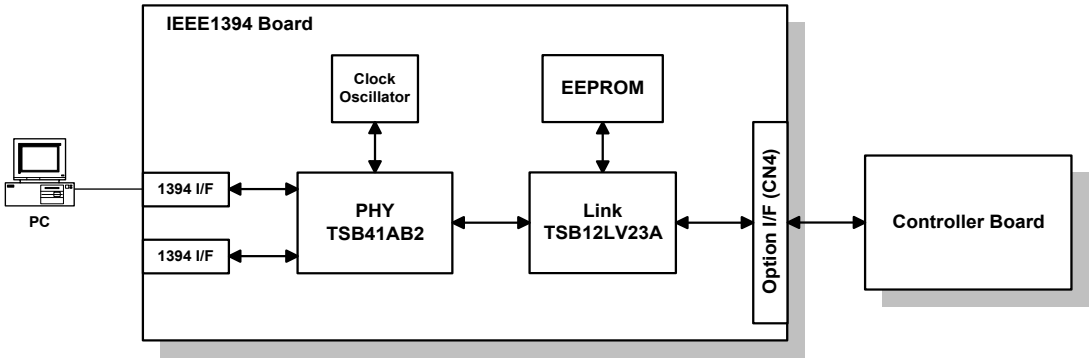
- Hot swapping (cables can be connected and disconnected while the computer and other devices are switched on)
- Peer-to-peer networking (no hub required)
- No terminator or device ID is required, unlike SCSI
- Automatic configuration of devices upon start-up, or “plug and play.”
- Real-time data transfer at 100, 200, and 400 Mbps
- Common connectors for different devices



The cable length is limited to 4.5 m (15ft). However, up to 16 cables and 63 devices can be connected to an IEEE1394 network.

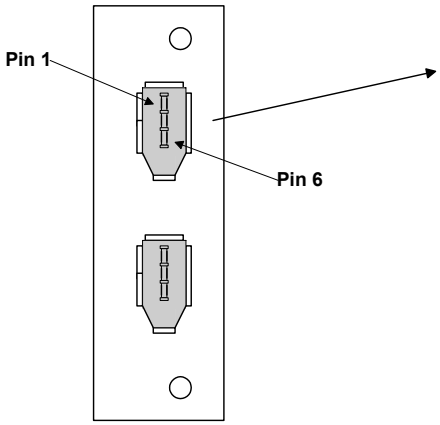
IEEE1394 cables can be either 4-pin (data only) or 6-pin (data and power). IEEE1394 allows either 6-pin or 4-pin connectors. However, this machine only uses the 6-pin style connector. The machine has two 6-pin ports.

6.6.3 BLOCK DIAGRAM



- PHY: Physical layer control device
- Link: Link layer control device
- EEPROM: 256-byte ROM

6.6.4 PIN ASSIGNMENT



Pin assignment	
Pin 1	Pin 4
Pin 2	Pin 3
Pin 5	Pin 6

Pin No.	Signal Description
1	Cable Power
2	GND
3	Receive strobe
4	Transmit data
5	Receive data
6	Transmit strobe

6.6.5 REMARKS

Note the following details about this unit.

- The machine does not print reports specifically for IEEE1394. Print the Configuration Page during installation to check that the machine recognizes the card.
- There is no spooler or print queue. If a computer tries to print over the IEEE1394 while the printer is busy, the IEEE1394 interface card inside the printer will return a busy signal.
- After starting a job using IEEE1394, do not switch the printer off until the job has been completed. Although the printer may appear to be inactive, it may be in the middle of an IEEE1394 protocol exchange with the computer.
- When using IEEE1394, it is not possible to check the printer status from the computer with a utility such as Printer Manager for Client.

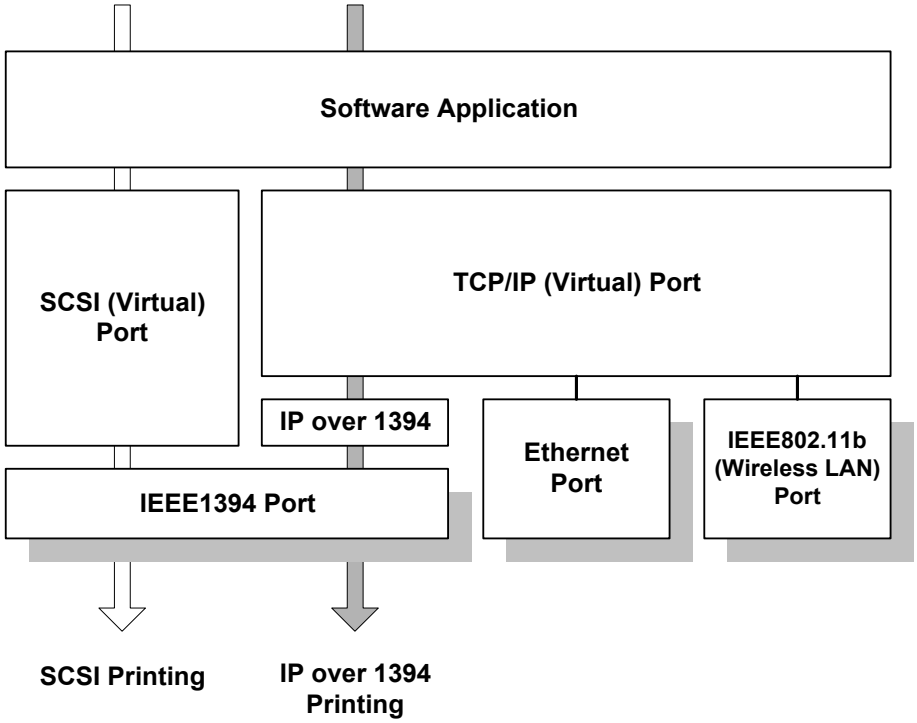
6.6.6 TROUBLESHOOTING NOTES

If there are problems printing using the IEEE1394 interface, check the following.

- Is the computer using Windows 2000 with Service Pack 1 (minimum).
- Has the interface card been replaced recently? Each card has an individual address, similar to the MAC address in an Ethernet card. If the card was changed, the driver still looks for the old card. The new card is considered as another device and a new printer appears in Windows Control panel. The new card must be configured in the same way as the previous configuration (the old printer icon in Windows Control Panel should be deleted).
- Is there a loop somewhere in the network? An IEEE1394 network must be a chain or a branched chain. There can be no loops.
- Try to find out where in the chain the problem is occurring. Test the machine one-to-one with the computer to determine if the printer is defective (when the printer's interface cable is plugged in, the computer should see "Printer Ready," when the cable is disconnected, the computer should see "Offline").

6.6.7 IP OVER 1394

In addition to IEEE1394 printing, this machine supports IEEE1394 printing by setting an IP address. This feature is called “IP over 1394”.
The former IEEE1394 printing without IP address, is known as “SCSI printing.”



NOTE: 1) Windows XP is the only OS which supports IP over 1394.
(Windows 9X/ME/2000 & Windows NT4 can also be used when used in combination with SmartNet Monitor.)
2) Windows XP and 2000 support IEEE1394 SCSI printing.

6.7 USB

6.7.1 SPECIFICATIONS

This model is equipped with standard USB.

Interface: USB 1.1, USB 2.0
Data rates: 480 Mbps (high speed), 12 Mbps (full speed), 1.5 Mbps (low speed);
High-speed mode is only supported by USB 2.0.

6.7.2 USB 1.1/2.0

USB (Universal Serial Bus) offers simple connectivity for computers, printers, keyboards, and other peripherals. In a USB environment, terminators, device IDs (like SCSI), and DIP switch settings are not necessary.

USB 1.1 contains the following features:

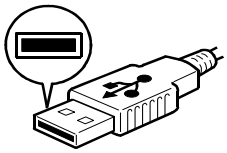
- Plug & Play
- Hot swapping (cables can be connected and disconnected while the computer and other devices are switched on)
- No terminator or device ID required
- Data rates of 12 Mbps (full speed), and 1.5 Mbps (low speed)
- Common connectors for different devices

USB 2.0 is a successor to the USB 1.1 specification. It uses the same cables, connectors, and software interfaces. It provides an easy-to-use connection to a wide range of products with a maximum data rate of 480 Mbps (high speed).

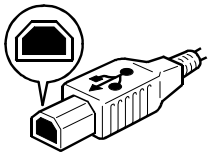
Up to 127 devices can be connected and six cascade connections are possible. Power is supplied from the computer, and the maximum cable length is 5 m.

6.7.3 USB CONNECTORS

USB is a serial protocol and a physical link that transmits all data on a single pair of wires. Another pair provides power to downstream peripherals.
The USB standard specifies two types of connectors, type “A” connectors for upstream connection to the host system, and type “B” connectors for downstream connection to the USB device.



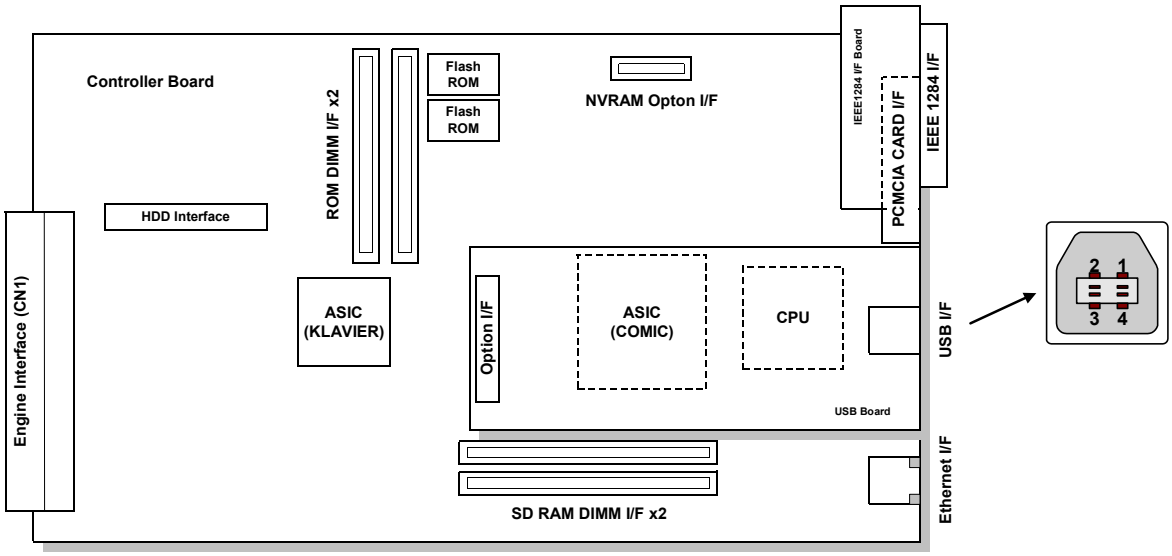
Type “A” connector



Type “B” connector

6.7.4 PIN ASSIGNMENT

The controller has a type “B” receptacle (CN10).



Pin No.	Signal Description	Wiring Assignment
1	Power	Red
2	Data –	White
3	Data +	Green
4	Power GND	White

6.7.5 REMARKS

- The machine does not print reports specifically for USB.
- Only one host computer is allowed for the USB connection.
- After starting a job using USB, do not switch the printer off until the job has been completed.
  When a user cancels a print job and data transmitted to the printer has not been printed at the time of cancellation, the job will continue to print up to the page where the print job was cancelled
- When the controller board is replaced, the host computer will recognize the machine as a different device.

Related SP Mode

"USB Settings" are located in the printer engine service mode. Data rates can be adjusted to full speed fixed (12 Mbps). This switch may be used for troubleshooting if there is a data transfer error using the high-speed mode (480 Mbps).

Data rates can also be adjusted using the UP (User Program) mode "USB Setting" in the Host Interface in the System menu.
This mode can be accessed only when the "Enter", "Escape", then "Menu" keys are pressed (individually, not together) to enter the UP mode.

6.8 IEEE802.11B (WIRELESS LAN)

6.8.1 SPECIFICATIONS

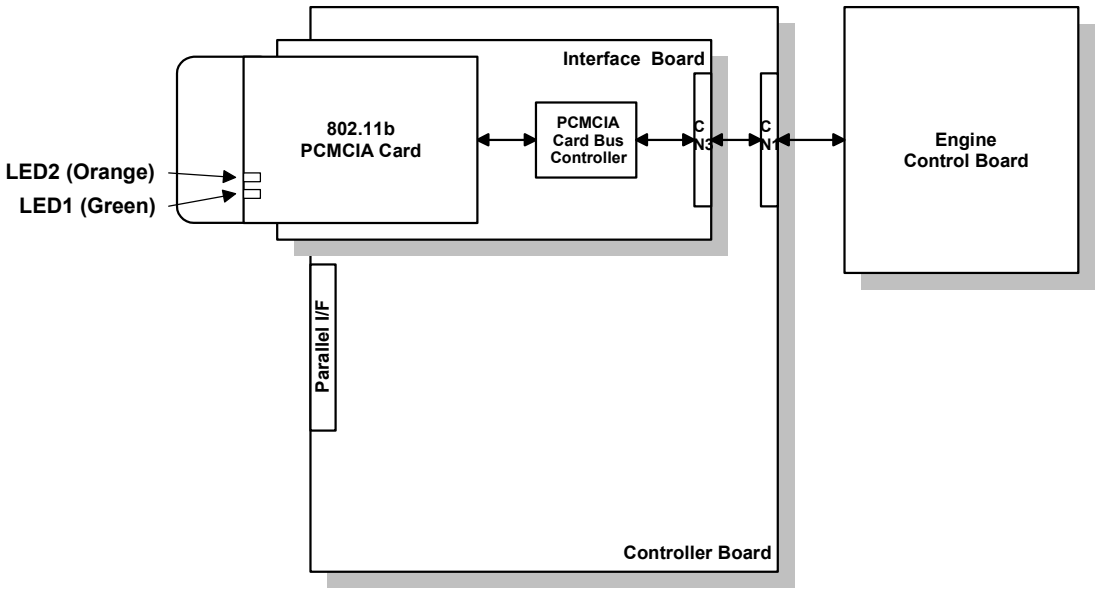
A wireless LAN is a flexible data communication system used to extend or replace a wired LAN. Wireless LAN employs radio frequency technology to transmit and receive data over the air and minimize the need for wired connections.

- With wireless LANs, users can access information on a network without looking for a place to plug into the network.
- Network managers can set up or expand networks without installing or moving wires.
- Most wireless LANs can be integrated into existing wired networks. Once installed, the network treats wireless nodes like any other physically wired network component.
- Flexibility and mobility make wireless LANs both effective extensions of and attractive alternatives to wired networks.

Standard applied:	IEEE802.11b
Data transfer rates:	11 Mbps/5.5 Mbps/2 Mbps/1 Mbps (auto sense)
Network protocols:	TCP/IP, Apple Talk, NetBEUI, IPX/SPX
Bandwidth:	2.4GHz (divided over 14 channels, 2400 to 2497 MHz for each channel)

NOTE: The wreless LAN access cannot be active at the same time as the Ethernet port. The “LAN Type” setting in the Host Interface menu determines which LAN interface will be used.

6.8.2 BLOCK DIAGRAM



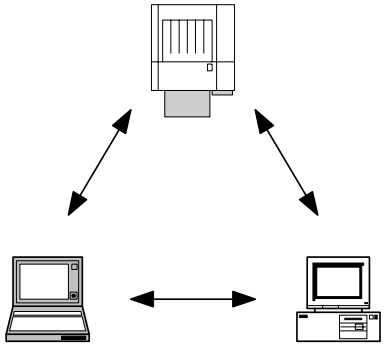
LED Indicators

LED	DESCRIPTION	ON	OFF
LED1 (Green)	Link status	Link success	Link failure
LED2 (Orange)	Power distribution	Power on	Power off

6.8.3 TRANSMISSION MODE

The following transmission modes are provided for wireless communication.

Ad Hoc Mode

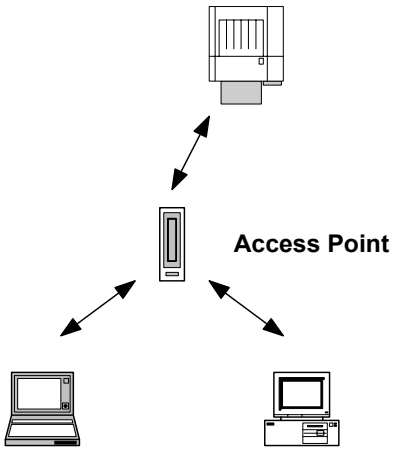


Ad hoc mode allows communication between each device (station) in a simple peer-to-peer network. In this mode, all devices must use the same channel to communicate.

In this machine, the default transmission mode is ad hoc mode and the default channel is 11. First, set up the machine in ad hoc mode and program the necessary settings. This is required even if the machine will be used in infrastructure mode.

To switch between ad hoc and infrastructure modes, use the following user tool:
Host Interface Menu - IEEE802.11b - Comm Mode

Infrastructure Mode



The infrastructure mode allows communication between each computer and the printer via an access point equipped with an antenna and wired into the network. This arrangement is used for topologies that are more complex.

- The wireless LAN client must use the same SSID (Service Set ID) as the access point in order to communicate.

6.8.4 SECURITY FEATURES

SSID (Service Set ID)
The SSID is used by the access point to recognize the client and allow access to the network. Only clients that share the same SSID with the access point can access the network.

NOTE: The SSID can be set using the web status monitor or telnet

Using the SSID in Ad hoc mode

When the SSID is used in ad hoc mode and nothing is set, the machine automatically uses “ASSID” as the SSID. In such a case, “ASSID” must also be set at the client.

NOTE: SSID in ad hoc mode is sometimes called “Network Name” in some devices.

Some devices automatically change from ad hoc mode to infrastructure mode when the same SSID is used in ad hoc mode and infrastructure mode. In such a case, to use the device in ad hoc mode, use a specified SSID in infrastructure mode and use “ASSID” in the ad hoc mode.

WEP (Wired Equivalent Privacy)
WEP is a coding system designed to protect wireless data transmission. In order to unlock encoded data, the same WEP key is required on the receiving side. There are 64 bit and 128 bit WEP keys. This machine supports both 64 and 128 bit WEP.

NOTE: The WEP key can be set using the web status monitor or telnet.

MAC Address
If the infrastructure mode is used, access to the network can also be limited at the access points using the MAC address. This setting may not be available with certain types of access points.

6.8.5 TROUBLESHOOTING NOTES

Communication Status

Wireless LAN communication status can be checked with the UP mode “W.LAN Signal” in the Maintenance menu. This can also be checked using the Web Status Monitor or Telnet.
The status is described on a simple number scale.

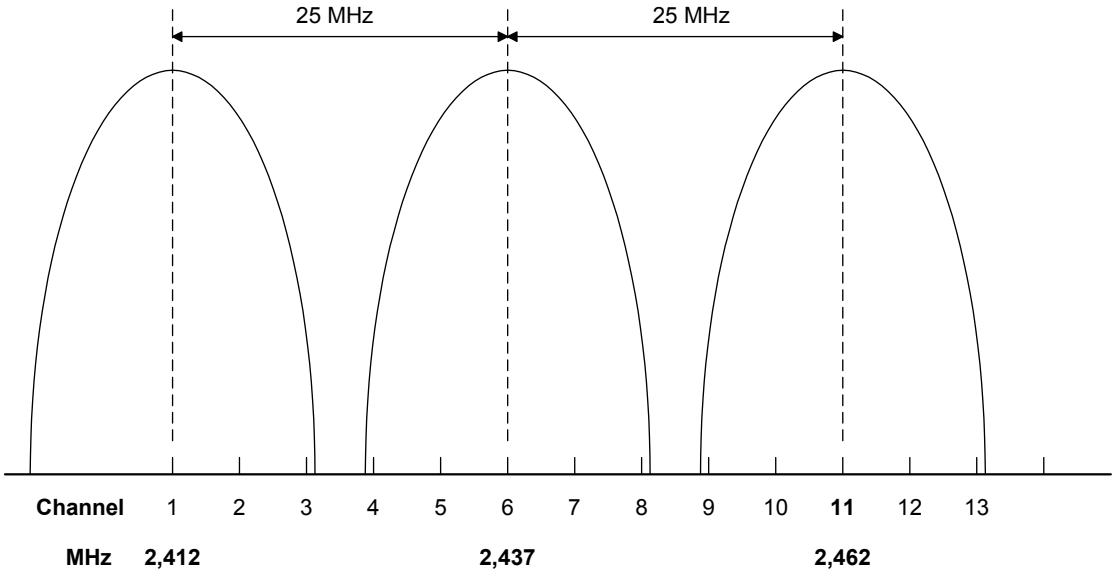
STATUS DISPLAY	COMMUNICATION STATUS
Good	76~100
Fair	41~75
Poor	21~40
Unavailable	0~20

NOTE: Communication status can be measured only when the infrastructure mode is being used.

Channel Settings

If a communication error occurs because of electrical noise such as interference with other electrical devices, etc., you may have to change the channel settings.

To avoid interference with neighboring channels, a separation of 3 channels is recommended. For example, if there are problems using channel 11 (default), try using channel 8.



Troubleshooting steps

If there are problems using the wireless LAN, check the following:

1) Check the LED indicator on the wireless LAN card.
2) Check if “IEEE802.11b” is selected in the UP mode LAN Type in Network Setup in the Host Interface menu.
3) Check if the channel settings are correct.
4) Check if the SSID and WEP are correctly set.

If infrastructure mode is being used:

1) Check if the MAC address is properly set
2) Check the communication status.

If the communication status is poor, bring the machine closer to the access point. Additionally, check for any obstructions between the machine and the access point. If the problem cannot be solved, try changing the channel setting.

6.9 BLUETOOTH (WIRELESS)

6.9.1 SPECIFICATIONS

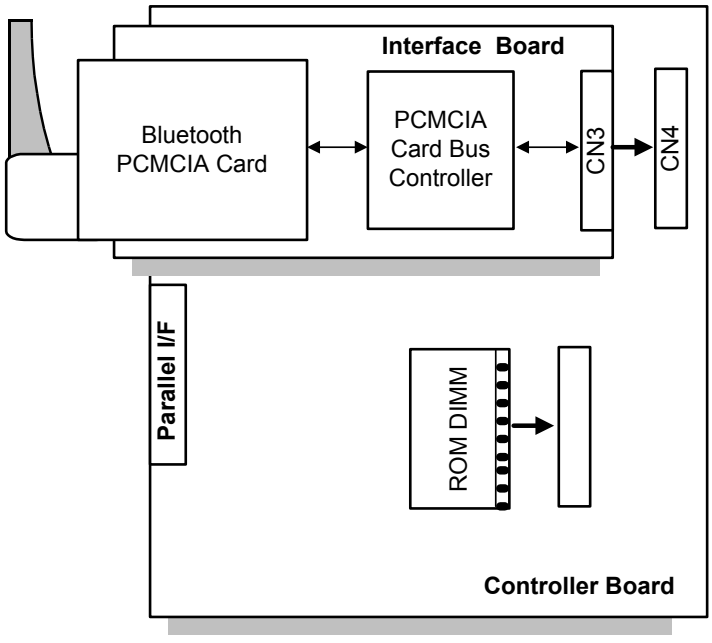
Bluetooth wireless provides radio links between mobile computers, mobile phones and other portable handheld devices.

Bluetooth contains the following features.

- Cheaper compared to the IEEE802.11b wireless LAN.
- Many protocols for infrared transmission (IrDA) can be used with Bluetooth.
- A Bluetooth device can connect to other Bluetooth devices without any special settings.

Standard applied:	Bluetooth 1.1 (Bluetooth Special Interest Group)
Data transfer rates:	1 Mbps
Bandwidth:	2.4GHz Frequency Hopping Spread Spectrum (FHSS)

6.9.2 BLOCK DIAGRAM



6.9.3 COMMUNICATION USING BLUETOOTH

Piconet

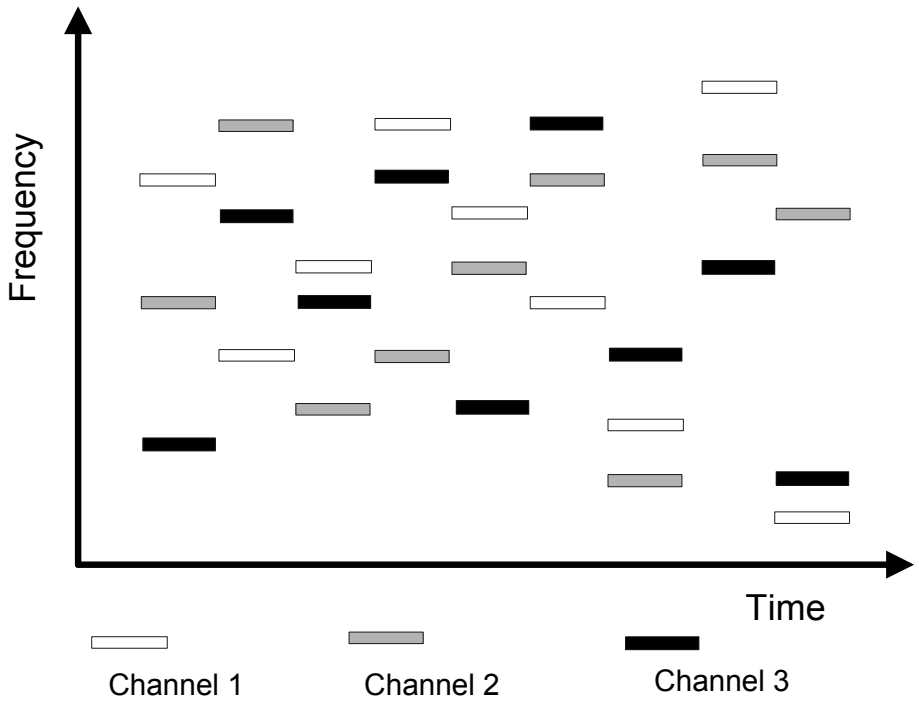
Bluetooth devices communicate with each other device in the ad hoc mode. This network is called a "Piconet.” A Piconet may contain a maximum of 8 Bluetooth devices.

There is one master device and seven slave devices in a Piconet. The master device controls the hopping frequency and timing, as well as storing the ID codes of the slave devices. The master and slave devices can be swapped. Once the master device leaves the Piconet, one of the slave device then becomes the new master.

Machines with the Bluetooth option become potential slave devices to connect to the PC.

Frequency Hopping Spread Spectrum (FHSS)

The Bluetooth device divides 2402 to 2480 MHz into 79 channels of 1 MHz width, and changes the channel 1600 times per second. If other devices in the LAN are using the same radio band, Bluetooth can avoid interference from the other devices.



Profiles

A Bluetooth device will not operate if it is located in close proximity to another Bluetooth device. However, the Bluetooth device should support the protocols to communicate with each other. There are many types of Bluetooth and service protocols (together referred to as “profiles). These “profiles” are listed below.

- Generic Access Profile
- Service Discovery Profile
- Cordless Telephony Profile
- Intercom Profile
- Serial Port Profile
- Headset Profile
- Dial-up Networking Profile
- Fax Profile
- LAN Access Profile
- Generic Object Exchange Profile
- Object Push Profile
- File Transfer Profile
- Synchronization Profile
- Hardcopy Cable Replacement Profile

Serial Port Profile (SPP) and Hardcopy Cable Replacement Profile (HCRP) are used for the printer products.

SPP is used is place of the serial port, while HCRP is used in place of the parallel port.

6.9.4 SECURITY FEATURES

Public and Private Mode

The PC can browse Bluetooth devices. The machine’s default is public mode. The PC cannot browse to the machine if it has been changed to private mode.

PIN Code (Personal Identification Number)

When the PIN code is used, the PC connects to the device that sent the PIN code.

The PIN code is a 4 digit number. This machine uses the last four digits of the machine's serial number. It cannot be changed.

6.10 CONNECTOR PIN DESCRIPTIONS

NOTE: The following tables are to be used in conjunction with the “Connector Layout Tables” information provided on the back of the Point-to-Point Diagram. For “Ready Condition” information, please refer to the “Connector Layout Tables.” The information provided here includes signal descriptions not found on the Connector Layout Tables.

CN1 (on ECB)/CN1 (on LSU)

Pin No.	Signal Name	Description	In/Out	
			CN1-E	CN1-L
1	+5VLD	+5V	---	---
2	+5VGND	Ground	---	---
3	5VGND	Ground	---	---
4	5VGND	Ground	---	---
5	NENB	LD Enable	Out	In
6	PSEL	LD Light Power Select	Out	In
7	-VIDEO_K	Black Video Data	Out	In
8	NADJUST_K	Black Adjust Enable	Out	In
9	-VIDEO_C	Cyan Video Data	Out	In
10	NADJUST_C	Cyan Adjust Enable	Out	In
11	5VGND	Ground	---	---
12	-VIDEO_M	Magenta Video Data	Out	In
13	NADJUST_M	Magenta Adjust Enable	Out	In
14	5VGND	Ground	---	---
15	-VIDEO_Y	Yellow Video Data	Out	In
16	NADJUST_Y	Yellow Adjust Enable	Out	In

CN2 (on ECB)/CN3 (on LSU)

Pin No.		Signal Name	Description	In/Out	
CN2	CN3			CN2	CN3
5	5	+24V	+24V	---	---
4	4	24VGND	Ground	---	---
3	3	NPMCTL	Motor Control	Out	In
2	2	NPMLD	Motor Lock Detect	In	Out
1	1	PMCLK	Motor Clock	Out	In

CN3 (on ECB)/CN2 (on LSU)

Pin No.		Signal Name	Description	In/Out	
CN2	CN3			CN3	CN2
1	4	+5V	+5V	---	---
2	3	5VGND	Ground	---	---
3	2	NHSYNC	Horizontal Sync.	In	Out
4	1	+5VGND	Ground	---	---

CN5 (on ECB)/CN1 (on high voltage board)

Pin No.	Signal Name	Description	In/Out	
			CN1	CN5
1	GND	Ground	---	---
2	DHVACCLK	Dev. AC Clock	Out	In
3	DHVERR	HVU Error	In	Out
4	DLATHV	Serial D/A Converter Data Load	Out	IN
5	DHVEN	High Voltage Enable	Out	IN
6	DSDATHV	Serial D/A Converter Data	Out	IN
7	24VGND	Ground	---	---
8	DSCLKHV	Serial D/A Converter Clock	Out	In
9	+24VGND	Ground	---	---
10	+24VHV	+24V	---	---

CN6 PCU

Pin No.	Signal Name	Description	In/Out
1	PIKFUSEK	Black PCU Fuse	In/Out
2	GND	Ground	---
3	PIKFUSEYMC	CMY (Color) PCU Fuse	In/Out
4	GND	Ground	---

CN7 Front/Right Door Sensor

Pin No.	Signal Name	Description	In/Out
1	DOPEN	Front/Right Door Open	In
2	GND	Ground	---

CN8 Power Supply Unit Fan

Pin No.	Signal Name	Description	In/Out
1	FANPWR	+24V	---
2	24VGND	Ground	---
3	PSFNERR	Power Supply Fan Error	In

CN9 Fusing Fan

Pin No.	Signal Name	Description	In/Out
1	FSRFNERR	Fusing Fan Error	In
2	24VGND	Ground	---
3	FANPWR	+24V	---

CN10 (on ECB)/CN1503 (on Toner Empty Sensor Board)

Pin No.		Signal Name	Description	In/Out	
CN10	CN150301			CN4	CN1503
1	10	NEMPK	Black Toner Empty	In	Out
2	9	NEMPC	Cyan Toner Empty	In	Out
3	8	EMPLEDK	LED ON for Black	Out	In
4	7	GND	Ground	---	---
5	6	+5V_EMP	+5V	---	---
6	5	EMPLEDY	LED ON for Yellow	Out	In
7	4	NEMPY	Yellow Toner Empty	In	Out
8	3	NEMPM	Magenta Toner Empty	In	Out
9	2	EMPLEDC	LED ON for Cyan	Out	In
10	1	EMPLEDM	LED ON for Magenta	Out	In

CN11 Toner Cartridge Cover Sensor

Pin No.	Signal Name	Description	In/Out
2	TCDOPEN	Toner Cartridge Cover Open	In
1	GND	Ground	---

CN12 (on ECB)/CN1 (on CMY Motor)/CN1 (BK Motor)

Pin No.			Signal Name	Description	In/Out		
CN12	CN1 (CMY)	CN1 (BK)			CN12	CN1 (CMY)	CN1 (BK)
1	1		+24VIR (IT)	+24V for BK Motor	---	---	
2		1	+24VIR (PIK)	+24V for CMY Motor	---		---
3	2		24VGND (IT)	Ground	---	---	
4		2	24VGND (PIK)	Ground	---		---
5	3		NITMLD (IT)	Lock Detect for BK Motor	In	Out	
6		3	NPIKMLD (PIK)	Lock Detect CMY Motor	In		Out
7	4		+5V (IT)	+5V for BK Motor	---	---	
8		4	+5V (PIK)	+5V for CMY Motor	---		---
9	5		NITMON (IT)	Start for BK Motor	Out	In	
10		5	NPIKMON (PIK)	Start for CMY Motor	Out		In
11	6		ITMCLK (IT)	Clock for BK Motor	Out	In	
12		6	PIKMCLK (PIK)	Clock for CMY Motor	Out		In
13	7		GND (IT)	Ground	---	---	
14		7	GND (PIK)	Ground	---		---
15	8		ITMG (IT)	Gain for BK Motor	Out	In	
16		8	PIKMG (PIK)	Gain for CMY Motor	Out		In

CN13 (on ECB)/CN1509 (PCU Home Sensor)

Pin No.		Signal Name	Description	In/Out	
CN13	CN1509			CN13	CN1509
1	4	GND	Ground	---	---
2	3	YMCZPH	CMY PCU Home Position	In	Out
3	2	KZPH	Black PCU Home Position	In	Out
4	1	+5V_OPCSEN	+5V	---	---

CN14 (on ECB) / CN1510 (on TB Unit Cam Home Position Sensor)

Pin No.	Signal Name	Description	In/Out	
			CN1-E	CN1-L
1	+5V_CAMSEN	+5V	---	---
2	ITHOME1	TB Unit Cam Home Position	In	Out
3	GND	Ground	---	---

CN15 (on ECB)/CN1601 (on Fusing Unit)

Pin No.		Signal Name	Description	In/Out	
CN15	CN1601			CN15	CN1601
1		FSRFUSE	Fusing Detection	In	---
2	6	TH1HIGH	Fusing Jam	In	Out
3	5	TH2HIGH	+5V	In	Out
4	4	GND	Ground	---	---
5	3	ROTATE	Heat Roller Rotation Detect	In	Out
6	2	NFSRJAM	Fusing Jam	In	Out
7	1	+5V_FSR	+5V	---	---
8		GND	Ground	---	

CN17 (on ECB)/CN1505 (on Paper Full/Jam Sensor)

Pin No.		Signal Name	Description	In/Out	
CN17	CN1505			CN17	CN1505
1	4	EXITFULL	Paper Output Tray Full	In	Out
2	3	NEXTJAM	Paper Exit Jam	In	Out
3	2	GND	Ground	---	---
4	1	+5V_EXIT	+5V	---	---

CN18 (on ECB) / CN1506 (on Paper Empty/Registration Sensor)

Pin No.	Signal Name	Description	In/Out	
			CN18	CN1506
1	+5V	+5V	---	---
2	STPNON	Main Paper Cassette Paper Empty	In	Out
3	NREGSEN	Registration Sensor	In	Out
4	GND	Ground	---	---

CN19 Pickup Solenoid

Pin No.	Signal Name	Description	In/Out
1	PICSOL	Pickup Solenoid ON/OFF signal	---
2	SOLPWR	+24V	---

CN20 Registration Clutch

Pin No.	Signal Name	Description	In/Out
1	REGCLU	Registration Clutch Drive Line	Out
2	GND	+24V	---

CN21 BK Solenoid

Pin No.	Signal Name	Description	In/Out
1	+24VGND	Ground	---
2	NC	NC	---
3	FEEDCLU	BK Solenoid Drive Line	---

CN22 Paper Pickup Motor

Pin No.	Signal Name	Description	In/Out
1	OUTB-	Paper Pickup Motor Drive Pulse	Out
2	OUTB	Paper Pickup Motor Drive Pulse	Out
3	OUTA-	Paper Pickup Motor Drive Pulse	Out
4	OUTA	Paper Pickup Motor Drive Pulse	Out

CN23 (on ECB)/CN1507 (on By-pass Tray Paper Detection Sensor)/CN1512 (on By-pass Tray Home Position Sensor)

Pin No.			Signal Name	Description	In/Out		
CN23	CN 1507	CN 1512			CN23	CN 1507	CN 1512
1		3	+5V_MPT	+5V	---		---
2		2	GND	Ground	---		---
3		1	MPTHOME	By-pass Tray Home Position Detection Signal	In		Out
4	3		+5VA_MPT	+5V	---	---	
5	2		MPPSEN	By-pass Tray Paper Empty Detection Signal	In	Out	
6	1		GND	Ground	---	---	

CN24 Mono/Color Changer Solenoid

Pin No.	Signal Name	Description	In/Out
1	SOLPWR	+24V	---
2	NC	NC	---
3	ITSOL2	Changer Solenoid Drive Line	---

CN25 TB Unit Cam Switching Solenoid

Pin No.	Signal Name	Description	In/Out
1	ITSOL1	Cam Switching Solenoid Drive Line	---
2	NC	NC	---
3	SOLPWR	+24V	---

CN26 Switchback Solenoid

Pin No.	Signal Name	Description	In/Out
1	SOLPWR	+24V	---
2	ADUSOL	Switchback Solenoid Drive Line for Duplex Unit	Out

CN27 (on ECB)/CN1501 (on Color Registration Sensor)

Pin No.		Signal Name	Description	In/Out	
CN27	CN1501			CN27	CN1501
1	8	TBFUL	Waste Toner Cartridge Full Detection signal	In	Out
2	7	+5V_REG	+5V	---	---
3	6	LED_L	Left Side LED ON/OFF signal	Out	In
4	5	SNS_L	Left Side Color Regist. Sensing signal	In	Out
5	4	GND	Ground	---	---
6	3	WTB_NON	Waste Toner Cartridge Detection signal	In	Out
7	2	LED_R	Right Side LED ON/OFF signal	Out	In
8	1	SNS_R	Right Side Color Regist. Sensing signal	In	Out

CN28 Paper Size Detector

Pin No.	Signal Name	Description	In/Out
1	STPSZ1	Paper Size Detection signal 1*[1]	In
2	STPSZ2	Paper Size Detection signal 2*[1]	In
3	GND	Ground	----
4	STNON	Main Cassette Detection signal	In

***1**

Paper Size	Letter	A4	B5	Legal
STPSZ2	L	L	H	H
STPSZ1	L	H	L	H

CN29 (on ECB)/CN1 (on Humidity/Temperature Sensor)

Pin No.	Signal Name	Description	In/Out	
			CN1-E	CN1-L
1	TEMP	Temperature Sensing signal	In	Out
2	GND	Ground	In	Out
3	HUM	Humidity Sensing signal	---	---
4	+5V_HUM	+5V	In	Out

CN30 Sub Fusing Fan

Pin No.	Signal Name	Description	In/Out
1	FANPWR	+24V	---
2	24VGND	Ground	---
3	RIPFNERR	Sub Fusing Fan Error	In

CN31 (on ECB)/CN1 (on Option Paper Feeder Unit)

Pin No.	Signal Name	Description	In/Out	
			CN1-E	CN1-L
1	GND	Ground	---	---
2	SIOCS1	Option Feeder 1 Chip Select	Out	In
3	SCLK	Option Feeder Clock	Out	In
4	SIOCS2	Option Feeder 2 Chip Select	Out	In
5	GND	Ground	---	---
6	SDI	Option Feeder Input Data	In	Out
7	SDO	Option Feeder Output Data	Out	In
8	24VGND	Ground	---	---
9	+5V	+5V	---	---
10	+24VC	+24V	---	---
11	NRST	Option Feeder Reset	Out	In
12	+24VC	+24V	---	---
13	+5VA	+5V	---	---
14	24VGND	Ground	---	---
15	ACFNON1	Option Feeder 1 Non	Out	In
16	ACFSMNA1	Option Feeder 1 Motor Clock A	Out	In
17	SLP_CST_1	Option Cassette Non	In	Out
18	ACFSMNB1	Option Feeder 1 Motor Clock B	Out	In
19	ACFSMNA2	Option Feeder 2 Motor Clock A	Out	In
20	ACFSMNB2	Option Feeder 2 Motor Clock B	Out	In

CN32 (on ECB)/CN2503 (on Power Supply Board)

Pin No.		Signal Name	Description	In/Out	
CN32	CN2503			CN32	CN2503
1	9	NCSAD	A/D Converter Chip Select	Out	In
2	8	SCLKAD	A/D Converter Clock	Out	In
3	7	SDOAD	A/D Converter Input Data	Out	In
4	6	SDIAD	A/D Converter Output Data	In	Out
5	5	DZCROSS	Zero Cross	In	Out
6	4	IHON	IH ON	Out	In
7	3	IHPOWER	+24V	---	---
8	2	VIN100V	AC Line Voltage Detect	In	Out
9	1	GND	Ground	---	---

CN33 (on ECB)/CN2505 (on Power Supply Board)

Pin No.		Signal Name	Description	In/Out	
CN33	CN2505			CN33	CN2505
1	8	+5VA	+5V	---	---
2	7	+5VA	+5V	---	---
3	6	GND	Ground	---	---
4	5	+5VB	+5V	---	---
5	4	+5VB	+5V	---	---
6	3	GND	Ground	---	---
7	2	GND	Ground	---	---
8	1	NSLP	Sleep	Out	In

CN34 (on ECB)/CN2504 (on Power Supply Board)

Pin No.		Signal Name	Description	In/Out
CN34	CN2504			
1	12	+5V	+5V	---
2	11	GND	Ground	---
3	10	+3.3V	+3.3V	---
4	9	GND	Ground	---
5	8	+24VB	+24V	---
6	7	+24VB	+24V	---
7	6	24VGND	Ground	---
8	5	24VGND	Ground	---
9	4	+24VA	+24V	---
10	3	+24VA	+24V	---
11	2	24VGND	Ground	---
12	1	+24VC	+24V	---

CN35 LSU Safety Interlock Switch

Pin No.	Signal Name	Description	In/Out
1	+5VLD	+5V	---
2	NC	NC	---
3	+5V	+5V	---

CN38 Main Control Board *1 of 3*

Pin No.	Signal Name	Description	In/Out
A32	FP3	Ground for front panel	---
A31	FP6	Data 4 for front panel	In/Out
A30	FP9	Data 1 for front panel	In/Out
A29	FP12	Data 7 for front panel	In/Out
A28	FP15	Key Read for front panel	In
A27	FP18	Register Select for front panel	In
A26	FP21	Ground for front panel	---
A25	NENG	Engine Alive	Out
A24	NSTS	Serial data from engine to main control board	Out
A23	NCMD	Serial data from main control board to engine	In
A22	GND	Ground	---
A21	NHSYNC [K]	Horizontal Sync for Black	Out
A20	GND	Ground	---
A19	GND	Ground	---
A18	GND	Ground	---
A17	NHSYNC [C]	Horizontal Sync for Cyan	Out
A16	GND	Ground	---
A15	GND	Ground	---
A14	GND	Ground	---
A13	NHSYNC [M]	Horizontal Sync for Magenta	Out
A12	GND	Ground	---
A11	GND	Ground	---
A10	GND	Ground	---
A9	NHSYNC [Y]	Horizontal Sync for Yellow	Out
A8	GND	Ground	---
A7	GND	Ground	---
A6	5VA	+5V	---
A5	5VA	+5V	---
A4	GND	Ground	---
A3	GND	Ground	---
A2	GND	Ground	---
A1	ENGRDY	Engine Reset	Out

CN38 Main Control Board *2 of 3*

Pin No.	Signal Name	Description	In/Out
B32	FP2	Ground for front panel	---
B31	FP5	Data 3 for front panel	In/Out
B30	FP8	Data 5 for front panel	In/Out
B29	FP11	Data 0 for front panel	In/Out
B28	FP14	Enable for front panel	In
B27	FP17	+5V for front panel	---
B26	FP20	+5V for front panel	---
B25	NSLP	Sleep	In
B24	CRDY	Controller Ready	In
B23	NVD2[K]	Video Data 2 for Black	In
B22	NVD0[K]	Video Data 0 for Black	In
B21	NVSZ[K]	Vertical Size for Black	Out
B20	GND	Ground	---
B19	NVD2[C]	Video Data 2 for Cyan	In
B18	NVD0[C]	Video Data 0 for Cyan	In
B17	NVSZ[C]	Vertical Size for Cyan	Out
B16	GND	Ground	---
B15	NVD2[M]	Video Data 2 for Magenta	In
B14	NVD0[M]	Video Data 0 for Magenta	In
B13	NVSZ[M]	Vertical Size for Magenta	Out
B12	GND	Ground	---
B11	NVD2[Y]	Video Data 2 for Yellow	In
B10	NVD0[Y]	Video Data 0 for Yellow	In
B9	NVSZ[Y]	Vertical Size for Yellow	Out
B8	GND	Ground	---
B7	GND	Ground	---
B6	5VA	+5V	---
B5	5VB	+5V	---
B4	5VB	+5V	---
B3	GND	Ground	---
B2	GND	Ground	---
B1	GND	Ground	---

CN38 Main Control Board *3 of 3*

Pin No.	Signal Name	Description	In/Out
C32	FP1	Ground for front panel	---
C31	FP4	Ground for front panel	---
C30	FP7	Data 2 for front panel	In/Out
C29	FP10	Data 6 for front panel	In/Out
C28	FP13	LED Set for front panel	In
C27	FP16	Read/Write for front panel	In
C26	FP19	Enable for front panel	In
C25	FP22	Ground for front panel	---
C24	PRDY	Engine Ready	Out
C23	NVD3 [K]	Video Data 3 for Black	In
C22	NVD1 [K]	Video Data 1 for Black	In
C21	DCLK [K]	Video Clock for Black	In
C20	GND	Ground	---
C19	NVD3 [C]	Video Data 3 for Cyan	In
C18	NVD1 [C]	Video Data 1 for Cyan	In
C17	DCLK [C]	Video Clock for Cyan	In
C16	GND	Ground	---
C15	NVD3 [M]	Video Data 3 for Magenta	In
C14	NVD1 [M]	Video Data 1 for Magenta	In
C13	DCLK [M]	Video Clock for Magenta	In
C12	GND	Ground	---
C11	NVD3 [Y]	Video Data 3 for Yellow	In
C10	NVD1 [Y]	Video Data 1 for Yellow	In
C9	DCLK [Y]	Video Clock for Yellow	In
C8	GND	Ground	---
C7	5VHD	+5V	---
C6	5VA	+5V	---
C5	5VB	+5V	---
C4	5VB	+5V	---
C3	GND	Ground	---
C2	GND	Ground	---
C1	GND	Ground	---

CN39 (on ECB)/CN1508 (on Duplex Unit Jam Sensor)

Pin No.		Signal Name	Description	In/Out	
CN27	CN1501			CN27	CN1501
1		GND	Ground	---	
2		ADUNON	Duplex Unit Non	In	
3	1	+5V_ADU	+5V	---	---
4	2	GND	Ground	---	---
5	3	NADUJAM	Duplex Unit Jam	In	Out

CN43 Toner Supply Solenoid

Pin No.	Signal Name	Description	In/Out
1	ITON	Solenoid ON signal	Out
2	+24VPWR	+24V	---
3	ITOFF	Solenoid OFF signal	Out

CN45, CN46 (on ECB)/CN3301 (on LCD Panel)

Pin No.			Signal Name	Description	In/Out		
CN45	CN46	CN 3301			CN12	CN1 (CMY)	CN1 (BK)
		---	NC1	NC		---	
1		---	FP4	Ground	---		---
	1	1	FP5	Data 3		In/Out	In/Out
2		2	FP6	Data 4	In/Out		In/Out
	2	3	FP7	Data 2		In/Out	In/Out
3		4	FP8	Data 5	In/Out		In/Out
	3	5	FP9	Data 1		In/Out	In/Out
4		6	FP10	Data 6	In/Out		In/Out
	4	7	FP11	Data 0		In/Out	In/Out
5		8	FP12	Data 7	In/Out		In/Out
	5	9	FP13	LED Set		Out	In
6		10	FP14	Enable 1	Out		In
	6	11	FP15	Key Read		Out	In
7		12	FP16	Read/Write	Out		In
	7	13	FP17	+5V		---	---
8		14	FP18	Register Select	Out		In
	8	15	FP19	Enable 2		Out	In
9		16	FP20	+5V	---		---
	9	17	FP21	Ground		---	---
10		18	FP22	Ground	---		---

CN1502 Waste Toner Full Sensor

Pin No.		Signal Name	Description	In/Out	
CN1502	CN1511			CN14502	CN1511
1	3	+5V	+5V	---	---
2	2	ADUN5VGND	Ground	---	---
3	1	TBFUL	Waste Toner Full Detection signal	In	Out

CN2001 AC Line

Pin No.	Signal Name	Description	In/Out
1	AC1	AC Line 1	---
2	FG	Frame Ground	---
3	AC2	AC Line 2	---

CN2203 (on IH Power Board)

Pin No.	Signal Name	Description	In/Out
1	Thermostat	IH Power Thermostat	---
2	NC	NC	---

CN2204 IH Heater

Pin No.	Signal Name	Description	In/Out
1	IHCOIL 1	IH Power Coil1	---
2	NC	NC	---
3	IHCOIL 2	IH Power Coil 2	---

CN1502 Power Switch

Pin No.		Signal Name	Description	In/Out
CN1502	CN1511			
1	2	AC1	AC Line (live)	---
2	1	AC1	AC Line (neutral)	---

CN1502 (on Power Supply Board)/CN2207 (on IH Power Supply Board)

Pin No.		Signal Name	Description	In/Out	
CN2502	CN2207			CN2502	CN2207
1	10	DO	A/D Converter Output Data	In	Out
2	9	CS	A/D Converter Chip Select	Out	In
3	8	ZCROS	Zero Cross	In	Out
4	7	CLK	A/D Converter Data Clock	Out	In
5	6	IHON	Zero Cross	In	Out
6	5	DI	A/D Converter Input Data	Out	In
7	4	IHPOWER	+24V	---	---
8	3	GND	Ground	---	---
9	2	GND	Ground	---	---
10	1	GND	Ground	---	---

CN2506 Side/Front Door Interlock Switch

Pin No.	Signal Name	Description	In/Out
1	+24V	+24V	---
2	NC	NC	---
3	+24V	+24V	---

SPECIFICATIONS

SPECIFICATIONS

1. GENERAL SPECIFICATIONS

Configuration: Desktop

Print Process: Dry electrostatic transfer system

Printer Languages:
PCL5c
Adobe PostScript3
RPCS (Refined Printing Command Stream)

Resolution:
PCL5c:
600 x 600 dpi, 300 x 300 dpi
Adobe PostScript3:
1200 x 1200 dpi, 1200 x 600 dpi, 600 x 600 dpi
RPCS:
1200 x 1200 dpi, 1200 x 600 dpi, 600 x 600 dpi

Gradation: 1 bit/pixel

Printing speed:

	Resolution	Plain paper	Thick/OHP
Monochrome	600 x 600 dpi	20 ppm	8 ppm
	1200 x 600 dpi	20 ppm	8 ppm
	1200 x 1200 dpi	8 ppm	8 ppm
Color	600 x 600 dpi	16 ppm	8 ppm
	1200 x 600 dpi	16 ppm	8 ppm
	1200 x 1200 dpi	8 ppm	8 ppm

Resident Fonts:
PCL5c:
35 Intelli fonts
10 TrueType fonts
1 bitmap font
Adobe PostScript 3:
136 fonts (24 Type 2 fonts, 112 Type 14 fonts)

Host Interfaces:
Bi-directional IEEE1284 parallel x 1: Standard
Ethernet (100 Base-TX/10 Base-T): Standard
USB2.0: Standard
IEEE1394: Optional
IEEE802.11b (Wireless LAN): Optional
Bluetooth (Wireless): Optional

Network Protocols: TCP/IP, IPX/SPX, NetBEUI, AppleTalk

First Print Speed: 25 seconds or less (from tray 1)

Warm-up Time: Less than 45 seconds (at 23 °C/50%)

Print Paper Capacity:
(80 g/m2, 20lb)
Standard tray: 530 sheets
By-pass tray: 100 sheets
Optional paper feed tray: 530 sheets x 2

Print Paper Size: (Refer to “1.1Supported Paper Sizes”.)

	Minimum	Maximum
Standard Tray	A4/B5/8 1/2" x 11"/8 1/2" x 14" (SEF)	
By-pass	90 x 148 mm	216 x 356 mm
Optional Tray	A4/B5/8 1/2" x 11"/8 1/2" x 14" (SEF)	

Printing Paper Weight:
Standard tray: 60 to 105 g/m^2 (16 to 28 lb.)
Optional paper tray: 60 to 105 g/m^2 (16 to 28 lb.)
By-pass tray: 60 to 163 g/m^2 (16 to 43 lb.)

Output Paper Capacity: Standard exit tray: 500 sheets (face down)

Memory: Standard 64 MB, up to 384 MB with optional DIMM

Power Source: 120 V, 60 Hz: More than 10 A (for North America)
220 V - 240 V, 50/60 Hz: More than 6 A (for Europe/Asia)

Power Consumption:

	120V	230V
Maximum	1200 W or less	1300 W or less
Energy Saver	9 W or less	9 W or less

Noise Emission:
(Sound Power Level)

	Mainframe Only	Full System
Printing	63 dB or less	62 dB or less
Stand-by	45 dB or less	45

⇒ **NOTE:** The above measurements were made in accordance with ISO7779 at the operator position.

Dimensions (W x D x H):419 x 536 x 395 mm (16.5" x 21.1" x 15.5")

Weight: Less than 30 kg (66.1 lb.)

1.1 SUPPORTED PAPER SIZES

Paper	Size (W x L)	Paper Trays Main Unit/Options		By-pass Tray	Duplex
		US	Eur/Asia		
A3	297 x 420 mm	N	N	N	N
A4 SEF	210 x 297 mm	Y	Y	Y#	Y
A4 LEF	297 x 210 mm	N	N	N	N
A5 SEF	148 x 210 mm	N	N	Y#	N
A5 LEF	210 x 148 mm	N	N	N	N
A6 SEF	105 x 148 mm	N	N	Y#	N
B4 SEF	257 x 364 mm	N	N	N	N
B5 SEF	182 x 257 mm	Y	Y	Y#	Y
B5 LEF	257 x 182 mm	N	N	N	N
B6 SEF	128 x 182 mm	N	N	N	N
Ledger	11" x 17"	N	N	N	N
Letter SEF	8.5" x 11"	Y	Y	Y#	Y
Letter LEF	11" x 8.5"	N	N	N	N
Legal SEF	8.5" x 14"	Y	Y	Y#	Y
Half Letter SEF	5.5" x 8.5"	N	N	Y#	N
Executive SEF	7.25" x 10.5"	N	N	Y#	N
Executive LEF	10.5" x 7.25"	N	N	N	N
F SEF	8" x 13"	N	N	Y#	N
Foolscap SEF	8.5" x 13"	N	N	Y#	N
Folio SEF	8.25" x 13"	N	N	Y#	N
8K	267 x 390 mm	N	N	N	N
16K SEF	195 x 267 mm	N	N	Y#	N
16K LEF	267 x 195 mm	N	N	N	N
Custom	Minimum: 90 x 148 mm Maximum: 216 x 356 mm	N	N	Y#	N
Com10 Env.	4.125" x 9.5"	N	N	Y#	N
Monarch Env.	3.875" x 7.5"	N	N	Y#	N
C6 Env.	114 x 162 mm	N	N	Y#	N
C5 Env.	162 x 229 mm	N	N	Y#	N
DL Env.	110 x 220 mm	N	N	Y#	N

Remarks:

Y	Supported: the sensor detects the paper size.
Y#	Supported: the user specifies the paper size.
Y*	Supported: depends on a technician adjustment
N	Not supported

2. SOFTWARE ACCESSORIES

The printer drivers and utility software are provided on one CD-ROM. An auto-run installer allows you to select which components to install.

2.1 PRINTER DRIVERS

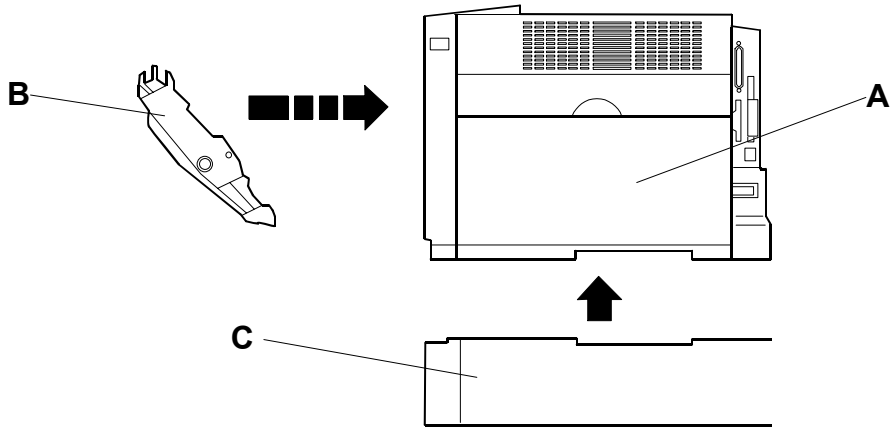
Printer Language	Windows 95/98/ME	Windows NT4.0	Windows 2000	Windows XP	Macintosh
PCL 5c	Yes	Yes	Yes	Yes	No
PS3	Yes	Yes	Yes	Yes	Yes
RPCS	Yes	Yes	Yes	Yes	No

NOTE: 1) The printer drivers for Windows NT 4.0 are only for the Intel x86 platform. There is no Windows NT 4.0 printer driver for the PowerPC, Alpha, or MIPS platforms.
2) The PS3 drivers are all genuine AdobePS drivers, except for Windows 2000, which uses Microsoft PS. A PPD file for each operating system is provided with the driver.
3) The PS3 driver for Macintosh supports Mac OS 7.6 or later versions.

2.2 UTILITY SOFTWARE

Software	Description
Agfa Font Manager 2000 (Win95/98, 2000, NT4)	A font management utility with screen fonts for the printer.
SmartNetMonitor for Admin (Win95/98, ME, 2000, NT4)	A printer management utility for network administrators. NIB setup utilities are also available.
SmartNetMonitor for Client (Win95/98, ME, 2000, NT4)	• A printer management utility for client users. • A utility for peer-to-peer printing over a NetBEUI or TCP/IP network. • A peer to peer print utility over a TCP/IP network. This provides the parallel printing and recovery printing features.
Printer Utility for Mac (Mac)	This software provides several convenient functions for printing from Macintosh clients.
IEEE1394 Utility (Win2000)	This utility solves problems with Windows 2000.
DeskTopBinder V2 Lite (Win95/98, ME, 2000, NT4)	DeskTopBinder V2 Lite itself can be used as personal document management software and can manage both image data converted from paper documents and application files saved in each client's PC.

3. MACHINE CONFIGURATION



Item	Machine Code	No.	Remarks
Main Unit	G081	A	
Options			
Duplex Unit	G343	B	Option
Paper Feed Unit	G342	C	Up to two tray units can be installed.
Internal Options			
64 MB DIMM Memory	G330		
128 MB DIMM Memory	G331		
256 MB DIMM Memory	G332		
NVRAM Memory	G311		Used in common with G060.
IEEE1394 I/F Board	G336		Used in common with G073/G074
IEEE802.11b Board	G628		Used in common with G073/G074
Bluetooth Board	G350		
HDD Type 3000	G345		
NIB	G355		Standard with the model G081, option for model G092
Others			
Fusing Unit Type125	G207		Includes the fusing unit and the transfer roller.
Intermediate Transfer Unit Type125	G205		Includes the transfer belt unit.

NOTE: 1) When installing IEEE1394, IEEE802.11b or Bluetooth, remove the USB2.0 interface board.
2) The IEEE1394, IEEE802.11b, Bluetooth, and USB2.0 interface board cannot be installed at the same time.
3) The NIB is an option for model G092.
4) Only the model G081 is available in the U.S. market.

G342

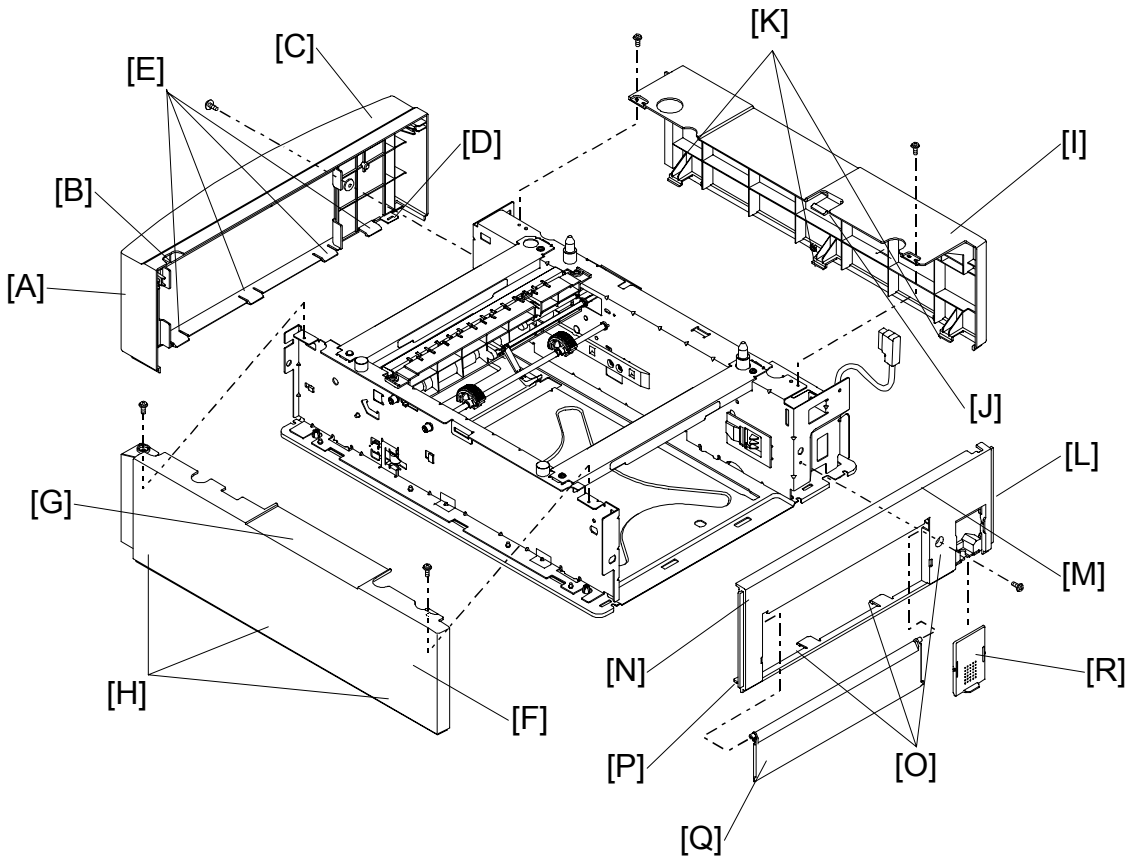
PAPER FEED UNIT TYPE 3000

G342

TABLE OF CONTENTS

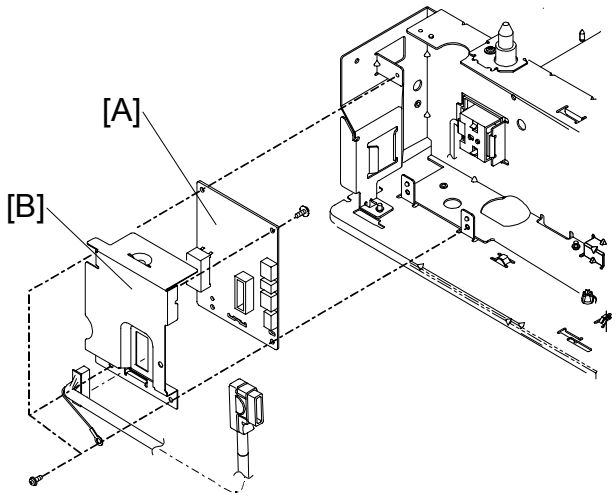
1. REPLACEMENT AND ADJUSTMENT

1.1 EXTERIOR COVERS



1. Front cover [A] (🖉 x 1)
   NOTE: Release both hooks [B] [C] on the top and five hooks [D][E] on the bottom.
2. Right cover [F] (🖉 x 2)
   NOTE: Release one hook [G] on the top and three hooks [H] on the bottom.
3. Left cover [I] (🖉 x 2)
   NOTE: Release one hook on the top [J] and three hooks [K] on the bottom.
4. Rear cover [L] (🖉 x 1)
   NOTE: Release two hooks [M][N] on the top and five hooks [O][P] on the bottom.
5. Cassette cover [Q]
6. Connector cover [R]

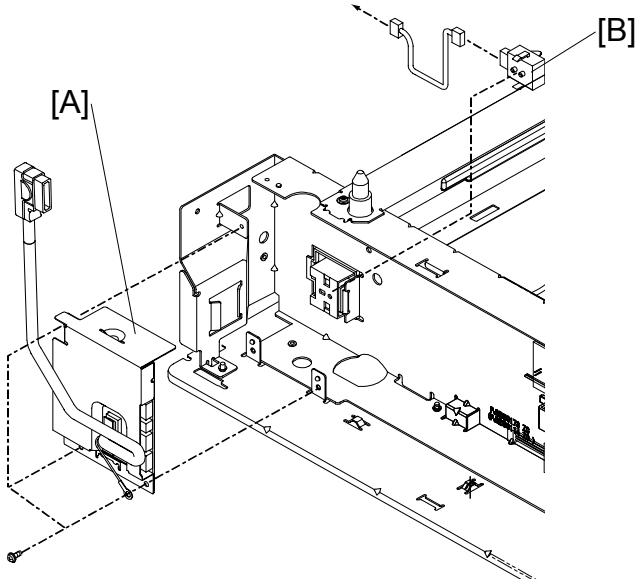
1.2 FEEDER BOARD



- Left cover (☛ 1.1)

1. Feeder board [A] with shield cover.(✋ x 5, 🔩 x 3)
2. Shield cover [B] (🔩 x 1)

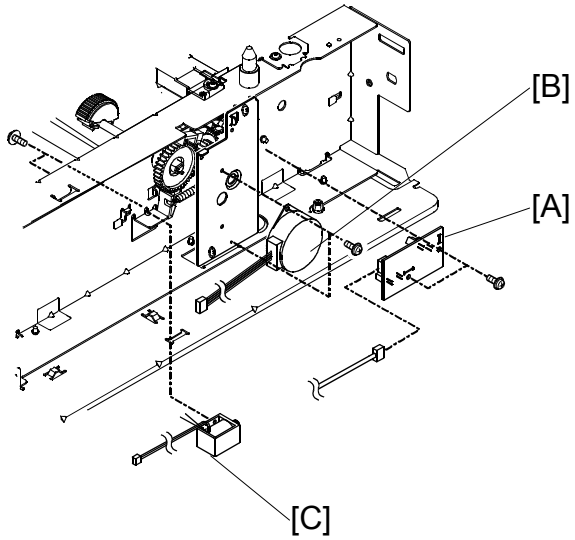
1.3 PAPER SIZE SWITCH



- Left cover (☛ 1.1)

1. Feeder board unit [A] (🔩 x 3)
2. Paper size switch [B] (✋ x 1)
   NOTE: The connector is located at CN5 on the feeder board.

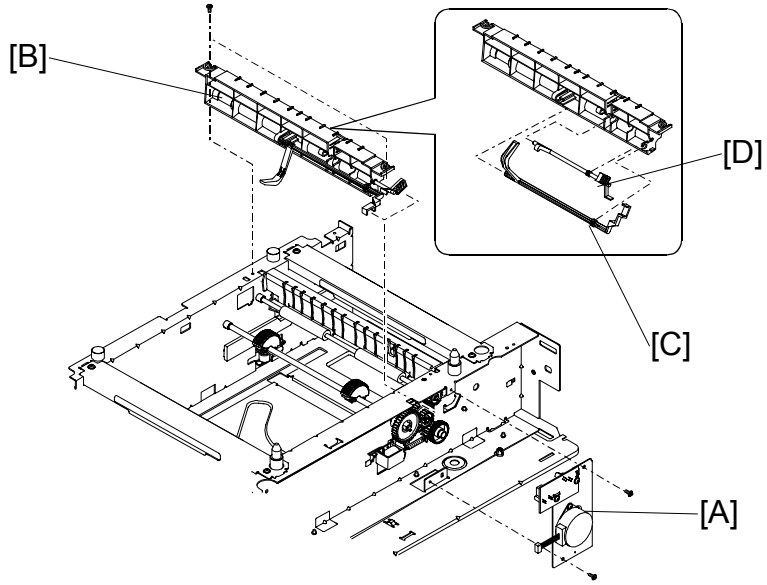
1.4 SENSOR BOARD, MOTOR, AND PICKUP SOLENOID



- Left cover (☛ 1.1)

1. Sensor board [A] (☞ x 2)
2. Motor [B] (✍ x 1, ☞ x 2)
3. Pickup Solenoid [C] (✍ x 1, ☞ x 2)

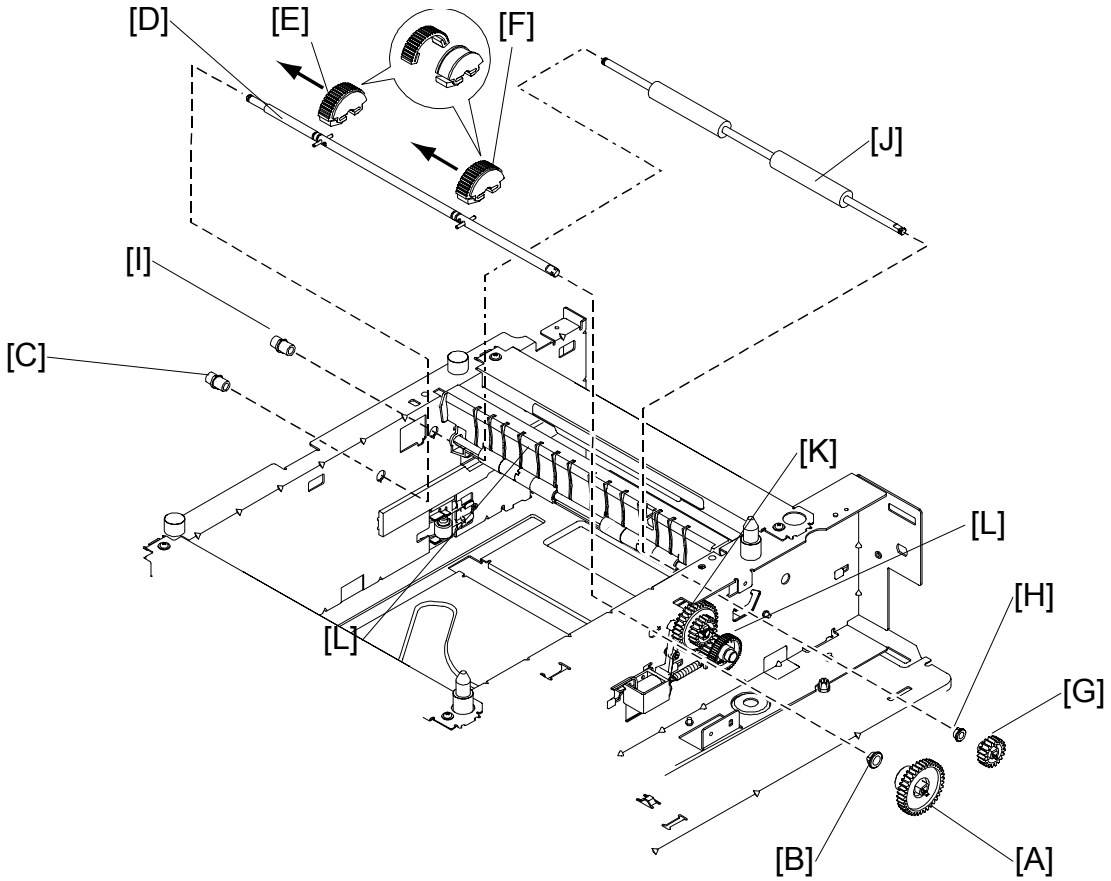
1.5 JAM SENSOR AND PAPER EMPTY SENSOR ARMS



- Left cover (☛ 1.1)

1. Motor bracket unit [A] (☞ x 2)
2. Paper guide unit [B] (☞ x 2)
3. Paper empty sensor arm [C]
4. Jam sensor arm [D]

1.6 PICKUP AND PAPER FEED ROLLERS



- Left cover (☛ 1.1)

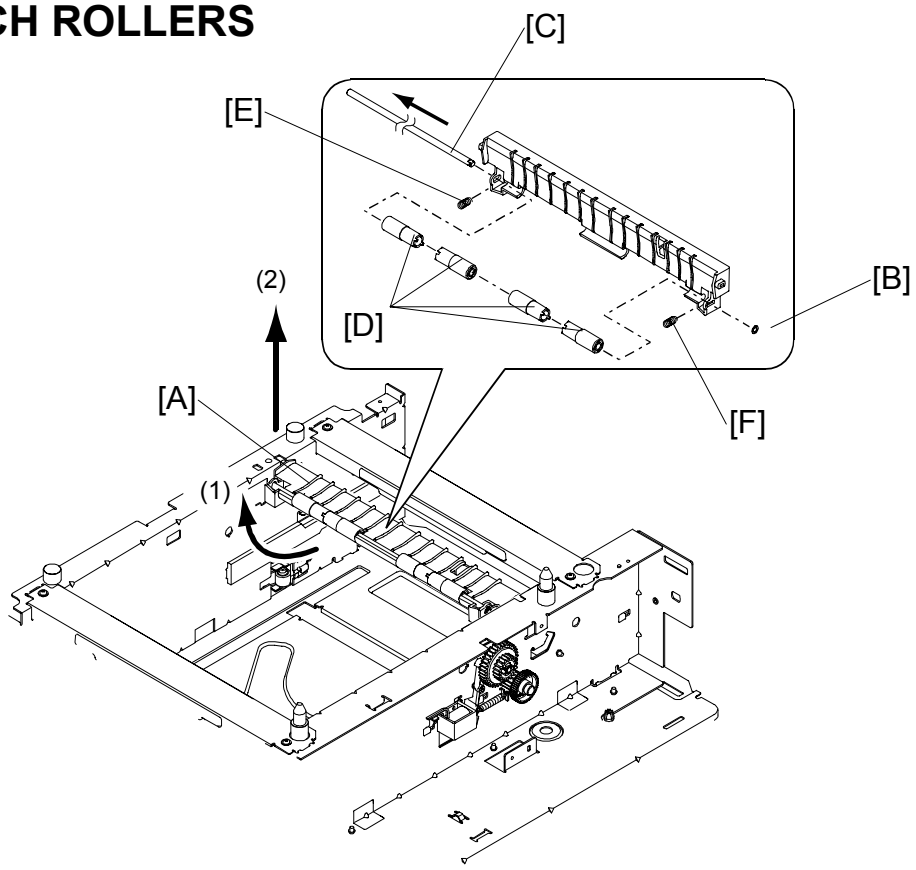
1. Pickup gear [A] (1 hook)
2. Bushing [B]
3. Bushing [C] (1 hook)
4. Pickup roller shaft [D]
5. 2 pickup roller assemblies [E][F] (1 hook each)
6. Feed gear [G] (1 hook)
7. Bushing [H]
8. Bushing [I] (1 hook)
9. Paper feed roller [J]

Lubricating

Lubricate the following parts (Grease G501) when replacing them (values in parentheses indicate the amount of lubricant):

- The shafts on the outer gear [K] (0.05 cc x 2)
- The outer cogs on the 2 inner gears (in the outer gear [K]) (0.1 cc x 2)
- The outer cogs on the idle gear [L] (0.1 cc)
- The shafts of the outer gear [M] and the idle gear [L] (0.05 cc x 2)

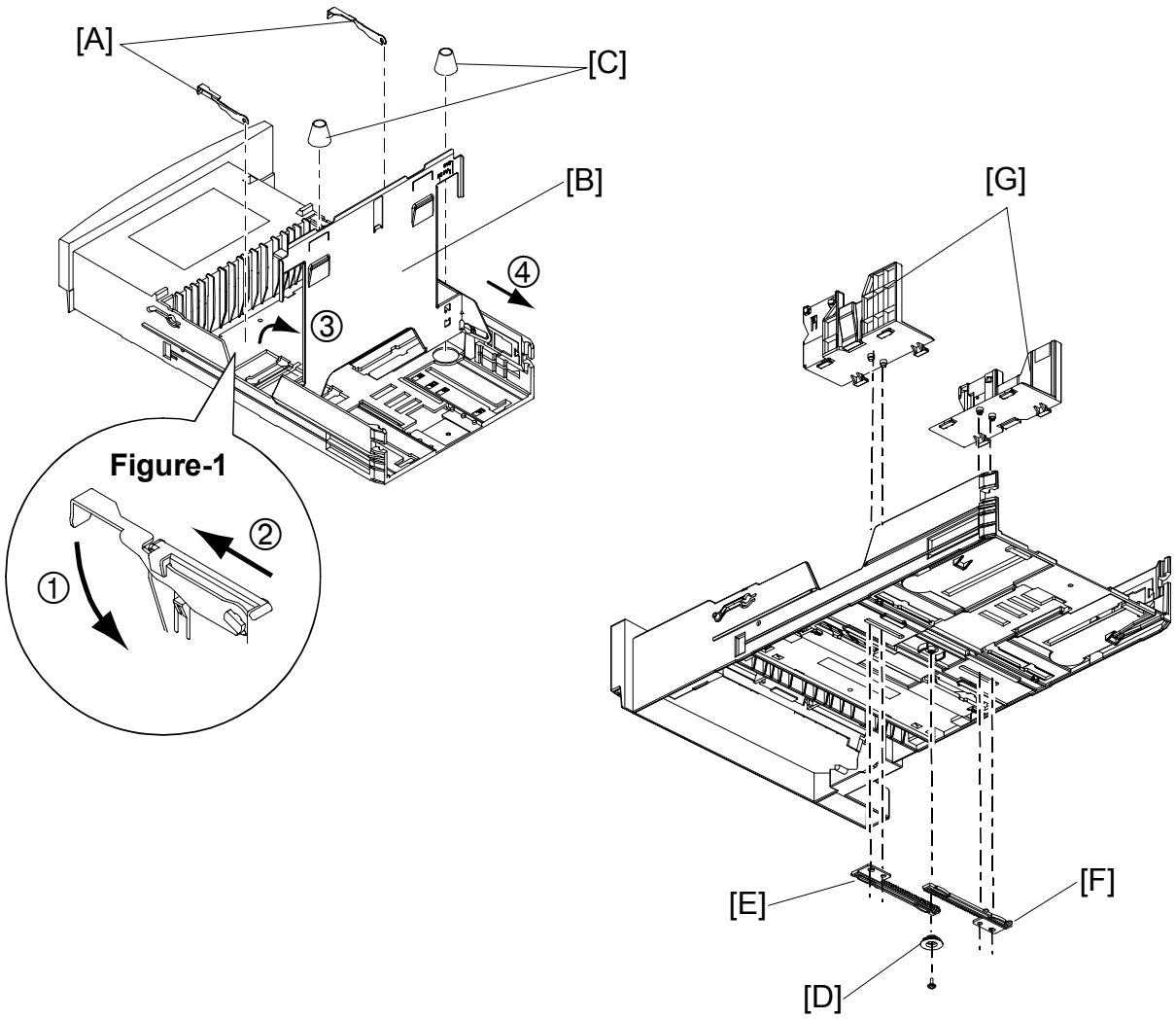
1.7 PINCH ROLLERS



- Left cover (☛ 1.1)

1. Raise the pinch roller base unit [A] in the arrow (1) direction.
2. Remove the pinch roller base unit in the arrow (2) direction.
3. Plastic ring [B]
4. Slide out the pinch roller shaft [C] in the arrow direction.
5. 4 pinch rollers [D]
6. 2 springs [E][F]

1.8 PAPER CASSETTE



1. Corner separator [A]
   NOTE: Remove the corner separator by moving it as shown by the arrows in Figure-1.
2. Raise the cassette base plate [B] in the arrow ③ direction.
3. Slide the cassette base plate in the arrow ④ direction, and remove it.
4. 2 springs [C]
5. Pinion gear [D] and 2 racks [E][F] (🔩 x 2)
6. Left and right paper guides [G]

2. DETAILED DESCRIPTIONS

See the following subsections in the service manual of the main unit:

- 6.3.9—Paper Feed
- 6.5.3—Paper Source Selection
- 6.5.4—Auto Continue

TECHNICAL SERVICE BULLETINS

TECHNICAL SERVICE BULLETIN

BULLETIN NUMBER: G081 – 001 **10/08/2003**

APPLICABLE MODEL:
GESTETNER – C7116
LANIER – LP020C
RICOH – CL3000
SAVIN – CLP1620

SUBJECT: SERVICE MANUAL - INSERT

■ SERVICE MANUAL

The Service Manual pages listed below must be replaced with the pages supplied.

The revised areas have been highlighted by an arrow ⇒.

PAGES:

- 5-3 and 5-6 Updated Information (Printer Controller Service Mode)

TECHNICAL SERVICE BULLETIN

BULLETIN NUMBER: G081 - 002 **10/16/2003**

APPLICABLE MODEL:
GESTETNER – C7116
LANIER – LP020C
RICOH – CL3000
SAVIN – CLP1620

SUBJECT: SERVICE MANUAL - INSERT

The Service Manual pages listed below must be replaced with the pages supplied.

An arrow has highlighted the revised areas ⇒.

PAGES:

- 7 - 2 Updated Information (Noise Emission)

SERVICE MANUAL

Print Paper Size: (Refer to “1.1Supported Paper Sizes”.)

	Minimum	Maximum
Standard Tray	A4/B5/8 1/2" x 11"/8 1/2" x 14" (SEF)	
By-pass	90 x 148 mm	216 x 356 mm
Optional Tray	A4/B5/8 1/2" x 11"/8 1/2" x 14" (SEF)	

Printing Paper Weight:
Standard tray: 60 to 105 g/m^2 (16 to 28 lb.)
Optional paper tray: 60 to 105 g/m^2 (16 to 28 lb.)
By-pass tray: 60 to 163 g/m^2 (16 to 43 lb.)

Output Paper Capacity: Standard exit tray: 500 sheets (face down)

Memory: Standard 64 MB, up to 384 MB with optional DIMM

Power Source: 120 V, 60 Hz: More than 10 A (for North America)
220 V - 240 V, 50/60 Hz: More than 6 A (for Europe/Asia)

Power Consumption:

	120V	230V
Maximum	1200 W or less	1300 W or less
Energy Saver	9 W or less	9 W or less

Noise Emission:
(Sound Power Level)

	Mainframe Only	Full System
Printing	63 dB or less	62 dB or less
Stand-by	45 dB or less	45

⇒ **NOTE:** The above measurements were made in accordance with ISO7779 at the operator position.

Dimensions (W x D x H): 419 x 536 x 395 mm (16.5" x 21.1" x 15.5")

Weight: Less than 30 kg (66.1 lb.)

5.2 PRINTER CONTROLLER SERVICE MODE

NOTE: In the Function/[Setting] column:

- The related pop-up screen name and function name (if any) appear in parenthesis following the function description.
- Comments are in *italics*.
- The setting range is enclosed in brackets, with the default setting written in **bold**.
- An asterisk (*) after the mode number means that this mode's value is stored in the NVRAM. If you do a RAM reset, all these SP modes will be returned to their factory settings.
- **DFU** stands for **D**esign/**F**actory **U**se only. Values marked **DFU** should not be changed.
- **FA** stands for **F**actory **A**djustment only. Values marked **FA** should not be changed.
- The Printer Controller is referred to as the Main Control Board.

5.2.1 SERVICE MENU-CONTROLLER SERVICE MODES ("1. SERVICE")

Mode No. (Class 1 and 2)		Function / [Setting]
[Bit Switch] – SP1001		
1	Bit Switch 1	(See "Bit Switch Settings".)
⇒ 2	Bit Switch 2	
3	Bit Switch 3	
4	Bit Switch 4	
5	Bit Switch 5	
6	Bit Switch 6	
7	Bit Switch 7	
8	Bit Switch 8	
[Clear Setting] – SP1003		
1	Clear Setting	Initializes the settings in the "System" menu of the user tools.
[Print Summary] – SP1004		
1	Print Summary	Prints the service summary sheet (a summary of all the controller settings).
[DispVersion] Display Version – SP1005		
1	Disp Version	Displays the version of the controller firmware.
[ToneCtlSet] Toner Control Setting – SP1101		
1	Tone (Factory)	Recalls the gamma settings. Select the factory, previous, or current setting.
2	Tone (Prev.)	
3	Tone (Current)	
[ToneCtlSet] Toner Control Setting – SP1102		
1	*1200 x 1200 Photo	Selects the printing mode (resolution) for the printer gamma adjustment. When selecting a print mode, an asterisk (*) is displayed in the front of the mode.
2	600 x 600 Text	
3	1200 x 600 Text	
4	600 x 600 Photo	
5	1200 x 600 Photo	

Bit Switch 1 (Japan only)

Bit	Function	Default
0	Key protect [0: Not activated, 1: Activated] **DFU**	0
1	(Not used.) **DFU**	0
2	(Not used.) **DFU**	0
3	(Not used.) **DFU**	0
4	(Not used.) **DFU**	0
5	(Not used.) **DFU**	0
6	(Not used.) **DFU**	0
7	Emulation print area (RPCS only). [0: Not printed, 1: Printed]**DFU**	0

Bit Switch 2

Bit	Function	Default
1	Overlap job mode (njob) [0: Not activated, 1: Activated] **DFU**	0
3	PDL Sniffing - See PUB(C)-051 for details. [**0: Enabled**, 1: Disabled]	0

Bit Switch 3

Not used

Bit Switch 4 (Japan only)

Bit	Function	Default
0	Background areas of simple graphics (RPDL, R16, R55, R98) [0: Not painted, 1: Painted] **DFU**	0
1	Unknown 2-byte characters (R98) [0: Cleared, 1: Not cleared] **DFU**	0
2	Specifies portrait/landscape reset (R16) [0: Reset by the reset command, 1: Not reset by the reset command] **DFU**	0
3	Changes line thickness adjustment mode [0: Mode 1, 1: Mode 2] **DFU**	0
4	Displays or not displays error messages No. 84 through DF (RPDL, R16, R55, R98, GL/GL2). [0: Displays, 1: Not displays] **DFU**	0
5	Displays or not displays error messages No. E1 and higher (RPDL, R16, R55, R98, GL/GL2). [0: Displays, 1: Not displays] **DFU**	0
6	Changes the tray setting (GL/GL2). [0: LP, 1: MFP] **DFU**	0
7	Changes the default tray. [0: LP (Tray 1), 1: MFP (System default)] **DFU**	0