Model PL-P1

(Machine Code: G108)

SERVICE MANUAL

Subject to change
7 April 2004

⚠IMPORTANT SAFETY NOTICES

PREVENTION OF PHYSICAL INJURY

1. Before disassembling or assembling parts of the printer and peripherals, make sure that the printer power cord is unplugged.
2. The wall outlet should be near the printer and easily accessible.
3. 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.
4. The printer drives some of its components when it completes the warm-up period. Be careful to keep hands away from the mechanical and electrical components as the printer starts operation.
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 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 serviced by a customer service representative who has completed the training course on those 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 used toner, the maintenance unit which includes developer or the organic photoconductor in accordance with local regulations. (These are non-toxic supplies.)
3. Dispose of replaced parts in accordance with local regulations.
4. When keeping used lithium batteries in order to dispose of them later, do not put more than 100 batteries per sealed box. Storing larger numbers or not sealing them apart may lead to chemical reactions and heat build-up.

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 Optics Unit section. Laser beams can seriously damage your eyes.

CAUTION MARKING:

Trademarks

Microsoft®, Windows®, and MS-DOS® are registered trademarks of Microsoft Corporation in the United States and /or other countries.

PostScript® is a registered trademark of Adobe Systems, Incorporated.

PCL® is a registered trademark of Hewlett-Packard Company.

Ethernet® is a registered trademark of Xerox Corporation.

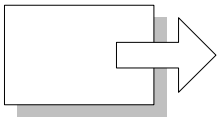
PowerPC® is a registered trademark of International Business Machines Corporation.

Other product names used herein are for identification purposes only and may be trademarks of their respective companies. We disclaim any and all rights involved with those marks.

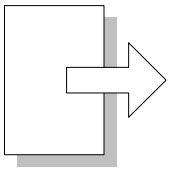
Symbols and Abbreviations

This manual uses the symbols and abbreviations shown below.

Symbol	Meaning
☛	Refer to section number
	Clip ring
	Screw
	Connector
	E ring
SEF	Short Edge Feed
LEF	Long Edge Feed



Short Edge Feed (SEF)



Long Edge Feed (LEF)

TABLE OF CONTENTS

PERIPHERALS

PAPER FEED UNIT (G389)

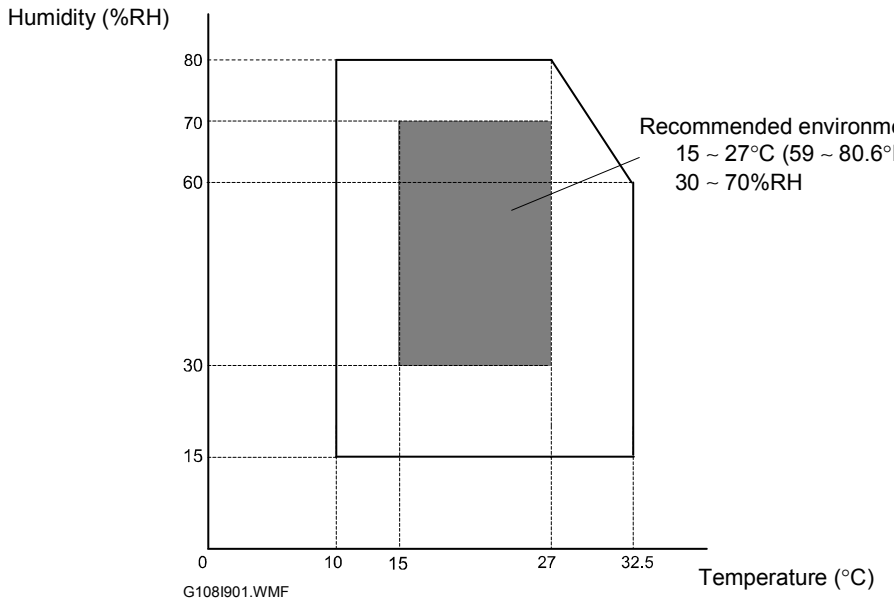
DUPLEX UNIT (G390)

SPECIFICATIONS

1. INSTALLATION

1.1 INSTALLATION REQUIREMENTS

1.1.1 ENVIRONMENT



1. Temperature range: 10 ~ 32.5 °C (50 ~ 90.5°F)
2. Humidity range: 15 ~ 80%RH
3. Do not install the machine in an area that is exposed to direct sunlight.
4. Do not install the machine in a space with bad airflow.
5. Do not expose the machine to a sudden temperature change, which include:
   1) Direct cool air from an air conditioner
   2) Direct heat from a heater
6. Do not install the machine in an area that can be exposed to corrosive gas.
7. Install the machine at a location lower than 2,500 m (8200 ft.).
8. Install the machine on a strong, level base.
9. Do not install the machine in an area that can be subjected to strong vibrations.

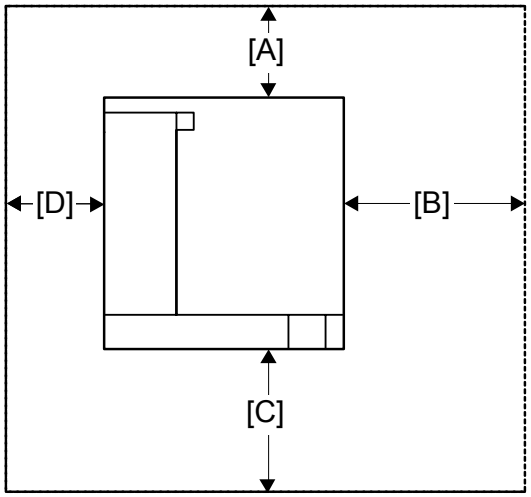
1.1.2 MACHINE LEVEL

Front to back: 1 degree or less

Left to right: 1 degree or less

1.1.3 MACHINE SPACE REQUIREMENT

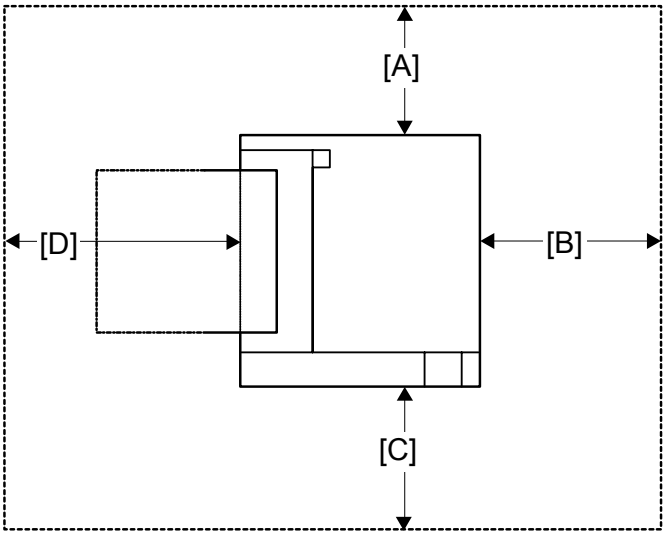
Printer Only



G108I915.WMF

[A] (right): 200 mm (8")
[B] (front): 700 mm (28")
[C] (left): 500 mm (20")
[D] (rear): 250 mm (10")

Printer and Duplex Unit



G108I916.WMF

[A] (right): 500 mm (20")
[B] (front): 700 mm (28")
[C] (left): 500 mm (20")
[D] (rear): 700 mm (28")

NOTE: The space for maintenance work is included.

1.1.4 POWER REQUIREMENT

⚠CAUTION

1. Put the power plug tightly in the outlet.
2. Do not use extension cords.
3. Ground the machine.

1. Input voltage level: 120 V, 60 Hz, 11 A or less
   220 V ~ 240 V, 50 Hz: More than 6 A
2. Permissible voltage fluctuation: ±10 %
3. Do not put or place anything on the power cord.

1.2 INSTALLATION PROCEDURE

1.2.1 INSTALLING THE PRINTER

See the Operating Instructions.

1.2.2 NECESSARY SETTINGS

For the installation procedure, see the Operating Instructions. After you install the printer, specify the settings that are necessary for the service contract. When you specify settings, use caution:

1. Enable Meter Charge (SP 5930 1) for any meter click counter contract. The default is off (disabled).
2. Double-check the contract before you change Counter Method (SP 5045). You can change it only one time.
3. When you have enabled Meter Charge (SP 5930 1), specify Counter Method (SP 5045) (developments/prints) in accordance with the contract (☛ 5.1.3).

The table lists the SP Mode settings related to service contracts.

Service Program	Function
Meter Charge > On/Off (SP5-930-001)	Enables or disables the Meter Charge. (Default: Off [Disabled]) When enabled: • The Counter menu appears immediately after you push the Menu key. The Counter Method (SP5-045) sets the type of the counter. • You can print the counter from the Counter menu. When disabled: • The Counter menu is not displayed. • The total counter starts from 0 (zero).
Meter Charge > Maintenance Style (SP5-930-001)	Specifies the type of maintenance contract.
Counter Method (SP5-045)	Specifies the count timing (developments/prints). (Default: 0 [Developments])
Telephone Number Setting > Service (SP5-812-001)	Displays the telephone number of the service station. To type the telephone number, see 5.1.5.
Telephone Number Setting > Fax Telephone Number SP5-812-002	Displays the fax number of the service station. The number is printed on the counter list when the Meter Charge is enabled. The user can send a fax message with the counter list. To type the fax number, see 5.1.5.

1.3 MOVING THE MACHINE

Use caution when you move the machine:

1. You need two or more persons to move the machine. The machine weighs about 31.5 kg (69 lb) without optional units.Keep the machine level while you move it.
3. Put the machine on a flat area. Make sure that the whole part of the base supports the weight of the machine.
4. Whenever possible, use the padding in the original package.
5. Remove the following units and components:
   - Photoconductor unit
   - Optional paper feed unit
   - Optional duplex unit
   - Paper

   NOTE: Do not remove the waste toner bottle. If you remove it, the waste toner may fall from the waste toner path.
6. Protect the photoconductor unit surface with paper or cloth.
7. Clean the units and components in the printer.
8. Secure the paper tray and all exterior covers with tape.

2. PREVENTIVE MAINTENANCE

2.1 USER MAINTENANCE

Page Count

The table lists the components that need maintenance work when the printer has output a certain number of pages.

Key: C: Clean, R: Replace, L: Lubricate, I: Inspect

Component	3.7KP	13.2KP	EM	Remarks
Registration roller			C	
Waste toner bottle	R			☛ NOTE 1)
OPC belt unit		R		☛ NOTE 1), 2)

NOTE: 1) The actual life is decided by the number of developmetnts. The figure in the table is calculated under the following conditions: ① A4 SEF, ② 5% image coverage ratio, ③ two pages per job, ④ 50% color ratio.

2) When replacing the OPC belt unit, the user executes the following menu: Menu > Maintenance > Maint. Reset > PCU. This menu and SP7-905-001 (PM Parts Clear, OPC Belt) have the same function.

2.2 SERVICE MAINTENANCE

Necessary Setting

When replacing the following units or components, execute SP7-905 (PM Parts Clear):

- Fusing unit
- Transfer belt unit
- Transfer roller
- Transfer roller cleaning unit
- Paper feed roller
- Separator pad

Page Count

The table lists the components that need maintenance work when the printer has output a certain number of pages.

Key: C: Clean, R: Replace, L: Lubricate, I: Inspect

PRINTER

Component	47KP	90KP	120KP	Remarks
Fusing unit	R			☛ NOTE 1)
Transfer belt cleaning unit			R	☛ NOTE 3)
Transfer roller			R	☛ NOTE 3)
Paper feed roller			R	☛ NOTE 3)
Separator pad			R	☛ NOTE 3)
Transfer belt unit			R	☛ NOTE 2), 3)

PAPER FEED UNIT

Component	47KP	90KP	120KP	Remarks
Paper feed roller		R		
Separator pad		R		

NOTE: 1) The figure is calcurated under the following conditions:① A4 SEF, ② 5% image coverage ratio, ③ two pages per job, ④ 50% color ratio.
2) The actual life is decided by the number of developmetnts. The figure in the table is calculated under the conditions above.
3) These are the yiled parts, however the expected yield is the same as the machine durability under the target conditions.

3. REPLACEMENT AND ADJUSTMENT

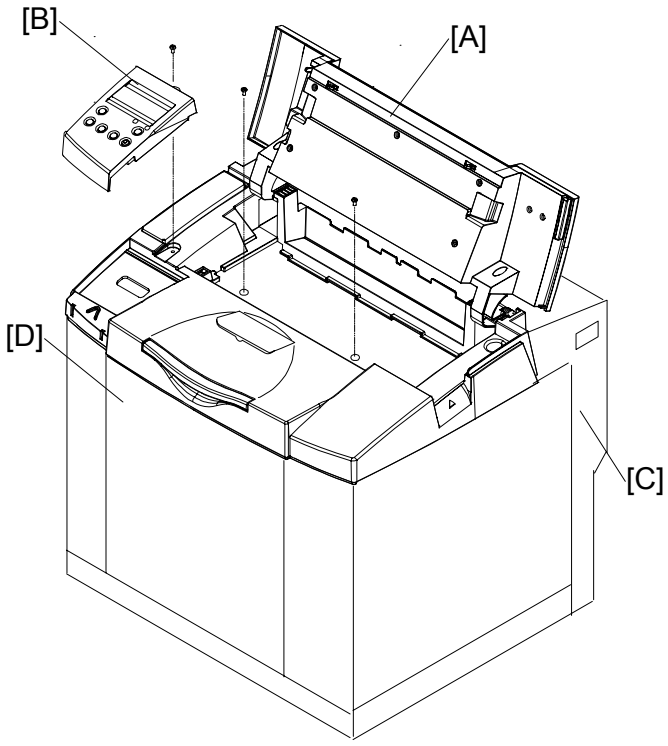
⚠CAUTION

Set the power off and disconnect the printer before you remove parts of the printer.

3.1 EXTERIOR COVERS

3.1.1 TOP COVER

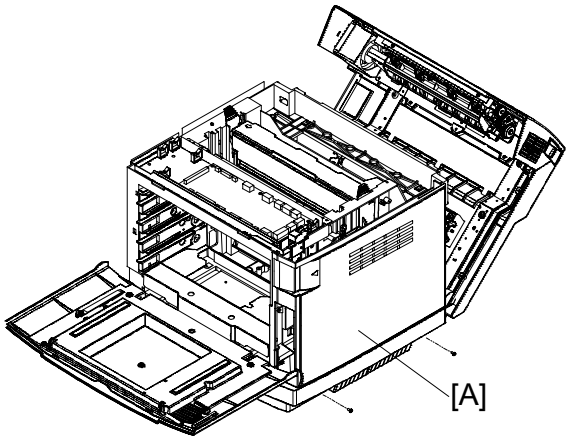
1. Open the top cover [A].
2. Operation panel [B] (✋ x 1, 🔩 x 1)
3. Open the rear cover [C].
4. Open the front cover [D].
5. Top cover (🔩 x 3)



G108R901.WMF

3.1.2 RIGHT COVER

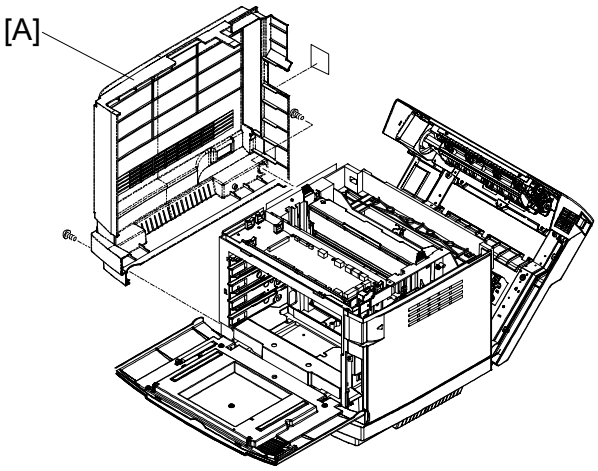
1. Top cover (☛ 3.1.1)
2. Right cover [A] (☞ x 2)



G108R902.WMF

3.1.3 LEFT COVER

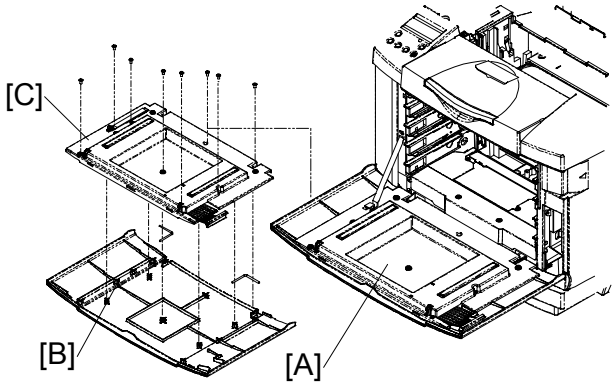
1. Top cover (☛ 3.1.1)
2. Left cover [A] (☞ x 2)



G108R903.WMF

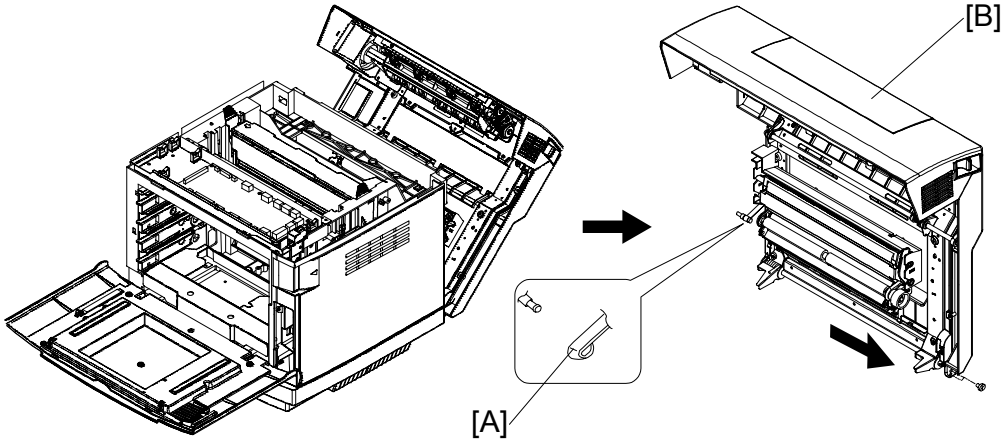
3.1.4 FRONT COVER

1. Open the front cover [A].
2. Front cover [B] (☞ x 8)
3. Internal cover [C] (Pin x 2)



G108R904.WMF

3.1.5 REAR COVER



G108R905.WMF

1. Top cover (☛ 3.1.1)
2. Release the strap [A] (☞ x 1, Guide x 1).
3. Rear cover (with the transfer unit and the paper exit unit) [B] (☞ x 1, ☞ x 2)

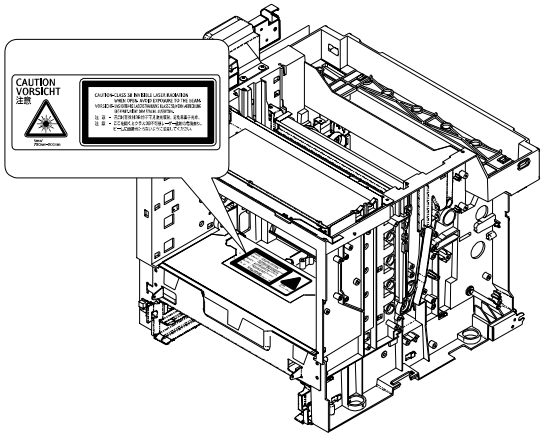
3.2 OPTICS UNIT

⚠WARNING

1. **Before starting the maintenance work described in this section, unplug the printer.**
2. **Do not disassemble the laser optics unit. A class 3B invisible laser beam is produced in the unit.**
3. **Do not adjust any part of the laser optics unit. Replace the unit as a whole.**
4. **To prevent exposure to laser radiation, confirm that all covers have been attached before starting the machine.**

3.2.1 CAUTION DECAL LOCATION

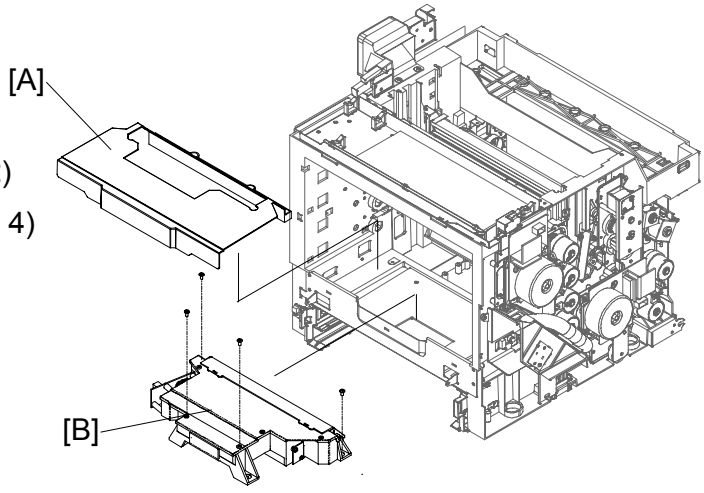
The caution decal is on the laser optics unit.



G108R932.WMF

3.2.2 REMOVING THE LASER OPTICS UNIT

1. Open the front cover.
2. All development units
3. OPC belt unit
4. Optics unit cover [A] (🔩 x 2)
5. Optics unit [B] (✋ x 1, 🔩 x 4)



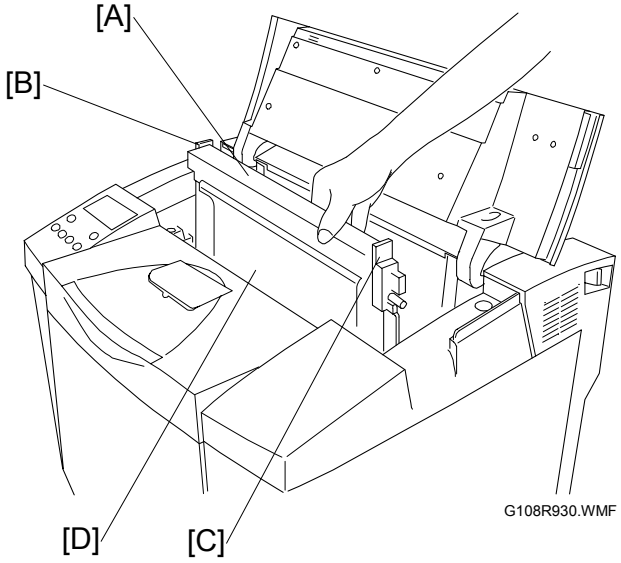
G108R914.WMF

3.3 OPC

3.3.1 OPC BELT UNIT

CAUTION: Do not touch the OPC belt. Hold the grip [A] when you move the OPC belt unit.

1. Open the top cover.
2. Release the locks [B][C].
3. OPC belt unit [D]

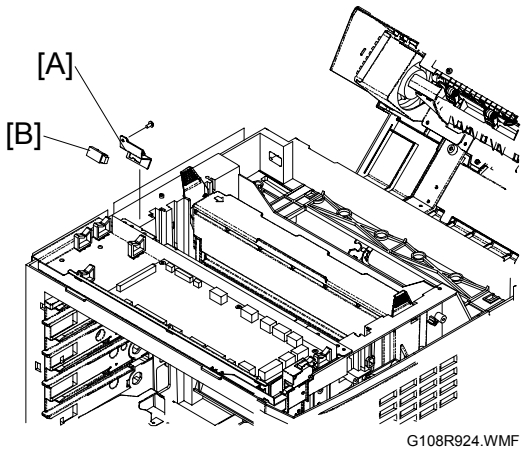


Necessary Setting

After replacing the OPC belt unit, execute SP7-905-001 (PM Parts Clear, OPC Belt).

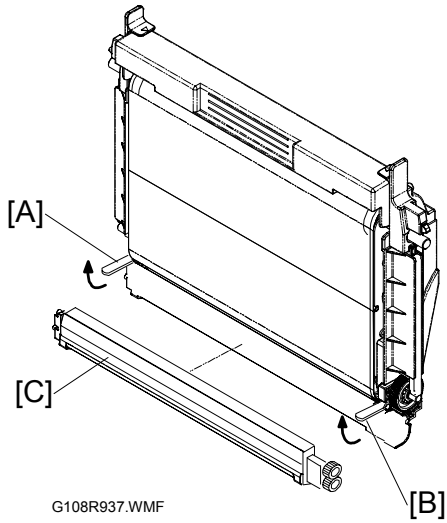
3.3.2 OPC BELT SENSOR

1. OPC belt
2. Top cover (☛ 3.1.1)
3. Sensor bracket (with the OPC belt sensor) [A] (☞ x 1, 🔩 x 1)
4. OPC belt sensor [B]

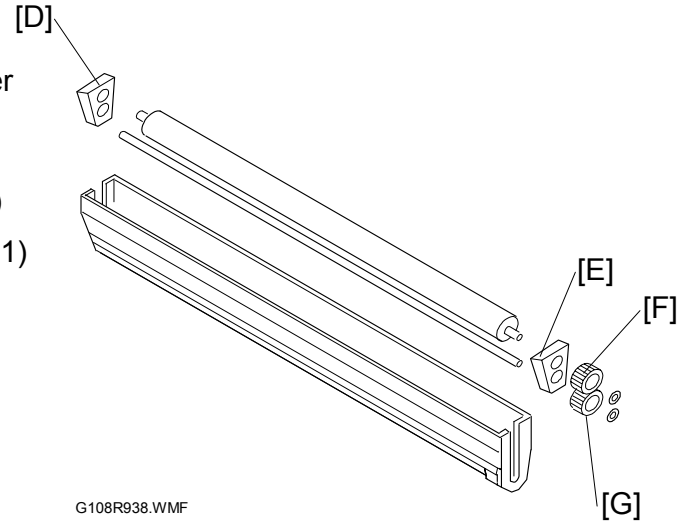


3.3.3 CHARGE ROLLER AND CLEANING ROLLER

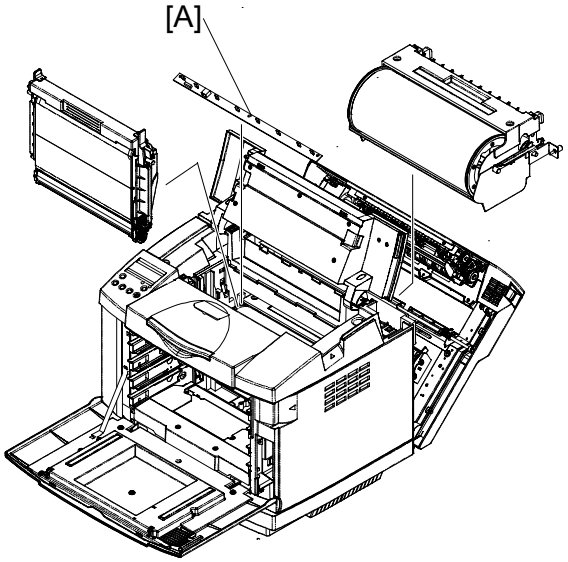
1. OPC belt unit (☛ 3.3.1)
2. Release the locks [A][B].
3. Charge roller and cleaning roller in the cover [C]



4. Left holder [D] and right holder [E] with the charge roller and the cleaning roller
5. Charge roller gear [F] (⛉ x 1)
6. Cleaning roller gear [G] (⛉ x 1)
7. Left holder
8. Right holder



3.3.4 ERASE LAMP



G108R910.WMF

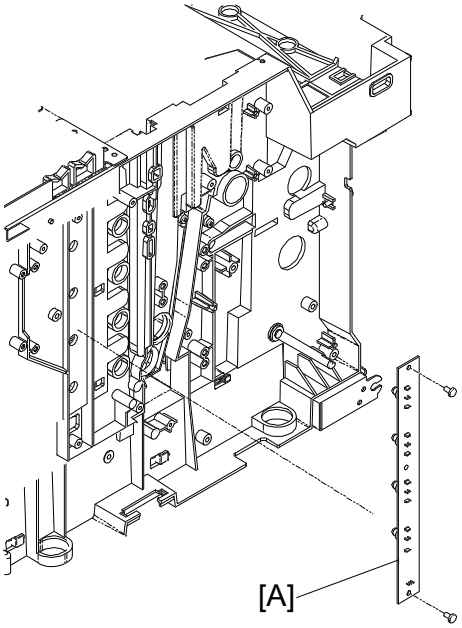
1. OPC belt unit (☛ 3.3.1)
2. Transfer belt unit (☛ 3.5.1)
3. Erase lamp [A] (✋ x 1, 🔩 x 2)

3.4 DEVELOPMENT

3.4.1 TONER END SENSOR

Emitter

1. Top cover (☛ 3.1.1)
2. Right cover (☛ 3.1.2)
3. Development gear assembly (☛ 3.11.2)
4. Emitter of the toner end sensor [A] (🔩 x 2, ✋ x 1)



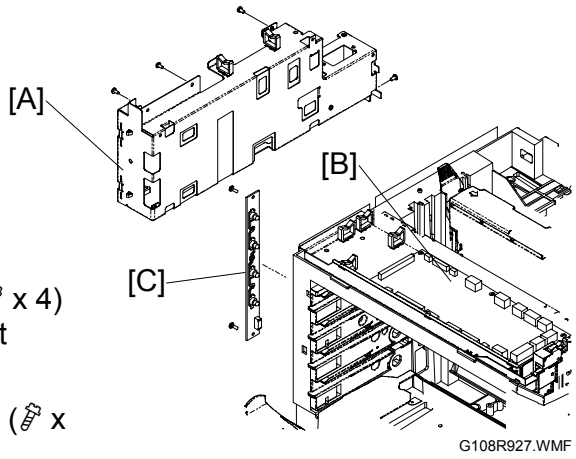
G108R926.WMF

Reassembling

Attach the upper end of the emitter with the 3x6 screw. Attach the lower with the 3x8 screw.

Receptor

1. Top cover (☛ 3.1.1)
2. Left cover (☛ 3.1.3)
3. Direct current unit (☛ 3.10.3)
4. High voltage unit (☛ 3.10.4)
5. Fusing unit
6. IOD cover (☛ 0)
7. High voltage unit base [A] (✋ x 1, 🔩 x 4)
   NOTE: The connector is on the input output device [B].
8. Receptor of the toner end sensor [C] (🔩 x 2, ✋ x 1)



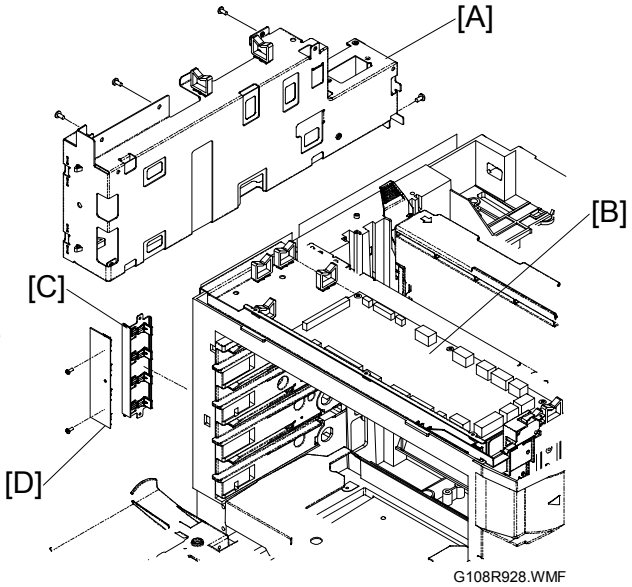
G108R927.WMF

Reassembling

Attach the upper end of the emitter with the 3x6 screw. Attach the lower with the 3x8 screw.

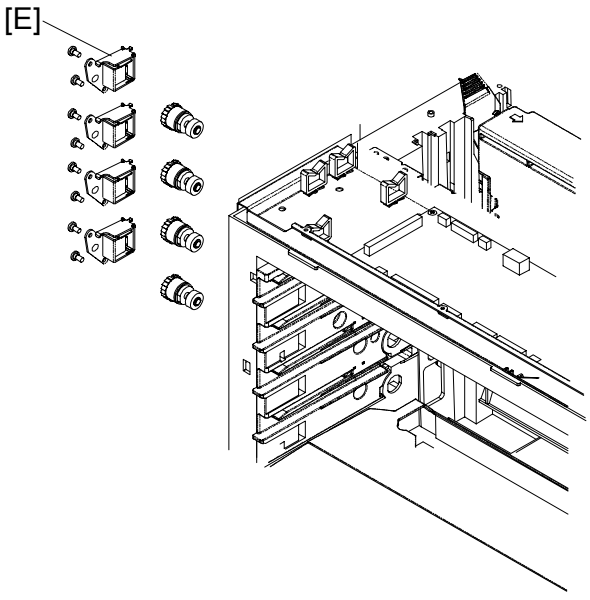
3.4.2 DEVELOPMENT UNIT SENSOR AND DEVELOPMENT CLUTCH

1. Top cover (☛ 3.1.1)
2. Left cover (☛ 3.1.3)
3. Direct current unit (☛ 3.10.3)
4. High voltage unit (☛ 3.10.4)
5. Fusing unit
6. High voltage unit base [A] (✋ x 1, 🔩 x 4)
   NOTE: The connector is on the input output device [B].
7. Sensor bracket (with the development unit sensor) [C] (🔩 x 2)
8. Development unit sensor (with the circuit board) [D] (🔩 x 2)



G108R928.WMF

9. Development clutch [E] (🔩 x 2)



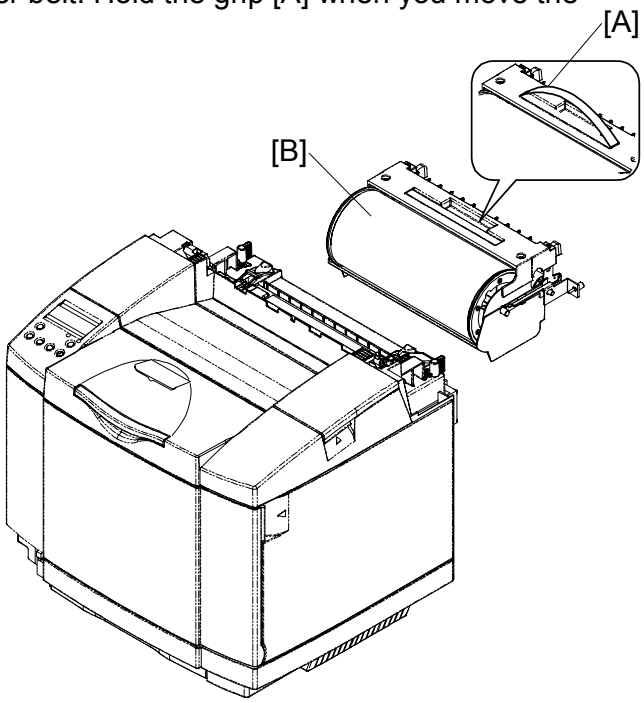
G108R946.WMF

3.5 TRANSFER BELT

3.5.1 TRANSFER BELT UNIT

CAUTION: Do not touch the transfer belt. Hold the grip [A] when you move the transfer belt unit.

1. Open the rear cover.
2. Transfer belt unit (🔩 x 2) [B]



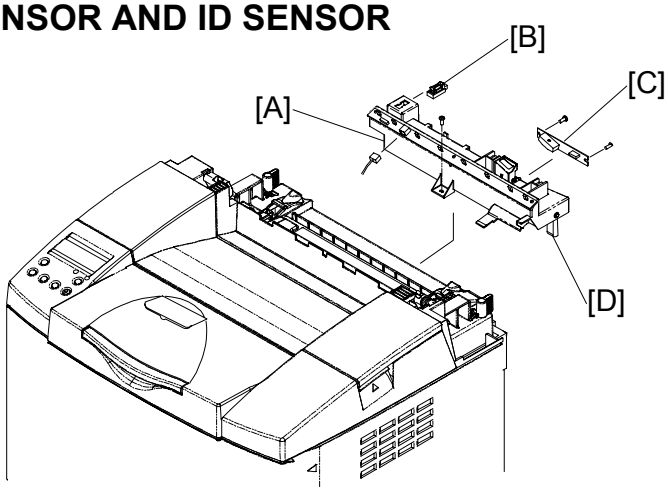
G108R929.WMF

Necessary Setting

After replacing the transfer belt, execute SP7-905-003 (PM Parts Clear, Transfer Belt).

3.5.2 TRANSFER BELT SENSOR AND ID SENSOR

1. OPC belt unit
2. Transfer belt unit
3. Erase lamp base [A] (✋ x 1, 🔩 x 2)
4. Transfer belt sensor [B] (✋ x 1)
5. ID sensor [C] (✋ x 1, 🔩 x 2)

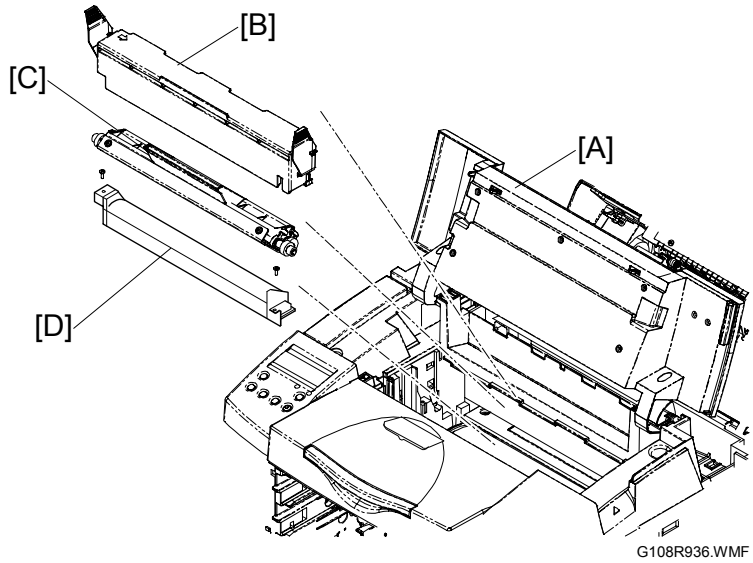


G108R923.WMF

Reassembling

Remove the paper tray out of the printer when you reassemble. The paper tray pushes up the lever [D] on the right end of the erase lamp base.

3.5.3 TRANSFER BELT CLEANING UNIT AND WASTE TONER DUCT



1. Open the top cover [A].
2. Cleaning unit cover [B].
3. Transfer belt cleaning unit [C].
4. Waste toner duct [D]. (☞ x 2)

Necessary Setting

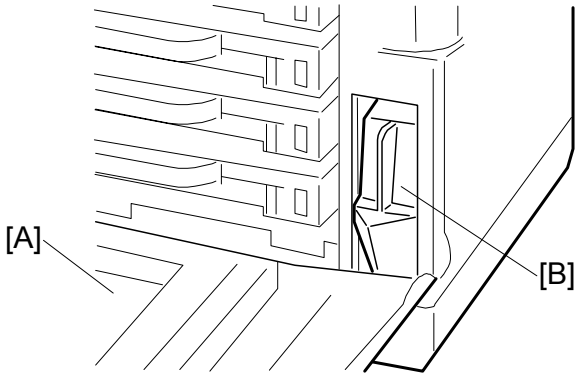
After replacing the transfer belt cleaning unit, execute SP7-905-004 (PM Parts Clear, Transfer Roller).

3.6 WASTE TONER COLLECTION UNIT

3.6.1 WASTE TONER BOTTLE

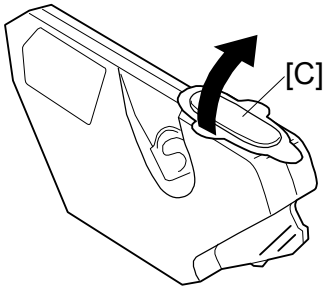
Discard waste toner in accordance with the local regulations.

1. Open the front cover [A].
2. Waste toner bottle [B].



G108R948.WMF

3. Remove the cover [C] from the new waste toner bottle.
4. Attach the cover to the old waste toner bottle.

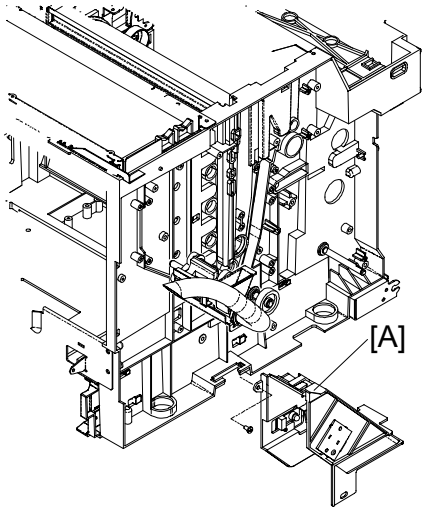


G108R947.WMF

3.6.2 WASTE TONER BOTTLE HOLDER

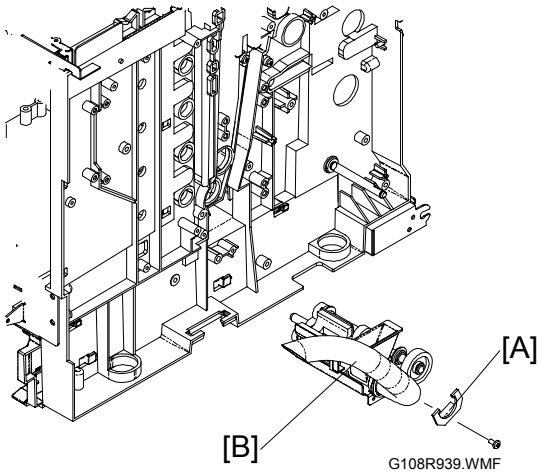
You cannot remove the waste toner sensor from the bottle holder. Replace the waste toner sensor with the bottle holder.

1. Right cover (☛ 3.1.2)
2. Waste toner bottle
3. Bottle holder [A] (x 1, x 2)



G108R925.WMF

3.6.3 WASTE TONER DUCT



1. Waste toner bottle holder (☛ 3.6.2)
2. Cover the area below the waste toner duct with paper or cloth.
   NOTE: When you remove the waste toner duct, waste toner comes out of the duct.
3. Support bracket [A] (☞ x 1)
4. Waste toner duct [B]

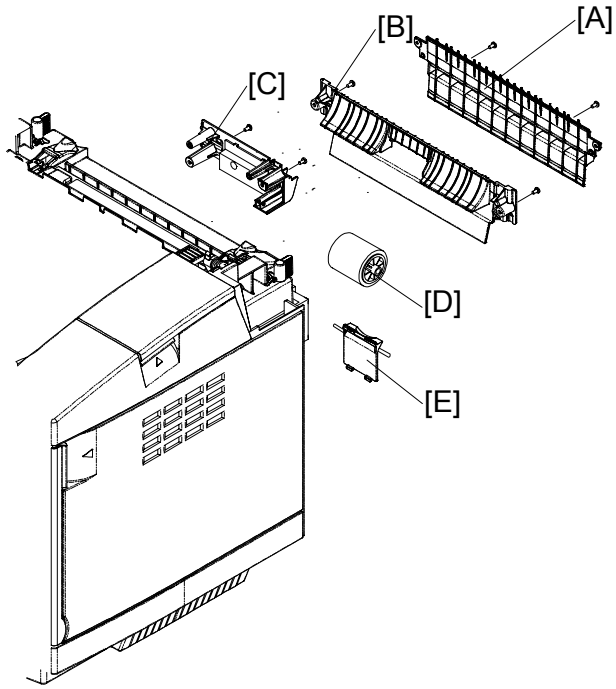
3.7 PAPER FEED

3.7.1 PAPER FEED ROLLER AND SEPARATOR PAD

1. Rear cover (☛ 3.1.5)
2. Paper guide 1 [A] (☞ x 2)
3. Paper guide 2 [B] (☞ x 2)
4. Paper sensor assembly [C] (☞ x 2)
   NOTE: You do not need to remove the connectors.
5. Paper feed roller [D]
6. Separator pad [E]

Necessary Setting

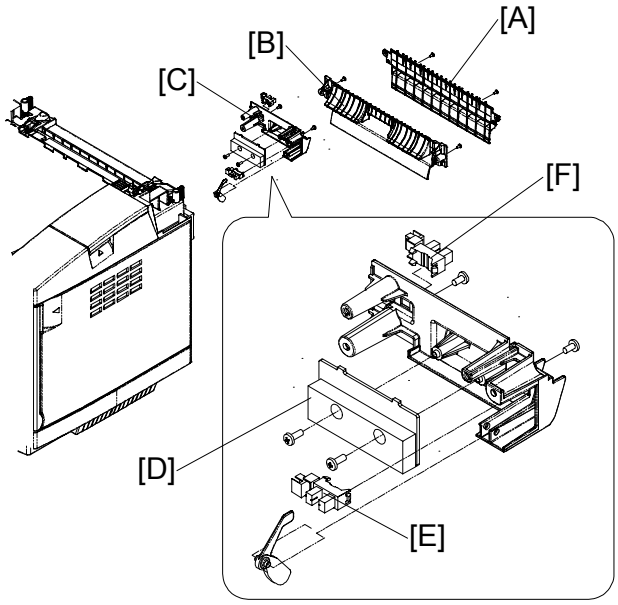
After replacing the paper feed roller and the separator pad, execute SP7-905-005 (PM Parts Clear, Pick Up Roller



G108R931.WMF

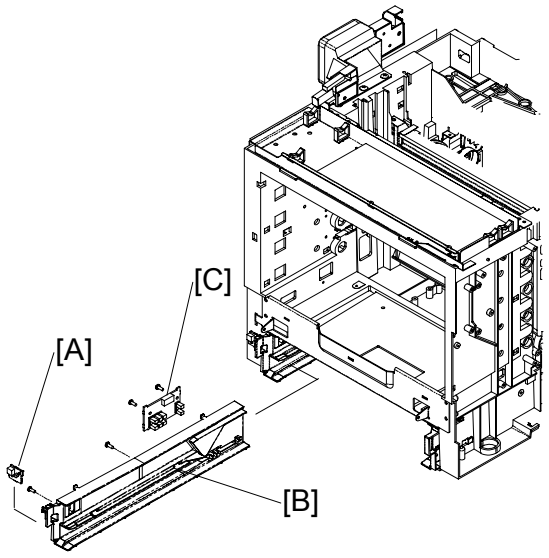
3.7.2 OHP SENSOR, PAPER END SENSOR, AND REGISTRATION SENSOR

1. Rear cover (☛ 3.1.2)
2. Paper guide 1 [A] (☞ x 2)
3. Paper guide 2 [B] (☞ x 2)
4. Paper sensor assembly [C] (☞ x 2)
5. OHP sensor [D] (✋ x 1, ☞ x 2)
6. Paper end sensor [E] (✋ x 1)
7. Registration sensor [F] (✋ x 1)



G108R920.WMF

3.7.3 TEMPERATURE SENSOR, PAPER SIZE SENSOR AND PAPER TRAY SENSOR



G108R922.WMF

1. Right cover (☛ 3.1.2)
2. Temperature sensor [A] (✋ x 1)
3. Paper tray
4. Direct current unit (☛ 3.10.3)
5. Left rail of the paper tray [B] (🔩 x 2)
   NOTE: The screws are behind the direct current unit.
6. Paper size sensor and paper tray sensor [C] (✋ x 1, 🔩 x 2)
   NOTE: Get the connector through the opening behind the direct current unit.

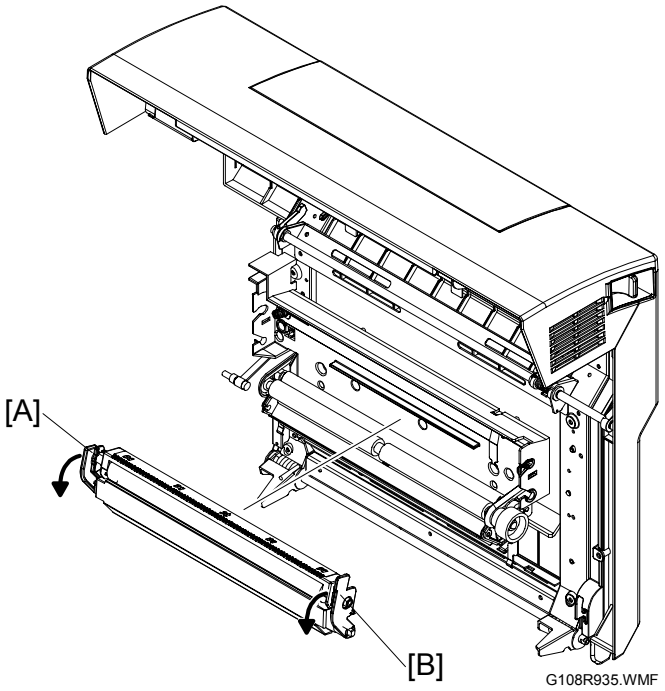
3.8 PAPER TRANSFER AND PAPER EXIT

3.8.1 TRANSFER ROLLER UNIT

1. Open the rear cover.
2. Grasp the left and right levers [A][B] and pull them frontward until the upper half of the transfer roller unit comes out.
3. Transfer roller unit

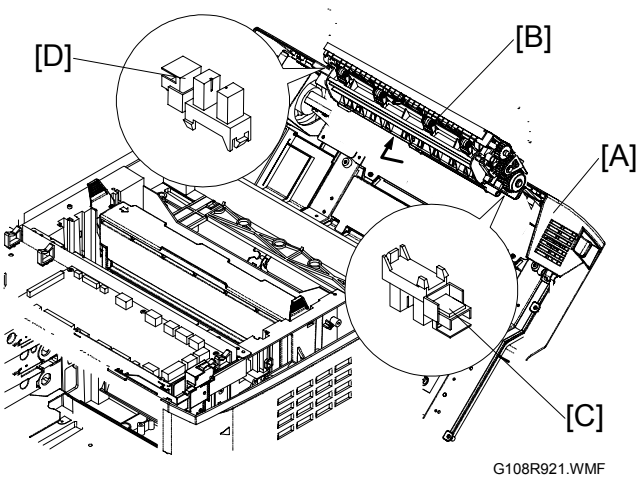
Necessary Setting

After replacing the transfer roller unit, execute SP7-905-004 (PM Parts Clear, Transfer Roller).



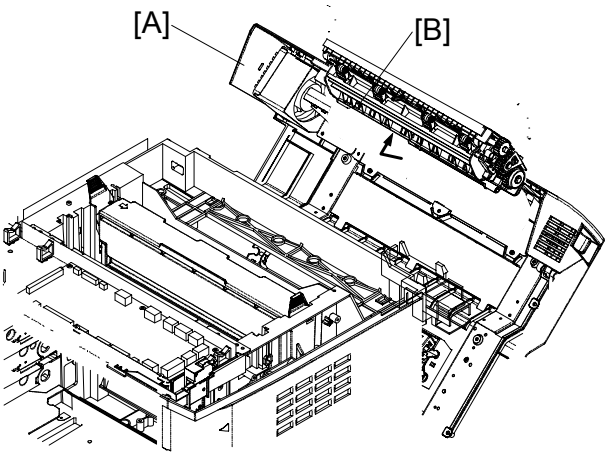
3.8.2 PAPER EXIT SENSOR AND PAPER OVERFLOW SENSOR

1. Open the rear cover [A].
2. Paper exit unit [B] (☞ x 4)
3. Paper exit sensor [C]
4. Paper overflow sensor [D]



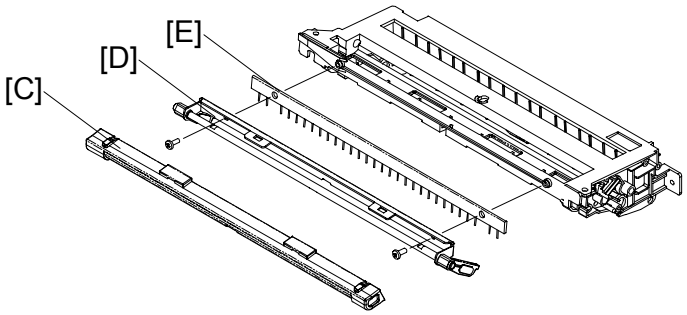
3.8.3 DISCHARGE BRUSH

1. Open the rear cover [A].
2. Paper exit unit [B] (☞ x 4)



G108R933.WMF

3. Lock shaft cover [C]
4. Lock shaft [D] (☞ x 2)
5. Discharge brush [E]



G108R934.WMF

3.9 FUSING UNIT AND FUSING LAMP

⚠CAUTION

1. Before starting the maintenance work, turn off the main power switch and unplug the machine.

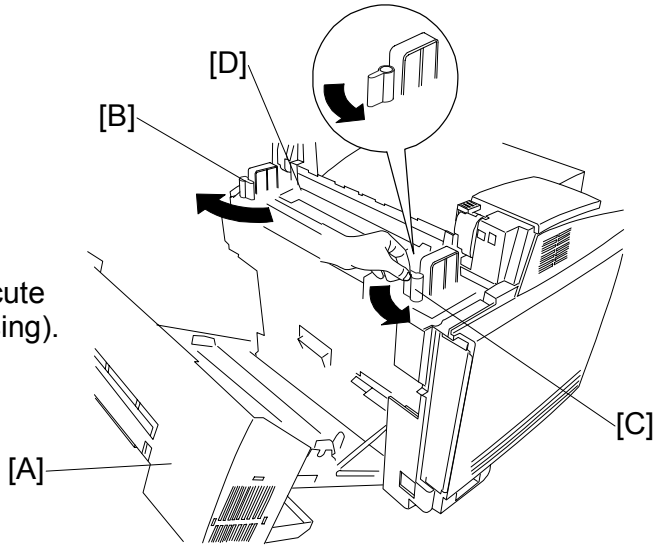
2. Use extreme caution when you touch the fusing unit. The fusing unit can be very hot.

3. Do not remove or adjust the tension bolts [Y] or the hot-roller guard [Z]. Normal operation is not guaranteed if you remove or adjust them.

1. Open the rear cover [A].
2. Release the locks [B][C].
3. Fusing unit [D]

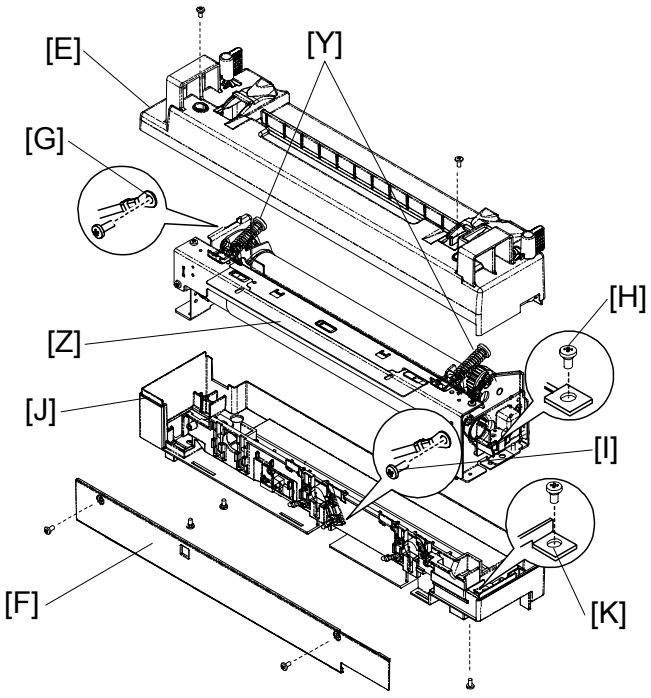
Necessary Setting

After replacing the fusing unit, execute SP7-905-002 (PM Parts Clear, Fusing).



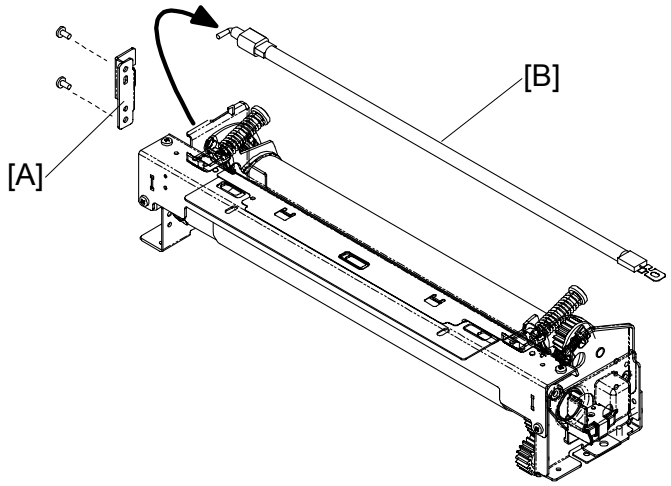
G108R941.WMF

4. Top cover [E] (🔩 x 2)
5. Front cover [F] (🔩 x 2)
6. Ground cable [G] (🔩 x 1)
7. Screw at the right end of the fusing lamp [H]
8. Screw at the terminal of the fusing lamp [I]
9. Bottom cover [J] (🔩 x 4)
   NOTE: One screw is at the right end [K]. The other three are on the bottom.



G108R942.WMF

10. Left bracket [A] (☞ x 2)
11. Fusing lamp [B]

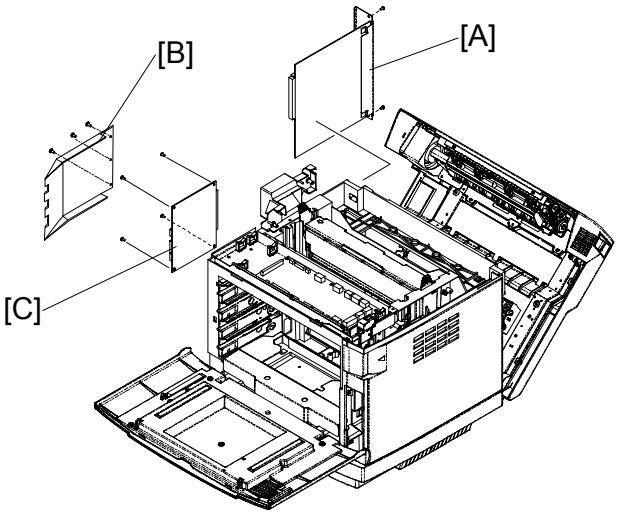


G108R943.WMF

3.10 CIRCUIT BOARD

3.10.1 CONTROLLER AND BASE ENGINE CONTROL UNIT

1. Start the SP mode.
2. Execute SP5-990-001 (SP Print Mode, All [Data List]).
3. Quit the SP mode.
4. Set the main switch off.
5. Disconnect the printer.
6. Controller [A] (☞ x 2)
7. Top cover (☛ 3.1.1)
8. Left cover (☛ 3.1.3)
9. BCU cover [B] (☞ x 3)
10. BCU [C] (Flat cable x 3, All ☜'s, ☞ x 4)



G108R906.WMF

Setting

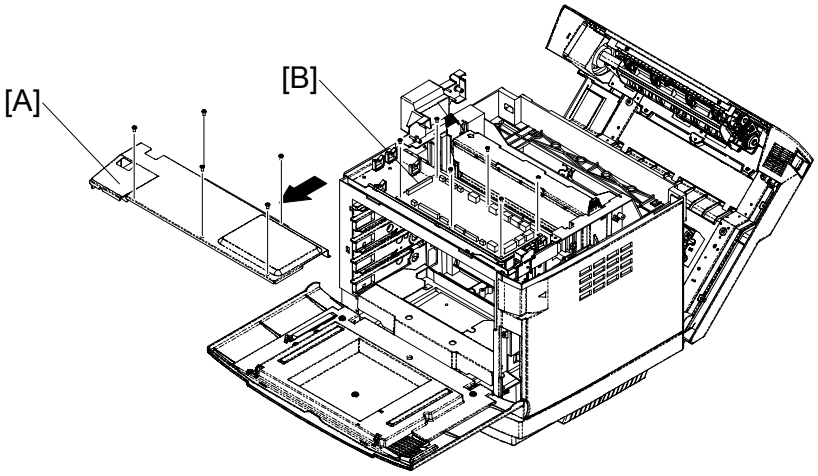
Do these when you replace the controller:

1. Remove the NVRAM from the used controller. Then install it on the new controller.
2. Execute SP5-990-001.
3. Check that the settings are not changed.

Do these when you replace the BCU:

1. Start the SP mode.
2. Put in the same settings as the SMC Report you have printed out before replacement.

3.10.2 INPUT OUTPUT DEVICE



G108R907.WMF

1. Top cover (☛ 3.1.1)
2. IOD cover [A] (🔩 x 5)
3. Input output device [B] (Flat cable x 2, All 🖐's, 🔩 x 6)

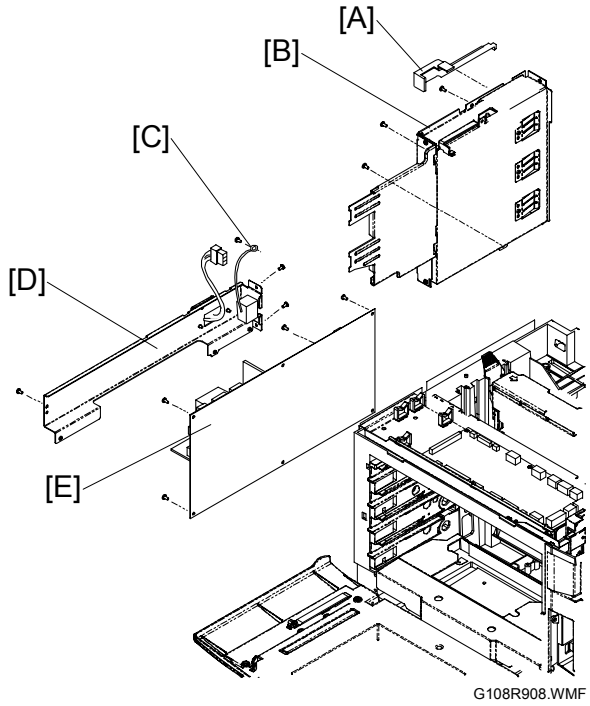
Reassembling

Make sure that the left end of the IOD cover is under the top end of the BCU cover when you reassemble.

3.10.3 DIRECT CURRENT UNIT

⚠ CAUTION

Check that you have connected the ground wire when you reassemble.

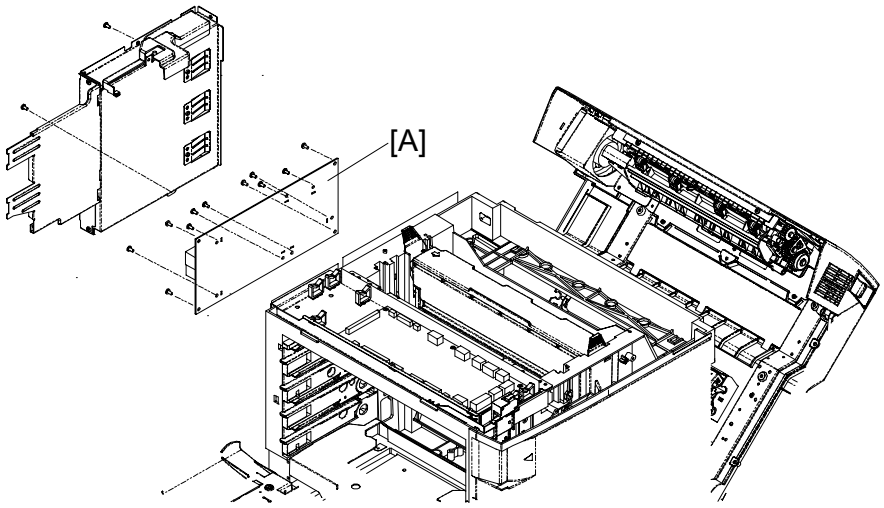


1. Top cover (☛ 3.1.1)
2. Left cover (☛ 3.1.3)
3. BCU cover (☛ 3.10.1)
4. All flat cables and 🖑's on the BCU
5. Safety-switch connector cover [A]
6. Controller box [B] (🖉 x 3)
7. Ground wire [C] (🖉 x 1)
8. Left frame [D] (🖑 x 1, 🖉 x 4)
9. Power supply unit [E] (All 🖑's, 🖉 x 7)

3.10.4 HIGH VOLTAGE UNIT

⚠WARNING

Make sure that you have disconnected the printer before you touch the high voltage unit. You can get an electrical shock if you touch the unit when the printer plug is put in.

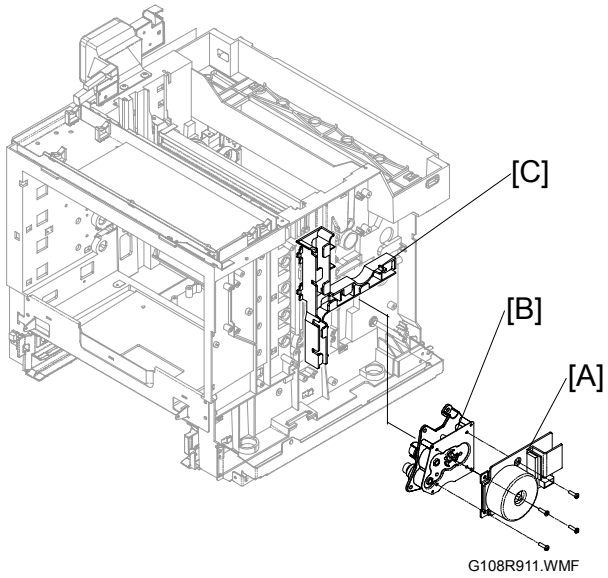


G108R909.WMF

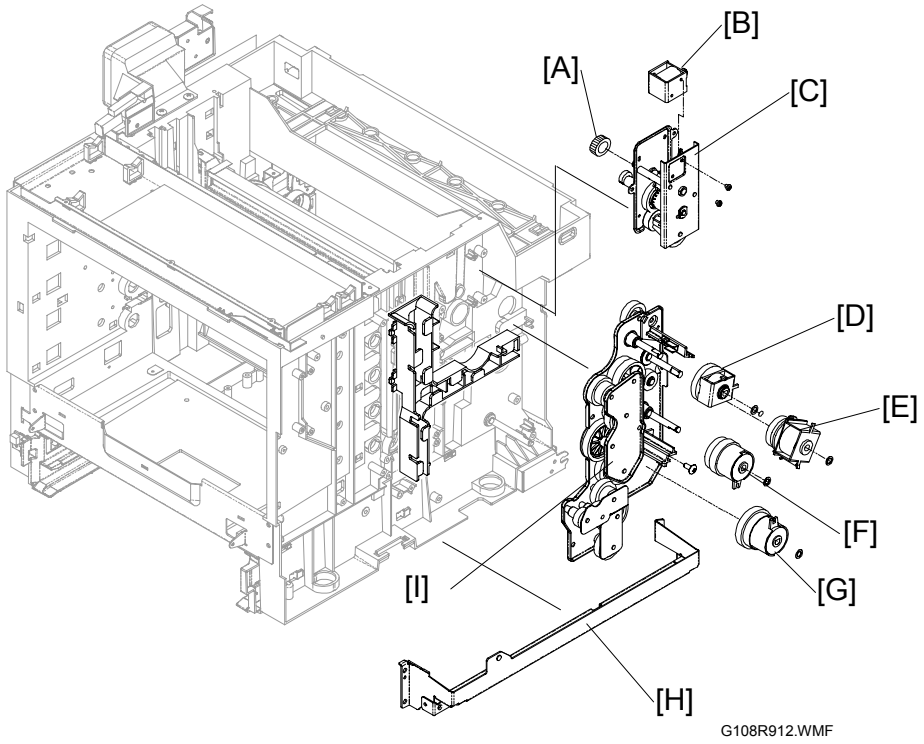
1. Controller box (☛ 3.10.3)
2. High voltage unit [A] (☞ x 7 for terminals, ☞ x 4)

3.11 DRIVE PATH

3.11.1 MAIN MOTOR DRIVE PATH

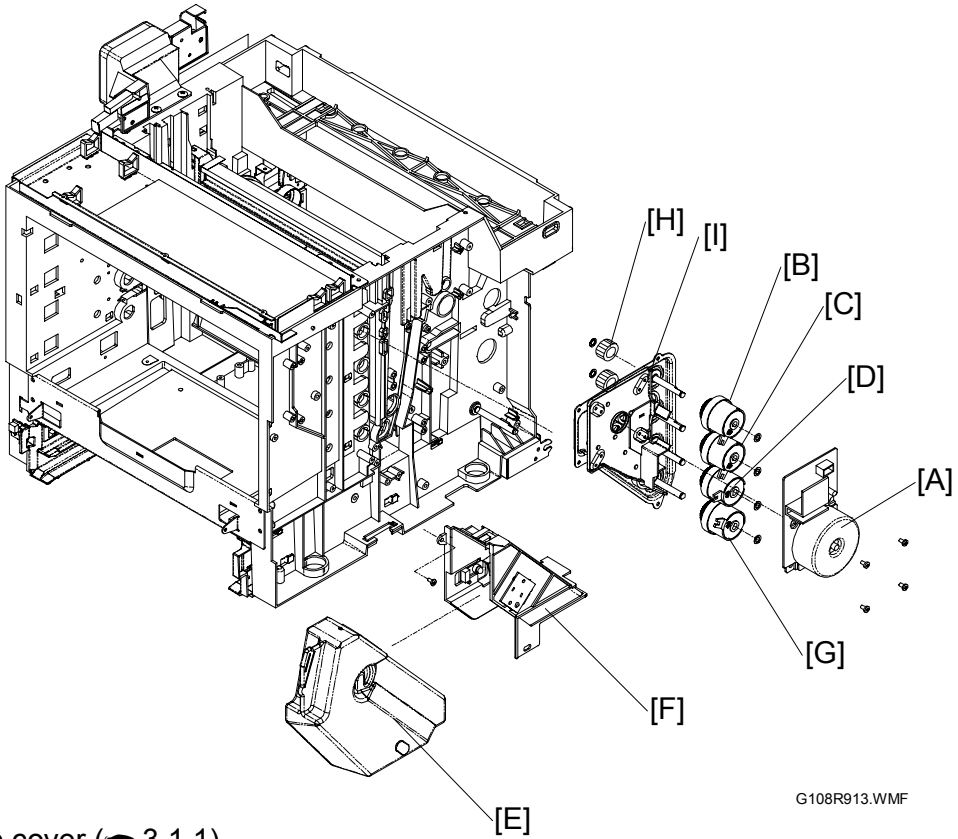


1. Top cover (☛ 3.1.1)
2. Right cover (☛ 3.1.2)
3. Main motor [A] (🔩 x 4)
4. Gear box [B] (🔩 x 4)
5. Release the cable holder [C] from the gear assemblies.



6. Cleaning unit cover (☛ 3.5.3)
7. OPC belt unit (☛ 3.3.1)
8. Drive gear (of the transfer-belt cleaning unit) [A]
9. Cleaning unit solenoid [B] (🔩 x 2) (only when you replace the solenoid)
10. Upper gear assembly [C] (🔩 x 3)
11. Fusing clutch [D] (⌀ x 1)
12. Paper transfer clutch [E] (⌀ x 1)
13. Registration clutch [F] (⌀ x 1)
14. Paper feed clutch [G] (⌀ x 1)
15. Right frame [H] (🔩 x 6)
16. Lower gear assembly [I] (🔩 x 4)

3.11.2 DEVELOPMENT MOTOR DRIVE PATH



1. Top cover (☛ 3.1.1)
2. Right cover (☛ 3.1.2)
3. Development motor [A] (x 1, x 4)
4. Development clutch K [B] (x 1)
5. Development clutch Y [C] (x 1)
6. Development clutch M [D] (x 1)
7. Waste toner bottle [E]
8. Bottle holder [F] (x 2)
9. Development clutch C [G] (x 1)
10. Development units
11. Development unit drive gears [H] (x 1)
12. Development gear assembly [I] (x 4)

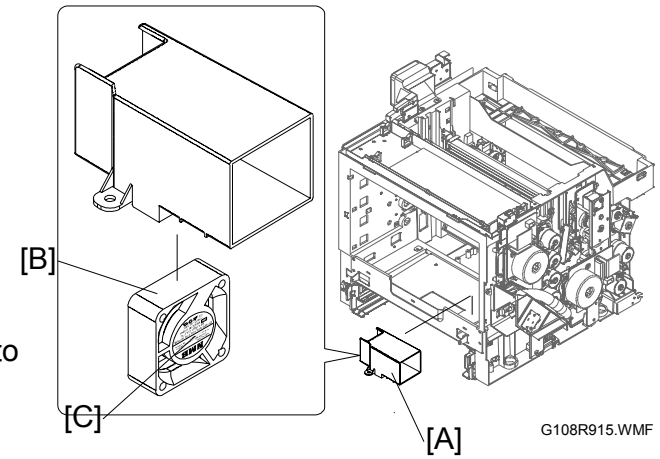
3.12 EXHAUST FAN

3.12.1 OPTICS UNIT FAN

1. Open the front cover.
2. All development units
3. Optics unit fan assembly [A] (✋ x 1, 🔩 x 1)
4. Optics unit fan [B]

Reassembling

Put the side with the fan label [C] to the right side of the printer when you reassemble.

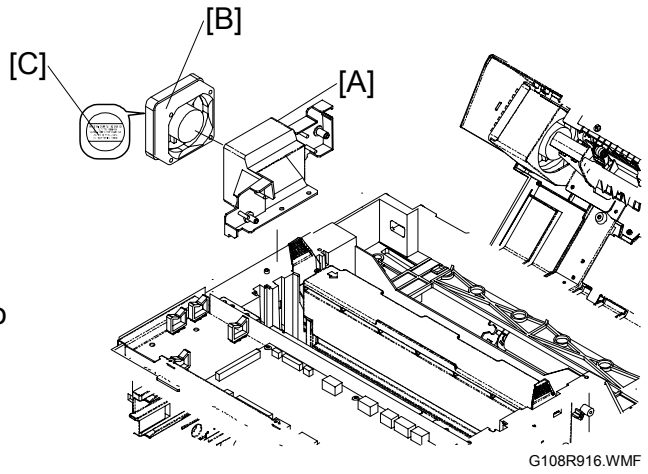


3.12.2 PSU FAN

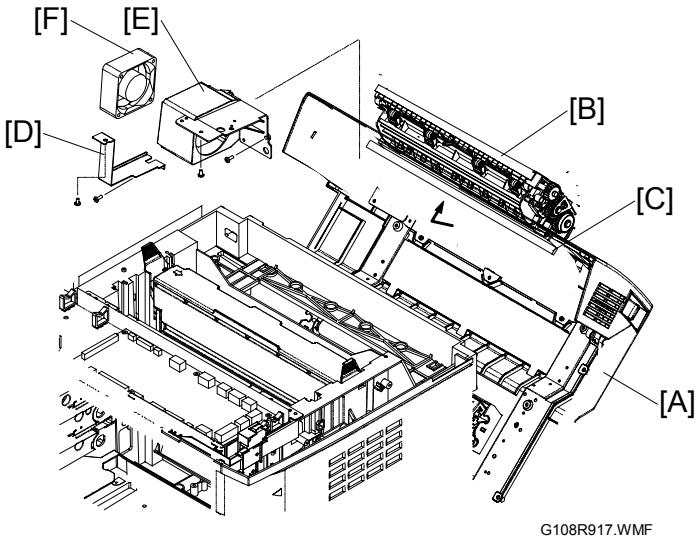
1. Top cover (☛ 3.1.1)
2. PSU fan assembly [A] (🔩 x 1)
3. PSU fan [B]

Reassembling

Put the side with the fan label [C] to the left side of the printer when you reassemble.



3.12.3 FUSING FAN

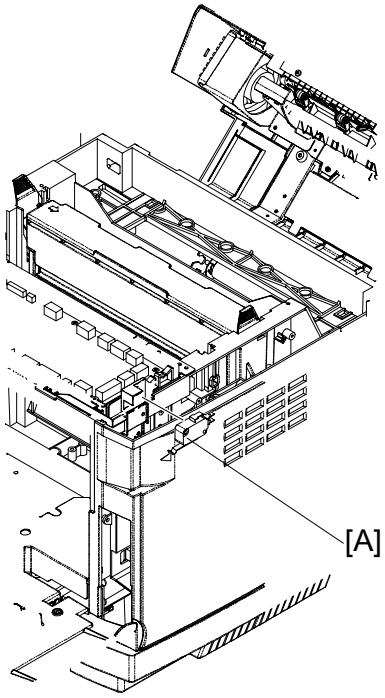


1. Open the rear cover [A].
2. Paper exit unit [B] with the base [C] (x 4)
3. Fan bracket [D] (x 2)
4. Fusing fan duct [E] (x 4)
5. Fusing fan [F] (x 1)

3.13 INTERLOCK SWITCH

3.13.1 FRONT COVER SWITCH

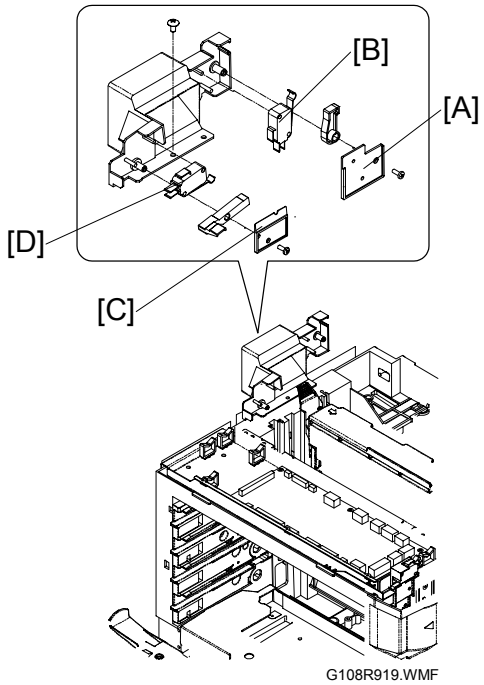
1. Top cover (☛ 3.1.1)
2. Front cover switch [A]



G108R918.WMF

3.13.2 TOP AND REAR COVER SWITCHES

1. Top cover (☛ 3.1.1)
2. Switch cover 1 [A] (🔩 x 1)
3. Rear cover switch [B]
4. Switch cover 2 [C] (🔩 x 1)
5. Top cover switch [D]



G108R919.WMF

3.14 REGISTRATION

3.14.1 LEADING EDGE REGISTRATION

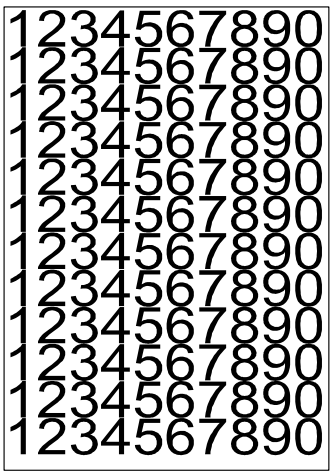
Default	±0.0 mm
Maximum	+4.9 mm
Minimum	-4.9 mm
Step	0.7 mm

Engine SP1-001 (Lead Edge Reg.) adjusts the margin on the leading edge. When you specify a greater value, the top margin becomes wider.

You can specify the values from -35 to +35. When the value increases or decreases by 5 in the SP, the margin changes by 0.7 mm. For example: ① when you specify "+5," the margin changes by +0.7 mm; ② when you specify "-10," the margin changes by -1.4 mm.

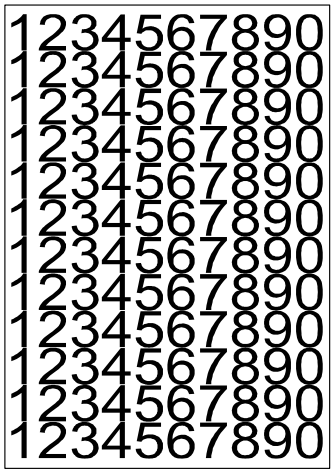
NOTE: The diagrams illustrate examples of adjustment results. Actual results may be different from these examples.

-4.9 mm



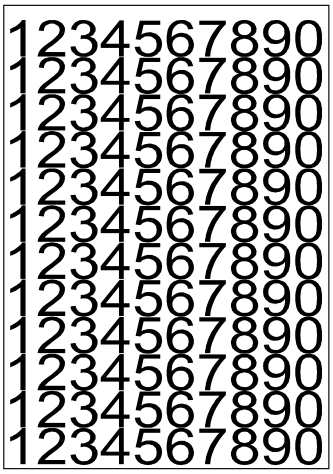
G108R951.WMF

±0.0 mm



G108R949.WMF

+4.9 mm



G108R950.WMF

3.14.2 SIDE-TO-SIDE REGISTRATION

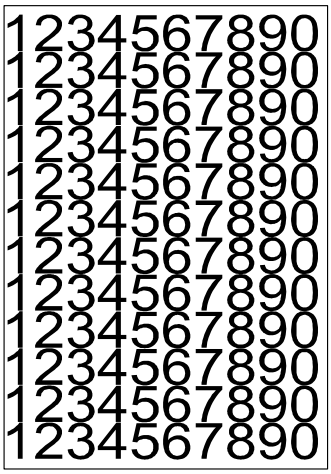
Default	±0.0 mm
Maximum	+3.5 mm
Minimum	-3.5 mm
Step	0.5 mm

Engine SP1-002 (S-to-S Reg.) adjusts the margin on the left edge. When you specify a greater value, the left margin becomes wider. Specify the value for each tray and the duplex unit:

- Engine SP1-002-001: Tray 1 (Standard paper tray)
- Engine SP1-002-002: Tray 2 (Optional paper feed unit)
- Engine SP1-002-003: Duplex (Optional duplex unit)

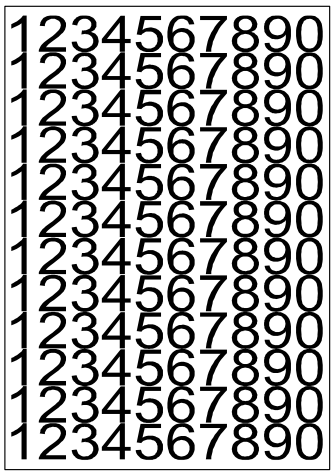
NOTE: The diagrams illustrate examples of adjustment results. Actual results may be different from these examples.

-3.5 mm



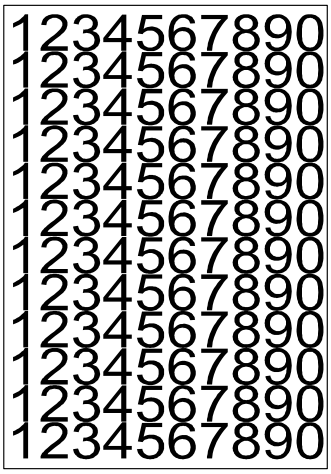
G108R952.WMF

±0.0 mm



G108R949.WMF

+3.5 mm



G108R953.WMF

4. TROUBLESHOOTING

4.1 SERVICE CALL

4.1.1 SUMMARY

There are four classes as listed in the table. Note that these classes are commonly used by multiple models. Some classes are not supported by this machine.

Class	Definition	Reset Procedure	Remarks
A	The error involves the fusing unit. The printer operation is disabled. The user cannot reset the error.	Reset the SC. Turn the main switch off and on.	Not used for this machine
B	The error involves one or some specific units. The machine operates as usual, excluding the related units.	Turn the main power switch off and on.	
C	The error is logged. The SC-code history is updated. The machine operates as usual.	The SC will not be shown. Only the SC history is updated.	
D	The machine operation is disabled. You can reset the machine by turning the main switch off and on. If the error recurs, the same SC code is shown.	Turn the main power switch off and on.	

NOTE: 1) If the problem concerns electrical circuit boards, first disconnect then reconnect the connectors before replacing the PCBs.
2) If the problem concerns a motor lock, first check the mechanical load before replacing motors or sensors.

4.1.2 SC CODE CLASSIFICATION

The table lists the classification of the SC codes that are used by several machines. Note that this machine does not support some SC codes.

Class	Section	SC Code	Detailed Section
2XX	Laser exposure	200 -	Polygon motor
		220 -	Synchronization control
		230 -	FGATE signal related
		240 -	LD control
		260 -	Magnification
		280 -	Unique for a specific model
3XX	Image development 1	300 -	Charge
		330 -	Drum potential
		350 -	Development
		380 -	Unique for a specific model
4XX	Image development 2	400 -	Image transfer
		420 -	Paper separation
		430 -	Cleaning
		440 -	Around drum
		460 -	Unit
		480 -	Unique for a specific model
5XX	Paper feed/Fusing	500 -	Paper feed
		515 -	Duplex
		520 -	Paper transport
5XX	Paper feed/Fusing	530 -	Fan motor
		540 -	Fusing
		560 -	Others
		580 -	Unique for a specific model
6XX	Communication	600 -	Electrical counters
		620 -	Mechanical counters
		630 -	Account control
		640 -	CSS
		650 -	Network
		670 -	Internal data processing
		680 -	Unique for a specific model
8XX	Controller	800 -	Error after ready condition
		820 -	Diagnostics error
		860 -	Hard disk
		880 -	Unique for a specific model
9XX	Others	900 -	Counter
		920 -	Memory
		990 -	Others

4.1.3 SC TABLE

Code	Class	Error	Possible Cause
221	D	Laser beam detection error	• Loose connection • Defective LD unit • Defective BCU
240	D	Laser power error	• Loose connection • Defective LD unit • Defective BCU
310	D	High voltage unit error	• Incorrect installation of the charge roller • Loose connection of the terminal BRV on the high voltage unit • Incorrect cable connection on the high voltage unit • Defective high voltage unit • Defective BCU
311	D	Power supply unit error	• Loose connection between the power supply unit and BCU
380	D	Development motor error	• Defective development unit • Defective gears in the drive path • Loose connection • Defective development motor • Defective input output device • Defective BCU
381	D	Y development clutch error	• Loose connection • Defective development clutch • Defective input output device • Defective BCU
382		M development clutch error	
383		C development clutch error	
384		K development clutch error	
385	D	Y development solenoid error	• Loose connection • Incorrect installation of the front cover • Defective input output device • Defective BCU
386		M development solenoid error	
387		C development solenoid error	
388		K development solenoid error	
440	D	Transfer belt sensor error	• Incorrect installation of the transfer belt unit • Loose connection • Defective transfer belt sensor • Defective input output device • Defective BCU
441	D	Transfer belt cleaning unit solenoid error	• Loose connection • Defective solenoid • Defective input output device • Defective BCU
442	D	Fusing lamp error	• Loose connection • Defective fusing lamp • Defective power supply unit • Defective BCU
481	D	OPC belt sensor error	• Defective OPC belt unit • Dirty OPC belt • Loose connection • Defective OPC belt sensor • Defective input output device • Defective BCU

Code	Class	Error	Possible Cause
490	D	Transfer roller clutch error	• Loose connection • Defective solenoid • Defective input output device • Defective BCU
515	D	Duplex unit controller hardware error 1	• Loose connection between the BCU and the duplex unit controller board
516	D	Duplex unit controller hardware error 2	• Loose connection between the BCU and the duplex unit controller board
517	D	Duplex motor error	• One of the fuses on the duplex unit controller has blown. **NOTE:** The fuses prevent excess electricity from flowing into the motors.
520	D	Main motor error	• Loose connection • Defective motor • Defective input output device
521	D	Paper gate solenoid error	• Loose connection • Defective solenoid • Defective duplex-unit controller
530	D	Controller fan error	• Loose connection • Defective fan • Defective input output device • Defective BCU
531	D	Optics unit fan error	
532	D	Fusing fan error	
540	D	Scanner motor error	• Loose connection • Defective LD unit • Defective BCU
541	D	Thermistor short-circuit error	• Loose connection • Incorrect installation of the fusing unit • Defective fusing unit • Defective BCU
542	D	Fusing lamp error	• Loose connection • Defective thermistor • Defective fusing unit • Defective power supply unit • Defective BCU • Insufficient power supply
543		Fusing temperature error during warming up	
544		Fusing temperature error during on	
545		Fusing temperature error during off	
546		AC relay off error	
547	D	Fusing clutch error	• Loose connection • Defective clutch • Defective input output device • Defective BCU
610	D	High voltage unit connection error	• Loose connection • Defective high voltage unit • Defective BCU
611	D	Toner end sensor error 1	• Loose connection of the emitter of the toner end sensor • Defective PCB of the receptor of the toner end sensor • Defective input output device • Defective PCB of the emitter of the toner end sensor • Defective BCU
612		Toner end sensor error 2	

Code	Class	Error	Possible Cause
622	D	Optional paper feed unit error	• Loose connection between the IOD and the optional paper feed unit
623	D	Duplex unit communication error 1	• Loose connection • Defective circuit in the duplex unit • Defective BCU
624		Duplex unit communication error 2	
660	D	NVRAM error	• Defective BCU
670	D	BCU error	• Loose connection • Defective controller • Defective BCU
680	D	BCU error	• Defective BCU
681	D	Process timing error	• Loose connection • Defective main motor • Defective input output device
818	D	Watch-dog error	• Defective controller • Software error
819	D	Fatal error	
[696E]		Process error	• Defective RAM DIMM • Defective ROM DIMM • Defective controller • Software error
[766D]		Memory error	• Defective RAM DIMM • Defective ROM DIMM • Defective controller • Software error
820	D	Self-diagnostics error: CPU	
[0001] to [06FF]		CPU error	• System firmware problem • Defective controller
[0702] [0709] [070A]		CPU/Memory Error	• System firmware problem • Defective RAM-DIMM • Defective controller
[0801] to [4005]		CPU error	• System firmware problem • Defective controller
821	D	Self-diagnosis error: ASIC	• System firmware problem • Defective RAM-DIMM • Defective controller
822	B	Self-diagnostic error: HDD (Hard Disk Drive)	
[3003]		Timeout error	• Loose connection • Defective HDD • Defective controller
[3004]		Command error	• Loose connection • Defective HDD • Defective controller
823	B	Self-diagnostic error: NIB	
[6101]		MAC address check sum error	• Defective controller
[6104]		PHY IC error	• Defective controller
[6105]		PHY IC loop-back error	• Defective controller

Code	Class	Error	Possible Cause
824	D	Self-diagnosis error: Standard NVRAM	• Loose connection • Defective standard NVRAM • Defective controller
827	D	Self-diagnostic error: Standard SRAM DIMM	
[0201]		Verification error	• Loose connection • Defective SRAM DIMM • Defective controller
828	D	Self-diagnostic error : ROM	
[0101]		Check sum error 1	• Defective ROM DIMM • Defective controller
[0104]		Check sum error 2	• Defective ROM DIMM • Defective controller
829	B	Self-diagnosis error: optional RAM	
[0302]		Composition error (Slot 0)	• Not specified RAM DIMM installed • Defective RAM DIMM
[0401]		Verification error (Slot 1)	• Not specified RAM DIMM installed • Defective RAM DIMM
[0402]		Composition error (Slot 1)	• Not specified RAM DIMM installed • Defective RAM DIMM
838	D	Self-diagnosis error: Clock generator	• Defective clock generator • Defective I2C bus • Defective CPU
850	B	Network interface error	• Defective controller
851	B	IEEE1394 interface error	• Defective IEEE1394 • Defective controller.
853	B	Wireless LAN card not detected	• Loose connection
854	B	Wireless LAN card not detected	• Loose connection
855	B	Wireless LAN card error	• Loose connection • Defective wireless LAN card
856	B	Wireless LAN card error	• Defective wireless LAN board • Loose connection
857	B	USB interface error	• Defective USB driver • Loose connection
860	B	HDD: Initialization error	• HDD not initialized • Defective HDD
861	D	HDD: Reboot error	• Loose connection • Defective cables • Defective HDD • Defective controller
863	D	HDD: Read error	• Defective HDD • Defective controller
864	D	HDD: CRC error	• Defective HDD
865	D	HDD: Access error	• Defective HDD
866	B	SD card authentication error	• Corrupted SD card data • Defective SD card
867	D	SD card error	• Loose connection • Defective SD card
868	D	SD card access error	• Defective SD card • Defective SD card controller

Code	Class	Error	Possible Cause
870	B	Address book error	• Defective software • Corrupted address book • Incorrect address book
900	D	Electric counter error	• Defective NVRAM • Defective controller
920	B	Printer function error	• Defective software
921	B	Printer font error	• Font file not found
990	D	Software error 1	• Defective software • Defective controller • Software error
991	C	Software error 2	• Defective software
992	D	Unexpected SC	• Software error
998	D	Application start error	• Loose connection of RAM-DIMM, ROM-DIMM • Defective controller • Software problem

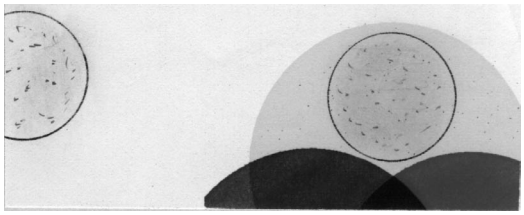
4.2 IMAGE QUALITY

This section illustrates some examples of image quality troubles.

4.2.1 BACKGROUND

Symptom

The background is smeared.



G108T901.TIF

Possible Cause

1) Too small charge quantity in the development procedure.
2) Not sufficient contact of the development roller's bias pole.
3) Life or failure of the transfer belt unit.
4) Failure of the high voltage unit.

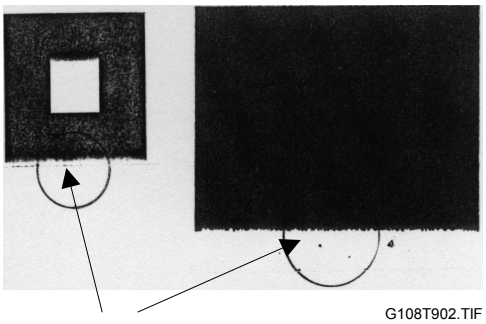
Countermeasures

1) Replace the development unit.
2) Check that the developer bias pole is not damaged.
3) Replace the transfer belt unit.
4) Replace the high voltage unit.

4.2.2 MISSING IMAGE AT EDGE

Symptom

There are some missing areas at the edges of toner images.



G108T902.TIF

Possible Cause

1) Not sufficient toner mass amount and/or charge amount in the development procedure.
2) The OPC belt is damaged.

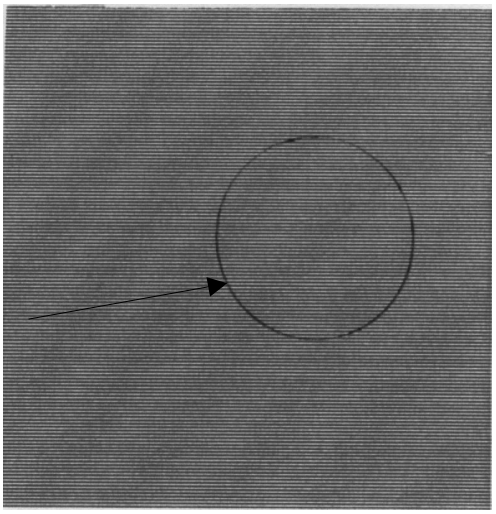
Countermeasures

1) Replace the development unit.
2) Replace the OPC belt unit.

4.2.3 JITTER

Symptom

The image density changes at times and horizontal lines appear.



G108T903.TIF

Possible Cause

1) Failure of main motor.
   a) Irregular rotation of the main motor.
   b) Failure in the OPC belt drive path.
   c) Changes of OPC belt run speed due to above reasons.
2) Failure of the OPC belt unit.
3) Failure of the gearbox.
4) Failure in the development unit drive path.

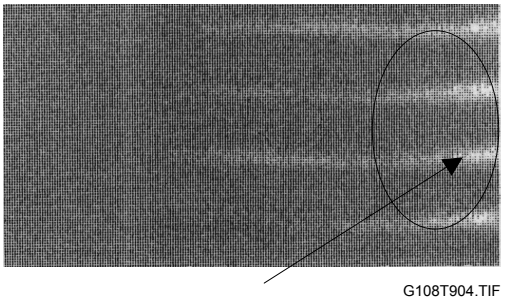
Countermeasures

1) Replace the gears on the OPC belt drive path.
2) Replace the OPC belt unit.
3) Replace the gearbox.
4) Replace the gears in the development unit drive path.

4.2.4 RIBBING

Symptom

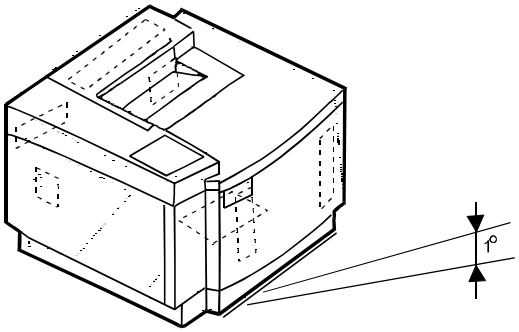
The image is weak on the right or left side.



G108T904.TIF

Possible Cause

1) Small tilt on the surface where the printer is installed (tilt should be less than 1 degree).
2) Toner amount in the development unit is not sufficient.
3) The development unit is not level (the toner in the unit is on one side only).
4) The rear cover is not correctly closed.
5) The OPC belt is off the track and damaged.
6) Retraction of the development unit.



G108T900.WMF

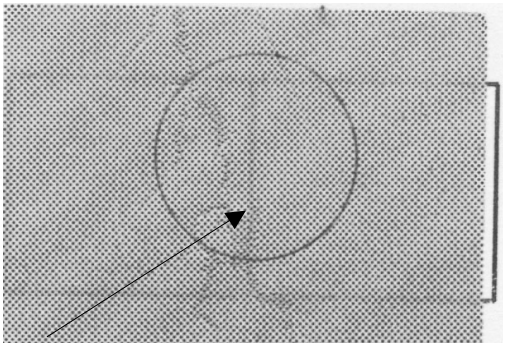
Countermeasures

1) Check that the printer is installed on a level surface.
2) Shake the toner cartridge horizontally several times.
3) Replace the development unit.
4) Close the rear cover correctly.
5) Replace the OPC belt unit.
6) Replace the development solenoid

4.2.5 WRINKLE/IMAGE MIGRATION

Symptom

The image density changes and band-like shadows appear because of wrinkled paper, image migration, and/or incorrect color registration.



G108T905.TIF

Possible Cause

1) Paper in use is wrinkled or not a recommended type.
2) The rear cover is not locked correctly.
3) The fusing unit is damaged.
4) One side of the fusing unit is not in position when the unit is installed.

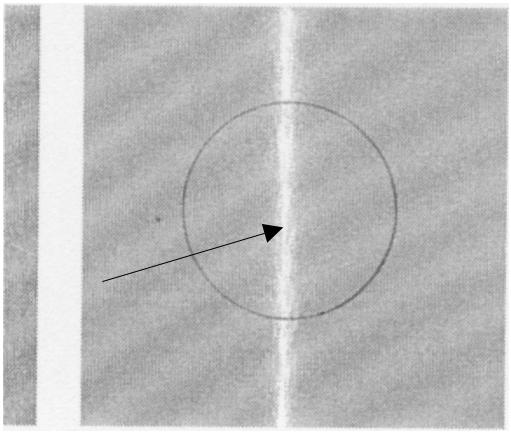
Countermeasures

1) Use a recommended paper type or new paper.
2) Push the rear cover and make sure it is locked on both sides.
3) Check that the fusing unit is installed correctly and attached with the lock levers on both sides.
4) Replace the fusing unit.

4.2.6 WHITE LINE 1

Symptom

A vertical white line appears in a specified color area on a test print in the four-color mode (Stripe Mode).



G108T906.TIF

Possible Cause

1) Unwanted particles bond to the development roller of the color in question.
2) The development roller's surface is damaged.

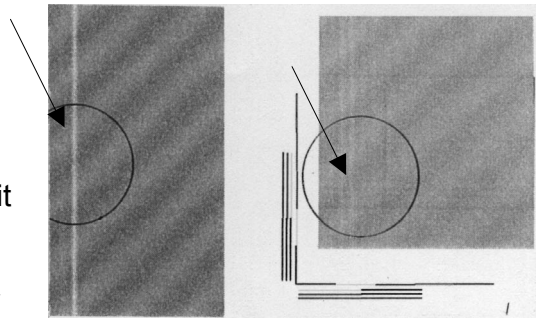
Countermeasures

1) Execute the test print.
2) Isolate the development unit that causes the white line.
3) Remove the unwanted particles from the development roller.

4.2.7 WHITE LINE 2

Symptom

A vertical white line appears from the leading edge to the trailing edge.



G108T907.TIF

Possible Cause

1) The dustproof glass on the optics unit is smeared with toner or unwanted particles.
2) Unwanted particles bond to the laser beam path.
3) There are unwanted particles mixed in the development unit.

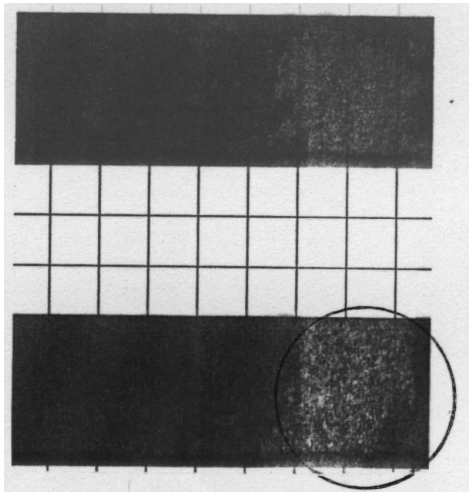
Countermeasures

1) Clean the dustproof glass.
   a) Remove the OPC belt unit and the development unit.
   b) Open the optics unit cover.
   c) Clean the dust-shield glass.
2) Check and clean the laser beam path.
3) Replace the development unit.

4.2.8 VERTICAL WHITE BAND

Symptom

A vertical white band appears.



G108T908.TIF

Possible Cause

1) Doctor blade failure in the development unit.
2) Stain on the OPC belt charge roller.
3) Stain on the OPC belt.
4) Stain on the transfer belt.

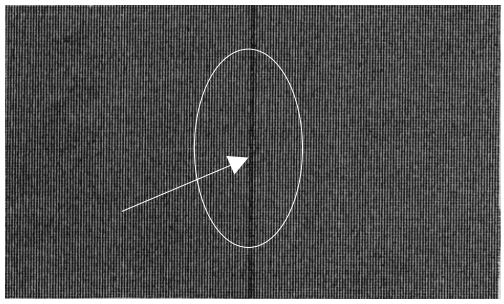
Countermeasures

1) Replace the development unit.
2) Replace the OPC belt unit.
3) Replace the transfer belt unit.

4.2.9 BLACK LINE

Symptom

A fine black line appears.



G108T909.TIF

Possible Cause

1) The doctor blade in the development unit is damaged.
2) The OPC belt surface is damaged.
3) Unwanted particles (paper dust, etc.) stay in between the cleaning blade and the OPC belt.
4) Unwanted particles bond to the perimeter parts of the OPC belt and the transfer belt. Then they contact the toner image formed on the belt.

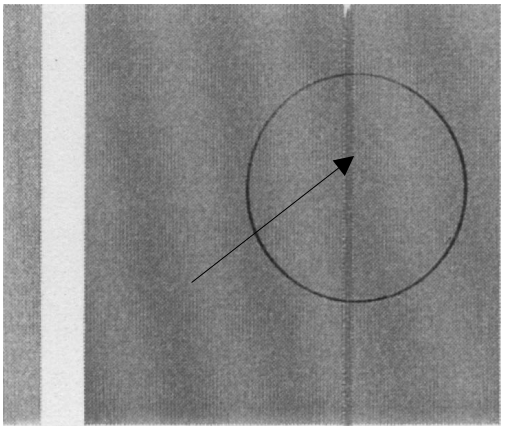
Countermeasures

1) Replace the development unit.
2) Replace the OPC belt unit.
3) Clean the perimeter of the mounting area of the OPC belt and the transfer belt.

4.2.10 VERTICAL LINE

Symptom

A vertical line appears.



G108T910.TIF

Possible Cause

1) Unwanted particles (dust, etc.) bond to the parts near the OPC belt and the transfer belt. Then they contact the toner image formed on the belt surface.

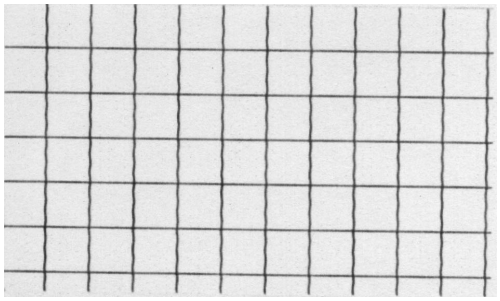
Countermeasures

1) Clean the stain on the OPC belt unit.
2) Clean the stain on the transfer belt.
3) Remove the transfer unit cleaning unit. Then clean the inside and outside of the waste toner feeder.

4.2.11 VERTICAL STAGGERING IMAGE

Symptom

Some images make wavy lines.



G108T911.TIF

Possible Cause

1) Shock or vibration is given to the printer.
2) Failure of the LD unit (vibration from the rotation of the scanner motor).

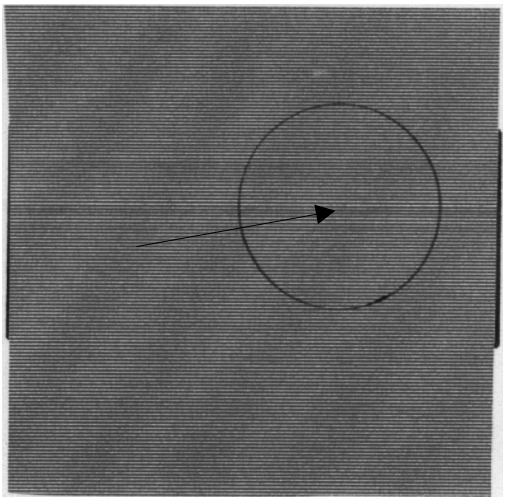
Countermeasures

1) Do not apply shock or vibration to the printer body.
2) Replace the LD unit.

4.2.12 BANDING

Symptom

A horizontal band-like line appears.



G108T912.TIF

Possible Cause

1) This is a transfer failure because of the uneven rotational speed caused by the shock that occurs when the seam of OPC belt passes over the cleaning blade.
2) The OPC belt and the transfer belt fail to maintain the regular and proper rotation due to the impact caused during the retraction of the toner cartridge.

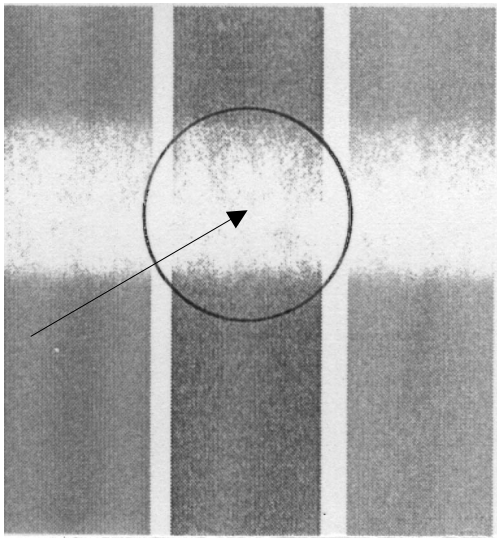
Countermeasures

1) Replace the OPC belt unit.
2) Replace the development unit.

4.2.13 WHITE BAND

Symptom

A horizontal white band appears.



G108T913.TIF

Possible Cause

1) Deformation of the transfer roller.
2) Contact failure of the transfer roller's bias terminal.
3) Failure of the paper transfer clutch.

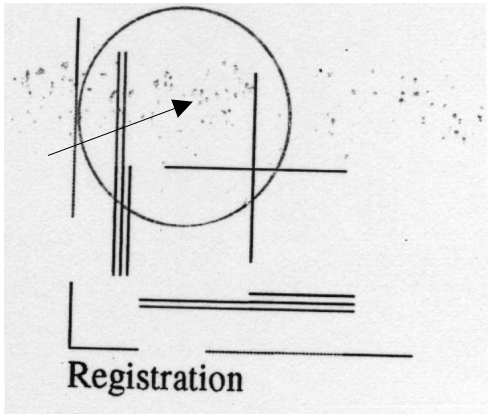
Countermeasures

1) Replace the transfer roller unit.
2) Check the transfer roller's bias terminal.
3) Check the paper transfer clutch and cam structure.

4.2.14 TONER DROP

Symptom

Irregular dot images appear.



G108T914.TIF

Possible Cause

1) Toner drops on the transfer belt because of the failure of the waste toner auger.
   a) Mylar of the waste toner auger is damaged.
   b) Waste toner is not correctly collected by the waste toner auger.
2) Toner adhering to the development roller drops on the OPC belt.

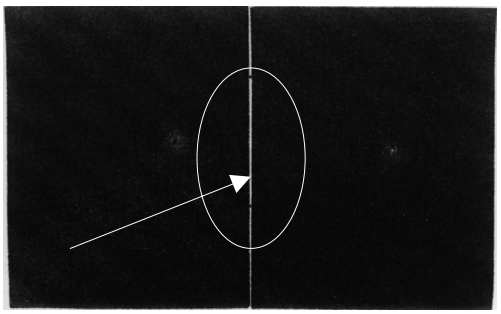
Countermeasures

1) Check the cleaning brush and the waste toner path.
   a) Clean the perimeter of the transfer-belt cleaning unit.
   b) Check the seal on the transfer-belt cleaning unit. Replace the transfer-belt cleaning unit if necessary.
   c) Check the waste toner path. If waste toner stays, remove it with a vacuum cleaner.
2) Clean or replace the development unit.

4.2.15 WHITE SPOT / BLACK SPOT

Symptom

A white spot or a black spot appears.



G108T915.TIF

Possible Cause

1) Unwanted particles bond to the OPC belt or the transfer belt.
2) The OPC belt or the transfer belt is damaged.
3) Unwanted particles are mixed in the toner.
4) Unwanted particles bond to the transfer roller, or partial deformation of the transfer roller.

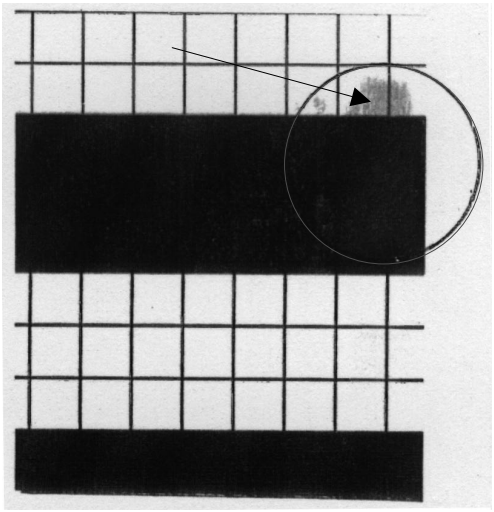
Countermeasures

1) Clean or replace the OPC belt unit.
2) Clean or replace the transfer roller unit. Replace the rear cover if necessary.
3) Replace the development unit.
4) Replace the transfer roller unit.

4.2.16 MIXED COLOR IMAGE

Symptom

A mixed color image appears.



G108T916.TIF

Possible Cause

1) Retraction error of the development unit.
2) Retraction error of the transfer roller.
3) Retraction error of the transfer-belt cleaning unit.

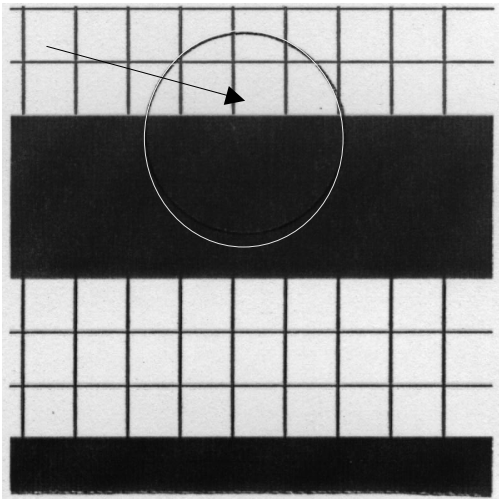
Countermeasures

1) Check where the mixed color image is caused.
   a) If it is on the OPC belt, the cause is the retract error of the toner cartridge.
   b) If it is on the transfer belt, the cause is the retract error of the transfer belt or cleaning roller.
2) Replace the spring clutch or the development solenoid.
3) Replace the transfer roller clutch.
4) Replace the transfer-belt cleaning solenoid.

4.2.17 INCORRECT COLOR REGISTRATION

Symptom

Incorrect color registration is seen between the two colors.



G108T917.TIF

Possible Cause

1) OPC belt error.
2) The OPC belt fails to keep the regular and correct rotation because of the impact caused when the toner cartridge contacts the OPC belt.
3) Transfer belt error.
4) The transfer belt fails to keep the regular and correct rotation because of the impact caused when the transfer roller contacts the transfer belt.

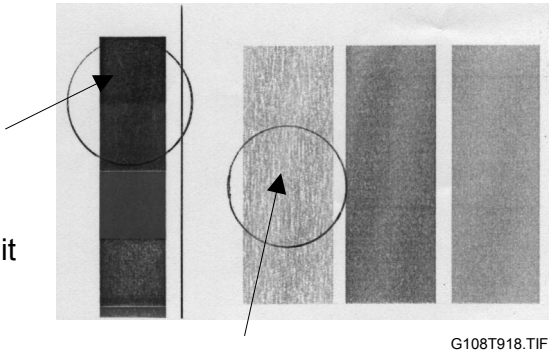
Countermeasures

1) Check that the transfer roller unit is correctly installed.
2) Check that the transfer-belt cleaning unit is correctly installed.
3) Replace the OPC belt unit.
4) Replace the transfer belt unit.

4.2.18 MOTTLING

Symptom

The image density varies.



G108T918.TIF

Possible Cause

1) The rear cover is not in place.
2) The transfer roller is incorrectly installed.
3) The THV output of Power supply unit is not correct.
4) Failure in the development unit.
5) Damage of the print paper.

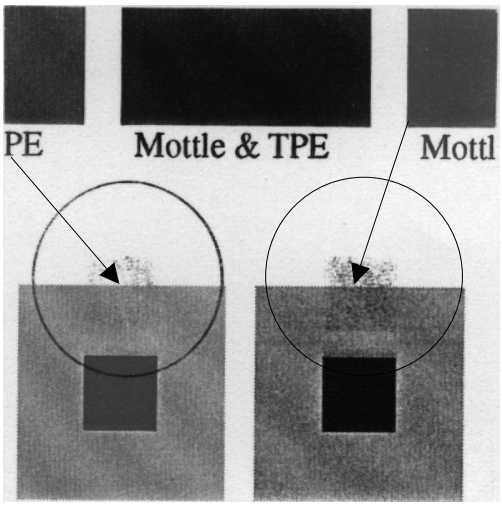
Countermeasures

1) Check that the rear cover is correctly locked.
2) Replace the papers with new papers.
3) Replace the development unit.
4) Check that the transfer roller unit is correctly installed.
5) Replace the high voltage unit.

4.2.19 RESIDUAL IMAGE

Symptom

Part of the image on the previous page appears.



G108T919.TIF

Possible Cause

1) The transfer-belt cleaning unit is lifted at incorrect intervals.
2) Contact failure of the cleaning unit's bias terminal.
3) Failure of the high voltage unit.

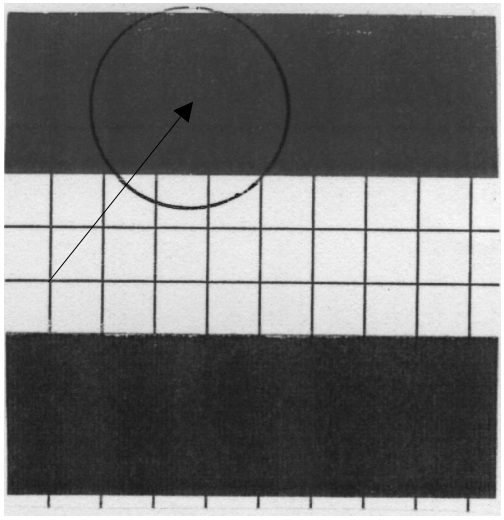
Countermeasures

1) Check that the transfer-belt cleaning unit is correctly installed.
2) Replace the high voltage unit.

4.2.20 INSUFFICIENT GLOSS

Symptom

Part of the image is not glossy enough.



G108T920.TIF

Possible Cause

1) The hot roller or the pressure unit in the fusing unit is damaged.
2) The fusing temperature is not correctly controlled.
3) The paper type is not set correctly.

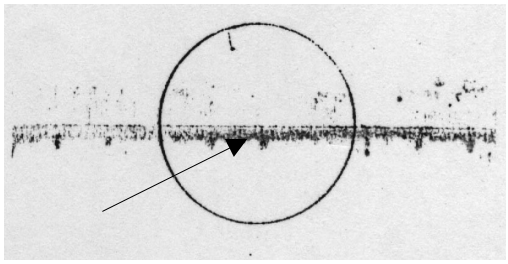
Countermeasures

1) Replace the fusing unit.
2) Check the mode setting of the paper.

4.2.21 BACK STAIN

Symptom

The backside of the paper is stained.



G108T921.TIF

Possible Cause

1) Fuser Unit:
   a) The hot roller and the pressure unit are stained. (The paper is output immediately after a paper jam has occurred.)
   b) The fusing temperature is not correct.
   c) The hot roller and the pressure unit are damaged
2) The transfer roller is stained.

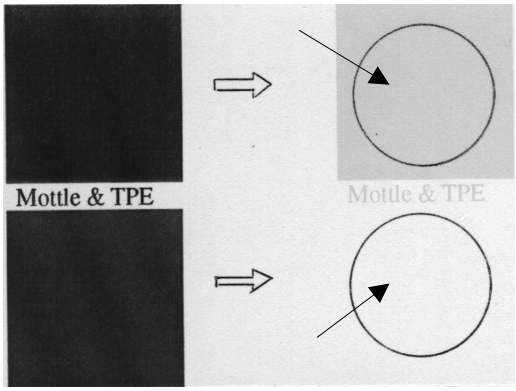
Countermeasures

1) Clean the hot roller by printing a couple of pages.
2) Replace the fusing unit.
3) Replace the transfer roller unit.

4.2.22 WHITE PRINT

Symptom

A blank page is output or a specified color is missing.



G108T922.TIF

Possible Cause

1) The paper stops the laser beam path.
2) The development unit is not in its position.
3) The bias voltage of the transfer roller is not sufficient (loose connection).

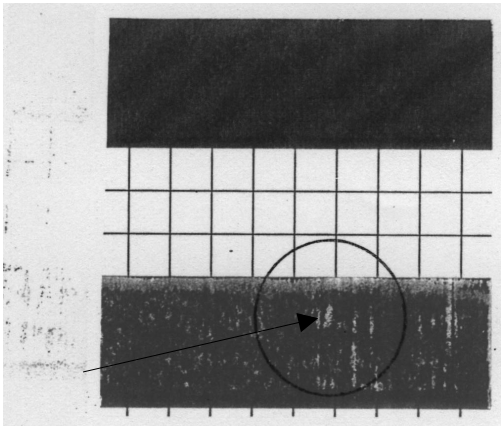
Countermeasures

1) Check the laser beam path and remove unwanted particles.
2) Replace the development unit.
3) Check the development solenoid.
4) Check the transfer roller unit is correctly installed.
5) Replace the high voltage unit.

4.2.23 INSUFFICIENT FUSING

Symptom

Parts of the image printed images are partially missing.



G108T923.TIF

Possible Cause

1) The tension lever on the fusing unit is not locked.
2) Inappropriate paper is used.

Countermeasures

1) Check that the tension lever is locked.
2) Check that paper type settings are correct.
3) Use the recommended paper.
4) Replace the defective fusing unit.

4.2.24 UNEVEN DENSITY BETWEEN LEFT AND RIGHT SIDES

Symptom

The image density on one side of the paper is different from the image density on the other side.

Possible Cause

1) The quantity of toner in the development unit is not sufficient.
2) The retraction mechanism of the development unit does not operate correctly.
3) The doctor blade in the development unit is damaged.
4) The transfer belt is damaged.
5) The transfer roller unit is not correctly installed.
6) The rear cover is damaged.
7) The rear cover is not correctly locked.
8) The dustproof glass of the optics unit is stained.

Countermeasures

1) Replace the development unit.
2) Check the spring clutch.
3) Replace the OPC belt unit.
4) Check that the transfer roller unit is correctly installed.
5) Replace the transfer roller unit.
6) Check that the rear cover is correctly locked.
7) Replace the) rear cover.
8) Clean the dustproof glass of the optics unit.
9) Replace the optics unit.

4.2.25 UNEVEN DENSITY AMONG DIFFERENT PAGES

Symptom

The image density is not the same for each page, or it changes suddenly.

Possible Cause

1) The cable of the ID sensor is disconnected.
2) The ID sensor is stained.
3) The cleaning mechanism of the ID sensor is broken.
4) The ID sensor does not work.

Countermeasures

1) Check that the massage "TMAs" is displayed. This message is displayed when the ID sensor fails.
2) If you see the message, check these components:
   - The ID sensor cable
   - The ID sensor
   - The cleaning mechanism of the ID sensor

NOTE: The printer operates even when the message "TMAs" is displayed. In a condition like this, the image density on the outputs can be incorrect.

4.3 ELECTRICAL COMPONENT

4.3.1 SENSORS

Reflective Photo Sensors

Sensor	Connector	Condition	Symptom
ID	TACN	Abnormal	Image quality may deteriorate.
OPC belt	DCN5	Abnormal	• SC481 • The message "Reset PCU Correctly" is displayed.
Waste toner	DCN10	Abnormal	• The waste toner bottle or the waste toner is not detected. • The message "Waste Toner is Almost Full" or "Check Waste Toner Bottle" is displayed.
Toner end	DCN15	Abnormal	• SC611 • SC612
Transfer belt	DCN16	Abnormal	• The message "Reset PCU Correctly" is displayed.
OHP	DCN16	Abnormal	• OHP sheets are not detected. • The paper types other than OHP sheets are not detected

NOTE: Connector TACN is on the BCU. The other connectors are on the I/O device.

Photo Sensors

Sensor	Connector	Condition	Symptom
Development unit	DCN2	Interrupted	The message "Check Toner Crtg xxxxx" is displayed, where xxxxx indicates a color.
		Not interrupted	The message "Add Toner xxxxx" is displayed, where xxxxx indicates a color.
Paper exit	DCN7	Interrupted	The paper stops in the paper exit unit and the message "Remove Misfeed Internal Path" is displayed.
		Not interrupted	The message "Remove Misfeed Internal Path" is displayed while no paper is in the path.
Registration	DCN16	Interrupted	The message "Remove Misfeed Paper Tray" is displayed.
		Not interrupted	The massage "Remove Misfeed Internal Path" is displayed.
Paper end	DCN16	Interrupted	The message "Load Paper: Tray 1 or Form Feed" is displayed while the paper is in the tray.
		Not interrupted	The message is not displayed while no paper is in the tray.
Paper size/tray	DCN19	Interrupted	The message "Remove Misfeed Paper Tray" is displayed.
		Not interrupted	The message "Load Paper: Tray 1 or Form Feed" is displayed.

NOTE: The connectors are on the I/O device.

4.3.2 BLOWN FUSE CONDITION

The table lists the fuses on the power supply unit.

Fuse	Rating		Symptom
	115V	220–240V	
F001	20A/250V	20A/250V	No response
F002	6.3A/125V	6.3A/125V	No response

4.3.3 LED

Operation Panel

LED	Lights
Yellow LED	• One of the toner cartridges is almost empty (☛ 6.5.6). • The waste toner bottle is almost full (☛ 6.6.4).
Red LED	• One of the toner cartridges is empty (☛ 6.5.6). • The waste toner bottle is full (☛ 6.6.4).

Controller

LED	Blinks	Stays on/off
LED 1	Error	Error
LED 2	Normal	Error

BCU

The BCU has no LED.

4.4 DUPLEX UNIT

For the information on problems that may occur with the optional duplex unit, see the service manual of the optional duplex unit (G390).

5. SERVICE TABLES

5.1 SERVICE PROGRAM MODE

⚠CAUTION

Before you go into the service program mode, check that the printer is not processing any data. The data in LED (📥) is set off when the machine does not process data.

5.1.1 OPERATING SERVICE PROGRAM MODE

⚠IMPORTANT

Do not let the user go into the service program mode. Normal operation is not guaranteed if the user goes into the service program mode.

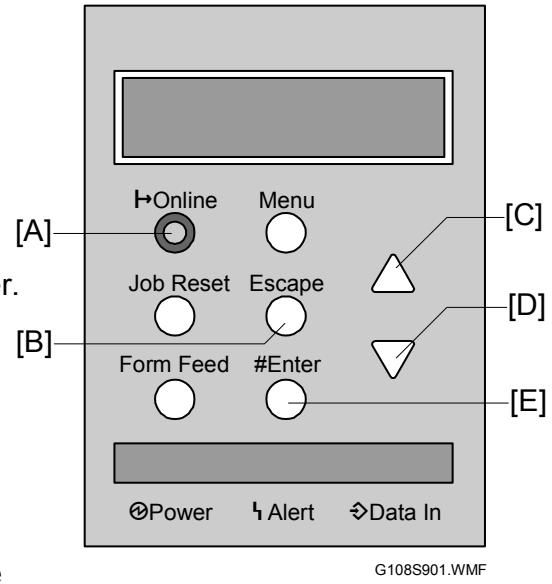
Activating SP Mode

- When the printer is off:

1. Push the online key [A] and the escape key [B] and hold them down.
2. Set main power on. (Keep the two keys held down.)
3. Wait until the message "SYSTEM ver. x.xx" is displayed. x.xx shows the firmware version.

- When the printer is on:

1. Push the up-arrow key [C] and the down-arrow [D] and hold them down for five seconds or more.
2. Push the enter key [E]. The message "SYSTEM ver. x.xx" is displayed.



G108S901.WMF

Selecting a Service Program

1. Push the up-arrow key or the down-arrow key to select one of these menus:
   - 1. Service
   - 2. Engine
2. Push the enter key.
3. Push the up-arrow key or the down-arrow key to select one of the submenus.
4. Push the enter key.
5. Push the up-arrow key or the down-arrow key to select one of the service programs.
6. Push the enter key.

Specifying a Setting

1. Push the up-arrow key or the down-arrow key to select a setting.
2. To save the setting, push the enter key.
3. To quit the program, push the escape key.

Quitting SP Mode

1. Push the escape key several times until the message "SYSTEM ver. x.xx" is displayed.
2. Push the up-arrow key or the down-arrow key to select the following menu:
   - 3. End
3. Push the enter key.

5.1.2 SERVICE

Abbreviations and keys
- * : Saved in the NVRAM on the controller
- FA : Factory setting (The settings can be adjusted before shipment.)
- DFU : Design/Factory Use (Do not change these settings.)

Possible Settings
- [Adjustable range / **Default** / Step] : *Step* is the amount of minimum change.
- [**Setting 1**, Setting 2, Setting 3, ...] : Boldface shows the default.

Service SP or Engine SP
- Service SPx-xxx-xxx : Service SP (☛ 5.1.2)
- Engine SPx-xxx- xxx : Engine SP (☛ 5.1.3)

Tables

1001	Bit Switch		
	Adjusts bit switch settings. **DFU**		
1001 001*	Bit Switch 1	1001 005*	Bit Switch 5
1001 002*	Bit Switch 2	1001 006*	Bit Switch 6
1001 003*	Bit Switch 3	1001 007*	Bit Switch 7
1001 004*	Bit Switch 4	1001 008*	Bit Switch 8

1003	Clear Setting	
1003 001	Initialize System	Initializes settings in the system menu of the user mode.
1003 003	Delete Program	**DFU**

1004	Print Summary
	Prints the service summary sheet (a summary of all the controller settings).

1005	Display Version
	Shows the version of the controller firmware.

1101	Toner Control Set	
1101 001*	Toner (Factory)	Recalls one of these gamma settings: • Factory setting • Previous setting • Current setting
1101 002*	Toner (Previous)	
1101 003*	Toner (Current)	

1102*	Toner Control Set
	Sets the resolution and the print mode of the printer gamma adjustment. The asterisk (*) shows which mode is selected. • *1200 x 600 Photo • 600 x 600 Text • 1200 x 600 Text • 600 x 600 Photo

1103	Print Color Sheet	
1103 001	Toner Control Sheet	Prints the test page to check the color balance before and after the gamma adjustment.
1103 002	Color Chart	

1104	Toner Control Value	
	Adjusts the printer gamma of each adjustment point on the color calibration test sheet. To save the settings, see Service SP1-105.	
1104 001*	Set Black 1	[0 to 255 / **16** / 1/step]
1104 002*	Set Black 2	[0 to 255 / **32** / 1/step]
1104 003*	Set Black 3	[0 to 255 / **48** / 1/step]
1104 004*	Set Black 4	[0 to 255 / **64** / 1/step]
1104 005*	Set Black 5	[0 to 255 / **80** / 1/step]
1104 006*	Set Black 6	[0 to 255 / **96** / 1/step]
1104 007*	Set Black 7	[0 to 255 / **112** / 1/step]
1104 008*	Set Black 8	[0 to 255 / **128** / 1/step]
1104 009*	Set Black 9	[0 to 255 / **144** / 1/step]
1104 010*	Set Black 10	[0 to 255 / **160** / 1/step]
1104 011*	Set Black 11	[0 to 255 / **176** / 1/step]
1104 012*	Set Black 12	[0 to 255 / **192** / 1/step]
1104 013*	Set Black 13	[0 to 255 / **208** / 1/step]
1104 014*	Set Black 14	[0 to 255 / **224** / 1/step]
1104 015*	Set Black 15	[0 to 255 / **240** / 1/step]
1104 021*	Set Cyan 1	[0 to 255 / **16** / 1/step]
1104 022*	Set Cyan 2	[0 to 255 / **32** / 1/step]
1104 023*	Set Cyan 3	[0 to 255 / **48** / 1/step]
1104 024*	Set Cyan 4	[0 to 255 / **64** / 1/step]
1104 025*	Set Cyan 5	[0 to 255 / **80** / 1/step]
1104 026*	Set Cyan 6	[0 to 255 / **96** / 1/step]
1104 027*	Set Cyan 7	[0 to 255 / **112** / 1/step]
1104 028*	Set Cyan 8	[0 to 255 / **128** / 1/step]
1104 029*	Set Cyan 9	[0 to 255 / **144** / 1/step]
1104 030*	Set Cyan 10	[0 to 255 / **160** / 1/step]
1104 031*	Set Cyan 11	[0 to 255 / **176** / 1/step]
1104 032*	Set Cyan 12	[0 to 255 / **192** / 1/step]
1104 033*	Set Cyan 13	[0 to 255 / **208** / 1/step]
1104 034*	Set Cyan 14	[0 to 255 / **224** / 1/step]
1104 035*	Set Cyan 15	[0 to 255 / **240** / 1/step]
1104 041*	Set Magenta 1	[0 to 255 / **16** / 1/step]
1104 042*	Set Magenta 2	[0 to 255 / **32** / 1/step]
1104 043*	Set Magenta 3	[0 to 255 / **48** / 1/step]
1104 044*	Set Magenta 4	[0 to 255 / **64** / 1/step]
1104 045*	Set Magenta 5	[0 to 255 / **80** / 1/step]
1104 046*	Set Magenta 6	[0 to 255 / **96** / 1/step]
1104 047*	Set Magenta 7	[0 to 255 / **112** / 1/step]
1104 048*	Set Magenta 8	[0 to 255 / **128** / 1/step]
1104 049*	Set Magenta 9	[0 to 255 / **144** / 1/step]
1104 050*	Set Magenta 10	[0 to 255 / **160** / 1/step]
1104 051*	Set Magenta 11	[0 to 255 / **176** / 1/step]
1104 052*	Set Magenta 12	[0 to 255 / **192** / 1/step]
1104 053*	Set Magenta 13	[0 to 255 / **208** / 1/step]
1104 054*	Set Magenta 14	[0 to 255 / **224** / 1/step]
1104 055*	Set Magenta 15	[0 to 255 / **240** / 1/step]

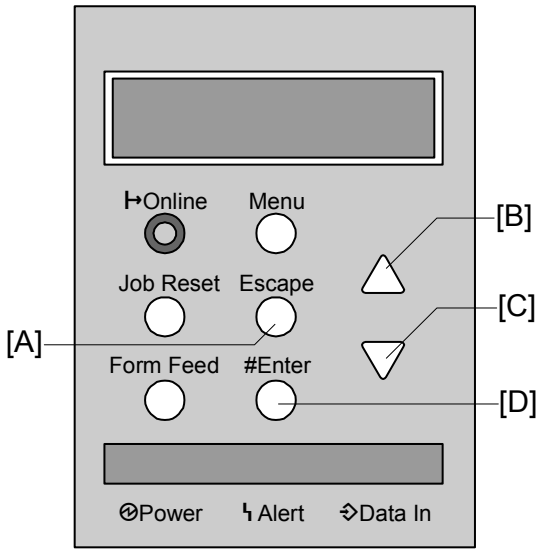
1104 061*	Set Yellow 1	[0 to 255 / **16** / 1/step]
1104 062*	Set Yellow 2	[0 to 255 / **32** / 1/step]
1104 063*	Set Yellow 3	[0 to 255 / **48** / 1/step]
1104 064*	Set Yellow 4	[0 to 255 / **64** / 1/step]
1104 065*	Set Yellow 5	[0 to 255 / **80** / 1/step]
1104 066*	Set Yellow 6	[0 to 255 / **96** / 1/step]
1104 067*	Set Yellow 7	[0 to 255 / **112** / 1/step]
1104 068*	Set Yellow 8	[0 to 255 / **128** / 1/step]
1104 069*	Set Yellow 9	[0 to 255 / **144** / 1/step]
1104 070*	Set Yellow 10	[0 to 255 / **160** / 1/step]
1104 071*	Set Yellow 11	[0 to 255 / **176** / 1/step]
1104 072*	Set Yellow 12	[0 to 255 / **192** / 1/step]
1104 073*	Set Yellow 13	[0 to 255 / **208** / 1/step]
1104 074*	Set Yellow 14	[0 to 255 / **224** / 1/step]
1104 075*	Set Yellow 15	[0 to 255 / **240** / 1/step]

1105	Toner Control Save
	Keeps the new print gamma settings (☛ Service SP1-104) as *Current* (☛ Service SP1-101-003). The former *Current* is saved as *Previous* (☛ Service SP1-101-002).

1106	Toner Limit	
	Adjusts the maximum amount of toner for image development.	
1106 001*	Toner Limit Photo	[100 to 400 / **260** / 1 %/step]
1106 002*	Toner Limit Text	[100 to 400 / **190** / 1 %/step]

Bit Switches

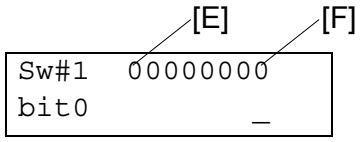
Do not change the bit switches unless you are instructed to do so by the manufacturer.



G108S901.WMF

1. Start the SP mode. The menu "Service" is shown.
2. Push the enter key [D] two times.
3. To select a bit switch, push the up-arrow key [B] or the down-arrow key [C].
4. Push the enter key.
5. Set the value:
   - Push the up-arrow key [B] or the down-arrow key [C] to move the cursor.
   - To select one of the bits, push the enter key.
   - To change the value, push the up-arrow key or the down-arrow key.
   - To keep the value, push the enter key.
   - To quit the bit switch, push the escape key.

   NOTE: The leftmost digit [E] is bit 7 and the rightmost digit [F] is bit 0.

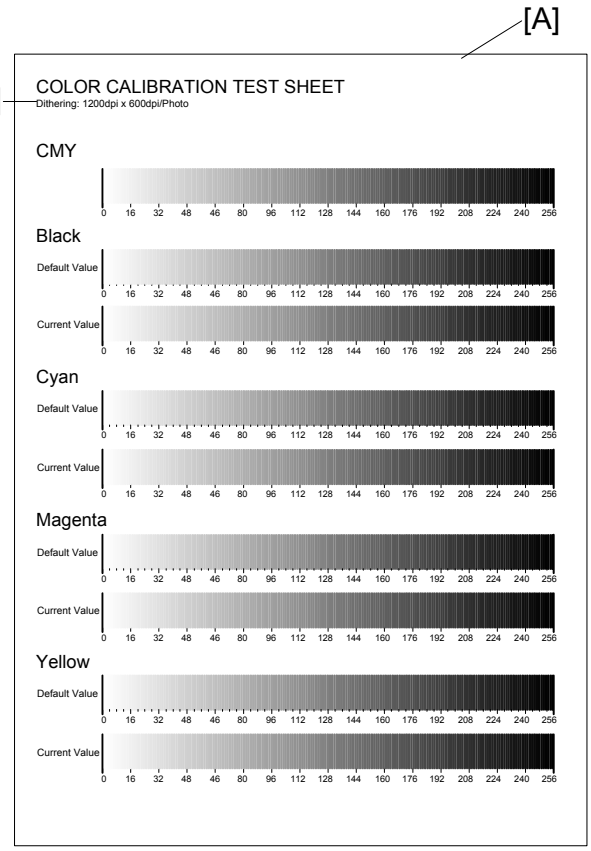


6. Push the escape key several times until the menu "Service" is shown.
7. Select "End" and push the enter key.

Adjusting Printer Gamma

To improve color quality, clean the components first. Replace units and/or components as necessary. If such maintenance work is not effective enough, adjust the printer gamma.

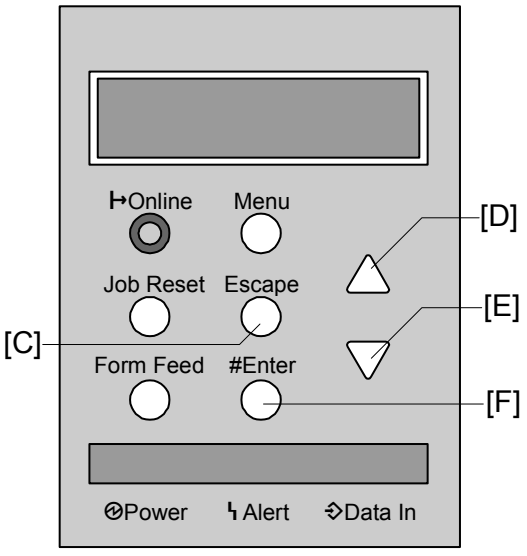
To adjust the printer gamma, you use the color calibration test sheet [A]. This sheet shows the color gradations produced by the color (CMY) development units, the black development unit, the magenta development unit, and the yellow development unit. Gradation balance on the color calibration test sheet changes when you adjust the printer gamma. Adjust the printer gamma until the color calibration test sheet shows well-balanced color gradations.



G108S905.WMF

1. Start the SP mode.
2. Locate Service SP1-102 (ToneCtlSet). Then press the enter key [F].
3. To locate a print mode, press the up-arrow key [D] or the down-arrow key [E].
4. To select a mode, press the enter key. Make sure a star (✱) is shown. The star shows which mode is selected.

   NOTE: The mode is printed on the second [B] line of the color calibration test sheet.
5. Select Service SP1-103-001 (ToneCtlSheet).
6. Press the enter key. The message "Execute?" is shown.
7. Press the enter key. The color calibration test sheet [A] is output.



G108S901.WMF

Service Tables

8. Make sure that the message "Execute OK" is shown.
9. Press the escape key [C] two times. The SP name "PrnColorSheet" is shown.
10. Press the down-arrow key. The SP name "ToneCtlValue" is shown.
11. Press the enter key. Service SP1-104-001 (Set Black 1) is shown.
12. To locate a color range, press the up-arrow key or the down-arrow key. For example, the color range *Black 1* is the range around *Default Value 16.* The color rage *Black 2* is the range around *Default Value 32.* For more details, see the table.

Color Range	Color Calibration Test Sheet
Black 1, Cyan 1, Magenta 1, Yellow 1	Default Value 16
Black 2, Cyan 2, Magenta 2, Yellow 2	Default Value 32
Black 3, Cyan 3, Magenta 3, Yellow 3	Default Value 48
: :	: :
Black 13, Cyan 13, Magenta 13, Yellow 13	Default Value 208
Black 14, Cyan 14, Magenta 14, Yellow 14	Default Value 224
Black 15, Cyan 15, Magenta 15, Yellow 15	Default Value 240

13. Press the enter key. The current value is shown.
14. Set a value.
    - To move the cursor, push the up-arrow key or the down-arrow key.
    - To select one of the digits, push the enter key.
    - To change the value, push the up-arrow key or the down-arrow key.
    - To set a digit, push the enter key.
15. Quit service SP1-104 and print out the color calibration test sheet (☛ steps 5 through 8).
16. Quit service SP1-103-001 and specify another value (☛ steps 11 through 14) as necessary.
17. Do steps 12 and 13 again until the color calibration test sheet shows well-balanced color gradations.
18. Quit service SP1-103-001.
19. Select service SP1-105 (ToneCtlSave).
20. Press the enter key. The message "Execute?" is shown.
21. Press the enter key to keep your adjustment.
22. Make sure that the message "Execute OK" is shown.

Toner Control Set (Service SP1-101)

Service SP1-101 (ToneCtlSet) keeps these three sets of printer gamma:

1) Factory setting (Factory)
2) Previous setting (Prev.)
3) Current setting (Current).

FACTORY SETTING

The factory setting (Service SP1-101-001) is the default setting. If you execute this SP, the printer gamma returns to the factory setting (the default setting).

PREVIOUS SETTING

The previous setting (Service SP1-101-002) is the setting that is previously saved. If you execute this SP, the printer gamma returns to the previous setting. Note that this is the setting previously saved by Service SP1-105 (ToneCtlSave).

CURRENT SETTING

The current setting (Service SP1-101-003) is the setting that is last saved. If you execute this SP (after you have executed Service SP1-101-001 or 2), the printer gamma returns to the current setting. Note that this is the setting last saved by Service SP1-105 (ToneCtlSave).

TONECTLSET AND TONECTLSAVE

If you specify a new setting and execute Service SP1-105 (ToneCtlSave), this new setting is saved as the current setting. In addition, the previous setting (Service SP1-101-002) is also updated. Service SP1-105 (ToneCtlSave) does not change the factory setting (Service SP1-101-001).

5.1.3 ENGINE

Abbreviations and keys
- * : Saved in the NVRAM on the controller
- FA : Factory setting (These settings may be adjusted before shipment.)
- DFU : Design/Factory Use (Do not change these settings.)

Possible Settings
- [Adjustable range / **Default** / Step] : *Step* is the amount of minimum change.
- [**Setting 1**, Setting 2, Setting 3, ...] : Boldface indicates the default.

Service SP or Engine SP
- Service SPx-xxx-xxx : Service SP (☛ 5.1.2)
- Engine SPx-xxx-xxx : Engine SP (☛ 5.1.3)

SP1: Feed

1001*	Leading Edge Registration	[-35 ~ +35 / 0 / 5 /step]
	Adjusts the leading edge registration. When the value increases or decreases by 5 in the SP, the margin changes by 0.7 mm. For example: ① when you specify "+5," the margin changes by +0.7 mm; ② when you specify "-10," the margin changes by -1.4 mm.	

1002	Side to Side Registration	[-35 ~ +35 / 0 / 5 /step]
1002 001*	Paper Tray 1	Adjusts the side-to-side registration. When the value increases or decreases by 5 in the SP, the margin changes by 0.5 mm. For example: ① when you specify "+5," the margin changes by +0.5 mm; ② when you specify "-10," the margin changes by -1.0 mm.
1002 002*	Paper Tray 2	
1002 003*	Paper Duplex	

SP2: Drum

2201	Development Bias	Adjusts the development bias.
2201 001*	[K] Over All	[-35 ~ +35 / 0 / 5 /step]
2201 002*	[C] Over All	[-35 ~ +35 / 0 / 5 /step]
2201 003*	[M] Over All	[-35 ~ +35 / 0 / 5 /step]
2201 004*	[Y] Over All	[-35 ~ +35 / 0 / 5 /step]

2310	Paper Transfer Bias	[-20 ~ +20 / 0 / 5 /step]
	Adjusts the paper transfer bias.	
2310 001*	Plain Paper	For plain paper (60~74 g/m^2)
2310 002*	Transparency	For OHP sheets
2310 003*	Normal	For middle thick paper (74~105 g/m^2)
2310 004*	Thick 1	For thick paper (105~162 g/m^2)
2310 005*	Thick 2	For thick paper (162~210 g/m^2)
2310 006*	Envelope	For envelopes
2310 010*	Duplex Plain Paper	For plain paper (60~74 g/m^2)
2310 011*	Duplex Transparency	For OHP sheets
2310 012*	Duplex Normal	For middle thick paper (74~105 g/m^2)
2310 013*	Duplex Thick 1	For thick paper (105~162 g/m^2)
2310 014*	Duplex Thick 2	For thick paper (162~210 g/m^2)

2311	OPC Belt Bias	[-20 ~ +20 / 0 / 5 /step]
	Adjusts the OPC belt bias (CBV). **NOTE**: The bias CBV is the bias that is charged on the OPC belt unit. This bias is different from the bias that is charged on the charge roller.	

2312	Transfer Belt Cleaner Bias	[-20 ~ +20 / 0 / 5 /step]
	Adjusts the bias for the transfer-belt cleaning unit.	

SP5: Mode

5024*	mm/inch Display	[0 ~ 1 / Europe: 0, North America: 1 / 1/step]]
	Sets the unit of measure.	

5045*	Counter Method	[0 ~ 1 / 0 / 1/step] 0: Developments, 1: Prints
	Sets the development counter or the print counter for the meter charge (Engine SP5-930-001). You can change the setting of Engine SP5-045 only one time.	

5302*	Set Time	[-1440 ~ 1440 / - / 1 minute/step] **DFU**
	Adjusts the RTC (real time clock) time setting. Sets the local time. (Montreal: -300, Paris: + 60, Beijing: +480, Taipei: +480, Hong Kong: +480)	

5404	User Code Counter Clear
	Clears all user counters.

5501*	PM Alarm	[0 ~ 9999 / **0** / 1/step] **DFU** 0: Disables the PM alarm
	Sets the PM alarm level. A PM alarm goes on at this time: PA x 1000 = PC, where PA is the value set in Engine SP5-501 and PC is the value in the PM counter.	

5504*	Jam Alarm	[0 ~ 3 / **3** / 1/step] **DFU** 3: 6K, 2: 3K, 1: 1.5K, 0: Disables the jam alarm
	Sets the jam alarm level. If a paper jam occurs, the jam alarm counter increases by +1. If no paper jam occurs while the specified number of paper is output, the jam alarm counter decreases by -1. The jam alarm is issued when the jam alarm counter reaches +10.	

5505*	Error Alarm	[0 ~ 255 / **50** / 1/step] **DFU** 0: Disables the PM alarm
	Sets the error alarm level. If an SC code is generated, the error alarm counter increases by +1. If no SC code is generated while the specified number of paper is output, the jam alarm counter decreases by -1. The error alarm is issued when the error alarm counter reaches +5.	

5507*	Supply Alarm **DFU**	
Enables or disables the supply alarm.		
5507 001*	Paper Supply Alarm	[0 to 1 / **0** / 1/step] 0: OFF, 0: ON
5507 003*	Toner Supply Alarm	
Sets the supply alarm level. Each supply alarm counter increases by +1 when a sheet of the size is used. The supply alarm is issued when one of the supply alarm counter reaches the specified value.		
5507 128*	Interval: Others	[250 to 10000 / **1000** / 1/step]
5507 133*	Interval: A4	
5507 134*	Interval: A5	
5507 142*	Interval: B5	
5507 164*	Interval: LG	
5507 166*	Interval: LT	
5507 172*	Interval: HLT	

5801	Memory Clear ☛ 5.1.4	
5801 001	All	Executes Engine SP5-801-003 through 014.
5801 003	SCS	Clears the system settings.
5801 004	IMH	Clears IMH data. **DFU**
5801 005	MCS	Clears MCS data. **DFU**
5801 008	PRT	Clears the printer application settings.
5801 011	NCS	Initializes the system default and interface settings (IP address also), SmartNetMonitor for Admin, WebStatusMonitor settings, and the TELNET settings.
5801 014	DCS Setting	Clears or deletes the DCS-related data and information.
5801 015	Clear UCS Setting	Clears or deletes the UCS-related data and information.
5801 016	MIRS Setting	Clears or deletes the MIRS-related data and information.

5808*	Destination
	Shows the destination code.

5811	Serial Number	
5811 002	Display Controller Serial Number	Shows the serial number.
5811 010	Display Engine Serial Number	
5811 011	Set Engine Serial Number	Ask your supervisor for the information on this SP.

5812	Tel. No. Setting (☛ 5.1.5)	
5812 001*	Service	
	Sets the telephone number for a service representative. This number is printed on the counter list, which can be printed with the user's "Counter" menu. This can be up to 20 characters (both numbers and alphabetic characters can be input).	
5812 002*	FAX TEL No.	
	Sets the fax or telephone number for a service representative. This number is printed on the Counter List, which can be printed with the user's "Counter" menu if the Meter Charge mode is selected with Engine SP5-930-1. This can be up to 13 characters (both numbers and alphabetic characters can be input).	

5816	Remote Service **Japan Only**	
5816 001*	I/F Setting	[0 ~ 1 / **1** / 1/step] 0: Off 1: Network (The remote service function is on.)
5816 002*	CE Call	[0 ~ 1 / **1** / 1/step] 0: Start, 1: End
5816 003*	Function Flag	[0 ~ 1 / **1** / 1/step] 0: Off (The remote service function is disabled.) 1: On (The remote service function is validated.)
5816 006*	Device Information	[0 ~ 1 / **0** / 1/step] 0: Not displayed, 1: Displayed
	Displays or does not display the device information in the User Tools.	
5816 007*	SSL Disable	[0 ~ 1 / **0** / 1/step] 0: Enabled, 1: Disabled
5816 008*	RCG Connect Time	[1 ~ 90 / **10** / 1 second/step]
	Sets the timeout counter for the remote connection.	
5816 009*	RCG Write Timeout	[0 ~ 100 / **60** / 1 second/step]
	Sets the timeout counter for the writing processing.	
5816 010*	RCG Read Timeout	[0 ~ 100 / **60** / 1 second/step]
	Sets the timeout counter for the reading processing.	
5816 011*	Port 80 Enable	[0 ~ 1 / **0** / 1/step] 0: Disables, 1: Enables
	Enables or disables the access to the SOAP method via port 80.	

5821	Remote Service Address	
5821 001*	CSS-PI Device Code	[0 ~ 4 / **0** / 1/step] **DFU**
5821 002*	RCG IP Address	[00000000h ~ FFFFFFFFh / **00000000h** / 1/step]
	Specifies the IP address of the RCG (Remote Communication Gate).	

5824	NVRAM Upload
	Uploads the UP and SP mode data (except for counters and the serial number) from the NVRAM to an SD card.

5825	NVRAM Download
	Downloads the UP and SP mode data from an SD card to the NVRAM.

5828	Network	
5828 066*	HD job clear	[0 to 1 / **1** / 1/step] 0: Data is cleared 1: Automatically printed
	Treatment of the job when a spooled job exists at power on.	
5828 069*	Job Spool (Protocol)	[0 to 1 / **1** / 1/step] 0: Off, 1: On Bit switch: • Bit 0: LPR • Bit 1: FPT • Bit 2: IPP • Bit 3: SMB • Bits 4 to 7: Reserved
	Switches job spooling off or on and allows settings for job spooling protocols.	
5828 074*	Delete Password	Deletes passwords.
5828 084*	Print Settings List	Prints a list of NCS related parameters.
5828 090*	TELNET	[0 to 1 / **1** / 1/step] 0: Disabled, 1: Enabled
	Enables or disables Telnet.	
5828 091*	Web	[0 to 1 / **1** / 1/step] 0: Disabled, 1: Enabled
	Enables or disables the Web monitor.	
5828 115*	SMB Computer Name	
	Displays the SMB computer name.	
5828 116*	SMB Workgroup Name	
	Displays the workgroup name.	

5832	HDD Initialization
	Initializes the hard disk. Use this SP mode only when a hard disk error occurs. This SP initializes the whole area (the all partitions) in the hard disk.

5839	IEEE 1394	
5839 004*	Host Name	**DFU**
5839 007*	Cycle Master	**DFU**
5839 008*	BCR mode	**DFU**
5839 009*	IRM 1394a Check	**DFU**
5839 010*	Unique ID	**DFU**
5839 011*	Logout	**DFU**
5839 012*	Login	**DFU**
5839 013*	Login MAX	**DFU**

5840	IEEE 802.11b	
5840 004*	Current SSID	
	Enters a unique ID (up to 32 characters long) to identify the device when it is operating in an area with another wireless LAN network.	
5840 006*	Channel Max	[1 to 11 or 13 / **1** / 1/step] Europe/Asia: 1 to 13 USA: 1 to 11 **Note**: Do not change the setting
	Sets the maximum number of channels available for data transmission via the wireless LAN. The number of channels available varies according to location. The default settings are set for the maximum end of the range for each area. Adjust the upper 4 bits to set the maximum number of channels. **DFU**	
5840 007*	Channel Min	[1 to 11 or 13 / **1** / 1/step] Europe/Asia: 1 to 13 USA: 1 to 11 **Note**: Do not change the setting
	Sets the minimum number of channels available for data transmission via the wireless LAN. The number of channels available varies according to location. The default settings are set for the minimum end of the range for each area. Adjust the lower 4 bits to set the minimum number of channels. **DFU**	
5840 011*	WEP key number	[00~11 / 00 / 1 binary] 00: Key #1 01: Key #2 (Reserved) 10: Key #3 (Reserved) 11: Key #4 (Reserved)
	Selects the WEP key.	
5840 018	SSID Key Check	Checks that the specified SSID is correct. The result is displayed on the operation panel. **NOTE:** You cannot use the characters other than 0x20 ~ 0x7e in an SSID. This SP is commonly used among multiple machines. This SP is for MFP machines, which can input incorrect characters from various keys.
5840 020*	WEP mode	[0~1/0/1] 0: Max. 64-bit (10 characters) 1: Max. 128-bit (10, 26 characters)
	Determines the operation mode of the WEP key. Displayed only when the option 801.11b for wireless LAN is installed.	

5844	USB	
5844 001*	Transfer Rate	Adjusts the USB transfer rate. [0 to 1 / **0** / 1/step] 0: Auto Change, 1: Full speed
5844 002*	Vendor ID	Displays the vendor ID. **DFU**
5844 003*	Product ID	Displays the product ID. **DFU**
5844 004*	Development Release Number	Displays the development release version number. **DFU**

5845	Delivery Server	
5845 003*	Retry Interval	[60 to 900 / **300** / 1 second/step]
	Specifies the retry interval.	
5845 004*	Number of Retries	[0 to 99 / **3** / 1/step]
	Specifies the maximum number of retries.	

5846	UCS Setting
5845 003*	Maximum Entries
	Specifies the number of maximum entries.
5845 050	Initialize All Data
	Initializes all data.

5856*	Remote Update	[0 to 1 / **0** / 1/step] 0: Disable, 1: Enable
	Allows the technician to upgrade the firmware using a parallel cable	

5857	Save Debug Log	
5857 001*	On/Off	[0 to 1 / **0** / 1/step] 0: Disabled, 1: Enabled
	Enables or disables the debug log saving function.	
5857 002*	Target	[2 to 3 / **2** / 1/step] 2: Hard disk, 3: SD card
	Selects the storage for the debug log.	
5857 005*	Save to HDD	
	Specifies the key number of the debug log.	
5857 006*	Save to SD	
	Specifies the key number of the debug log.	
5857 009*	HDD to SD (4 MB)	
	Copies the latest 4 MB of debug log from the hard disk to the SD card.	
5857 010*	HDD to SD (Any)	
	Specifies the key number of the debug log copied from the hard disk to the SD card.	
5857 011*	Erase HDD Log	
	Deletes the debug log from the hard disk.	
5857 012*	Erase SD Log	
	Deletes the debug log from the SD card.	
5857 013*	Free Space on SD	
	Displays the free space on the SD card.	
5857 014*	SD to SD (4 MB)	
	Copies the latest 4 MB of debug log from an SD card to another SD card.	
5857 015*	SD to SD (Any)	
	Specifies the key number of the debug log copied from an SD card to another SD card.	
5857 016*	Make HDD Log File	Generates a log file on the HDD to save debug logs. To save debug logs, the controller generates a log file first, and writes data in the file afterward. This processing may take a long time. The user may turn off the main power switch before the log is written in the file. To prevent this possible problem, you can prepare a log file beforehand. The controller takes a shorter time to save logs since the log file is already generated.
5857 017*	Make SD Log File	

5858	Debug Save When	
5858 001*	Engine SC Error	[0 to 1 / **0** / 1/step] 0: Collected, 1: Not collected
	Collects debug logs when an engine-related SC code is generated.	
5858 002*	System SC Error	[0 to 1 / **0** / 1/step] 0: Collected, 1: Not collected
	Collects debug logs when a controller-related SC code is generated.	
5858 003*	Any SC Error	[00000 to 65535 / **0** / 1/step]
	Specifies the SC number whose logs are collected.	
5858 004*	Jam	[0 to 1 / **0** / 1/step] 0: Collected, 1: Not collected
	Collects debug logs when a paper jam occurs.	

5859	Log Save Key No.	[0000000 to 9999999 / **0** / 1/step]
5859 001*	Key 1	Specifies the key number of a specific event whose logs are saved in the specified storage. When multiple key numbers are assigned, the logs are collected in the following order: Key 1, Key 2, ..., Key 9, Key 10. **NOTE:** The event is specified by Engine SP5-857-2. The storage is specified by Engine SP5-858.
5859 002*	Key 2	
5859 003*	Key 3	
5859 004*	Key 4	
5859 005*	Key 5	
5859 006*	Key 6	
5859 007*	Key 7	
5859 008*	Key 8	
5859 009*	Key 9	
5859 010*	Key 10	

5860	SMTP/POP3/IMAP	
5860 002*	SMTP Server Port No.	[1 to 65535 / **25** / 1/step]
	Specifies the number of the SMTP server ports.	
5860 003*	SMTP Auth.	[0 to 1 / **0** / 1/step] • 0: Disable, • 1: Enable
	Enables or disables the SMTP authentication for mail transfers.	
5860 006*	SMTP Auth. Encryption	[0 to 2 / **0** / 1/step] • 0: Automatic, • 1: Not encrypt, • 1: Encrypt
	Encrypts or does not encrypt passwords for SMTP authentications.	
5860 007*	POP before SMTP	[0 to 1 / **0** / 1/step] • 0: Disable, • 1: Enable
	Enables or disables the authentication that is executed on the POP server before the communication is established with the SMTP server.	
5860 008*	POP to SMTP Wait	[0 to 10000 / **300** / 1 ms/step]
	Specifies the waiting time to access the SMTP server after the authentication on the POP server.	
5860 013*	POP Auth. Encryption	[0 to 2 / **0** / 1/step] • 0: Automatic, • 1: Not encrypt, • 1: Encrypt
	Encrypts or does not encrypt passwords for POP3/IMAP4 authentications.	
5860 014*	POP Server Port No.	[1 to 65535 / **110** / 1/step]
	Specifies the port number of the POP server.	
5860 022*	SMTP from Replace	[0 to 1 / **0** / 1/step]
	Determines whether the FROM item of the mail header is switched to the validated account after the SMTP server is validated. 0: No. “From” item not switched, 1: Yes. “From” item switched.	

5866*	E-Mail Alert	[0 to 1 / **0** / 1/step] **DFU** 0: Not attached, 1: Attached
	Attaches or does not attach the data field to the header of alert e-mail.	

5869*	RAM Disk Setting	[0 to 1 / **0** / 1/step] **DFU** 0: On, 1: Off
	Specifies that the e-mail transfer function is used or not. This SP determines the RAM disk size for the e-mail transfer function.	

5870*	Common Key Info Writing	Writes the authentication data (used for NRS) in the memory.

5873	SD Card Appli Move	
5873 001	Move Exec	☛ 5.3
5873 002	Undo Exec	

5907	**[Plug/Play]** Plug & Play Name Selection	
5907 001*	Plug/Play	Specifies the manufacturer and model name. [0 to 7 / **0** / 1/step] **FA** 0: Ricoh Aficio CL1000N 1: Savin CLP831 2: NRG P7431cn 3: Gestetner P7431cn 4: Lanier LP031c

5930	Meter Charge	
5930 001*#	On/Off	[**Off**, On]
	Enables or disables the Meter Charge mode. When enabling the Meter Charge mode, the "Counter" menu is added to the user menu.	
5930 002*#	Maintenance Style	[**Year Contract**, M-PaC, Click Charge]
	Specifies the type of maintenance contract.	

5949	Special Paper	
5949 001*	A5/HLT Change	North America [0 ~ 1/ **1** / 1/step] Europe/Asia [0 ~ 1/ **0** / 1/step] • 0: A5 • 1: HLT
	Specifies the paper size of the special paper.	
5949 002*	A5 Duplex Permit **DFU**	
	Enables or disables duplex printing of the A4 size.	

5990	[SP print mode]	
5990 001	All (Data List)	Executes Engine SP5-990-002, 004, 005, 006, and 007.
5990 002	SP (Mode Data List)	Prints an SMC report on all SP modes.
5990 004	Logging	Prints an SMC report on the SPs that save logs.
5990 005	Diagnosis Report	Prints the Self-Diagnosis Report.
5990 006	Non-Default	Prints an SMC report on the SPs whose settings are different from the defaults.
5990 007	NIB Summary	Prints the network configuration report.


5996	LD Power	[-35 ~ +35 / 0 / 5/step]
5996 001	[K] Over All	Adjusts the LD power. When you specify a greater value, the toner density and the thickness of the color is intensified. Note that coloration can be changed if you change the value of a color.
5996 002	[C] Over All	
5996 003	[M] Over All	
5996 004	[Y] Over All	

5997	Fuser SC Clear
	DFU

5998	Engine Memory Clear
	☛ 5.1.4

SP7: Data Log

7401*	SC Counter	[0 to 9999 / **0** / 1/step]
	Shows the number of SC codes detected.	

7403	Latest 10 SC Log	
7403 001*	Latest	Logs the SC codes detected. The 10 most recently detected SC Codes are not shown on the screen, but can be seen on the SMC (logging) outputs.
7403 002*	Latest 1	
7403 010*	Latest 9	

7502*	Total Jam	[0 to 9999 / **0** / 1 sheet/step]
	Shows the total number of paper jams.	

7504	Jam Location	
7504 001*	At Power On	Shows the number of paper jams that occur during warming up or printing.
7504 003*	Print Jam	

7506	Jam Paper Size	
7506 006*	A5 LEF	Shows the number of paper jams according to the paper size. [0 to 9999 / **0** / 1 sheet/step]
7506 038*	LT LEF	
7506 044*	HLT LEF	
7506 133*	A4 SEF	
7506 134*	A5 SEF	
7506 142*	B5 SEF	
7506 164*	LG SEF	
7506 166*	LT SEF	
7506 172*	HLT SEF	
7506 255*	Others	

7507	Jam History	
7507 001*	Latest	Shows the 10 most recently detected paper jams.
7507 002*	Latest 1	
7507 010*	Latest 9	

7803	PM Counter Display	[0 to 9999999 / **0** / 1 sheet/step]
7803 001*	Paper	Shows the number of paper printed.
7803 002*	Page Total	Shows the number of the sides of paper printed. For example, the number of sides is "1" when the printer combines two pages into one side of paper.
7803 003*	(K) Page	Shows the number of developments.
7803 004*	(C) Page	
7803 005*	(M) Page	
7803 006*	(Y) Page	
7803 007*	Page Duplex	Shows the number of second sides printed. For example, the number of second sides is "1" when the printer executes duplex printing and outputs one sheet of paper.

7804	PM Counter Reset
	Clears the paper counter (SP7-803-001).

7805	Next Life Limit	
	Shows when you must replace the unit or component. These SPs indicate the total number of images or pages. For example, you must replace the transfer roller when the total counter reaches 400,000 pages. These SPs are updated when you execute PM Parts Clear (SP7-905). For example, SP7-805-008 displays "800,000 pages" when you execute PM Parts Clear.	
7805 001	PC (K)	Default: 400,000 images
7805 002	PC (C)	Default: 400,000 images
7805 003	PC (M)	Default: 400,000 images
7805 004	PC (Y)	Default: 400,000 images
7805 005	OPC Belt	Default: 400,000 images
7805 006	Fusing	Default: 400,000 pages
7805 007	Transfer Belt	Default: 400,000 images
7805 008	Transfer Roller	Default: 400,000 pages
7805 009	Waste Toner Bottle	Default: 400,000 images
7805 011	Pickup Roller	Default: 400,000 pages
7805 012	Pickup Roller 2	Default: 400,000 pages

7806	P/J Counter Display	
7806 001	1 P/J	Shows the number of pages output by one job. "1 P/J" indicates one page per job; "6-10 P/J" indicates six pages through 10 pages per job; "Over 21 P/J" indicates 21 pages and more per job.
7806 002	2 P/J	
7806 003	3 P/J	
7806 004	4 P/J	
7806 005	5 P/J	
7806 006	6-10 P/J	
7806 007	11-20 P/J	
7806 008	Over 21 P/J	

7807	SC/Jam Clear	Clears the counters related to SC codes and paper jams.

7808	Counter Clear (☛ 5.1.4)
	Clears all counters.

7809	P/J Counter Clear	Clears the P/J Counter.

7832*	Diagnostic Result
	Shows the result of the diagnostics. To scroll the return codes, push the up-arrow key or the down-arrow key.

7833	Coverage	
7833 001*	Last: Bk	Shows the image coverage dots for each color of the last output.
7833 002*	Last: C	
7833 003*	Last: M	
7833 004*	Last: Y	
7833 005*	Average: Bk	Shows the average coverage of each color. The average coverage is calculated as follows: IMAGEpix ÷ A4pix × 100 where ① IMAGEpix is the total number of pixels in the image areas, and ② A4pix is the total pixels in the printable areas on the paper. These SPs assume that the printer has been using only A4 paper regardless of actual paper sizes used.
7833 006*	Average: C	
7833 007*	Average: M	
7833 008*	Average: Y	

7836	Total Memory Size
	Shows the total memory size of the controller.

7901	Assert Info	
7901 001	File Name	Keeps the location where a problem is detected in the program. The data stored in this SP is used for problem analysis. **DFU**
7901 002	# of Lines	
7901 003	Location	

7905	PM Parts Clear	
7905 001	OPC Belt	Clears the counters of the PM parts. Execute the SP after you have replaced the component or unit. Note that SP7-905-004 is for the transfer roller and the transfer-roller cleaning unit.
7905 002	Fusing	
7905 003	Transfer Belt	
7905 004	Transfer Roller	
7905 005	Pickup Roller	
7905 006	Pickup Roller 2	

7907*	TMA 1	Specifies the TMA control switch (☛ 5.5).

7908	TMA 2	
7908 001	K	Specifies the TMA density switch (☛ 5.5).
7908 002	C	
7908 003	M	
7908 004	Y	
7908 005	TMA Status	Shows the TMA status (☛ 5.5).

7910	ROM Number		
	Shows the parts numbers of the firmware.		
7910 001	System	7910 159	PCLXL
7910 002	Engine	7910 160	MSIS
7910 009	Bank	7910 161	MSIS (OPTION)
7910 013	Duplex	7910 162	PDF
7910 014	Music	7910 163	BMLinkS
7910 131	Bluetooth	7910 180	FONT
7910 150	RPCS	7910 181	FONT 1
7910 151	PS	7910 182	FONT 2
7910 152	RPDL	7910 183	FONT 3
7910 153	R98	7910 200	Factory
7910 154	R16	7910 204	Printer
7910 155	RPGL	7910 209	Test Suite
7910 156	R55	7910 210	MIB
7910 157	RTIFF	7910 211	Web System
7910 158	PCL		

7911	Firmware Version		
	Shows the firmware versions.		
7911 001	System	7911 159	PCLXL
7911 002	Engine	7911 160	MSIS
7911 009	Bank	7911 161	MSIS (OPTION)
7911 013	Duplex	7911 162	PDF
7911 014	Music	7911 163	BMLinkS
7911 131	Bluetooth	7911 180	FONT
7911 150	RPCS	7911 181	FONT 1
7911 151	PS	7911 182	FONT 2
7911 152	RPDL	7911 183	FONT 3
7911 153	R98	7911 200	Factory
7911 154	R16	7911 204	Printer
7911 155	RPGL	7911 209	Test Suite
7911 156	R55	7911 210	MIB
7911 157	RTIFF	7911 211	Web System
7911 158	PCL		

7950	Unit Life Period	Shows the life of each component and unit. Note that the numbers are in hundred. "600" indicates 600 hundred (60,000).
7950 001	OPC Belt	"00600 pages" (=60,000 pages)
7950 002	Fusing	"00600 pages" (=60,000 pages)
7950 003	Transfer Belt	"03000 pages" (=300,000 developments) **NOTE**: The unit "pages" here indicates "developments."
7950 004	Transfer Roller	"01200 pages" (=120,000 pages)
7950 005	Pickup Roller	"01200 pages" (=120,000 pages)
7950 006	Pickup Roller 2	"01200 pages (=120,000 pages)

7951	Unit Used Ratio	
7951 001	OPC Belt	Shows the unit used ratio. The unit used ratio is calculated as follows: $(SP7805 - SP7803) \div SP7950 \times 100$ Where "SP7805" is the value displayed by Engine SP7-805, "SP7803" is the value displayed by Engine SP7-803, and "SP7950" is the value displayed by Engine SP7-950. These SPs show what percentage of life is already consumed.
7951 002	Fusing	
7951 003	Transfer Belt	
7951 004	Transfer Roller	
7951 005	Pickup Roller	
7951 006	Pickup Roller 2	

SP8: Data Log 2

The counters in Data Log 2 are used by more than one machine. Data Log 2 includes the counters of the functions or units that are not supported by the machine. The counters in Data Log 2 are cleared by SP5-801 (Memory Clear) or SP7-808 (Counter Reset).

Keys and abbreviations in Data Log 2

- **Program-related keys and abbreviations**

T:	Grand total of the counters of all application programs
C:	Counter of the copier application program excluding the events related to the document server
F:	Counter of the facsimile application program excluding the events related to the document server
P:	Counter of the printer application program excluding the events related to the document server
S:	Counter of the scanner application program excluding the events related to the document server
L:	Counter of the document server (local storage)
O:	Counter of other application programs including remote application programs

- **Program-independent keys and abbreviations**

/	by (“T:Jobs/Apl” means the total Jobs by Application.)
>	or more (“2>” means two or more.)
AddBook	address book
Apl	application program
B/W	black & white
Bk	black
C	cyan
ColCr	color create
ColMode	color mode
Comb	combine
Comp	compression
Deliv	delivery
DesApl	designated application program (The designated application program is the application program that stores the data or information on the document server, for example.)
Dev Counter	development count; the number of pages developed
Dup, Duplex	duplex printing
Emul	emulation
FC	full color
FIN	finish, post-print processing
Full Bleed	without margin
GenCopy	generation copy
GPC	get print counter (The Get Print Counter starts counting when the number of processed pages exceeds 10. For example, when 12 pages are processed, the Get Print Counter shows 2.)
Ifax	Internet fax
ImgEdt	image editing performed on the original with the copier GUI (Image editing includes, for example, border removal, adding stamps, and page numbering.)
K	black in the YMCK mode
LS	local storage; document server
Lsize	large size
Mag	magnification
MC	one color

NRS	new remote service; NRS
Org	original for scanning
OrgJam	original jam
Palm 2	Print Job Manager/Desk Top Editor (A pair of utility programs that distribute print jobs evenly among the printers on the network and processes files.)
PC	personal computer
PGS	pages (Duplex printing is counted as two. A3/DLT simplex is counted as two if the A3/DLT double-count program is validated.)
PJob	print job
Ppr	paper
PrtJam	printer (plotter) jam
PrtPGS	print pages
R	red toner remaining (Currently, no machine supports this function.)
Rez	resolution
SC	service condition code; SC code
Scn	scan
Sim, Simplex	simplex, printing on one side.
S-to-Email	scan-to-e-mail
SMC	SMC report printed by SP5-990
Svr	server
TonEnd	toner end
TonSave	toner save
TXJob	send, transmission
YMC	yellow, magenta, and cyan
YMCK	yellow, magenta, cyan, and black

8001*	T: Total Jobs	The number of times the application program starts a job [0~9999999/ **0** / 1/step]
8004*	P: Total Jobs	
8007*	O: Total Jobs	

- The jobs interrupted by paper jams or some other errors are also counted.
- The jobs done by SPs are not counted.

The job is counted at the time when either “Delete Data” or “Specify Output” is set when you use secure printing (when a password is required to start the print job).

- When the user prints a report (user code list, for example), the O: counter increments.

8021*	T: Pjob/LS	The number of times the application program stores data on the document server [0~9999999/ **0** / 1/step]
8024*	P: Pjob/LS	
8027*	O: Pjob/LS	

- When images stored on the document server by a network application (including Palm 2), are printed with another application, the O: counter increments.

8031*	T: Pjob/DesApl	The number of times the application program retrieves data from the document server [0~9999999/ **0** / 1/step]
8034*	P: Pjob/DesApl	
8037*	O: Pjob/DesApl	

- When documents already stored on the document server are printed, the counter of the application program that executes the print job increases.

8061*	T: FIN Jobs	The number of times the application program uses the finisher [0~9999999/ **0** / 1/step]
8064*	P: FIN Jobs	
8067*	O: FIN Jobs	
001	Sort	The number of times the application program starts the sort mode
002	Stack	The number of times the application program starts the tack mode
003	Staple	The number of times the application program starts the staple mode
004	Booklet	The number of times the application program starts the booklet mode **NOTE:** The counter of the staple mode (003) can also increase.
005	Z-Fold	The number of times the application program starts the Z-fold mode **NOTE:** The booklet mode is not included.
006	Punch	The number of times the application program starts the punch mode **NOTE:** The counter of the printer application program (P:) can also increase.
007	Other	(Reserved)

8071*	T: Jobs/PGS	The number of jobs that try to output a specific number of pages [0~9999999/ **0** / 1/step]	
8074*	P: Jobs/PGS		
8077*	O: Jobs/PGS		
001	1 Page	008	21~50 Pages
002	2 Pages	009	51~100 Pages
003	3 Pages	010	101~300 Pages
004	4 Pages	011	301~500 Pages
005	5 Pages	012	501~700 Pages
006	6~10 Pages	013	701~1000 Pages
007	11~20 Pages	014	1001~ Pages

- The jobs interrupted by paper jams or some other errors are also counted.
- If a job is suspended and restarted later, the job is seen as one job.
- If the finisher runs out of staples during stapling, the job is counted at the time the error occurs.
- The first test print and subsequent test prints to adjust settings are added to the number of pages of the copy job (SP8-072).

8381*	T: Total PrtPGS	The number of sheets that the application program tries to print (excluding the pages printed in the SP mode) [0~9999999/ **0** / 1/step]
8384*	P: Total PrtPGS	
8387*	O: Total PrtPGS	

- A3/DLT simplex is counted as two if the A3/DLT double-count program is validated.
- The following pages are not counted as printed pages:
  - Blank pages in a duplex printing job
  - Blank pages inserted as document covers, chapter title sheets, and slip sheets
  - Reports printed to confirm counts
  - All reports done in the service mode (service summaries, engine maintenance reports, etc.)
  - Test prints for machine image adjustment
  - Error notification reports
  - Partially printed pages as the result of a copier jam

8391*	LSize PrtPGS	The number of sheets printed on A3/DLT and larger sizes [0~9999999/ **0** / 1/step]

8411*	Prints/Duplex	The number of sheets used in duplex printing [0~9999999/ **0** / 1/step]

- The counter increases by +1 when both sides (front/back) are printed. The counter does not increase when one of the two sides is not printed (e.g., the last page of the documents that have three pages, five pages, seven pages, and so on).

8421*	T: PrtPGS/Dup Comb	The number of sheets used in binding and combining [0~9999999/ **0** / 1/step]
8424*	P: PrtPGS/Dup Comb	
8427*	O: PrtPGS/Dup Comb	
001	Simplex> Duplex	
004	Simplex Combine	
005	Duplex Combine	
006	2>	2 pages on 1 side (2-Up)
007	4>	4 pages on 1 side (4-Up)
008	6>	6 pages on 1 side (6-Up)
009	8>	8 pages on 1 side (8-Up)
010	9>	9 pages on 1 side (9-Up)
011	16>	16 pages on 1 side (16-Up)
012	Booklet	
013	Magazine	

- These counters are useful for the users who want to know how much paper they have saved.
- Partially printed sheets are also counted as 1 page (e.g, the last page in the 4-Up mode is only partially printed when the documents have 5, 6, or 7 pages, 9, 10, or 11 pages, 13, 14, or 15 pages, and so on.).
- Here is a summary of how the counters work in the booklet and magazine modes.

Booklet		**Magazine**	
Original Pages	**Count**	**Original Pages**	**Count**
1	1	1	1
2	2	2	2
3	2	3	2
4	2	4	2
5	3	5	4
6	4	6	4
7	4	7	4
8	4	8	4

8431*	T: PrtPGS/ImgEdt	The number of pages that the application program handles in a specific way [0~9999999/ **0** / 1/step]
8434*	P: PrtPGS/ImgEdt	
8437*	O: PrtPGS/ImgEdt	
001	Cover/Slip Sheet	The number of cover sheets or slip sheets inserted **NOTE:** A duplex-printed cover is counted as two.
002	Series/Book	The number of pages printed in series (one side) or in the booklet mode
003	User Stamp	The number of pages where stamps were applied (including page numbering and date stamping)

8441*	T: PrtPGS/Ppr Size	The number of sheets of a specific paper size that the application program uses [0~9999999/ **0** / 1/step]	
8444*	P: PrtPGS/Ppr Size		
8447*	O: PrtPGS/Ppr Size		
001	A3	007	LG
002	A4	008	LT
003	A5	009	HLT
004	B4	010	Full Bleed
005	B5	254	Other (Standard)
006	DLT	255	Other (Custom)

- These counters do not distinguish between LEF and SEF.

8451*	PrtPGS/Ppr Tray	The number of sheets fed from a specific tray [0~9999999/ **0** / 1/step]
001	Bypass	Bypass Tray
002	Tray 1	Copier
003	Tray 2	Copier
004	Tray 3	Paper Tray Unit/LCT (Optional)
005	Tray 4	Paper Tray Unit (Optional)
006	Tray 5	(Not used)
007	Tray 6	(Not used)
008	Tray 7	(Not used)
009	Tray 8	(Not used)
010	Tray 9	(Not used)

8461*	T: PrtPGS/Ppr Type	The number of sheets of specific paper types [0~9999999/ **0** / 1/step]	
8464*	P: PrtPGS/Ppr Type		
001	Normal	005	Normal (Back)
002	Recycled	006	Thick (Back)
003	Special	007	OHP
004	Thick	008	Other

- These counters increase when the paper is output. On the other hand, the PM counter increases (to measure the service life of each feed roller) when the paper is fed.
- Blank sheets (covers, chapter covers, slip sheets) are also counted.
- During duplex printing, a sheet printed on two sides and a sheet printed on one side are both counted as 1.

8471*	PrtPGS/Mag	The number of pages magnified or reduced [0~9999999/ **0** / 1/step]	
001	~49%	004	101%~200%
002	50%~99%	005	201% ~
003	100%		

- Some application programs (on the computer) can specify the magnification setting of the printer driver (e.g., MS Excel). In a case like this, SP8-471 recognizes the setting and increases the corresponding counter. Other application programs can magnify or reduce the print images on their own. In a case like this, SP8-471 does not recognize the magnification setting of the application programs and increase the counter of 100%.
- Magnification adjustment conducted on the document server is not counted.
- Blank cover sheets and slip sheets are regarded as 100%.

8481*	T: PrtPGS/TonSave	The number of pages printed with the toner save feature activated [0~9999999/ **0** / 1/step]
8484*	P: PrtPGS/TonSave	

- These counters display the same result.

8501*	T: PrtPGS/Col Mode	The number of pages printed in a specific color mode [0~9999999/ **0** / 1/step]	
8504*	P: PrtPGS/Col Mode		
001	B/W	003	Full Color
002	Single Color		

8511*	T: PrtPGS/Emul	The number of pages printed by the printer emulation mode [0~9999999/ **0** / 1/step]	
8514*	P: PrtPGS/Emul		
001	RPCS	008	RTIFF
002	RPDL	009	PDF
003	PS3	010	PCL5e/5c
004	R98	011	PCL XL
005	R16	012	IPDL-C
006	GL/GL2	013	BM-Links (for local models only)
007	R55	014	Other

- These counters display the same result.

8521*	T: PrtPGS/FIN	The number of pages processed by the finisher [0~9999999/ **0** / 1/step]	
8524*	P: PrtPGS/FIN	[0~9999999/ **0** / 1/step]	
001	Sort	005	Z-Fold
002	Stack	006	Punch
003	Staple	007	Other
004	Booklet		

- Even if the pages are too many for the finisher to staple, all pages are counted (including unstapled pages).
- The counter of stapling (003) increases by +1 when the paper is transported from the printer to the tray of the finisher. Even if a paper jam occurs on this path, the counter (003) increases. If the same job is retried, the counter (003) increases once again.

8531*	Staples	The number of staples [0~9999999/ **0** / 1/step]

8581*	T: Counter	The number of outputs in a specific color mode [0~9999999/ **0** / 1/step]	
001	Total	007	Copy: B/W
002	Total: Full Color	008	Print: Color
003	B&W/Single Color	009	Print: B/W
004	Development: CMY	010	Total: Color
005	Development: K	011	Total: B/W
006	Copy: Color		

8584	P: Counter	The number of outputs in a specific color mode [0~9999999/ **0** / 1/step]	
001	B/W	003	Full Color
002	Single Color		

8591*	O: Counter	The number of A3/DLT, duplex printing, or staples [0~9999999/ **0** / 1/step]	
001	A3/DLT	003	Staple
002	Duplex		

- Note that these counters are not for the printer application program.

8771*	Dev Counter	The number of rotations of the development rollers [0~9999999/ **0** / 1/step]	
001	Total	004	M
002	K	005	C
003	Y		

8801*	Toner Remain	The percentage of the remaining toner [0~100/ **0** / 1/step]	
001	K	003	M
002	Y	004	C

8941*	Machine Status	The amount of time the machine spends in a specific mode [0~9999999/ **0** / 1/step]
001	Operation Time	The engine is operating. The counter does not include the time when the data is being saved in the HDD (while engine is not operating).
002	Standby Time	The engine is not operating. The counter includes the time when the data is being saved in the HDD. The counter does not include the time when the machine is n the Energy Saver Mode, the Low Power Mode, or the Off Mode.
003	Energy Save Time	The machine is in the Energy Saver Mode. The counter includes the time when the background printing is being executed.
004	Low Power Time	The machine is in the Low Power Mode. The counter includes the time when the engine is on in the Energy Saver Mode. The counter also includes the time when the background printing is being executed.
005	Off Mode Time	The machine is in the Off Mode. The counter includes the time when the background printing is being executed. The counter does not include the time when the main power switch is off.
006	Down Time/SC	The total downtime caused by SC codes
007	Down Time/PrtJam	The total downtime caused by paper jams
008	Down Time/OrgJam	The total downtime caused by original jams
009	Down Time/TonEnd	The total downtime caused by toner ends

5.1.4 MEMORY CLEAR/COUNTER CLEAR

The table lists the data and information cleared or deleted by the following SPs:

1) Engine SP5-801 (Memory Clear)
2) Engine SP5-998 (Engine Memory Clear)
3) Engine SP7-808 (Counter Clear)

The serial number information, meter charge setting (Engine SP5-930), and meter charge counters (Engine SP8-58x) are not cleared.

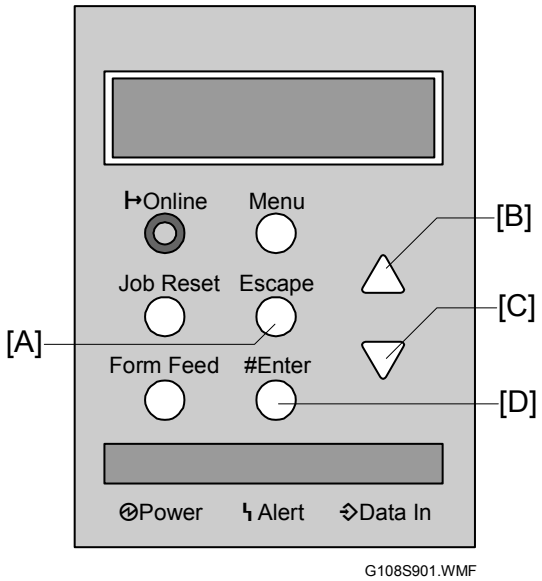
NOTE: In this section (5.1.4), the letter "x" represents a whole number from "0" to "9."

Service Program		Cleared or Deleted
5801 003	Memory Clear > SCS	Engine SP5-833 Engine SP7-401, 403, 502, 504, 506, and 507 Engine SP8-00x, 02x, 03x, 06x, 07x, 42x, 43x, 44x, 451, 46x, 471, 48x, 51x, 52x, 771, 781, 801, 831, 841, 851, 861, 871, 881, 891, 901, 941
5801 004	Memory Clear > IMH	No SP modes are cleared. All files stored in the HDD are deleted.
5801 005	Memory Clear > MCS	No SP modes are cleared.
5801 008	Memory Clear > PRT	Service settings: • Bit switches • Gamma settings (User & Service) • Toner Limit User settings: • Tray Priority • Menu Protect • System Setting except for setting of Energy Saver • I/F Setup (I/O Buffer and I/O Timeout) • PCL Menu
5801 011	Memory Clear > NCS	All setting of network setup
5998	Engine Memory Clear	When the NVRAM error (SC660) does not occur, the SP deletes the following data: • Total Page Data • Duplex Total Page Data • Each Image Data • Next Life Limit Data • Life Period Data When the NVRAM error (SC660) occurs, the SP deletes the following data: • Total Page Data • Duplex Total Page Data • Each Image Data • Next Life Limit Data • Life Period Data • ID Data • Margin for Top • Margin for Left • Margin for Left 1 • Margin for Left 3 • All Tune-Up Data (including Laser Power Default, Developer Bias Voltage Default, THV, THV2, CBV, FBV, TM1 and TM2).
7808 001	Counter Clear	SP7-401, 403, 502, 504, 506, 507 SP8-00x, 02x, 03x, 06x, 07x, 42x, 43x, 44x, 451, 46x, 471, 48x, 51x, 52x, 771, 781, 801, 831, 841, 851, 861, 871, 881, 891, 901, 941

5.1.5 TELEPHONE NUMBER SETTING (SP5-812)

Do this to set telephone numbers:

1. Start the SP mode.
2. Set SP5-812-1 (Service) or 2 (FAX TEL No.).
3. Press the enter key. A cursor is shown on the bottom-left corner.
4. To select a column, press the enter key [D]. A character is shown in the column.
5. To change the character, press the up-arrow key or the down-arrow key. The characters change as follows:
   1) Numbers ("0" to "9")
   2) Uppercase letters ("A" to "Z")
   3) Hyphen
   4) Period
6. To select the character, press the enter key.



G108S901.WMF

7. To move the cursor, push the up-arrow key [B] or the down-arrow key [C].
8. Set all necessary characters.
9. To quit the program, press the escape key [A].

5.2 FIRMWARE UPDATE

5.2.1 TYPES OF FIRMWARE

The table lists the firmware programs used by this machine.

Firmware	Display
Onboard System	Onboard Sys
Onboard Printer	Onboard Printer
Onboard WEBSYS	Web Support
PHY Multi-protocol	Network Support

5.2.2 PRECAUTIONS

Handling SD Card

Do these when you touch SD cards:

- Turn off the main power switch before you insert or remove an SD card. Data in the SD card may be corrupted if you insert or remove an SD card while the main power switch is on.
- Do not turn off the main power switch during at the time the machine downloads a program.
- Keep SD cards in a safe place. Do not keep SD cards in the following places:
  - Areas exposed to high temperature, high humidity, direct sunlight, or severe vibration
  - Areas affected by magnetic force
- Do not bend or scratch SD cards.
- Do not drop SD cards or give them shock or vibration.

Upload or Download

In this section (5.2), these words these meanings:

- Upload: To copy data from the printer to the SD card
- Download: To copy data from the SD card to the printer

Network Connection

Explain to the user that they cannot use the printer at the time of firmware update. Disconnect the printer from the network. Incoming print jobs may affect firmware update.

5.2.3 FILE ARRANGEMENT

How The Program Works

The firmware-updating program of the machine searches the folder *romdata* for necessary firmware. Make the folder *romdata* when you save the firmware in a SD card. You must not make the folder *romdata* in any other folder. But you can make more than one folder in the folder *romdata.* The firmware-updating program searches all folders if they are in *romdata.*

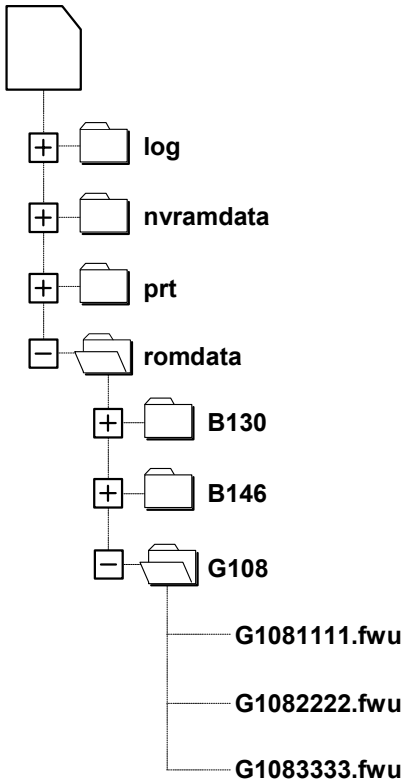
Each firmware program contains the file information. The firmware-updating program reads the file information before it downloads the firmware from an SD card. The firmware is downloaded only when the file information is correct.

NOTE: The file information can identify the firmware. But this information does not guarantee that the data is not corrupted.

Example

Keep folders and files as follows when you save the firmware:

- In the folder *romdata,* make another folder. Use this folder only for one machine. Use the machine code as the name of this folder.
- Make a new folder in the folder *romdata* when you save the firmware of another machine. Give it a name as above-mentioned. (The diagram illustrates an example. The folder *romdata* has three folders: B130, B146, and G106. Each folder is for one machine.)
- Make a new folder outside *romdata w*hen you save files that are not firmware. Keep the files in this folder. Do not keep files outside the folders. (The diagram illustrates an example. Three folders, *log*, *nvramdata*, and *prt*, are outside *romdata.* These folders can keep debug logs, NVRAM data, and captured files)

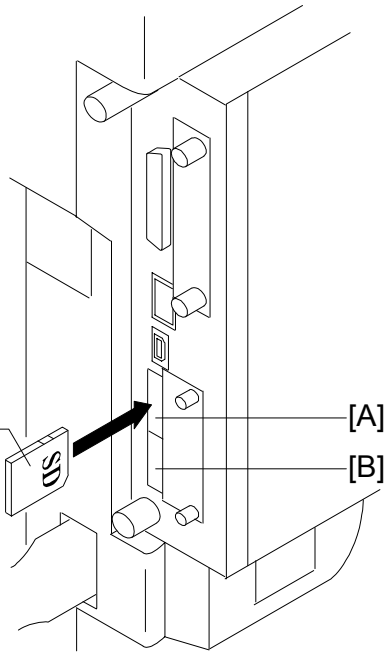


G108S906.WMF

5.2.4 UPDATING

Procedure

In this section, Slot 1 indicates the upper SD-card slot [A]. Slot 2 indicates the lower SD-card slot [B].



1. Turn off the main power switch.
2. Disconnect the printer from the network (☛ 5.2.2).
3. Turn the SD card face [C] to the left side of the printer. Then put it into Slot 1 [A].
4. Slowly put the SD card into the slot until it clicks.
5. Make sure that the SD card is locked in place.
   NOTE: To remove the SD card, push it in until it clicks. Then release it slowly. The slot pushes out the SD card.
6. Turn on the main power switch.
7. Wait until a firmware name is shown (about 45 seconds).
   NOTE: Each firmware name is read out of the firmware itself. The firmware name is not changed even if you change the file name on your computer (☛ 5.2.3).
8. If the necessary firmware is already shown, go to the next step. If you use some other firmware, push the up-arrow key or the down-arrow key to locate the necessary firmware.
9. To select the firmware, push the enter key. Make sure that a star (✱) is added to the firmware name. The star indicates which firmware is selected. To cancel selection, push the escape key.
10. To locate *Execute*, push the up-arrow key or the down-arrow key.
11. Make sure that *Execute* is shown. To start firmware update, push the enter key. Stars are shown while each firmware is downloaded.
12. Wait until the message "Updated Power Off On" is shown.
13. Turn off the main power switch.
14. Remove the SD card from the slot.
15. Connect the printer to the network physically.
16. Turn on the main power switch.
17. Print the configuration page (Menu > List/Test Print > Config.P/Er.Log). Make sure all firmware is correctly updated.

Error Handling

An error code is shown if an error occurs during downloading. Error codes have the letter "E" and a number. If an error occurs, the firmware is not successfully downloaded. At this time, see the error code table (5.2.6). Then do the necessary actions. Then download the firmware again.

Power Failure

If firmware update is interrupted by power failure, the firmware is not successfully downloaded. At this time, machine operation is not guaranteed. Download the firmware again.

5.2.5 NVRAM DATA UPLOAD/DOWNLOAD

⚠CAUTION

Turn off the main power switch before you put in or remove an SD card. Make sure that the controller and the BCU are correctly connected.

Uploading NVRAM Data

Copy the data from the NVRAM to an SD card (referred to as "to upload NVRAM data" in this section) before you replace the NVRAM. Otherwise, you must manually input necessary settings after you replace the NVRAM.

1. Start the SP mode.
2. Select Engine SP5-990-001 (ALL (Data List)).
3. Do the SP.
4. Check that the SMC report is correctly output.
   NOTE: You may need the SMC Report when you upload NVRAM data or download NVRAM data (☛ Downloading NVRAM Data).
5. Go out of the SP mode.
6. Turn off the main power switch.
7. Put an SD card into Slot 1.
8. Turn on the main power switch.
9. Start the SP mode.
10. Set Engine SP5-824 (NVRAM Upload).

11. Push the enter key. Uploading starts.
    This file is made at the time when uploading ends normally:
    NVRAM\serial_number.NV
    "NVRAM" is the folder name in the SD card. "Serial_number.NV" is the file name with the extension ".NV". The serial number of the machine is used as the fine name. For example, if the serial number is G1080017, the file name is "G1080017.NV".
12. Go out of the SP mode.
13. Turn off the main power switch.
14. Remove the SD card.
15. Put the machine code on the SD card. You need this SD card when you download NVRAM data (☛ Downloading NVRAM Data).
    NOTE: One SD card can keep the NVRAM data from two or more machines.

Downloading NVRAM Data

Copy the data from the SD card to the NVRAM (referred to as "to download NVRAM data" in this section) after you replace the NVRAM. You must manually input necessary settings if you do not download the NVRAM data.

1. Make sure that the main power switch is off.
2. Make sure that you have the correct SD card that keeps the necessary NVRAM data.
3. Put the SD card into Slot 1.
4. Turn on the main power switch.
5. Start the SP mode.
6. Set Engine SP5-825 (NVRAM Download).
7. Push the enter key. Downloading starts.
   NOTE: Downloading will stop if the file name in the SD card is not the same as the serial number of the machine (☛Uploading NVRAM Data).
8. Go out of the SP mode.
9. Turn off the main power switch.
10. Remove the SD card.
11. Turn on the main power switch.
12. Check that the NVRAM data is correctly downloaded.

5.2.6 ERROR CODE TABLE

Note that these error codes are commonly used by multiple machines. Some codes are not supported by this machine.

Code	Cause	Solution
20	Cannot map logical address	Make sure SD card inserted correctly, or use another SD card.
21	Cannot access memory	HDD connection incorrect or replace hard disks.
22	Cannot decompress compressed data	Incorrect ROM data on the SD card, or data is corrupted.
23	Error occurred when ROM update program started	Controller program abnormal. If the second attempt fails, replace controller board.
24	SD card access error	Make sure SD card inserted correctly, or use another SD card.
30	No HDD available for stamp data download	HDD connection incorrect or replace hard disks.
31	Data incorrect for continuous download	Insert the SD card with the remaining data required for the download, the re-start the procedure.
32	Data incorrect after download interrupted	Execute the recovery procedure for the intended module download, then repeat the installation procedure.
33	Incorrect SD card version	Incorrect ROM data on the SD card, or data is corrupted.
34	Module mismatch - Correct module is not on the SD card)	SD update data is incorrect. Acquire the correct data (Japan, Overseas, OEM, etc.) then install again.
35	Module mismatch – Module on SD card is not for this machine	SD update data is incorrect. The data on the SD card is for another machine. Acquire correct update data then install again.
36	Cannot write module – Cause other than E34, E35	SD update data is incorrect. The data on the SD card is for another machine. Acquire correct update data then install again.
40	Engine module download failed	Replace the update data for the module on the SD card and try again, or replace the BCU board.
42	Operation panel module download failed	Replace the update data for the module on the SD card and try again, or replace the LCDC.
43	Stamp data module download failed	Replace the update data for the module on the SD card and try again, or replace the hard disks.
44	Controller module download failed	Replace the update data for the module on the SD card and tray again, or replace controller board.
50	Electronic confirmation check failed	SD update data is incorrect. The data on the SD card is for another machine. Acquire correct update data then install again.

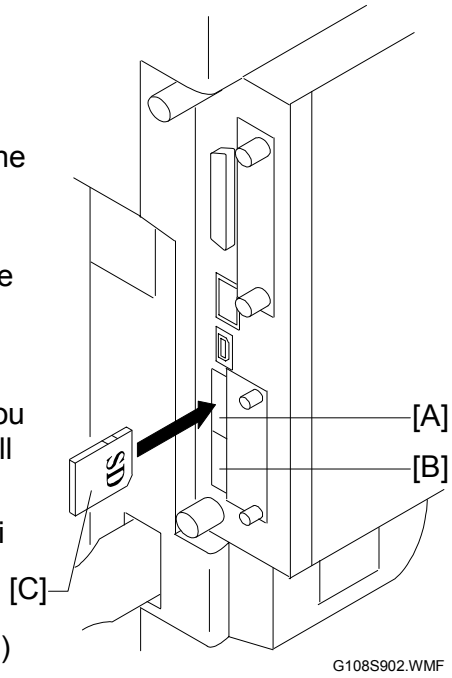
5.3 SD CARD APPLI MOVE

5.3.1 OVERVIEW

Slot 1 indicates the upper SD-card slot [A]. Slot 2 indicates the lower SD-card slot [B].

The service program "SD Card Appli Move" (Engine SP5-873) lets you to copy application programs from one SD card to another SD card.

There are two SD card slots. The machine can use Slot 1 and Slot 2 as the storage of application programs. Slot 1 can also be used for your maintenance work. When necessary application programs are stored in three SD cards or more, you must ① choose two of the SD cards and ② save all application programs in these cards (☛ 5.3.2).



G108S902.WMF

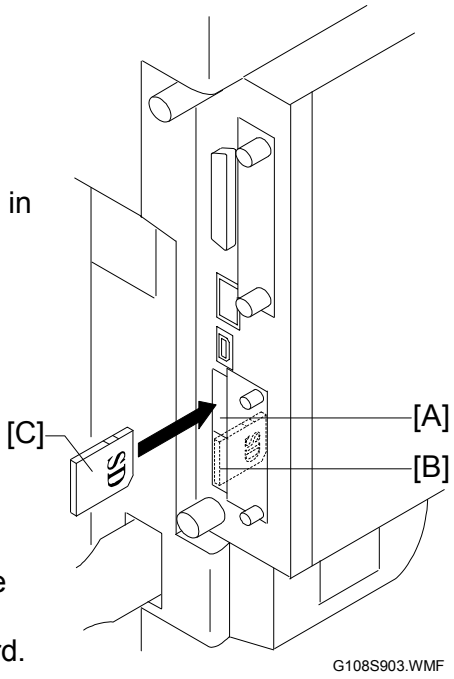
Use extreme caution when you use SD Card Appli Move:

- The authentication data is transferred with the application program from one SD card (in Slot 1) to the other SD card (in Slot 2).
- Do not use an SD card if it has been already used for some other work. Normal operation is not guaranteed when such SD card is used.
- Keep the SD card in a safe place after you copy the application program from the card. This is because: ① The SD card can be the only proof that the user is licensed to use the application program. ② You may need to check the SD card and its data to solve a problem in the future.
- You cannot copy PostScript data to another SD card. You can copy an application program to the SD card that saves PostScript data.

5.3.2 MOVE EXEC

Slot 1 indicates the upper SD-card slot [A.] Slot 2 indicates the lower SD-card slot [B].

The service program "Move Exec" (Engine SP5-873-001) lets you copy application programs from the original SD card to another SD card. The application programs are copied from the SD card in Slot 1 to the SD card in Slot 2. Note that the authentication data is also copied with the application program (☛ 5.3.1).



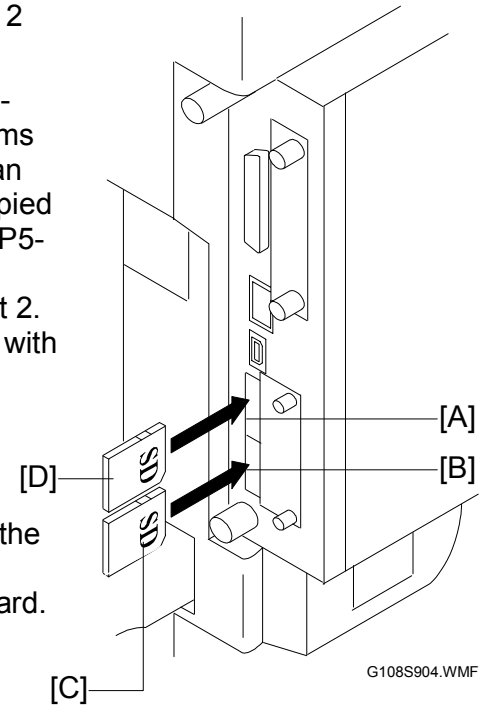
G108S903.WMF

1. Turn off the main power switch.
2. Make sure that an SD card is in Slot 2. The application program is copied to this SD card.
3. Prepare the SD card that has stored the application program.
4. Turn the SD card face [C] to the left side of the machine. Then put it into Slot 1 [A]. The application program is copied from this SD card.
5. Turn on the main power switch.
6. Start the SP mode.
7. Set Engine SP5-873-001 "Move Exec."
8. Follow the instruction on the operation panel.
9. Quit the SP mode.
10. Turn off the main power switch.
11. Remove the SD card from Slot 1.
12. Turn on the main power switch.
13. Make sure that the application programs operate correctly.

5.3.3 UNDO EXEC

Slot 1 indicates the upper SD-card slot [A]. Slot 2 indicates the lower SD-card slot [B].

The service program "Undo Exec" (Engine SP5-873-002) lets you copy back application programs from an SD card to the original SD card. You can use this program when you have mistakenly copied some programs by using Move Exec (Engine SP5-873-001). The application programs are copied from the SD card in Slot 1 to the SD card in Slot 2. Note that the authentication data is also copied with the application program (☛ 5.3.1).



1. Turn off the main power switch.
2. Prepare the original SD card.
3. Turn the SD card face [C] to the left side of the machine. Then put in into Slot 2. The application program is copied back to this card.
4. Prepare the SD card that has stored the application program.
5. Turn the SD card face [D] to the left side of the machine. Then put it into Slot 1. The application program is copied back from this SD card.
6. Turn on the main power switch.
7. Start the SP mode.
8. Select Engine SP5-873-002 "Undo Exec."
9. Follow the instruction on the operation panel.
10. Quit the SP mode.
11. Turn off the main power switch.
12. Remove the SD card from Slot 2.
13. Remove the other SD card from Slot 1.
14. Put in a necessary SD card to Slot 2.
15. Turn on the main power switch.
16. Check that the application programs operate correctly.

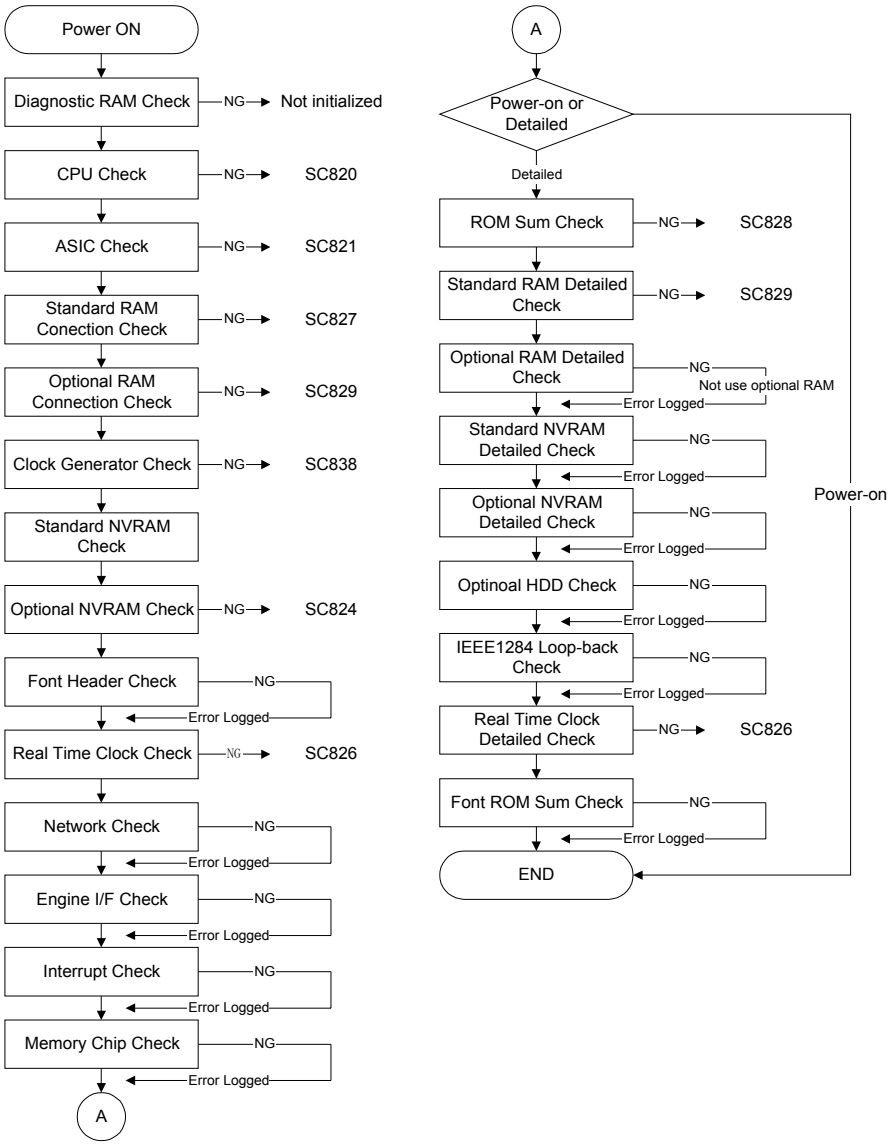
5.4 CONTROLLER SELF-DIAGNOSTICS

5.4.1 OVERVIEW

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

- Power-on self-diagnostics: The machine automatically starts this self-diagnostics when you turn on the main power switch.
- Detailed self-diagnostics: The machine does this self-diagnostics with the loop-back connector (P/N G0219350)
- SC detection: The machine automatically does this self-diagnostics to detect SC conditions at power-on or during operation.

This flowchart illustrates the process flow of the power-on and detailed self-diagnostics:



G108S907.WMF

5.4.2 DETAILED SELF-DIAGNOSTICS

The detailed self-diagnostics requires the loop-back connector (P/N: G0219350).

1. Turn off the main power switch. Then attach the loop-back connector to the parallel interface.
2. Press the online key and the enter key and hold them down.
3. Turn on the main power switch while you press the two keys.
4. The machine starts the self-diagnostics. The machine prints a diagnostic report when it finishes the self-diagnostics.
   - Examine the diagnostics report and check the result.
   - Use Engine SP7-832-001 (Diag. Result) to see the return code.
   - For the error codes, see section 4.1.

5.5 TONER MASS AMOUNT CONTROL

5.5.1 OVERVIEW

These SP modes are for the Toner Mass Amount Control (TMA):

- TMA 1 (Engine SP7-907): Sets one of the TMA control switches. The TMA control switches sets the intervals of the TAM.
- TMA 2 (Engine SP7-908)
  1) K (Engine SP7-908-001): Adjusts the K development bias.
  2) C (Engine SP7-908-002): Adjusts the C development bias.
  3) M (Engine SP7-908-003): Adjusts the M development bias.
  4) Y (Engine SP7-908-004): Adjusts the Y development bias.
  5) TMA Status (Engine SP7-908-005): Shows the TMA status.

The TMA takes about 25 seconds at the maximum. For the detailed process of the TMA, see section 6.2.

5.5.2 TMA CONTROL SWITCH

TMA 1 (Engine SP7-907) sets one of the 15 TMA control switches. The TMA control switches set the intervals of the TMA. The table lists the switches and intervals. The unit of intervals is 'page or minute'. The TMA is done at the end of a job after the condition is met.

For example: when the TMA control switch is "1," the TMA is done at the end of a job after 100 pages are printed or at the time when 100 minutes passes (whichever happens first).

TMA Control Switch (SP7-907)	Intervals (pages or minute)				Remarks
	1st Execution	2nd Execution	3rd Execution	4th Execution	
1	100	200	300	300	The development bias is adjusted.
2	100	200	200	200	
3	100	100	100	100	
4	50	200	300	300	
5	50	200	200	200	
6	50	100	300	300	
7	50	100	200	200	
8	30	60	150	250	
9	30	60	100	200	
10	30	60	100	100	
11	30	60	60	200	
12	30	60	60	100	
13	50	50	50	50	
14	Not executed	Not executed	Not executed	Not executed	
15	Not executed	Not executed	Not executed	Not executed	The development bias is not adjusted.

5.5.3 ADJUSTING DEVELOPMENT BIAS

Engine SP7-908-001 through 004 adjusts the density target for each color. Toner image is thicker when you set a greater value.

5.5.4 TMA STATUS

Engine SP7-908-005 (TMA Status) shows the return codes of the TMA. This SP shows an 8-digit number. The leftmost digit is Bit 7 and the rightmost digit is Bit 0. The table lists each bit and its description. Note that Bit 7 and Bit 0 are always "0".

Bit	Status	Return Code	Remarks
7	(0)	—	
6	TMA control status	• 0: The TMA is available. • 1: The TMA is not available.	
5	Sensor error status	• 0: Normal • 1: Error	The sensor error status in the latest TMA.
4	K development status	• 0: Successful • 1: Not successful	The result of the latest development bias adjustment.
3	C development status	• 0: Successful • 1: Not successful	
2	M development status	• 0: Successful • 1: Not successful	
1	Y development status	• 0: Successful • 1: Not successful	
0	(0)	—	

NOTE: The default development bias is used if the latest TMA or development bias adjustment is not successful.

5.6 USER PROGRAM MODE

Starting User Program

1. Push the menu key to go into the user program mode.
2. Use the up arrow key and the down arrow key to set a program.
3. Push the enter key to start the program.

NOTE: Push the escape key one or several times to go back to step 1.

Quitting User Program

Push the online key or push the escape key several times until the message "ready" is shown.

Menu List

For more information, print the Menu List (Menu > List/Test Print > Menu List).

Paper Input
- Tray Paper Size
- Paper Type
- Tray Locking
- Tray Priority

List/Test Print
- Config. Page/Error Log
- Config. Page
- Error Log
- Menu List
- Color Demo Page
- PCL Config. Page
- PS Config. Page
- PDF Config. Page
- Hex Dump
- Operations Test

Maintenance
- Color Calibrate
- Registration
- Plain Paper Type
- Thick Paper Type
- A5/HLT Size
- Maintenance Reset
- 4C. Graphic Mode
- Key Repeat

System
- Print Error Report
- Auto Continue
- Memory Overflow
- Copies
- Printer Language
- Sub Paper Size
- Page Size
- Def. Printer Language
- Energy Saver 1
- Energy Saver 2
- Unit of Measure
- Letterhead Mode
- RAM Disk
- Notify by Email

Host Interface
- I/O Buffer
- I/O Timeout
- Network Setup

PCL Menu
- Orientation
- Form Lines
- Font Source
- Font Number
- Point Size
- Font Pitch
- Symbol Set
- Courier Font
- Ext. A4 Width
- Append CR to LF
- Resolution

PS Menu
- Data Format
- Resolution
- Color Setting
- Color Profile

PDF Menu
- PDF: Change PW
- Resolution
- Color Setting
- Color Profile

Language

5.7 DIP SWITCHES

Controller Board

All switches are off.

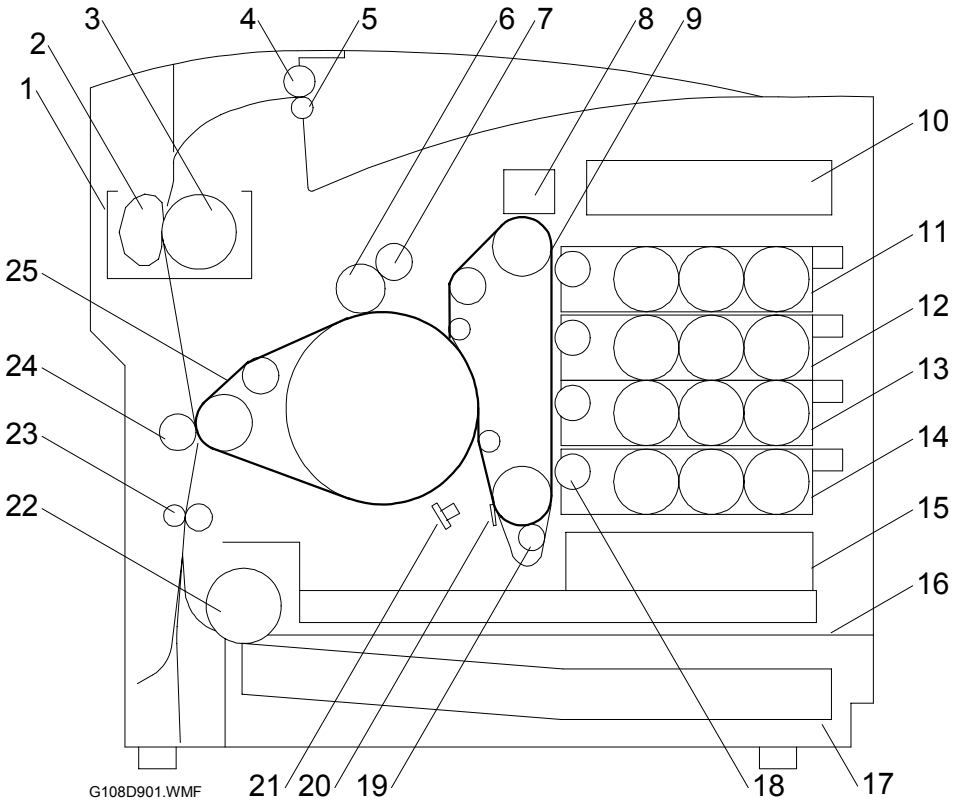
BCU Board

There are no DIP switches on the BCU.

6. DETAILED DESCRIPTIONS

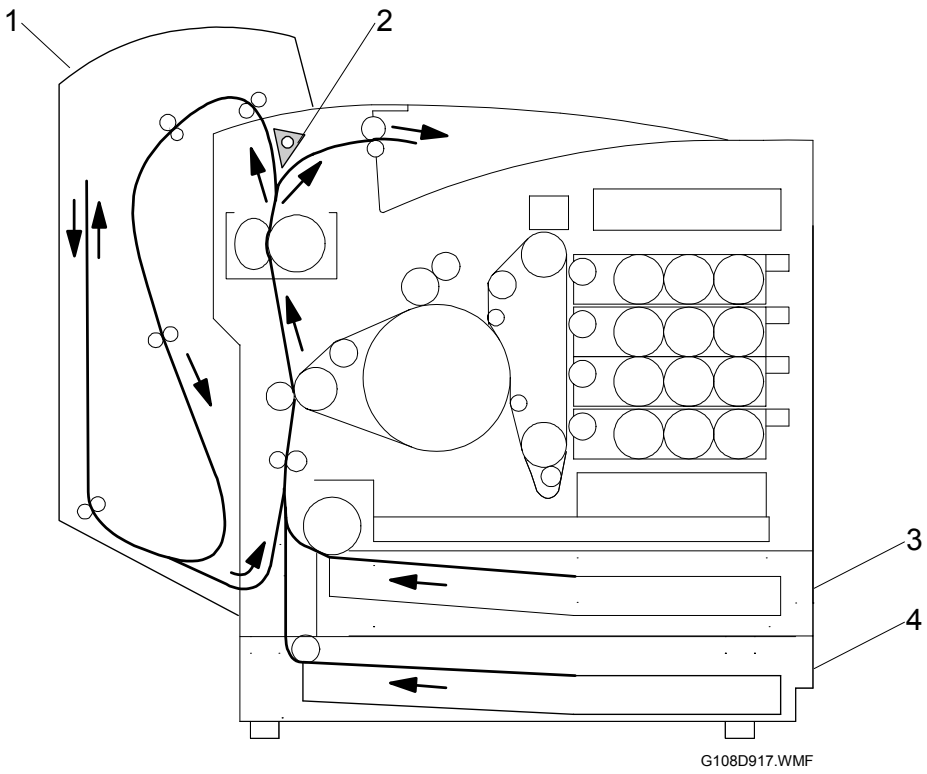
6.1 OVERVIEW

6.1.1 COMPONENT LAYOUT



1. Fusing unit
2. Pressure unit
3. Hot roller
4. Exit roller
5. Idle roller
6. Cleaning brush
7. Cleaning roller
8. OPC belt handle
9. OPC Belt
10. Input output device
11. Development unit K
12. Development unit Y
13. Development unit M
14. Development unit C
15. Optics unit
16. Paper tray
17. Paper
18. Development roller
19. Charge roller
20. Cleaning blade
21. Erase lamp
22. Paper feed roller
23. Registration roller
24. Transfer roller
25. Transfer belt

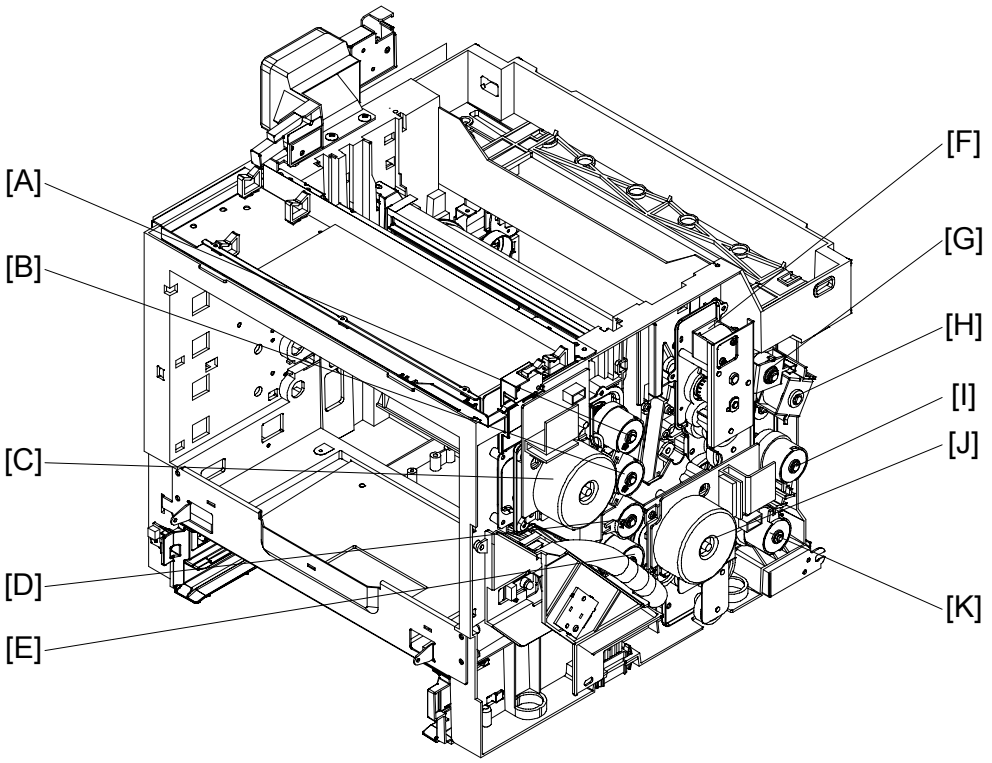
6.1.2 PAPER PATH



1. Duplex unit (optional)
2. Paper gate
3. Paper tray (standard)
4. Paper tray (optional)

The diagram shows the paper paths when the optional duplex unit and the optional paper feed unit are installed.

6.1.3 DRIVE LAYOUT



G108D903.WMF

The main motor and the development motor drive these units and components: The arrow (→) shows the drive path. All idle gears are not shown.

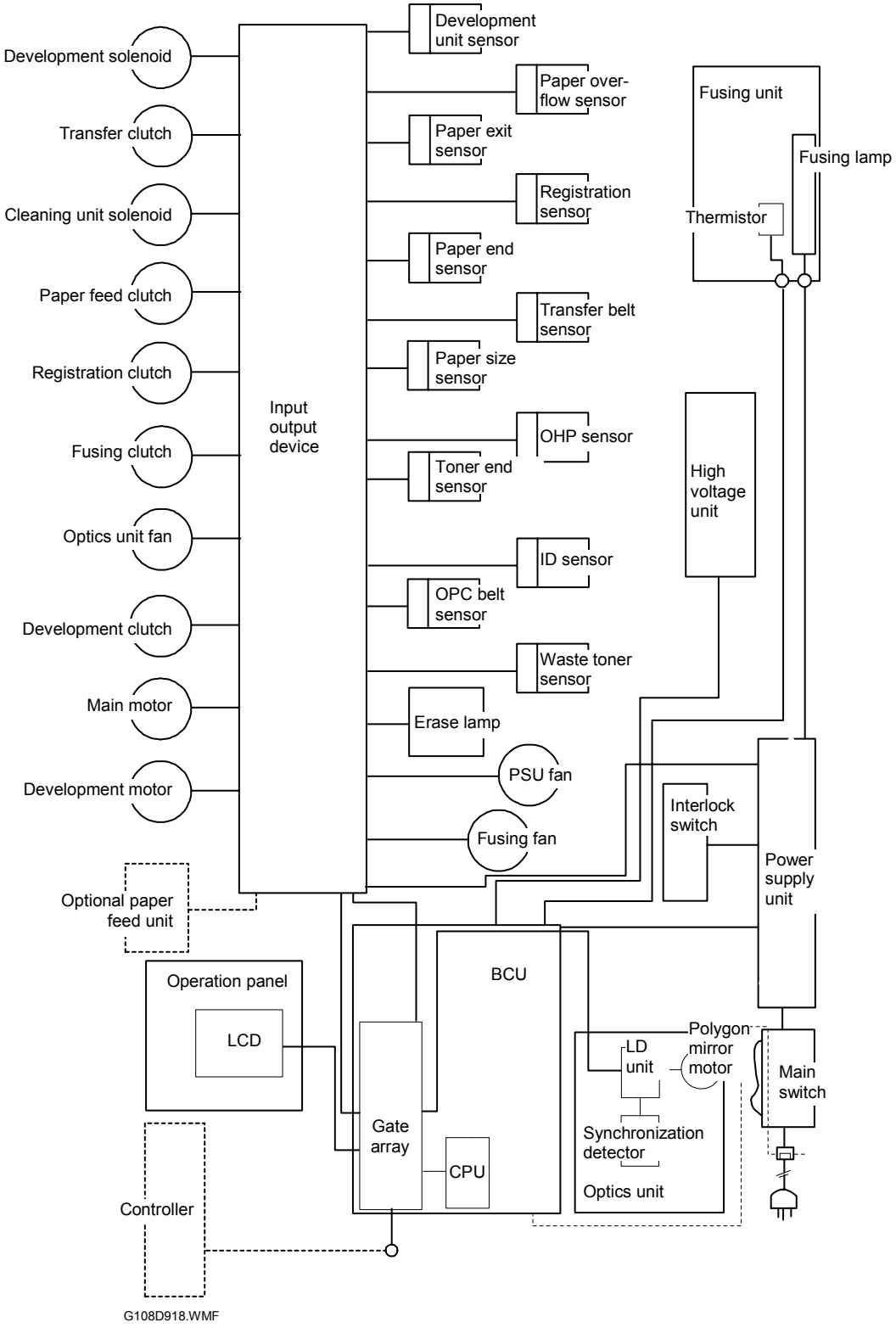
Main motor [J]

- OPC belt unit
- OPC belt charge unit
- OPC belt cleaning unit
- Transfer belt unit
- Transfer belt cleaning solenoid [F] → Transfer belt cleaning unit
- Paper transfer clutch [H] → Paper transfer unit contact mechanism
- Waste-toner collection unit
- Paper Feed Clutch [K] → Paper feed roller
- Registration clutch [I] → Registration roller
- Fusing clutch [G] → Fusing unit → Paper exit unit
- Optional paper tray unit

Development motor [C]

- Development clutch K [A] → Development unit K
- Development clutch Y [B] → Development unit Y
- Development clutch M [D] → Development unit M
- Development clutch C [E] → Development unit C

6.1.4 BOARD STRUCTURE



Controller

The controller is the only interface with the printer. The controller receives signals and data and sends them to the BCU. The controller supports the following:

- Standard: IEEE 1284, Ethernet, USB 2.0
- Optional: IEEE 802.11b (Wireless LAN), Bluetooth

You can install these optional components on the controller:

- Hard disk drive (10 GB)
- SDRAM (64/128/256 MB)
- Network data protection unit (stored in an SD card)

Base Engine Control Unit (BCU)

The BCU examines the power supply and the mechanical components. These include the optional paper feed unit and the optional duplex unit. The BCU also operates as the interface with the operation panel.

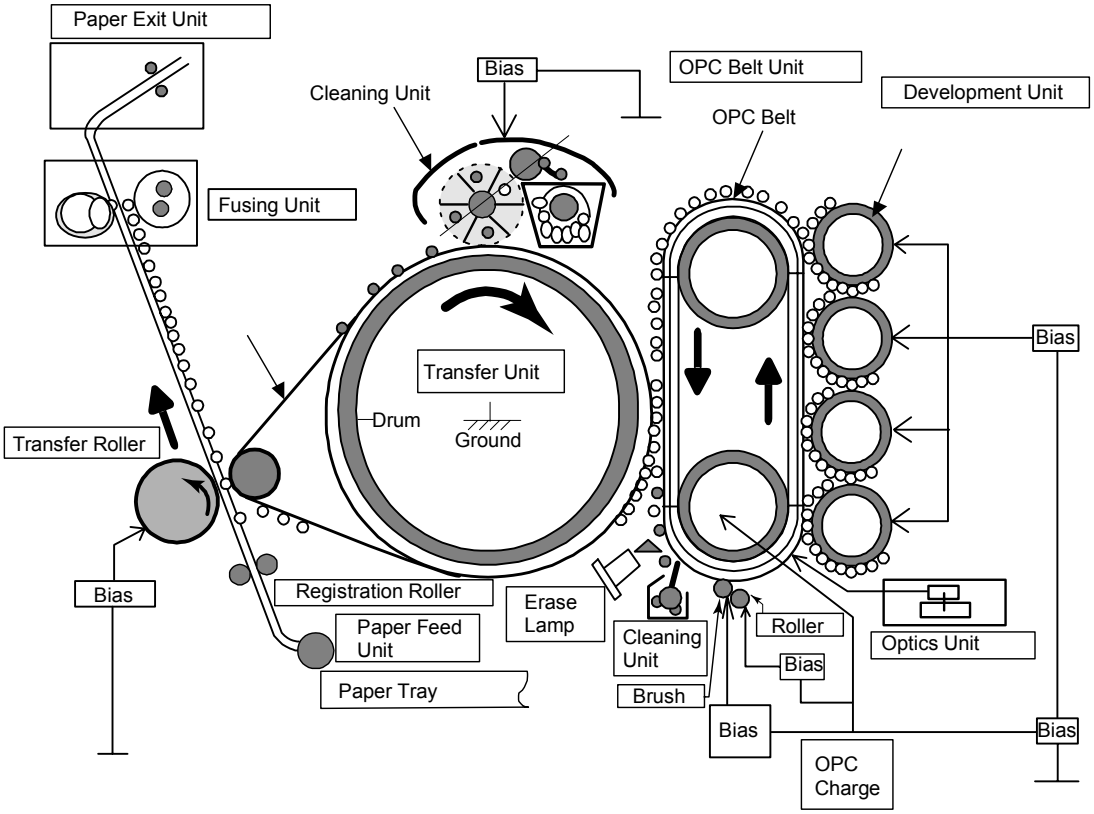
Input Output Device (IOD)

The IOD works as the interface between the BCU and many mechanical components.

Power Supply Unit and High Voltage Unit

The power supply unit changes alternating electrical current to direct current. The high voltage unit supplies high-voltage current.

6.1.5 PRINTING PROCEDURE



1. OPC belt charge: The charge unit gives the OPC belt the negative charge.
2. Laser exposure: The optical housing unit emits the laser beam and makes latent images on the OPC belt.
3. Development: The development units move the toner to the OPC belt and makes toner images.
4. Belt transfer: The OPC belt moves toner images to the transfer belt.
   1) After belt transfer, the erase lamp quenches the OPC belt.
   2) After quenching, the OPC belt-cleaning blade removes remaining toner from the OPC belt. Then it moves removed toner to the waste-toner collection unit.
   3) The waste-toner collection unit moves waste toner to the waste toner bottle.
5. Paper feed: The paper feed roller sends the paper from the paper tray to the registration roller.
6. Paper registration: The registration roller keeps the paper and moves it to the paper transfer roller.

7. Paper transfer: The paper transfer roller moves toner images from the transfer belt to the paper.
   1) After paper transfer, the transfer-belt cleaning unit removes remaining toner from the transfer belt. Then it sends removed toner to the waste-toner collection unit.
   2) The waste-toner collection unit moves waste toner to the waste toner bottle.
8. Fusing: The fusing unit fuses toner images onto the paper.
9. Paper exit: The paper exit unit sends the paper to the paper tray.

6.2 TONER MASS AMOUNT CONTROL

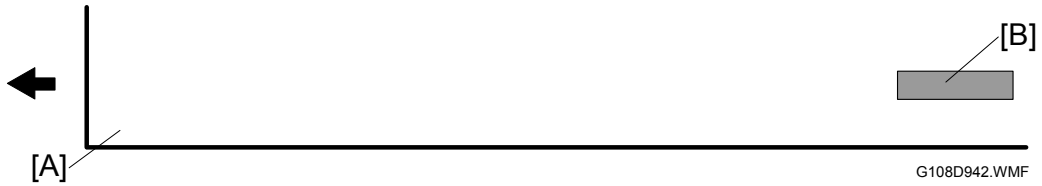
6.2.1 OVERVIEW

This machine automatically controls the toner mass quantity on the transfer belt. The control procedure has four phases:

1. ID sensor calibration
2. Test pattern processing
3. Reference equation processing
4. Development bias adjustment

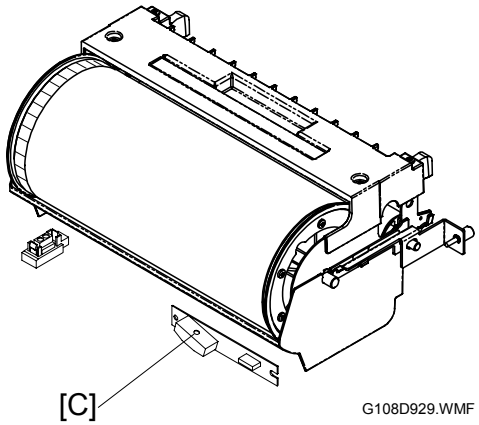
NOTE: The machine does not check the toner density on the paper.

6.2.2 ID SENSOR CALIBRATION



G108D942.WMF

1. The cyan development unit makes a rectangular image [B].
2. This cyan image on the transfer belt [A] reflects the light from the ID sensor [C].
3. The controller examines the signal level from this sensor, and calibrates the ID sensor.

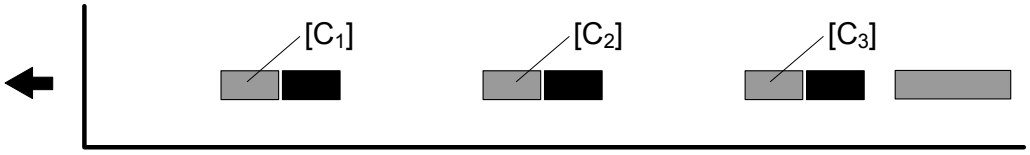


G108D929.WMF

6.2.3 TEST PATTERN PROCESSING

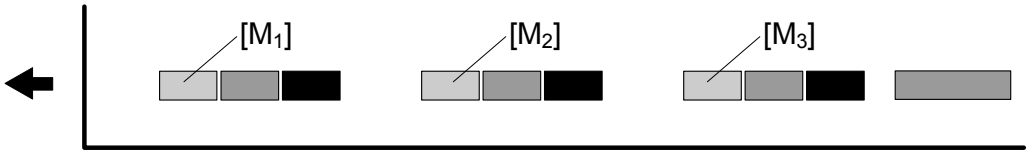
G108D943.WMF

1. The black development unit changes the development bias to make three rectangular images. The first image [K_1] is weaker than the second image [K_2]. The second image is weaker than the third image [K_3].



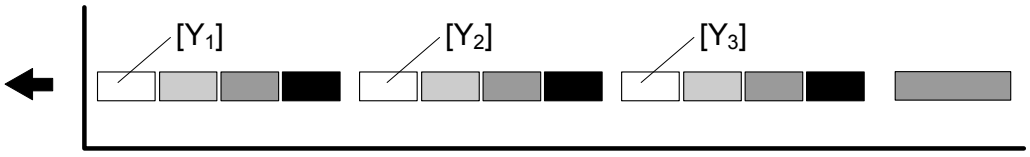
G108D944.WMF

2. The cyan development unit changes the development bias to make three rectangular images. The first image [C_1] is weaker than the second image [C_2]. The second image is weaker than the third image [C_3].



G108D945.WMF

3. The magenta development unit changes the development bias to make three rectangular images. The first image [M_1] is weaker than the second image [M_2]. The second image is weaker than the third image [M_3].



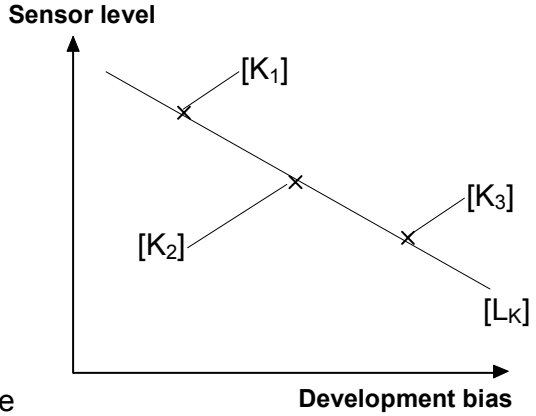
G108D941.WMF

4. The yellow development unit changes the development bias to make three rectangular images. The first image [Y_1] is weaker than the second image [Y_2]. The second image is weaker than the third image [Y_3].

6.2.4 REFERENCE EQUATION PROCESSING

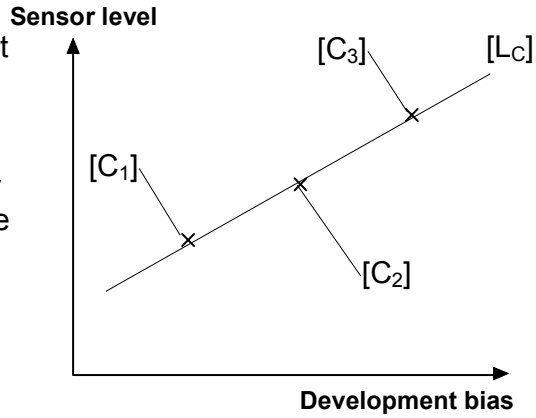
The controller makes these linear equations to adjust the development bias for each color:

1. The three black rectangular images [K_1][K_2][K_3] (☛ 6.2.3) reflect the light from the ID sensor.
2. The controller compares the signal levels from the ID sensor and finds a linear equation [L_K].
3. The controller calculates the black development bias that is appropriate to realize the target ID sensor level.
   NOTE: The sensor level decreases as the black-image density increases.



G108D946.WMF

4. The controller finds the cyan development bias, the magenta development bias, and the yellow development bias.
   NOTE: The diagram shows the linear equation of cyan [L_C]. The sensor level increases as the cyan-image density increases.



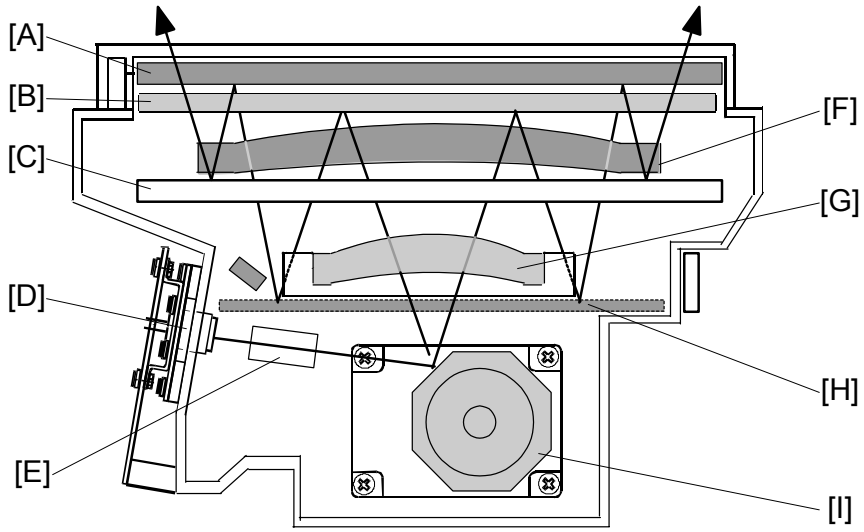
G108D947.WMF

6.2.5 DEVELOPMENT BIAS ADJUSTMENT

Based on the examined equations this machine adjusts the development bias of each development roller. If the machine does not make a linear equation, the default voltage goes to the development roller.

6.3 OPTICAL HOUSING UNIT

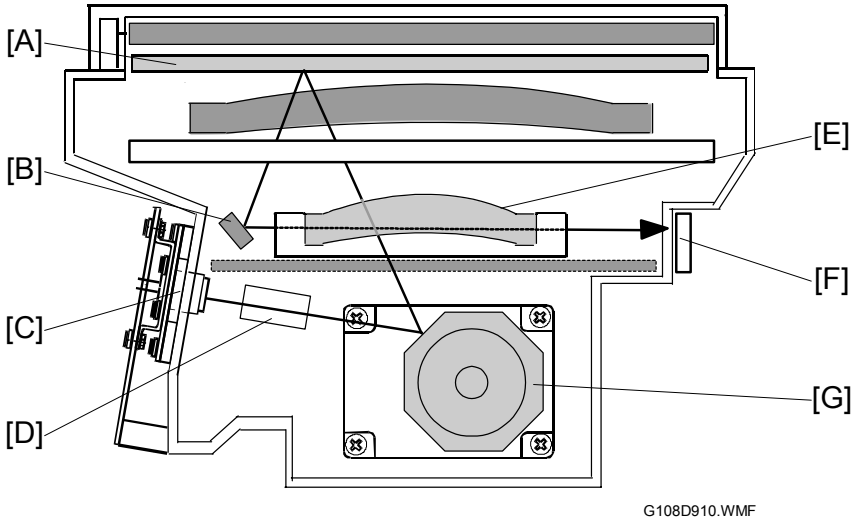
6.3.1 OPTICAL PATH



The laser beam moves as follows:

1. The laser diode unit [D] emits the laser beam.
2. The cylinder lens [E] condenses the laser beam.
3. The polygon mirror [I] reflects the laser beam.
4. The F-θ Lens [G] focuses the laser beam on the first mirror.
5. The first mirror [B] reflects the laser beam.
6. The second mirror [H] reflects the laser beam.
7. The barrel toroidal lens [F] focuses the laser beam on the third mirror.
8. The third mirror [A] reflects the laser beam.
9. The fourth mirror [C] reflects the laser beam.

6.3.2 LASER SYNCHRONIZATION



The synchronization detector [F] is on the right side of the optics unit. When emitted from the LD unit [C], the laser travels as follows: cylinder lens [D] → polygon mirror [G] → F-θ lens [E] → first mirror [A] → synchronization mirror [B] → synchronization detector [F].

6.3.3 SPECIFICATIONS

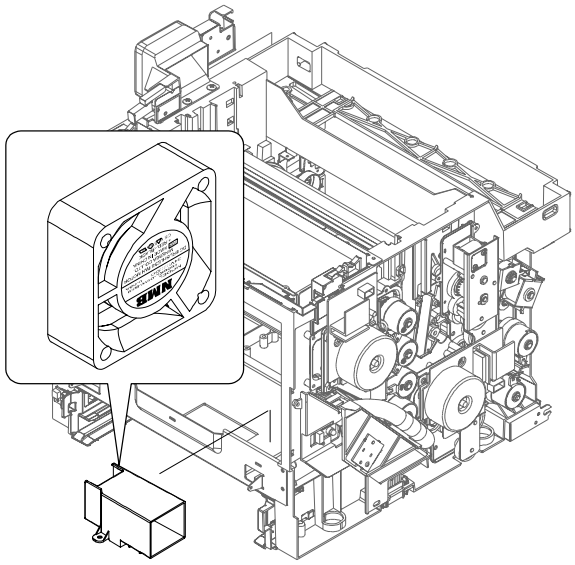
The table lists some specifications of the optical housing unit.

Rated output of laser diode	5 mW
Laser beam wavelength	Approx. 785 nm
Scanning resolution	600 dpi
Scanning width	314 mm
Number of rotations of polygon mirror (per minute)	35,904 rpm
Polygon mirror faces	8

6.3.4 OPTICS UNIT FAN

The optics unit fan cools down the laser optics unit.

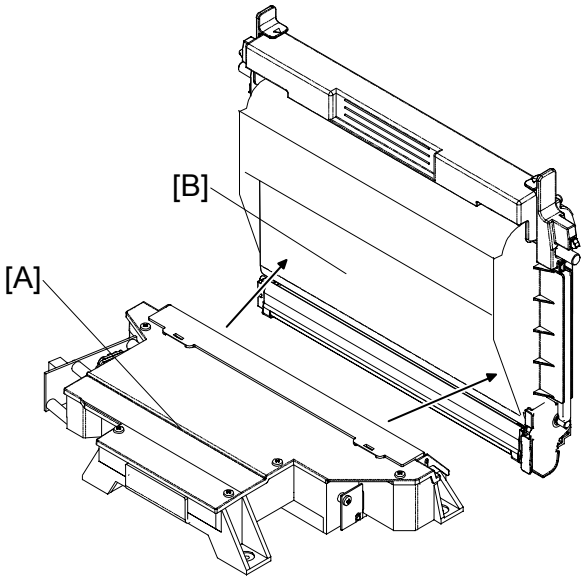
NOTE: This machine is smaller than its previous machine (G063) and has less free space inside. The optics unit fans is necessary to decrease the temperature inside the machine.



G108D956.WMF

6.3.5 LASER EXPOSURE

The optical housing unit [A] emits the laser beam and writes latent images on the OPC belt [B].

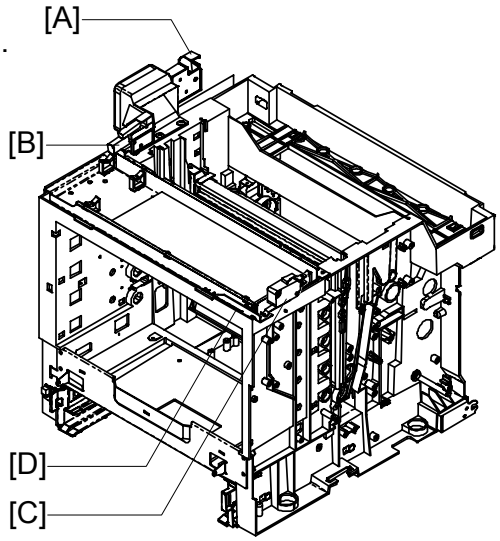


G108D922.WMF

6.3.6 SAFETY SWITCH

The printer has three safety switches [A][B][C]. They all go on when these covers are closed:

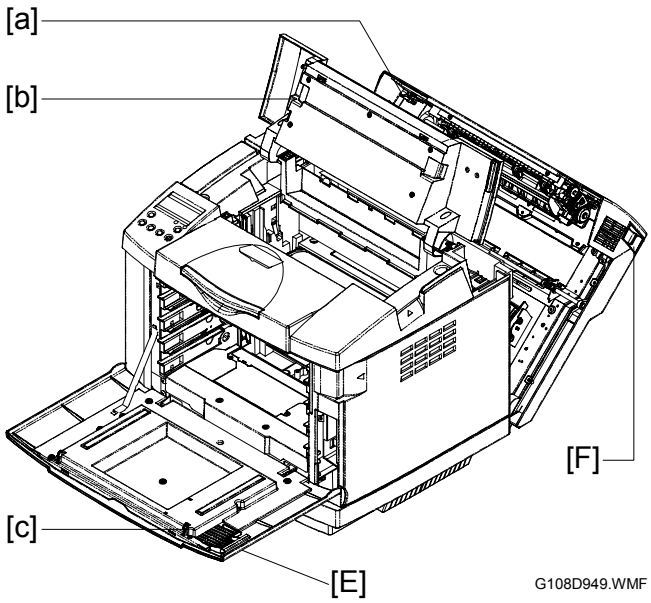
[A]: Rear cover
[B]: Top cover
[C]: Front cover



G108D950.WMF

These covers have a hook or a protruding part that is attached to a safety switch:

- Rear cover–in the front left corner [a]
- Top cover–on the bottom side near the left end [b]
- Front cover–at the top end near the right end [c]



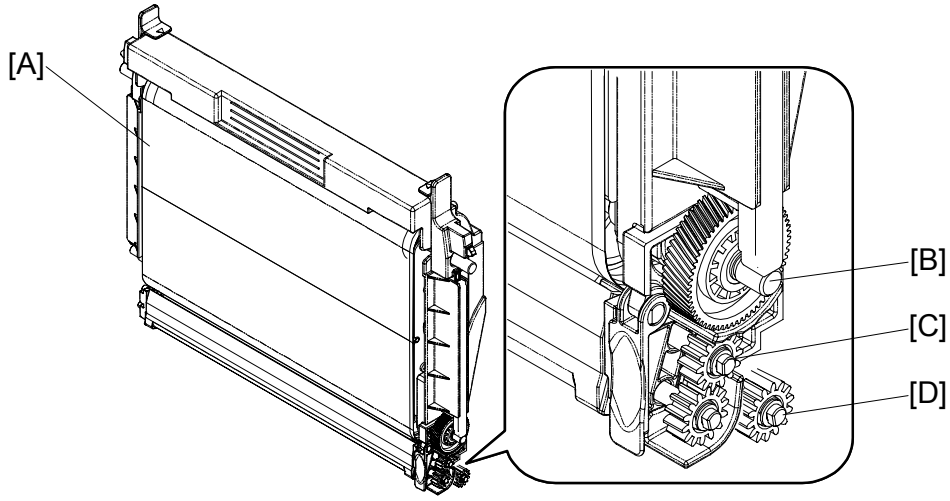
G108D949.WMF

The lever on the front cover [E] is attached to the hook [c]. When you pull the lever (the front cover stays closed), the hook releases one more lever [D] on the machine front. The safety switch [C] goes off. In other words, the safety switch [C] goes off before you open the front cover. On the other hand, the lever on the rear cover [F] is not attached to a safety switch. The printer can operate even when you pull the lever (if the rear cover stays closed).

NOTE: The top cover does not have such a lever.

6.4 OPC BELT

6.4.1 DRIVE

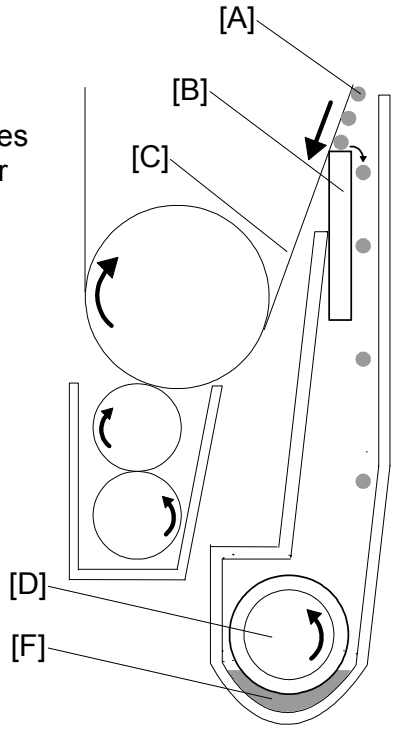


G108D921.WMF

The main motor drives three different gears on the OPC belt unit [A] via three different drive paths. Two different idle gears send the drive power to the OPC belt drive gear [B] and the charge roller gear [C]. The waste-toner collection unit sends the drive power to the waste toner transport gear [D] (☛ 6.6.4, Drive). The transfer belt sensor checks the drive speed (☛ 6.6.2).

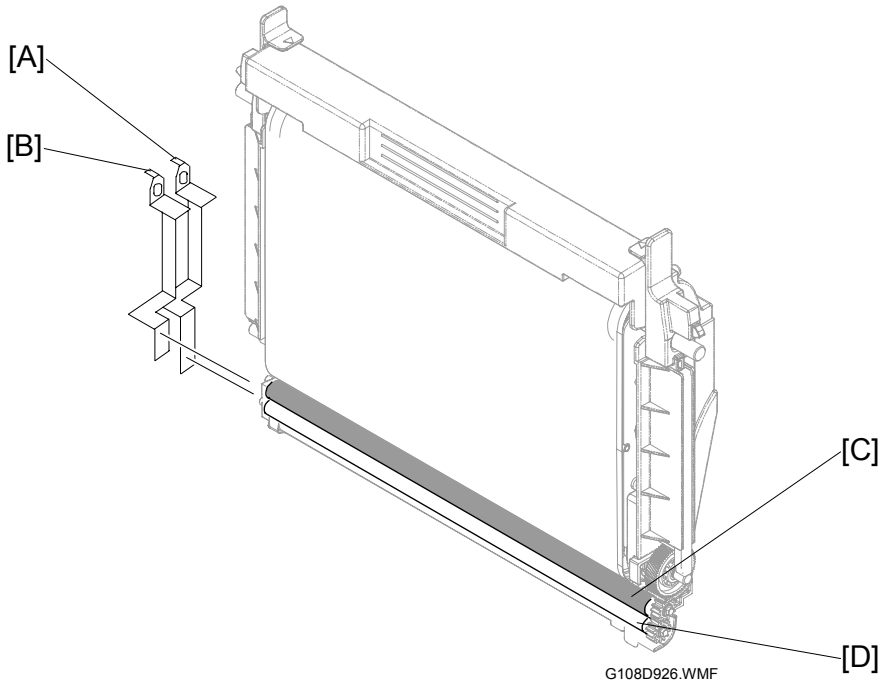
6.4.2 OPC BELT CLEANING

The OPC-belt cleaning blade [B] is near the bottom of the OPC belt [C]. The OPC-belt cleaning blade removes remaining toner [A] from the OPC belt. Removed toner (waste toner) goes into the waste toner duct [F]. The waste toner feeder [D] moves waste toner to the right end of the waste toner duct. At this time waste toner goes into the waste-toner collection unit.



G108D927.WMF

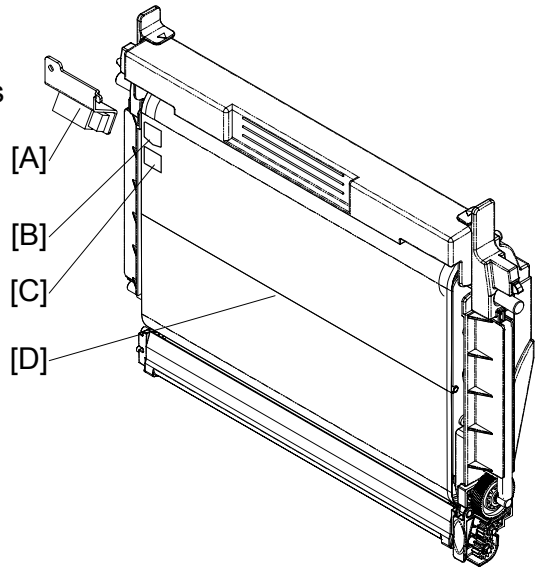
6.4.3 CHARGE ROLLER AND CLEANING ROLLER



The charge roller [C] gives negative charge to the OPC belt. The cleaning roller [D] cleans the charge roller. The high voltage unit (HVU) gives electrical power to the charge roller and the cleaning roller. The left end of the charge roller is attached to BRV [B] on the HVU. The left end of the cleaning roller is attached to CLV [A] on the HVU.

6.4.4 OPC BELT SENSOR

The OPC belt sensor [A] is above the top left corner of the OPC belt. The OPC belt sensor is a reflective photosensor and finds the markers [B][C] on the left end of the OPC belt. The controller uses the signals from the OPC belt sensor to calculate the position of the horizontal joint line [D] on the OPC belt. The printer does not use the area around this line to make latent and toner images.

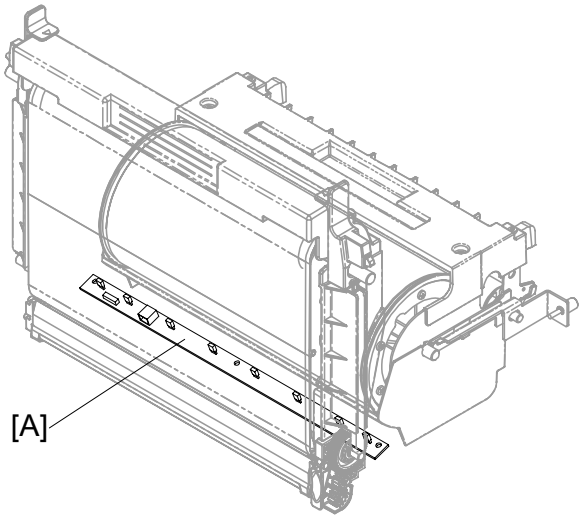


G108D925.WMF

6.4.5 QUENCHING

The erase lamp [A] is below the contact point of the OPC belt and the transfer belt. The erase lamp quenches the electrical charge on the OPC belt.

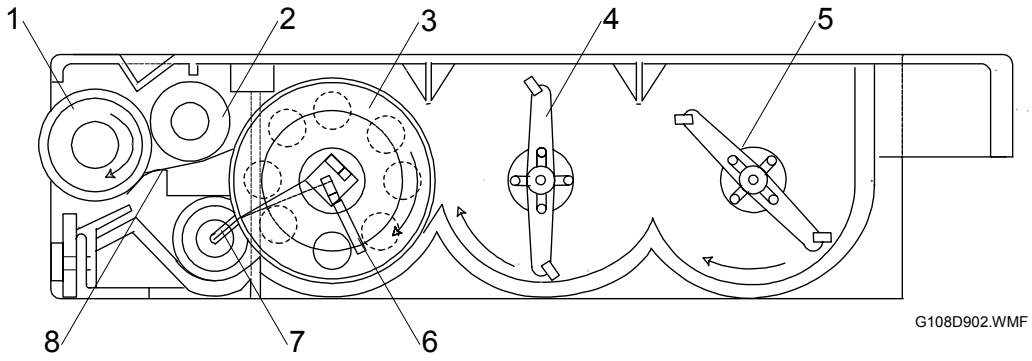
The cable on the erase lamp connects with DCN15 on the input output device (IOD).



G108D932.WMF

6.5 DEVELOPMENT UNIT

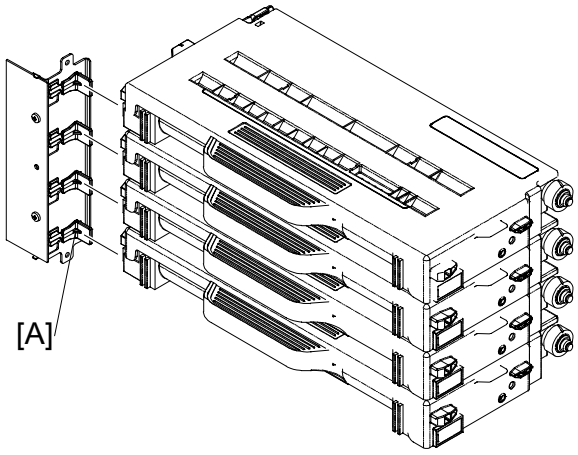
6.5.1 OVERVIEW



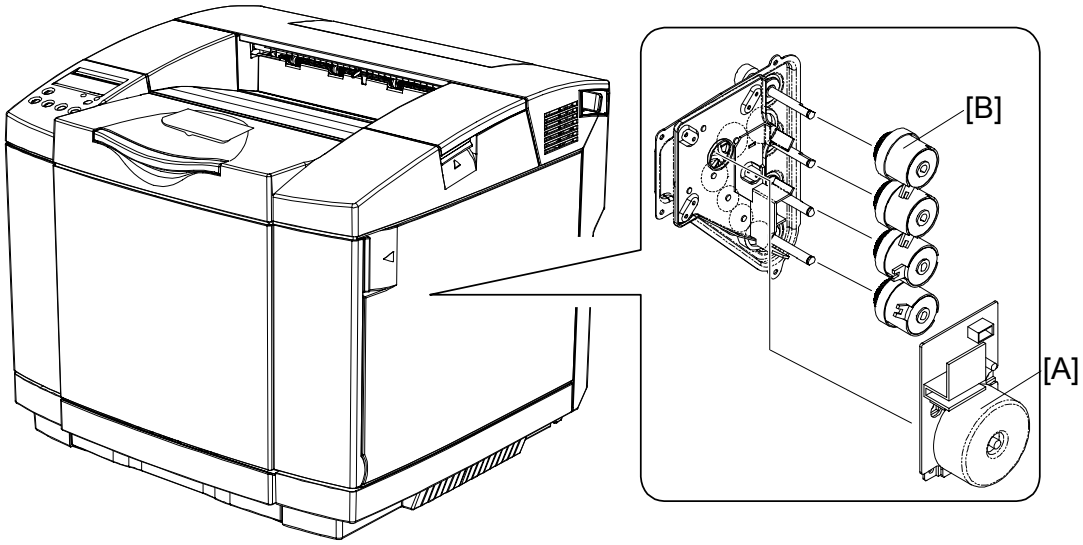
1. Development roller
2. Toner supply roller
3. Light interrupter gear
4. Toner agitator 2
5. Toner agitator 1
6. Toner agitator 3
7. Toner return duct
8. Doctor blade

6.5.2 DEVELOPMENT UNIT SENSOR

There are four feelers [A] on the front left corner of the printer. The left end of each feeler operates as an interrupter. Each interrupter interrupts the development unit sensor. When you set a development unit in the printer, the plate on the front left corner of the development unit pushes the feeler. The left end of the feeler (interrupter) moves out of the development unit sensor.

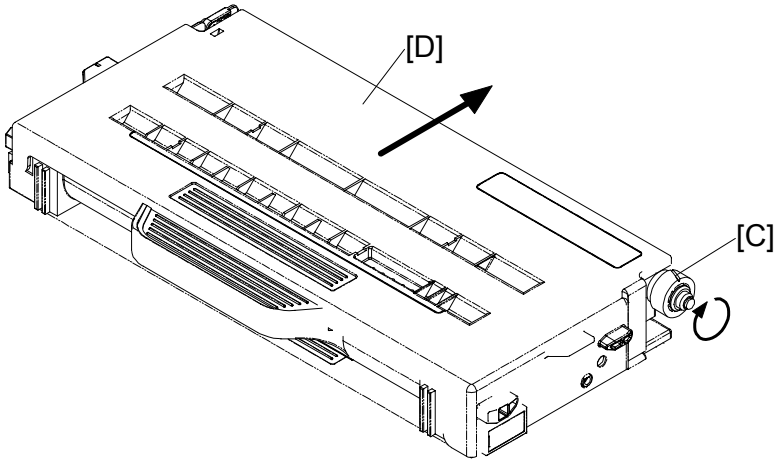


6.5.3 DRIVE



G108D904.WMF

Model PL-P1 has one development motor [A] and four development clutches [B]. When each development clutch is on, it transfers the drive power to the development drive gear [C].



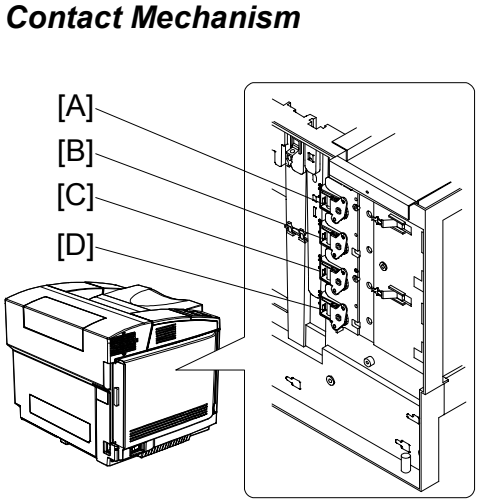
G108D960.WMF

The development drive gear has two functions. First, the drive gear drives the development roller (☛ 6.5.1). Second, the drive gear moves the right side of each development unit [D] to the OPC belt.

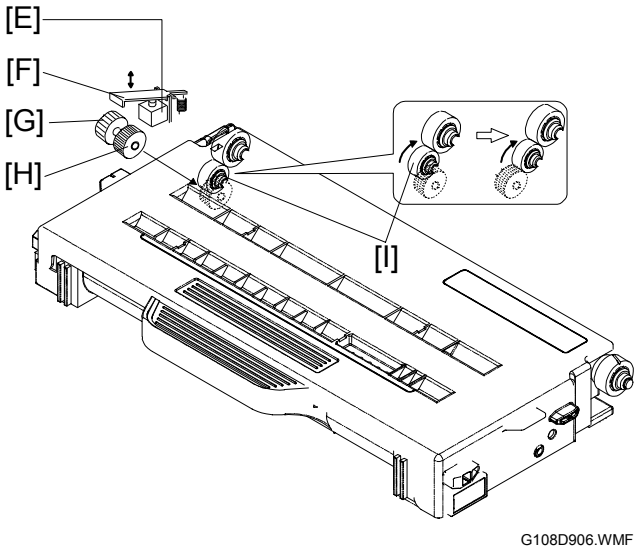
NOTE: For the contact mechanism on the left side, (see section 6.5.4)

6.5.4 DEVELOPMENT UNIT CONTACT MECHANISM

Contact Mechanism



G108D905.WMF



G108D906.WMF

STANDING BY

Each development unit moves on the rails inside the printer. There is one spring on each right rail, and another spring on each left rail. Pushed by these springs, each development unit stays away from the OPC belt when it does not develop toner images.

RIGHT SIDE

The development drive gear moves the right side of each development unit (☛ 6.5.3).

LEFT SIDE

There are four development solenoids [A][B][C][D] on the left side of the printer: one for each development unit. When the solenoid is on, it keeps the lever [F] on the leftmost gear [G]. This gear is on the same shaft as the spring clutch [H]. Each spring clutch engages the toner return gear [I] on a development unit.

When the machine starts development:

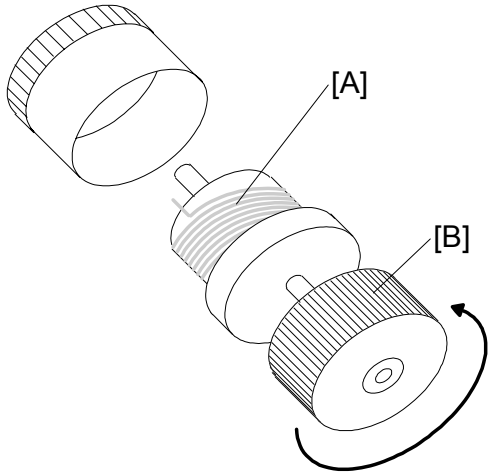
1. The drive power of the development motor is transferred to the development roller (☛ 6.5.3). This roller drives the toner return gear [I].
2. The development solenoid [E] goes on. The lever [F] holds the leftmost gear [G].
3. The spring clutch [H] stops when the leftmost gear stops. But the toner return gear [I] keeps on turning.
4. The development unit moves toward the OPC belt.
5. The development unit contacts the OPC belt.

Spring Clutch

Each spring clutch has a spring [A] on its shaft. This spring tightly holds the shaft. Strong torque is necessary to turn the gear [B].

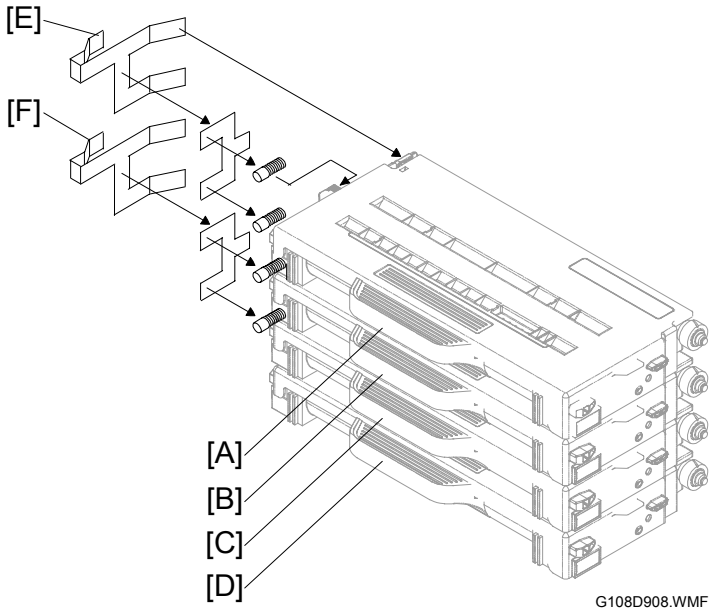
When the development solenoid goes on, the lever holds the leftmost gear. At this time, the spring clutch does this:

- Does not turn while the development unit moves towards the OPC belt.
- Starts to turn when the development unit contacts the OPC belt. This is because the torque given by the toner return gear becomes strong.



G108D907.WMF

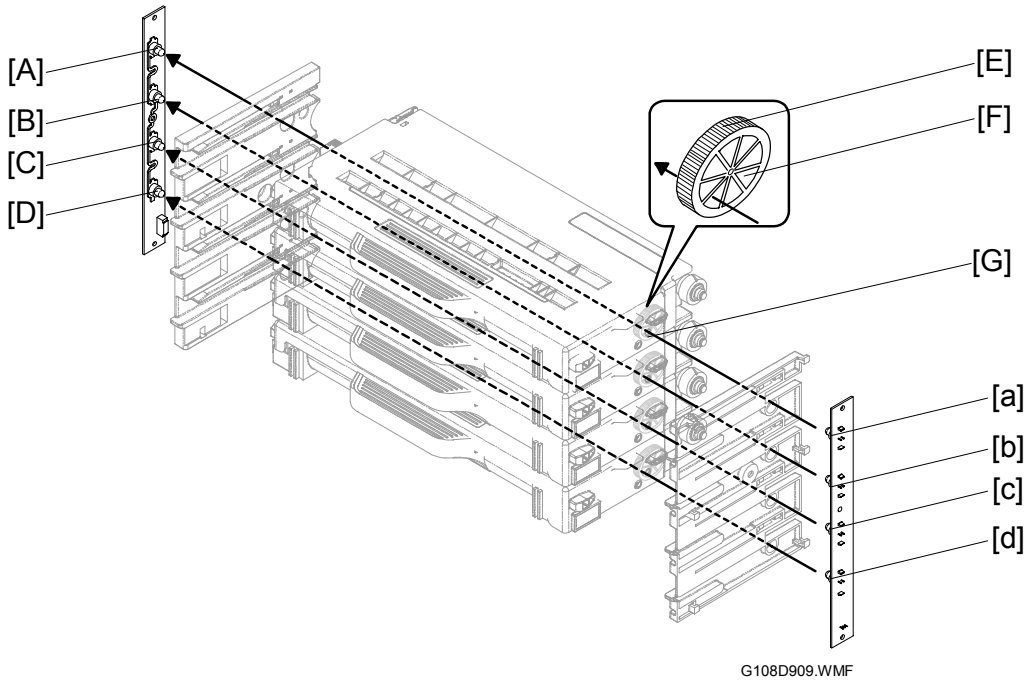
6.5.5 DEVELOPMENT BIAS



G108D908.WMF

The high voltage unit (HVU) gives development bias to the four development units. The development unit K [A] and the development unit Y [B] are attached to DBVKY [E] on the HVU. The development unit M [C] and the development unit C [D] are attached to DBVMC [F] on the HVU.

6.5.6 TONER END SENSOR



G108D909.WMF

Arrangement

There are four pairs of photo sensors [A][a][B][b][C][c][D][d]–one pair for each development unit. Each development unit has light windows in the two sides. The light goes into the development unit from the light window in the right side [G]. Then it goes out from the light window in the left side if the toner is not full.

Mechanism

There is a gear [E] in front of the right-side light window. This gear, the light interrupter gear, has openings [F] on its sides. While the gear turns, the light from the right-side photo sensor [a][b][c][d] is intermittently interrupted before going through the development unit. The left-side sensor [A][B][C][D] accepts blinking light when the toner in the development unit is not full.

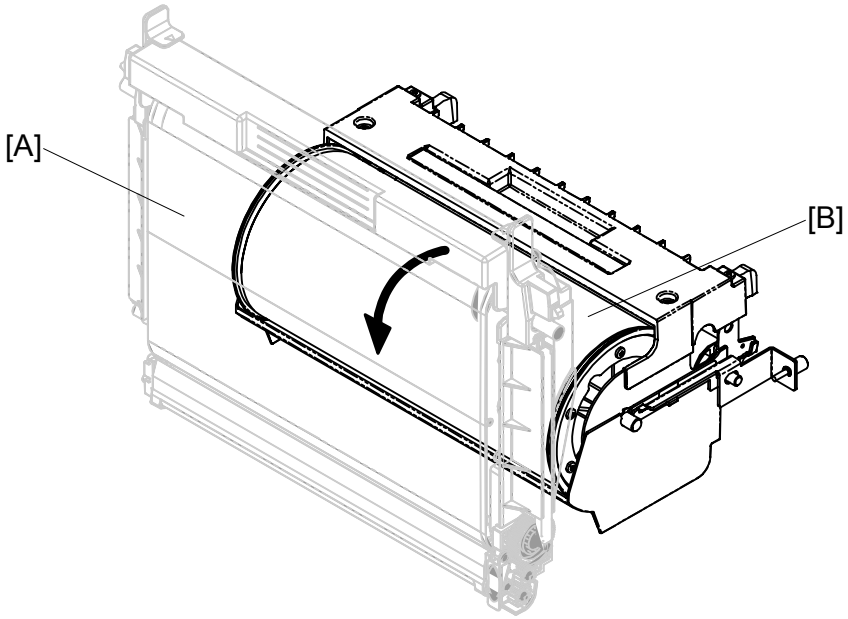
Near End and End

When the toner is almost empty, the message "Toner is Almost Empty: xxxxx" is shown. xxxxx is the name of the color such as cyan and magenta. The development unit can make approximately 250 images after this message shows. If one of the color development units (YMC) becomes empty, the machine stops color printing. Black and white printing continues. If the K development unit becomes empty, the machine stops printing.

NOTE: The figure (250 images) is calculated under these conditions: □ A4/LT size, □ two pages per job, □ 50% color ratio, □ 5% coverage.

6.6 TRANSFER BELT

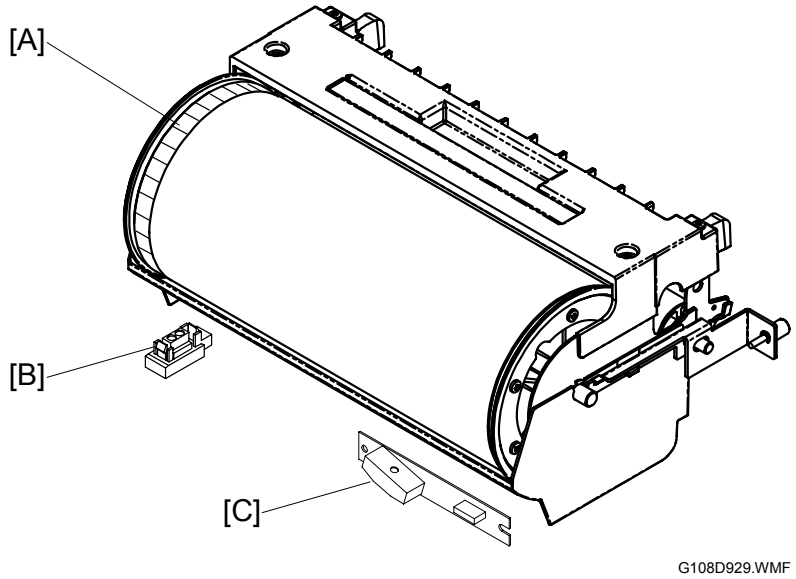
6.6.1 DRIVE



G108D928.WMF

The OPC belt [A] and the transfer belt [B] are in contact with each other. The transfer belt turns with the OPC belt when the main motor drives the OPC belt.

6.6.2 TRANSFER BELT SENSOR AND ID SENSOR



Transfer Belt Sensor

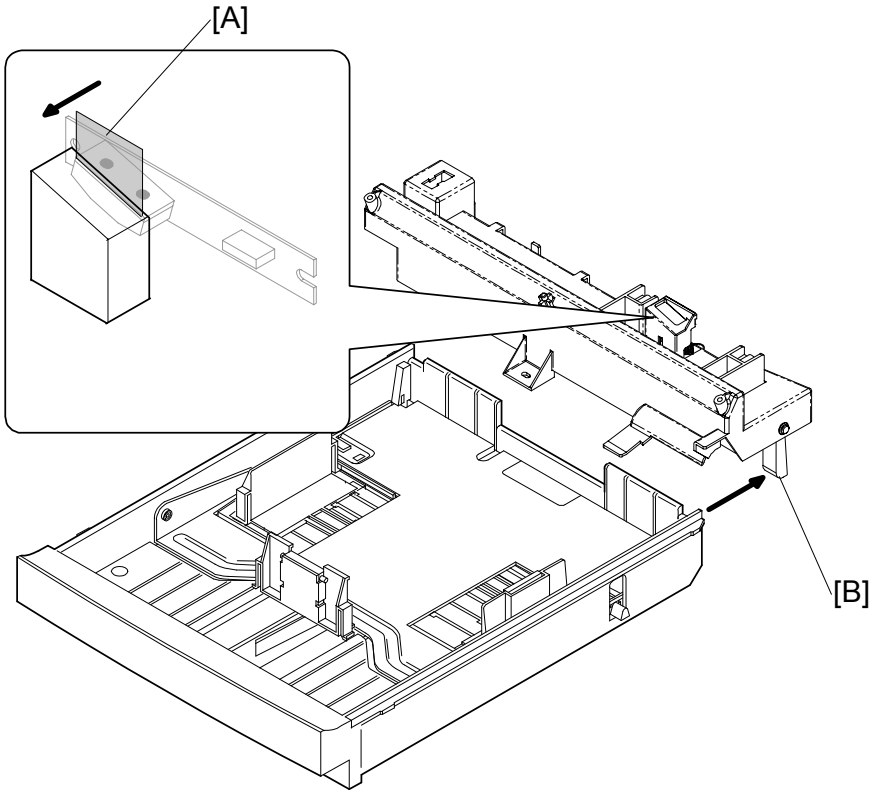
The printer has a reflective photosensor–the transfer belt sensor [B]–below the left side of the transfer belt. The transfer belt sensor emits light to the band [A] on the left end of the transfer belt, and accepts its reflection.

Since the transfer belt is driven with the OPC belt (☛ 6.6.1), the transfer belt and the OPC belt have the same rotation speed. If the transfer belt sensor fails to detect the normal rotation speed of the transfer belt, the message "Reset PCU Correctly" is shown.

ID Sensor

The machine has a reflective photosensor-the ID sensor [C]-below the right side of the transfer belt. The ID sensor emits light to the transfer belt and accepts its reflection. The controller examines the signals from the ID sensor to adjust the image density.

ID Sensor Cleaning



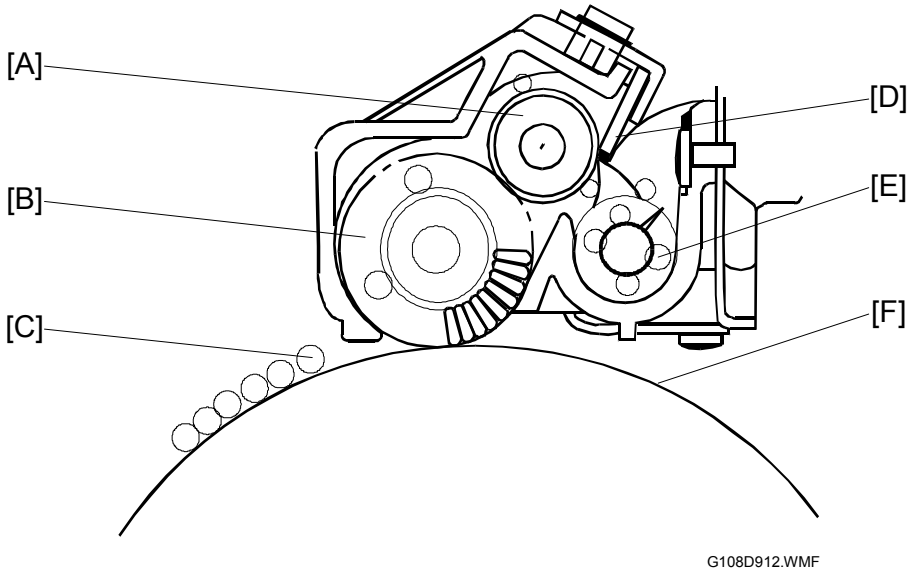
G108D939.WMF

The ID sensor is covered with the protection Mylar. This protects the ID sensor from unwanted material such as toner. On the protection Mylar is one more Mylar, the cleaning Mylar [A]. The cleaning Mylar is mechanically attached to the lever [B] above the right rail of the paper tray.

Each time you push the paper tray into the printer or pull it out of the printer, the cleaning Mylar cleans the surface of the protection Mylar.

6.6.3 TRANSFER BELT CLEANING

Cleaning Mechanism



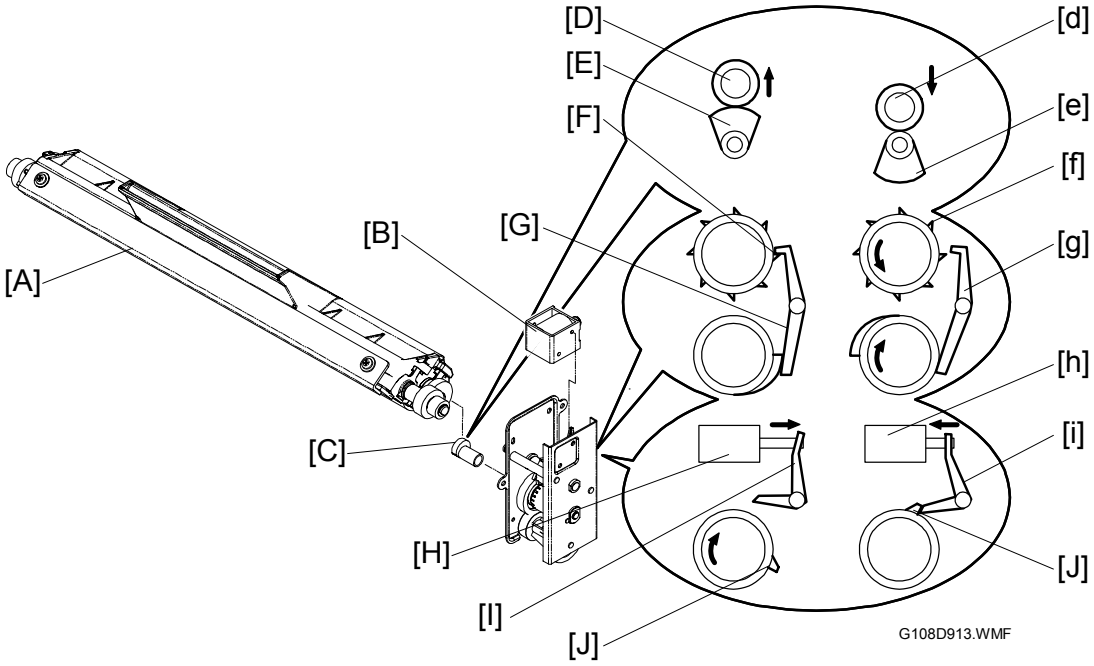
The transfer-belt cleaning unit is on top of the transfer belt [F]. The transfer-belt cleaning unit has these components:

1. The cleaning brush [B] removes the remaining toner [C] from the transfer belt.
2. The cleaning roller [A] removes the toner from the cleaning brush. The high voltage unit (HVU) gives the cleaning bias to the cleaning roller. The left end of the cleaning roller is attached to FCBV on the HVU.
3. The cleaning blade [D] removes the toner from the cleaning roller.
4. The toner removed by the cleaning blade goes into the waste toner path. The waste toner feeder [E] moves the toner to the right end of the waste toner path. At this time, the toner goes into the waste-toner collection unit.

Drive

The main motor drives the right side gear of the cleaning roller via idle gears. The left side gear of the cleaning roller sends this drive power to the cleaning brush and the waste toner feeder.

Contact-Release Mechanism



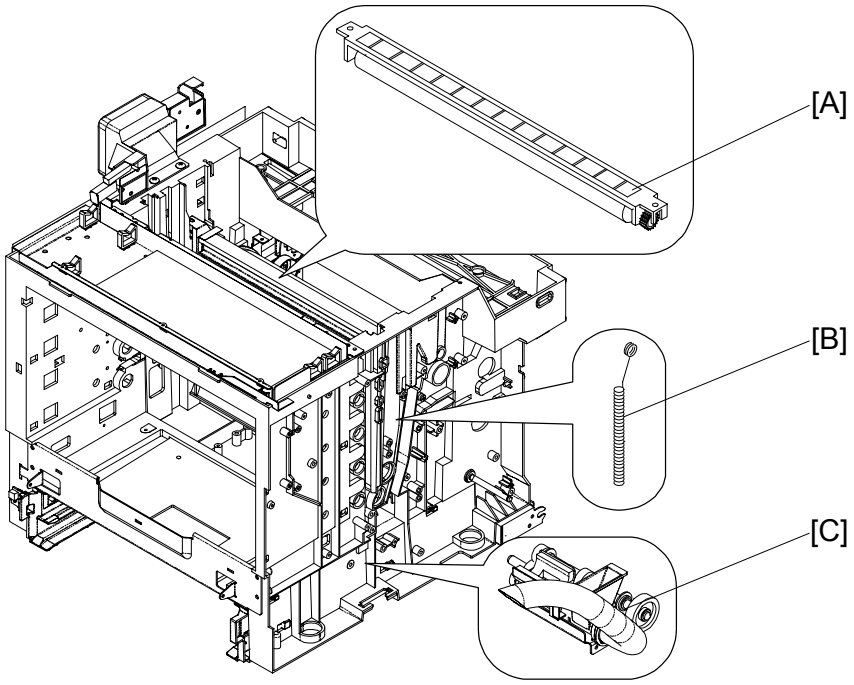
The transfer-belt cleaning unit [A] stays away from the transfer belt when not cleaning the transfer belt. The transfer-belt cleaning unit stays in contact with the transfer belt when it cleans it. These components do this procedure:

- The cleaning unit solenoid [B] moves the front lever [E].
- The front lever engages the front latch of the cam shaft [J].
- The rear lever engages the rear latch of the cam shaft [F].
- The cam lifts the cleaning unit interface [D].

When the cleaning unit solenoid is off [H], the front lever [I] releases the front latch [J] on the cam shaft. On the other hand, the rear lever [G] engages the rear latch [F] on the cam shaft. In this position, the cam stays in its upper position [E] and pushes up the cleaning unit interface [D]. As a result, the cleaning unit stays away from the transfer belt.

When the cleaning unit solenoid is on [h], the front lever [i] engages the front latch [j] on the cam shaft. On the other hand, the rear lever [g] releases the rear latch [f] on the cam shaft. In this position, the cam stays in its lower position [e] and does not push up the cleaning unit interface [d]. As a result, the cleaning unit stays in contact with the transfer belt.

Waste Toner Agitator



G108D940.WMF

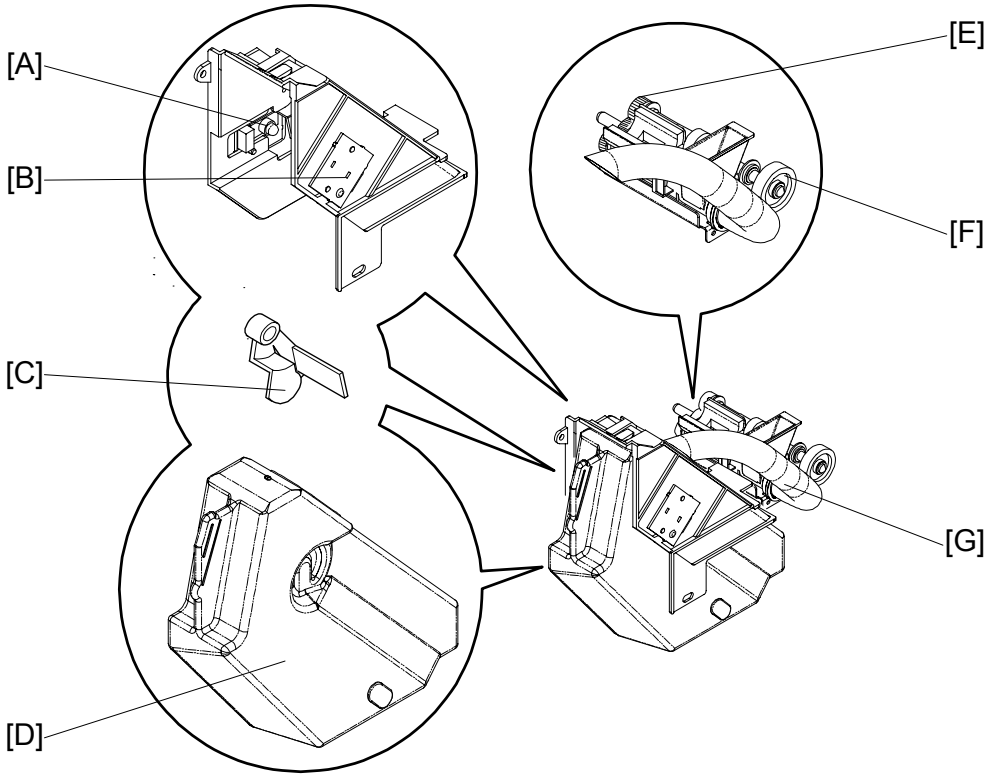
The printer has a vertical waste toner path on its right side. This path connects these two components:

- The waste toner path of the transfer-belt cleaning unit [A]
- The waste toner collection unit [C] (☛ 6.6.4)

In this vertical waste toner path is a spring-like component, the waste toner agitator [B]. The top end of the waste toner agitator makes a circle, which hangs from the drive-gear shaft of the transfer-belt cleaning unit. The drive-gear shaft has a cam-like structure. The waste toner agitator moves along the vertical waste toner path when the gear-shaft turns

The waste toner agitator agitates the waste toner in the vertical waste toner path. This does not let the waste toner stay on the toner path.

6.6.4 WASTE-TONER COLLECTION UNIT



Overview

The waste-toner collection unit is below the right end of the transfer belt unit. The waste toner feeders in the OPC belt unit (☛ 6.4.2) and in the transfer-belt cleaning unit move waste toner to the waste-toner collection unit. The waste-toner collection unit moves waste toner to the waste toner bottle [D] through the waste toner path [G]. The waste toner path has a collection coil in it.

Drive

The main motor drives the gear [F] on the right end of the waste-toner collection unit via idle gears. The drive power is sent to the collection coil via the gears [E] on the left end of the unit.

NOTE: The gear [F] on the right end also sends the drive power to the OPC-belt charge roller (☛ 6.4.1).

Waste Toner Sensor

The waste-toner collection unit has the waste toner sensor. The waste toner sensor consists of a light emitter on the left side [A] and a light receptor on the right side [B]. There is an interrupter [C] in front of the light emitter. The interrupter also works as a feeler. The interrupter interrupts light when the waste toner bottle is not set.

When you set the waste toner bottle in the waste toner collection unit, the waste toner bottle pushes the interrupter (feeler). The interrupter moves out of the light path. The light emitted from the light emitter goes through the waste toner bottle. At this time, the light receptor accepts the light. When the waste toner bottle is nearly full, waste toner interrupts the light. At this time, the receptor does not accept the light.

Messages

This machine uses only one sensor (the waste toner sensor) to detect the waste toner bottle and the quantity of waste toner. But the machine can show different messages when this sensor is interrupted. The table lists the messages, conditions, and possible causes.

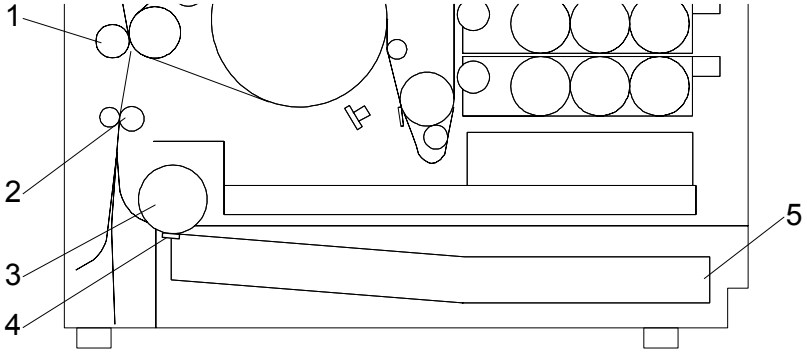
Message	Condition	Possible Cause
Waste Toner is Almost Full	The waste toner sensor is interrupted after warming up.	• The waste toner bottle becomes nearly full during printing.
Check Waste Toner Bottle	The waste toner sensor is already interrupted when the machine starts to warm up.	• The waste toner bottle is not in place. • The waste toner bottle is nearly full when the machine starts to warm up.

Near-Full and Full

When the waste toner bottle becomes almost full, the machine shows the message "Waste Toner is Almost Full”. The machine can make 200 developments after this message shows. The machine will not print until the waste toner bottle is replaced after it has made 200 developments.

6.7 PAPER TRAY UNIT

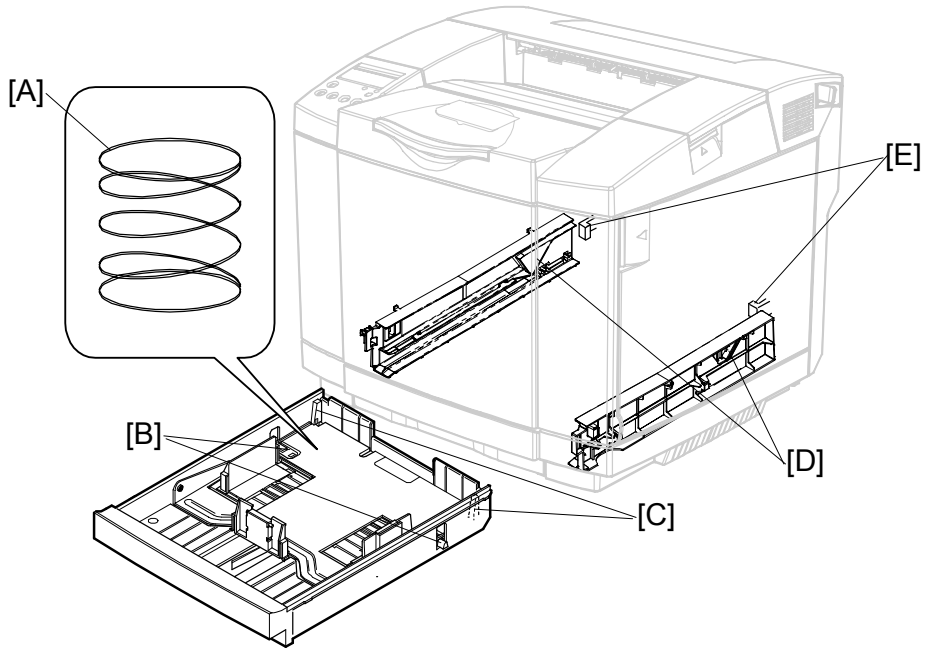
6.7.1 OVERVIEW



G108D919.WMF

1. Transfer Roller
2. Registration Roller
3. Paper Feed Roller
4. Friction Pad
5. Paper tray

6.7.2 PAPER LIFT



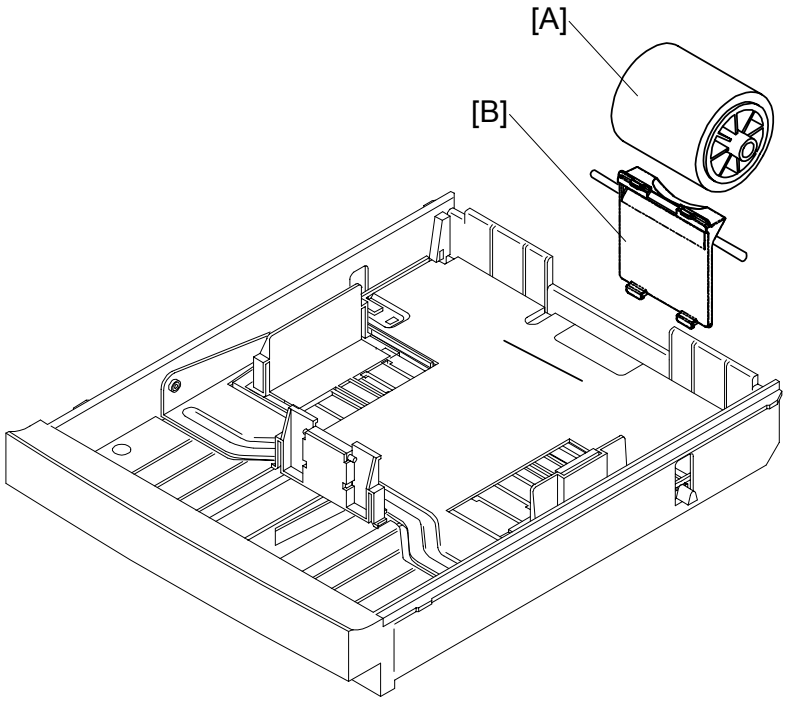
G108D948.WMF

The paper tray has two springs [A] below the bottom plate. It also has two levers [B] on the left and right ends of the bottom plate. There are two hooks [C] at the rear end. When the paper tray is out of the printer, the two hooks hold the bottom plate. The bottom plate is in its lowermost position.

When you push the paper tray into the printer, each protruding part [E] pushes the hook [C]. Each hook releases the bottom plate. The bottom plate is lifted by the springs.

When you pull the paper tray out of the printer, the triangular rails [D] on both sides push the levers [B]. The bottom plate is gradually pushed down when you pull the paper tray. At this time, the bottom plate is at its lowermost position. The hooks [C] hold the bottom plate.

6.7.3 PAPER FEED



G108D920.WMF

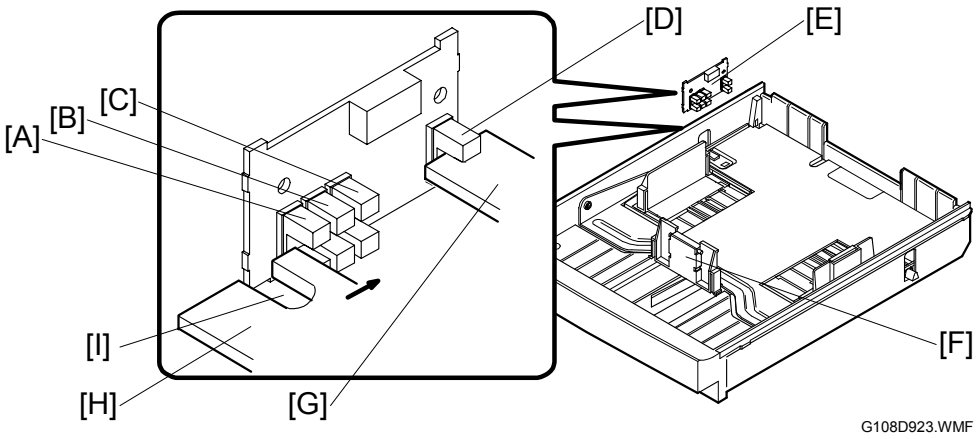
Paper Feed Roller

The paper feed roller [A] picks up the topmost sheet of paper and transports it to the registration roller. The friction pad [B] prevents the sheet below the topmost from being fed.

Drive

The main motor drives the paper feed clutch (☛ 6.1.3). The paper feed clutch sends the drive power to the paper feed roller when it is on.

6.7.4 PAPER SIZE AND PAPER TRAY DETECTION



Mechanism

There is a printed circuit board [E] at the rear end of the left paper-tray rail. There are four photosensors on this PCB. The three photosensors on the front side [A][B][C] are the paper size sensors. The other is the paper tray sensor [D]. The paper size sensors detect the paper size in the paper tray. The paper tray sensor detects the paper tray.

The interrupter [H] that is mechanically attached to the front plate [F] can interrupt the paper size sensors. This interrupter has an opening [I]. The interrupter can interrupt two sensors or less.

The paper tray has one more interrupter [G] on its rear left corner. This interrupter interrupts the paper tray sensor. If the paper tray is correctly set in the printer, the paper tray sensor is always interrupted.

Paper Size

The table lists the sensor patterns and detected paper sizes.

Paper Size Sensor			Paper Tray Sensor	Paper Size
[A]	[B]	[C]	[D]	
Not interrupted	Not interrupted	Not interrupted	Interrupted	DL/#10
Interrupted	Not interrupted	Not interrupted	Interrupted	B5
Not interrupted	Interrupted	Not interrupted	Interrupted	Executive
Interrupted	Not interrupted	Interrupted	Interrupted	Letter
Interrupted	Interrupted	Not interrupted	Interrupted	A4
Not interrupted	Not interrupted	Interrupted	Interrupted	Legal*

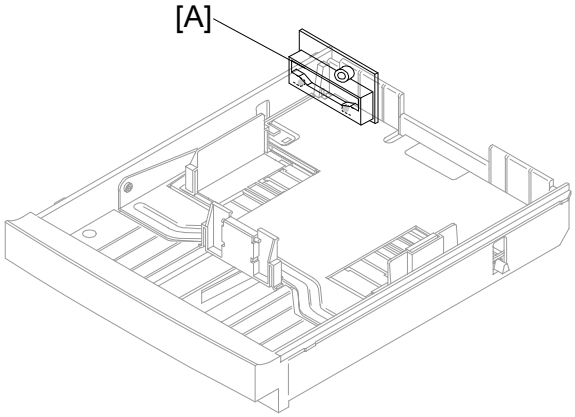
* Optional legal-size tray

6.7.5 OHP SENSOR

Reflective Photosensor

The OHP sensor [A] is above the rear left corner of the paper tray. The OHP sensor is a reflective photosensor. The sensor emits light and receives the reflection. The controller examines the OHP sensor signals and detects an OHP sheet in the paper tray.

NOTE: The optional paper feed unit (PFU) does not have an OHP sensor. The PFU cannot feed OHP sheets.



G108D924.WMF

Configuration Page and Utilities

The Configuration Page (Menu > List/Test Print > Configuration Page/Error Log) shows the user settings in *Paper Input.* The utility software programs do not reference the OHP sensor.

OHP Sensor, User Setting, and Printer Driver

Paper types are sensed or set by these components and programs:

- OHP sensor
- User setting (Menu > Paper Input > Paper Type)
- Printer driver on a computer

If these three are not consistent, this machine sends a print jobs as follows:

1. Does not do the print job if the user setting and the printer driver are not consistent.
2. Gives the priority to the OHP sensor under the following conditions (with one exception [☛ 3]):
   - The user settings and the printer driver are consistent.
   - The OHP sensor is not consistent with the two.
3. Gives the priority to the user setting and the printer driver under the following conditions:
   - The user setting and the printer driver set glossy paper.
   - The OHP sensor detects an OHP sheet.

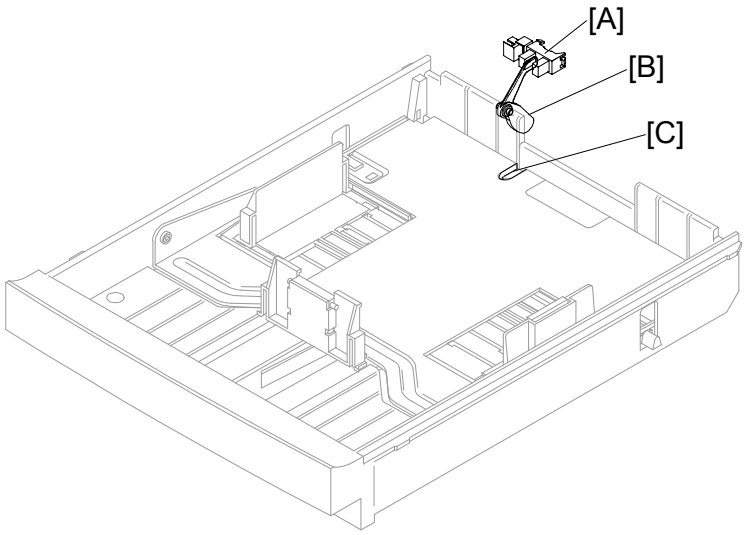
   NOTE: This is because the OHP sensor can incorrectly detect some types of glossy paper.
4. Assumes that the paper type is *glossy* under the following conditions:
   - The user setting and the printer driver specify the same paper type other than OHP sheet.
   - The printer driver sets duplex printing.
   - The OHP sensor detects OHP sheets.

   NOTE: When the printer driver sets simplex printing, the machine gives the priority to the OHP sensor (2).

The table lists the cases where the machine executes print jobs.

OHP Sensor	User Setting	Printer Driver	Processed as	Remarks
OHP	OHP	OHP	OHP	No inconsistency
OHP	Glossy	Glossy	Glossy	☛ 3
OHP	Not OHP (= Printer driver)	Not OHP (= User setting)	• Simplex: OHP • Duplex: Glossy	☛ 4
Not OHP	OHP	OHP	Not OHP	☛ 2
Not OHP	Glossy	Glossy	Glossy	No inconsistency
Not OHP	Not OHP (= Printer driver)	Not OHP (= User setting)	Not OHP	No inconsistency

6.7.6 PAPER END SENSOR



G108D930.WMF

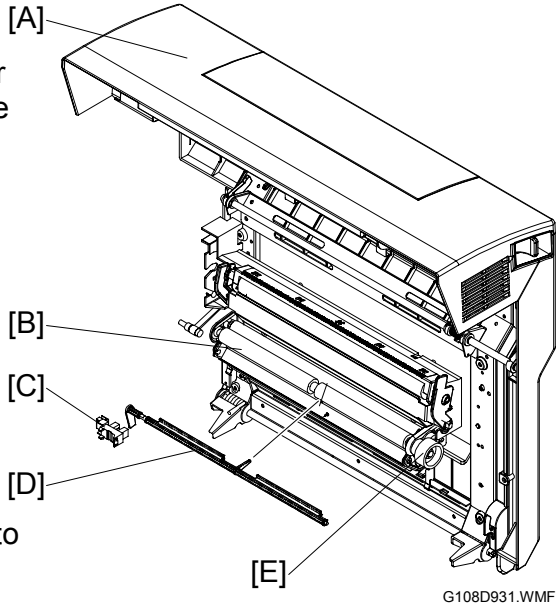
The paper end sensor [A] is above the rear end of the paper tray. When the paper is in the tray, the paper pushes up the bottom end of the feeler [B]. The feeler does not interrupt the paper end sensor. When the paper is not in the tray, the bottom end of the feeler goes into the opening [C] of the paper-tray base. The feeler interrupts the paper end sensor.

6.8 PAPER REGISTRATION AND PAPER TRANSFER

6.8.1 PAPER REGISTRATION

Registration Roller

The registration roller [B] is inside the rear cover [A]. The paper feed roller moves the paper to the registration roller. When the paper reaches the registration roller, the controller stops the paper feed roller. The controller starts the feed roller and the registration roller when the transfer belt is ready for the paper transfer.



Drive

The main motor drives the registration clutch (☛ 6.1.3) via idle rollers. The registration clutch sends the drive power to the registration roller when it is on. The registration clutch drives the registration roller gear [E].

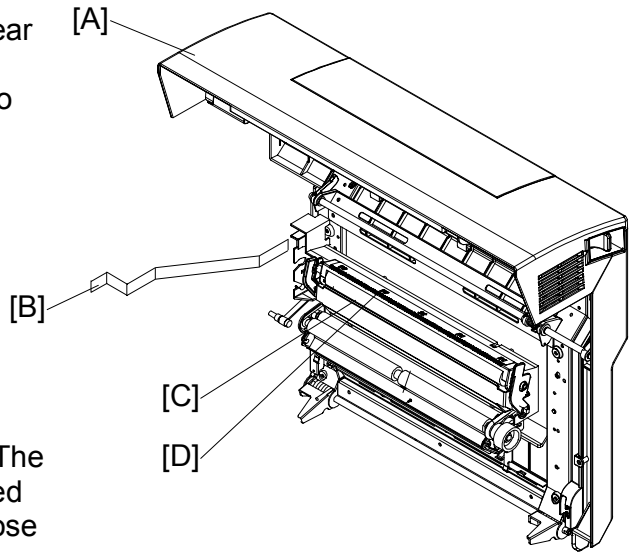
Registration Sensor

There is a paper feeler [D] below the registration roller. The left end of the feeler works as an interrupter. The interrupter interrupts the registration sensor [C] on the rear left corner of the printer. When the paper reaches the registration roller, the paper pushes the paper feeler. The left end of the feeler (interrupter) moves out of the registration sensor.

6.8.2 PAPER TRANSFER

Transfer Roller

The transfer roller [C] is inside the rear cover [A]. The transfer roller moves toner images from the transfer belt to the paper. When the paper goes between the transfer roller and the transfer belt, the transfer roller turns with the paper.



G108D934.WMF

Paper Transfer Bias

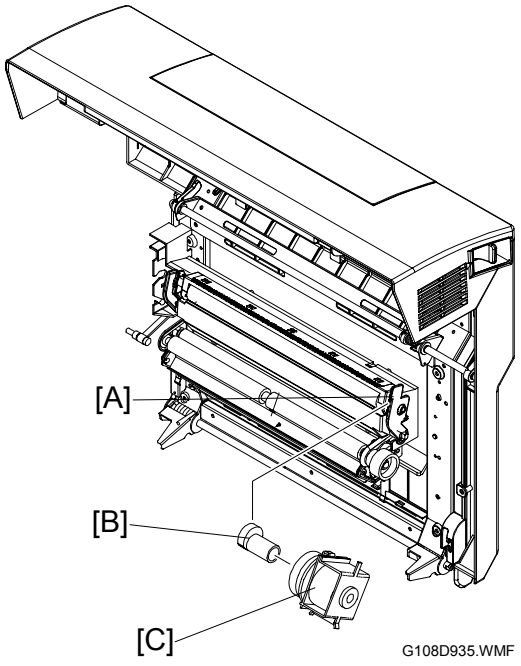
The high voltage unit (HVU) gives electricity to the transfer roller. The transfer roller is positively charged. The left end of the transfer unit is attached to THV [B] on the HVU when you close the rear cover.

Discharge Plate

The transfer unit has a discharge plate [D] above the transfer roller. The discharge plate quenches paper charged during paper transfer. Quenching helps paper move away from the transfer roller.

Contact Release Mechanism

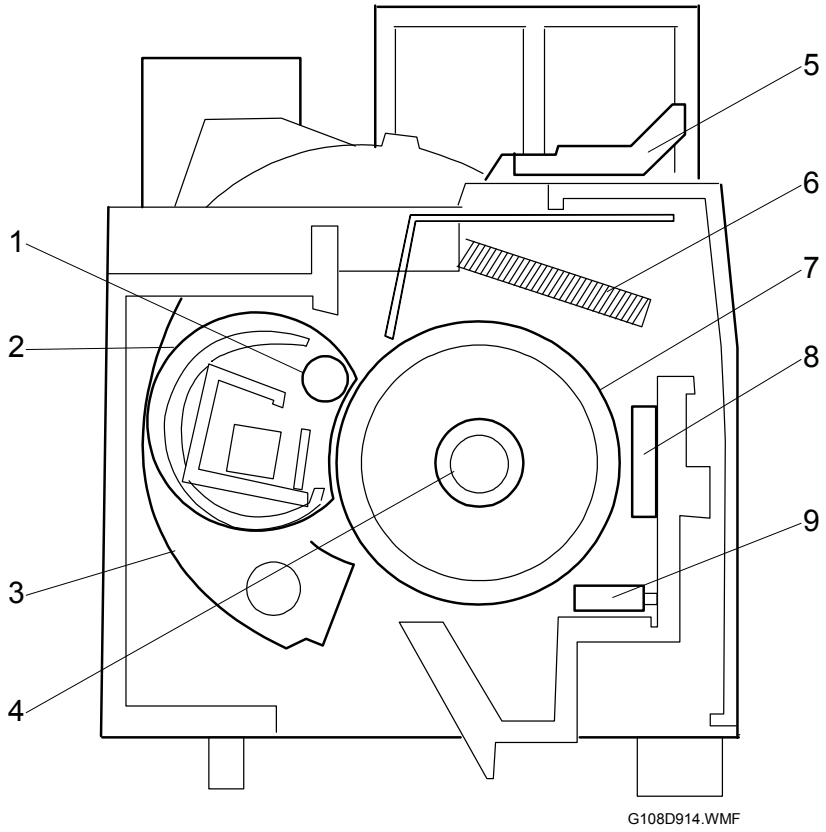
The transfer roller stays away from the transfer belt when the printer does not print. When the printer prints, the main motor drives the transfer roller clutch [C]. Each time the clutch turns on or off, the gear on the clutch makes a half turn. Therefore, the cam [B] stops at the position where it pushes the transfer roller lever [A] to the rear or where it does not push the transfer roller lever at all. As a result, the transfer roller comes in contact with the paper (during paper transfer), or stays away from the transfer belt.



G108D935.WMF

6.9 FUSING UNIT

6.9.1 OVERVIEW



1. Pressure Roller
2. Pressure-Roller Sheet
3. Tension Arm
4. Fusing Lamp
5. Tension Lever
6. Tension Bolt
7. Hot Roller
8. Fusing Thermostat
9. Fusing Thermistor

6.9.2 DRIVE

The main motor drives the fusing clutch (☛ 6.1.3). The fusing clutch sends drive power when it is on.

6.9.3 PRESSURE UNIT

The fusing unit has a pressure roller. The pressure roller presses the pressure-roller sheet on to the hot roller. As the hot roller turns, the pressure-roller sheet turns. The paper goes between the pressure-roller sheet and the hot roller.

There are two tension arms on the right side and the left side of the fusing unit. These arms push the pressure roller to the hot roller. The tension arms are attached on the frame with two tension bolts and two springs. You can release these arms by pulling up the two tension levers to remove jammed paper from the fusing unit.

6.9.4 FUSING PROCESS

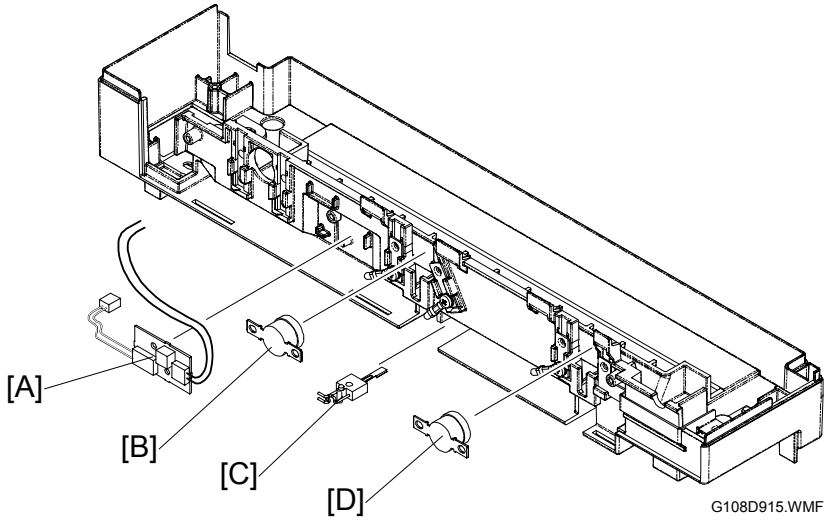
The hot roller and the pressure roller are approximately 150°C (302°F) during the fusing process. The pressure between these two rollers is approximately 300 N.

6.9.5 TEMPERATURE CONTROL

⚠CAUTION

Do not adjust or remove the thermistor [C], temperature control board [A], or thermostats [B][D]. Normal operation is not guaranteed if you remove or adjust them.

Main Components

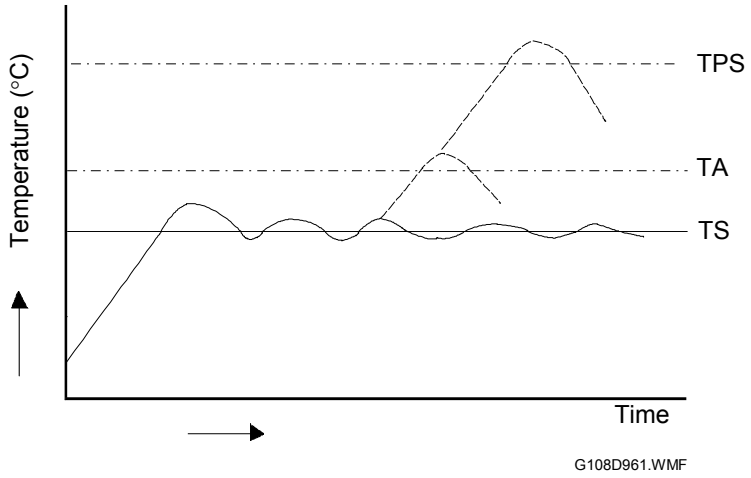


The fusing unit has these components for temperature control:

- The fusing thermistor [C] and the temperature control board [A] sends the signal when the fusing temperature goes past the threshold. The fusing thermistor and the temperature control board are on the same electrical circuit (□).
- The fusing thermostats [B][D] break the electric circuit when the fusing temperature goes past the threshold. The two fusing thermostats are on the same electrical circuit as the fusing lamp. The fusing lamp goes off if one of the two fusing thermostats breaks the electrical circuit (□).

The two electrical circuits, circuit □ and circuit □ are not the same circuits.

Temperature

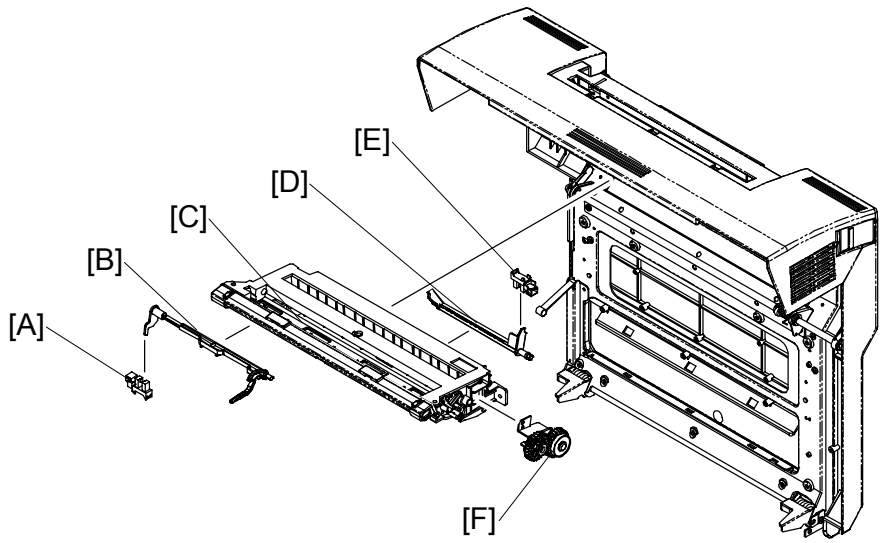


- TS (170°C): The controller sets the fusing lamp on and off to keep the fusing temperature.
- TA (185°C): The controller sets the relay (RY) off. The power supply to the fusing lamp is cut off. The printer will not print.
- TPS: The fusing thermostats break the electrical circuit to the fusing lamp. The printer will not print.

Energy Saver Mode

When the printer is in the energy saver mode, the fusing lamp is off.

6.10 PAPER EXIT UNIT



G108D936.WMF

Drive

The main motor drives the paper exit roller [C] via the fusing unit gears. When the rear door is closed, the topmost gear of the fusing unit and the rearmost gear [F] of the paper exit unit engage with each other. The paper exit roller turns when the fusing clutch sends the drive power to the fusing unit (☛ 6.9.2).

Paper Exit Sensor

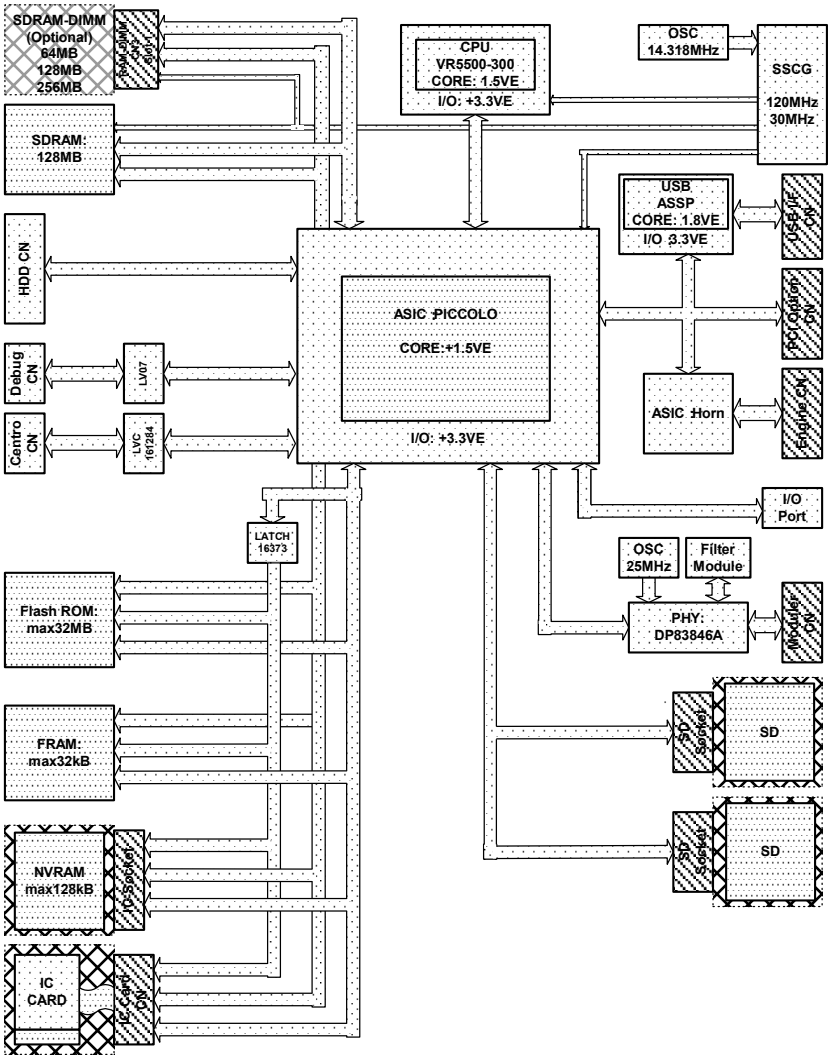
There is a paper feeler [D] at the rear end of the paper exit unit. The right end of the feeler works as an interrupter. When no paper is in the paper exit unit, the interrupter interrupts the paper exit sensor [E] on the right end of the paper exit unit. When the paper is in the paper exit unit, the paper pushes the paper feeler. The right end of the feeler (interrupter) moves out of the paper exit sensor.

Paper Overflow Sensor

There is a paper feeler [B] at the front end of the paper exit unit. The left end of the feeler works as an interrupter. The interrupter interrupts the paper overflow sensor [A] on the left end of the paper exit unit. The paper stack on the paper tray can become high enough to keep pushing the paper feeler. In a condition like this, the left end of the feeler (interrupter) stays out of the paper overflow sensor.

6.11 CONTROLLER

6.11.1 OVERVIEW



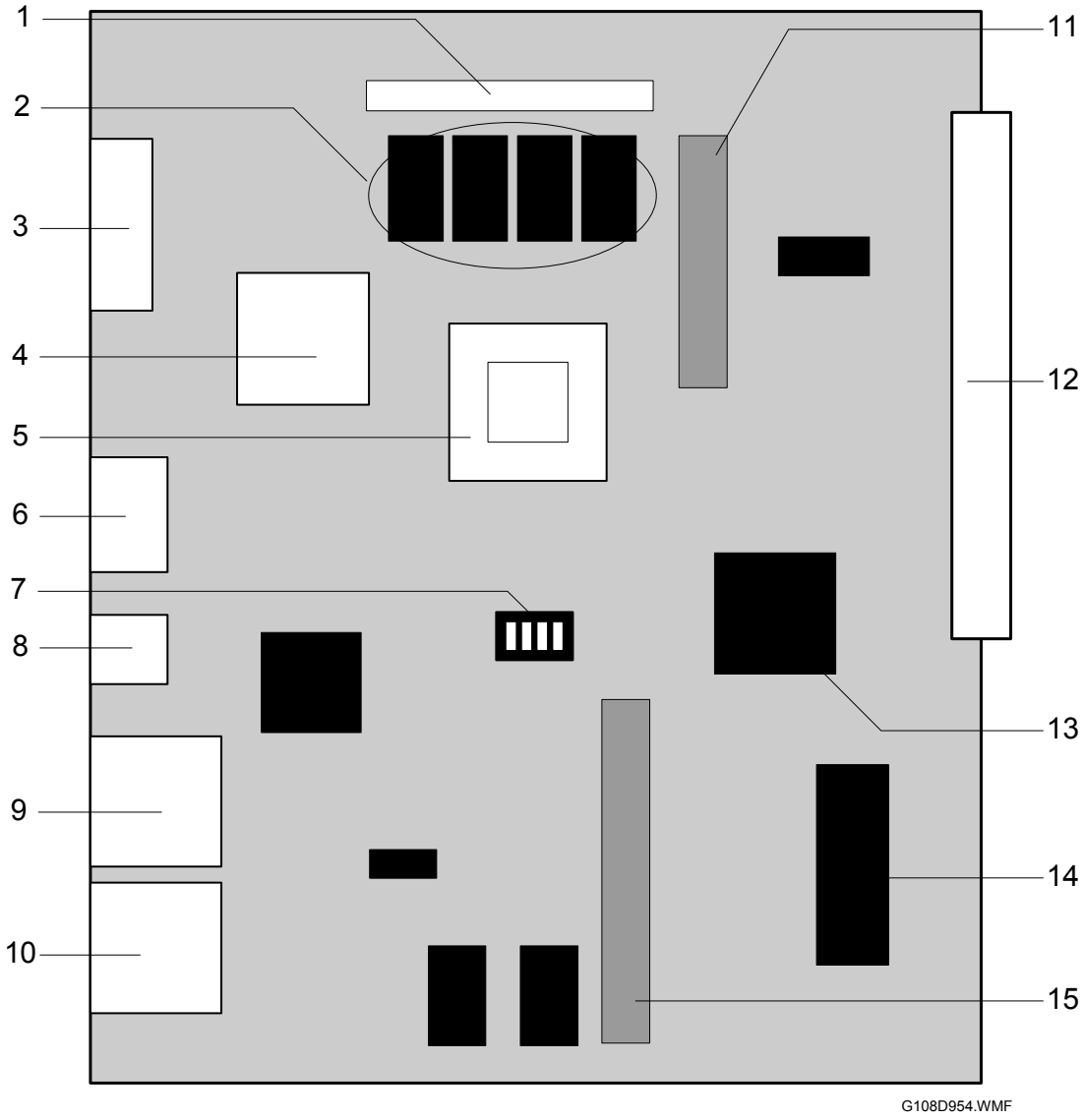
G108D959.WMF

The controller is based on the Ground Work (GW) Architecture.

Component		Remarks
CPU	VR5500 (300 MHz)	
ASIC	Piccolo, Horn	
RAM	Standard: 128 MB Optional: 64 MB, 128 MB, 256 MB	Maximum: 384 MB
Program ROM	24 MB	
SD card slots	2	
NVRAM	32 KB	Not expandable
Printer language	RPCS, PCL5c, PS3 (PDF)	
Emulation	None	
Hard disk	Standard: None Optional: 10 GB	Maximum: 10 GB
Network Interface	Standard: IEEE 1284, USB 2.0, Ethernet Optional: IEEE 802.11b, Bluetooth	

Detailed Descriptions

6.11.2 BOARD LAYOUT



1 SDRAM slot
2 SDRAM (128 MB)
3 IEEE 1284 port
4 CPU
5 ASIC (Piccolo)
6 Ethernet I/F
7 DIP switch
8 USB 2.0 port
9 SD card slot 1
10 SD card slot 2
11 IDE I/F
12 BCU I/F
13 ASIC (Horn)
14 NVRAM
15 I/F for an optional board

6.11.3 CONTROLLER FUNCTIONS

Tray Priority

The user can set 'auto tray' from the dialog box of the printer driver. In a condition like this, the controller examines the paper trays for the paper of the size and type that the user sets also from the dialog box. The user tool Tray Priority (Menu > Paper Input > Tray Priority) sets which tray the controller searches first. Tray Priority is helpful when the optional paper feed unit is installed. The standard paper tray is Tray 1. The optional paper feed unit is Tray 2.

When Tray 1 and Tray 2 do not have the correct paper, the controller stops the print job. The controller starts the print job again when the user puts in the correct paper.

Tray Locking

The user tool Tray Locking (Menu > Paper Input > Tray Locking) sets which tray the controller does not search when the user sets Auto Tray Select (☛ Tray Priority).

Manual Tray Select

The user can set Tray 1 or Tray 2 from the dialog box of the printer driver. In a condition like this, the controller feeds the paper from the set tray. When the set tray does not have the paper of the size and type that the user sets also from the dialog box, the controller stops the print job. The controller starts the job again when the user puts in the correct paper.

Auto Continue

The user may fail to load the correct paper while the controller stops a print job (☛ Tray Priority, Manual Tray Select). In a condition like this, the controller continues to stop the job if the user tool Auto Continue (Menu > System > Auto Continue) is disabled (Off). When Auto Continue is enabled (Immediate/1 minute/5 minutes/10 minutes/15 minutes), the controller starts the job again immediately, in one minute, in five minutes, in 10 minutes, or in 15 minutes.

6.11.4 BLACK OVER PRINT

Black Over Print does not let unexpected white lines show when black letters or lines are printed with color background. You can enable or disable this feature from the printer driver (default: disabled).

When it is enabled, Black Over Print has these bad side effects:

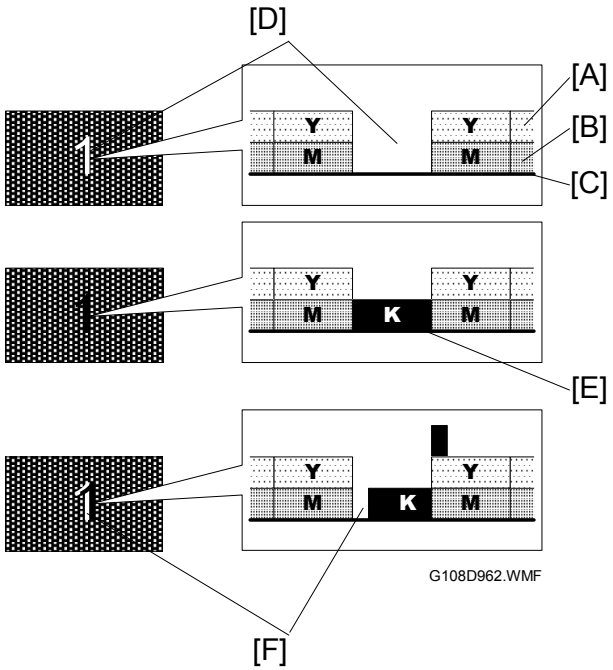
- Crispness can deteriorate because the black toner spreads out.
- More toner is consumed.
- The background color can be seen through black letters or lines.

Black Over Print Disabled

Black lines and color background are printed as follows:

1. The color toner (for example, magenta [B] and yellow [A] toner) is put on the paper [C]. Some space [D] stays blank for the black toner.
2. The black toner [E] is put in the blank space.

If the line position of the black toner is not correct, an unexpected white line [F] shows.

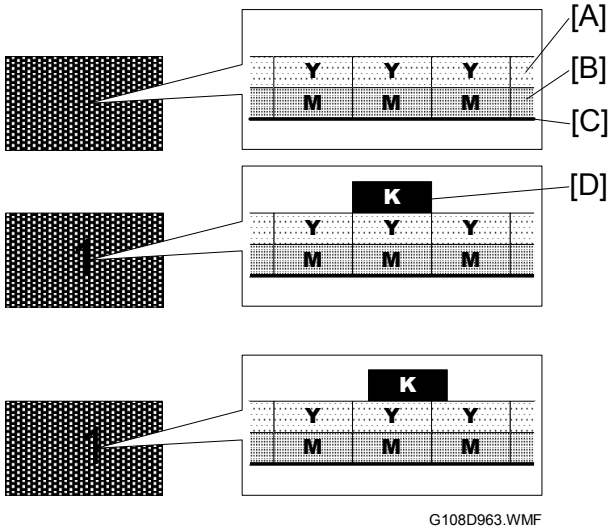


Black Over Print Enabled

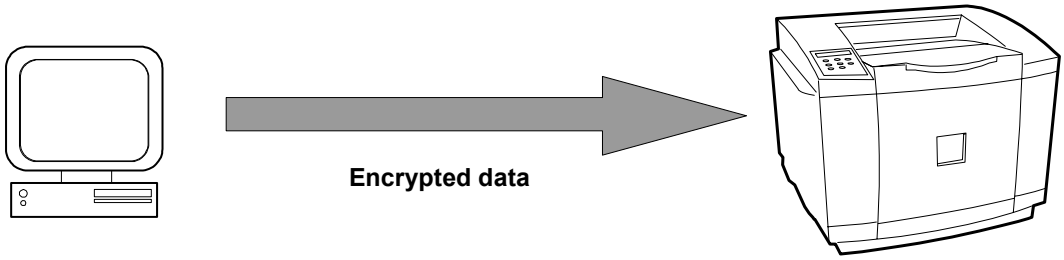
Black lines and color background are printed as follows:

1. The color toner (for example, magenta [B] and yellow [A] toner) is put on the paper [C].
2. The black toner [D] is put on the color toner.

Even if the line position of the black toner is not correct, an unexpected white line does not show.



6.11.5 NETWORK DATA PROTECTION UNIT



G108D955.WMF

NDPU and DES

When a networked computer sends a print job to the printer, the information and data go on the network. The network data protection unit (NDPU) encrypts such information and data.

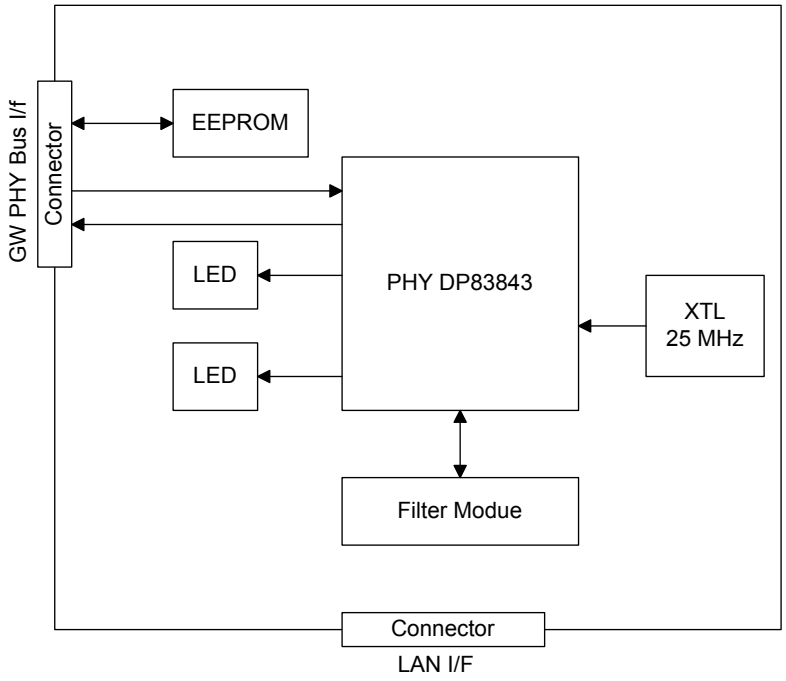
The NDPU is based on the Data Encryption Standard (DES), a specification for encryption of computer data developed by IBM and adopted by the U.S. government as a standard in 1976. DES uses a 56-bit key.

Supported Network Interface

The NDPU supports these network interfaces: Ethernet, IEEE 1394, and IEEE 802.11b.

6.12 ETHERNET BOARD

6.12.1 ETHERNET BOARD LAYOUT



G108D964.WMF

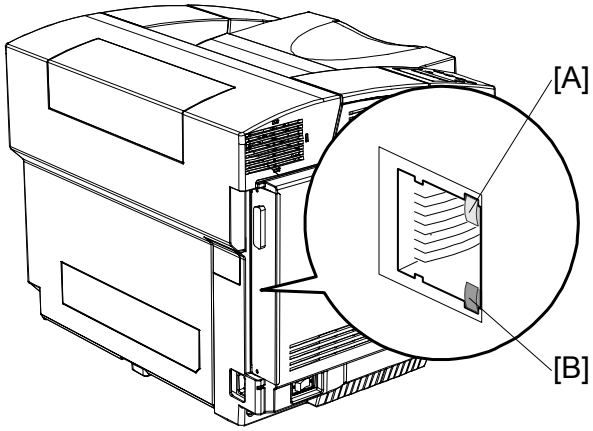
Function Blocks	Description
PHY (Physical Layer Device)	Completely standardized physical layer device for the functions of each device in the network.
EEPROM	Stores the MAC address.

The physical layer device, the lowest layer of the OSI reference model, refers to the physical components of the network: cables, connectors, etc. OSI, the *Operating Standard Interface*, is a framework upon which networking standards are arranged. It is commonly diagramed as a layered cake.

6.12.2 ETHERNET

The NIB is a standard IEEE 802.3u type that implements 10/100 Mbps auto negotiation. System initialization sets the network for 10 Mbps/100 Mbps.

The Ethernet interface unit has two LEDs–orange [A] and green [B]. These LEDs indicate the status of the Ethernet interface unit. The table lists the indications of these LEDs.



G108D951.WMF

LED	Function	Status
Orange [A]	Indicates the operation mode	On: 100 Mbps mode
		Off: 10 Mbps mode
Green [B]	Indicates the link status	On: Link Safe
		Off: Link Fail

6.13 USB 2.0

6.13.1 GENERAL FEATURES

Overview

The word USB is the acronym for universal serial bus. USB can connect up to 127 peripherals, such as external CD-ROM drives, printers, modems, mice, and keyboards, to the system through a single, general-purpose port. This is accomplished by daisy chaining peripherals together. USB does not require terminators, device IDs, or and DIP switches.

Plug and Play

The user can plug in a USB connector and play the equipment without manually configuring the system. The computer searches the physical storage for a necessary driver and installs it.

NOTE: The computer prompts the user to install the driver if it does not find the driver in its storage.

Hot Plugging

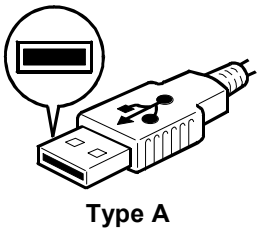
The user can connect a USB connector to a device, such as a computer, while the device is powered on.

USB 2.0 and 1.1

USB 2.0 and USB 1.1 can use the same cables, connectors, and software-program interfaces. Some users may not find any difference between them. USB 2.0 supports the bandwidth of 480 megabits per second (high speed).

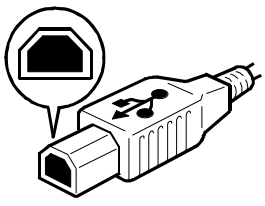
6.13.2 USB CONNECTORS

USB implements serial protocol and requires a physical link. All necessary data is transferred through a single pair of wires. The physical link has another pair of wires to supply the equipment with power. USB supports two types of connectors–type A and type B. Type A is used on the host device, such as a computer. Type B is for the peripheral equipment, such as a printer.



Type A

G108D965.WMF

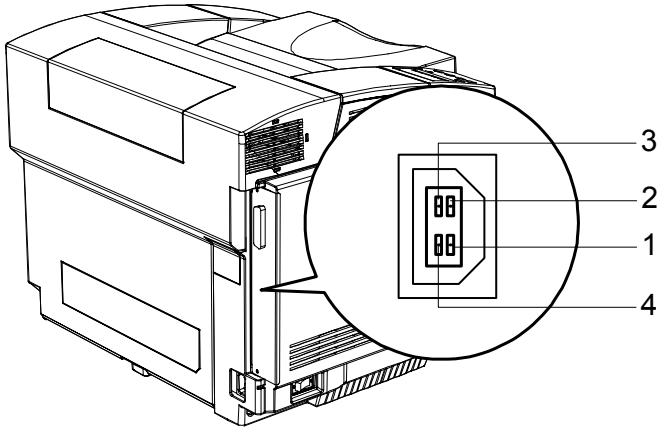


Type B

G108D966.WMF

6.13.3 PIN ASSIGNMENT

The machine has the type B interface.



G108D952.WMF

The table lists the functions of each pin.

Pin	Signal Description	Wiring Assignment
1	Power	Red
2	Data –	White
3	Data +	Green
4	Power GND	White

6.13.4 REMARKS

The machine does not generate any report that is dedicated to the USB operations.

When you have replaced the controller, the host computer (of the machine) does not recognize the printer as the same peripheral device.

Related SP Mode

Transfer Rate (SP5-844-001) adjusts the transfer rate of USB. You can specify Auto Change or Full Speed (12 Mbps). When Auto Change frequently causes transfer errors, you can specify Full Speed to solve the problem.

6.14 IEEE 802.11B (WIRELESS LAN)

6.14.1 SPECIFICATIONS

The IEEE 802.11b (wireless LAN) interface board is available as an option. The wireless LAN is a flexible data communication system used to extend or replace a wired LAN. The wireless LAN employs the radio frequency technology to transmit data and minimizes wired connections. The user can have an access to the network without using cables. In addition, most LANs handle wireless nodes like any other physically wired nodes.

You cannot activate the wireless LAN interface and the Ethernet interface at the same time. To select an interface, use the following menu: User Tool> Host Interface > Network Setup > Frame Type (NW).

Standard:	IEEE 802.11b	
Data transmission:	Speed	Distance
	11 Mbps	140 m (153 yd.)
	5.5 Mbps	200 m (219 yd.)
	2 Mbps	270 m (295 yd.)
	1 Mbps	400 m (437 yd.)
Network protocols:	TCP/IP, Apple Talk, NetBEUI, IPX/SPX	
Bandwidth:	2.4 GHz (divided over 14 channels, 2400 to 2497 MHz for each channel)	

LED Indicators

LED	Description	ON	OFF
LED 1 (Green)	Link Status	Linked	No Link
LED 2 (Orange)	Power Distribution	Power On	Power Off

6.14.2 TRANSMISSION MODES

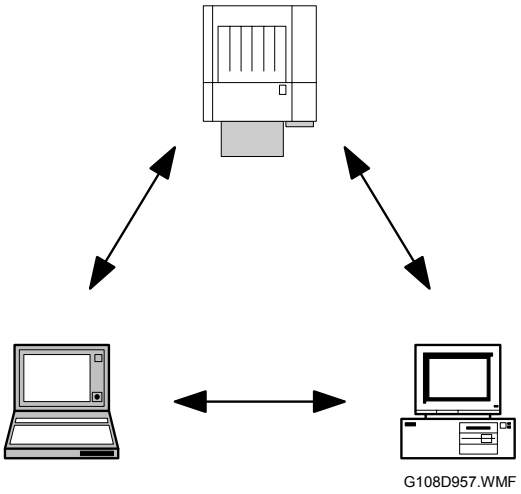
Wireless communication has two modes–① the ad hoc mode and ② the infrastructure mode.

Ad Hoc Mode

The ad hoc mode allows communication between each node on a simple peer-to-peer network. In this mode, all nodes use the same channel to communicate. The ad hoc mode is the default transmission mode. The default number of channels is 11.

Set up the printer in the ad hoc mode and specify necessary settings even if the printer will be used in the infrastructure mode.

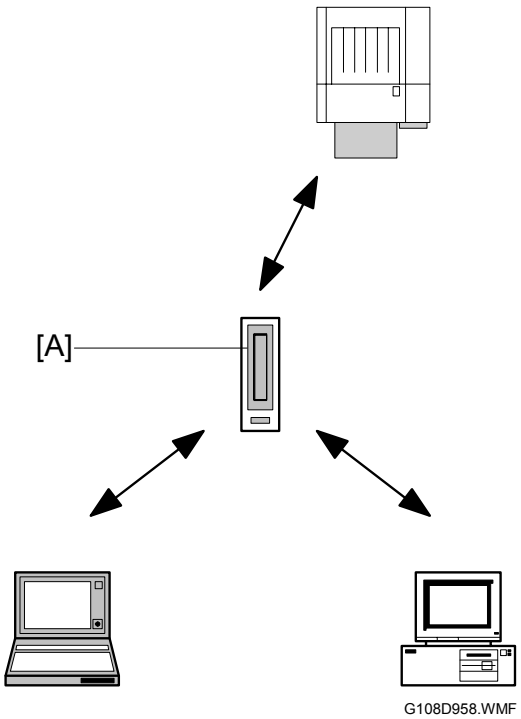
To switch between the ad hoc and infrastructure modes, use the following menu: Menu > Host Interface > Network Setup > Frame Type (NW).



G108D957.WMF

Infrastructure Mode

The infrastructure mode allows communication between each computer and the printer via an access point [A] equipped with an antenna. This access point is wired to the network. This arrangement is used usually in complex topologies. The nodes use the same Service Set ID (SSID) as the access point to communicate.



G108D958.WMF

6.14.3 SECURITY FEATURES

Service Set ID

The Service Set ID (SSID) is used by an access point to recognize the nodes. A node needs to share the same SSID with the access point to be connected to the network.

If you do not specify any SSID, the machine tries to access the nearest access point. You can specify an SSID from the Web Status Monitor.

SSID in Ad hoc mode

When the SSID is used in the ad hoc mode and no SSID is set, the machine automatically uses the ASSID as the SSID. In this case, you must specify the ASSID.

Some nodes can automatically change from the ad hoc mode to the infrastructure mode when the same SSID is used in the ad hoc mode and infrastructure mode. In this case, to use the node in the ad hoc mode, use a specified SSID in the infrastructure mode. As for the ad hoc mode, use the ASSID.

NOTE: SSIDs used in the ad hoc mode are also called *Network Name*.

Wired Equivalent Privacy (WEP)

WEP is a coding system designed to protect the data in wireless transmission. To decode the data, the same WEP key is required on the receiving side. There are 64-bit and 128-bit WEP keys. This machine supports the 64-bit WEP keys.

You can specify WEP keys from the Web Status Monitor or Telnet.

MAC Address

When the infrastructure mode is used, MAC addresses can be also used to manage accesses. Some types of access points do not support MAC addresses.

6.14.4 TROUBLESHOOTING

Communication Status

You can check the communication status from the user toll *W.LAN Signal* in the Maintenance menu. You can also use the Web Status Monitor or Telnet. The status is described on a simple number scale.

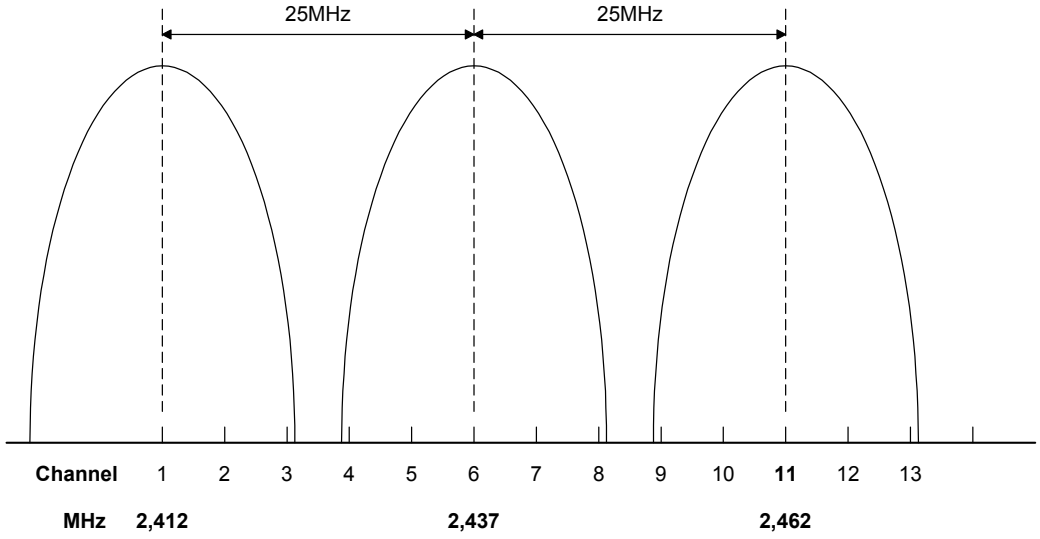
Status Display	Communication Status
Good	76 ~ 100
Fair	41 ~ 75
Poor	21 ~ 40
Unavailable	0 ~ 20

NOTE: The communication status is checked only when the infrastructure mode is used.

Channel Settings

If a communication error is caused by electrical noises or interference by other electrical devices, you may have to change the channel settings.

To avoid interference with neighboring channels, it is recommended that you change the channel by three. For example, if channel 11 (default) is currently used, try using channel 8.



G108D967.WMF

Procedure

Check the following:

- Check the LED indicator on the wireless LAN board.
- Check that *IEEE 802.11b* is specified in the following user toll: Host Interface > Network Setup > Frame Type.
- Check that the channel settings are correct.
- Check that the SSID and WEP are correct.

In addition, check the following when the infrastructure mode is used:

- Check that the MAC address is correct.
- Check the communication status.

If the communication condition is not good, try following:

1. Move the printer closer to the access point.
2. Check that anything interferes with wireless communication.
3. If the problem is not solved, try changing the channel.

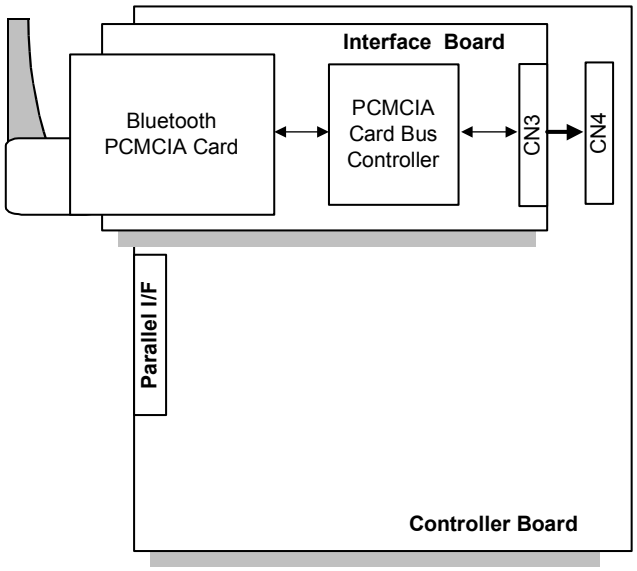
6.15 BLUETOOTH

6.15.1 SPECIFICATIONS

Bluetooth provides radio links between mobile computers, mobile phones, and other devices. This wireless communication requires less expensive devices than the wireless LAN (IEEE 802.11b) does. In addition, Bluetooth supports various protocols for infrared transmission (IRDA). The nodes do not need any special settings.

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

6.15.2 BLOCK DIAGRAM



G108D968.WMF

6.15.3 COMMUNICATION

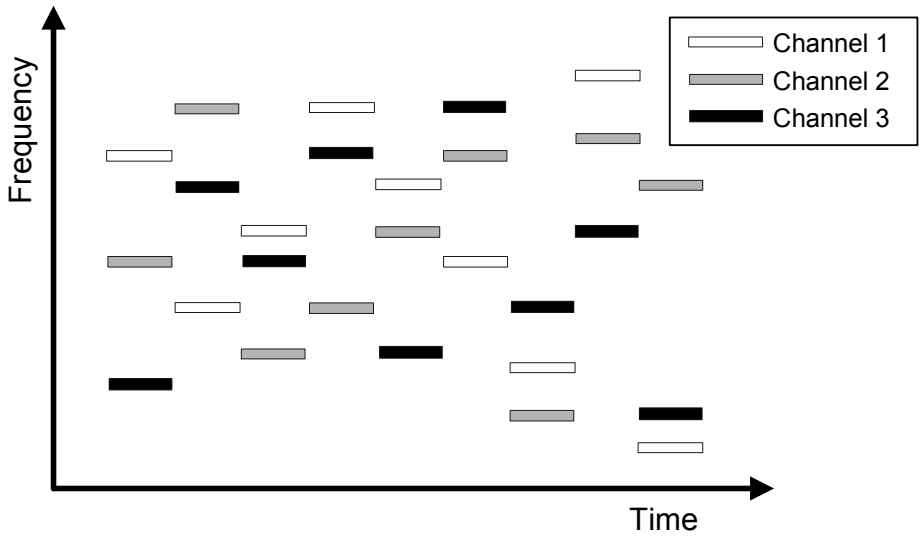
Piconet

The nodes communicate with each other in the ad hoc mode. This network is called *Piconet*. Piconet can connect up to eight nodes.

Piconet has one master and seven slaves at the maximum. The master controls the ID codes of the slaves. The master also controls the radio frequency in the net. (The frequency of Piconet is changed repeatedly.) The master can turn to a slave and a slave can turn to the master. If the master leaves Piconet, one of the slaves turns to the new master. This machine can be a slave of a computer.

Frequency Hopping Spread Spectrum (FHSS)

Bluetooth divides the radio band ranging from 2,402 to 2,480 MHz into 79 channels. Each channel has the 1-MHz width. Bluetooth changes the channel 1,600 times per second. By doing so, the nodes on one Piconet avoid interference with other nodes on another Piconet on the same LAN even if they use the same radio band.



G108D969.WMF

Profiles

A Bluetooth device will not operate if it is close to another Bluetooth device. However, Bluetooth devices should support the protocols to communicate with each other. There are many types of Bluetooth and service protocols. Here are 14 profiles of Bluetooth:

- 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
- Basic Imaging Profile

The Serial Port Profile (SPP) and the Hardcopy Cable Replacement Profile (HCRP) are used for printers. SPP is used in place of the serial port while HCRP is used in place of the parallel port.

This machine needs Adobe PostScript 3 to use the Basic Imaging Profile (BIP).

6.15.4 SECURITY FEATURES

Public and Private Mode

Computers can browse through nodes. They can find the nodes only when the nodes are in the public mode. When a node is in the private mode, computers cannot find the nodes. The machine is in the public mode by default.

PIN Code (Personal Identification Number)

A computer can communicate with a node when the node sends the PIN code. PIN codes are 4-digit numbers. The machine uses the last four digits of the serial number as its PIN code. You cannot change the PIN code.

SPECIFICATIONS

1. GENERAL SPECIFICATIONS

Printing Speed:	8 ppm in full color mode (A4/LT SEF) 31 ppm in B/W mode (A4/LT SEF)
Printer Languages:	PCL 5c, RPCS, PostScript 3
Resolution:	600 x 600 dpi, 1200 x 600 dpi 300 x 300 dpi (PCL in the B/W mode)
Resident Fonts:	Standard: PCL (45 fonts), PS3 (136 fonts) Optional: OCR, Bar code, Optional PCL font
Host Interfaces:	Standard: USB 2.0, IEEE 1284, Ethernet (100 Base-TX/10 Base-T) Optional: IEEE 802.11b, Bluetooth
Network Protocols:	TCP/IP, IPX/SPX, SMB (NetBEUI*, Net BIOS over TCP/IP), AppleTalk * Supported only by Smart Net Monitor

First Print Speed:

Paper Weight	Color Mode	B/W Mode
60 ~ 90 g/m^2	20 sec.	14 sec.
90 ~ 105 g/m^2	25 sec.	19 sec.
105 ~ 163 g/m^2	25 sec.	19 sec.
163 ~ 210 g/m^2	30 sec.	24 sec.

Warm-up Time	When the main power switch is on: 45 sec. or less (Room temp. 22°C) When the printer is out of the energy saver mode: 15 sec. or less (Room temp. 22°C)
Paper Capacity:	Standard tray: 250 sheets Optional paper feed unit: 530 sheets
Paper Size:	Max. 216 mm x 297 mm Min. 104.8 mm x 210 mm (☛ Supported Paper Sizes)
Paper Weight:	Standard tray: 60 ~ 210 g/m^2 Optional paper feed unit: 60 ~ 105 g/m^2
Output Paper Capacity:	250 sheets (face down)

Memory:	Standard: 128 MB Optional: 64 MB, 128 MB, 256 MB (Max. 384 MB)
Power Source:	North America: 120 V, 60 Hz, 11 A or less Others: 220 V - 240 V, 50 Hz, 6 A or less
Power Consumption:	In operation: 1300 W or less (Average: 630 W) On standby: 1300 W or less (Average: 200 W)
Noise Emission	Standby: 54 dB or less Operating: 66 dB or less
Dimensions (W x D x H)	Printer only: 482 x 420 x 382 mm With LG tray: 482 x 495 x 382 mm With PFU: 482 x 470 x 535 mm With duplex unit: 482 x 525 x 436 mm With PFU and duplex unit: 482 x 525 x 591 mm
Weight:	Printer: 31.5 kg PFU: 5.8 kg Duplex unit: 5.3 kg

2. SUPPORTED PAPER SIZES

Paper size			Printer		PFU		LGL		Dup.
			NA	EU	NA	EU	NA	EU	
A3	SEF	297x420 mm	-	-	-	-	-	-	-
B4	SEF	257x364 mm	-	-	-	-	-	-	-
A4	SEF	210x297 mm	✔	✔	✔	✔	✔	✔	✱
A4	LEF	297x210 mm	-	-	-	-	-	-	-
B5	SEF	182x257 mm	S	S	-	-	S	S	✱
B5	LEF	257x182 mm	-	-	-	-	-	-	-
A5	SEF	148x210 mm	A5/HLT	A5/HLT	-	-	A5/HLT	A5/HLT	-
A5	LEF	210x148 mm	-	-	-	-	-	-	-
B6	SEF	128x182 mm	-	-	-	-	-	-	-
B6	LEF	182x128 mm	-	-	-	-	-	-	-
A6	SEF	105x148 mm	-	-	-	-	-	-	-
A6	LEF	148x105 mm	-	-	-	-	-	-	-
DLT	SEF	11x17"	-	-	-	-	-	-	-
Legal	SEF	8.5x14"	-	-	-	-	✔	✔	✱
Letter	SEF	8.5x11"	✔	✔	✔	✔	✔	✔	✱
Letter	LEF	11x8.5"	-	-	-	-	-	-	-
Half Letter	SEF	5.5x8.5"	A5/HLT	A5/HLT	-	-	A5/HLT	A5/HLT	-
Half Letter	LEF	8.5x5.5"	-	-	-	-	-	-	-
Executive	SEF	7.25x10.5"	✔	✔	✔	✔	✔	✔	✱
Executive	LEF	10.5x7.25"	-	-	-	-	-	-	-
F/GL	SEF	8x13"	S	S	-	-	S	S	-
Foolscap	SEF	8.5x13"	S	S	-	-	S	S	-
Folio	SEF	8.25x13"	S	S	-	-	S	S	-
Govt. LG	SEF	8.25x14"	S	S	-	-	S	S	-
Com 10	SEF	4.125x9.5"	S	S	-	-	S	S	-
Monarch	SEF	3.875x7.5"	-	-	-	-	-	-	-
C6	SEF	114x162 mm	-	-	-	-	-	-	-
C5	SEF	162x229 mm	S	S	-	-	S	S	-
DL Env.	SEF	110x220 mm	S	S	-	-	S	S	-
8 K	SEF	267x390 mm	-	-	-	-	-	-	-
16 K	SEF	195x267 mm	S	S	-	-	S	S	-
16 K	LEF	267x195 mm	-	-	-	-	-	-	-
Custom (Standard tray and PFU)	width	104.8-215.9 mm	✱	✱	-	-			-
	length	210-297 mm							
	width	4.13-8.5"							
	length	8.27-11.69"							
Custom (Legal tray)	width	104.8-215.9 mm					✱	✱	-
	length	210-355.6 mm							
	width	4.13-8.5"							
	length	8.27-14"							

Printer: Standard tray
PFU: Optional paper feed unit
LGL: Optional legal tray
Dup.: Optional duplex unit
NA: North America
EU: Europe
SEF: Short edge feed
LEF: Long edge feed

✔: The paper size is automatically detected.
A5/HLT: The paper size is detected according to the setting (Menu > System > Page Size).
S: The paper size is selected manually (Menu > Paper Input > Tray 1/2 Paper Size).
✱: The paper size is not detected; but the paper can be used.
-: The paper size is not usable.

Spec.

3. SOFTWARE ACCESSORIES

3.1 PRINTER DRIVERS

Operating System	Printer Language		
	PCL 5c	RPCS	PostScript 3
Windows 95	✔	✔	✔
Windows 98	✔	✔	✔
Windows Me	✔	✔	✔
Windows 2000 professional	✔	✔	✔
Windows 2000 Server			
Windows 2000 Advanced Server			
Microsoft Windows XP Professional	✔	✔	✔
Microsoft Windows XP Home Edition			
Windows Server 2003 Standard Edition	✔	✔	✔
Windows Server 2003 Enterprise Edition			
Windows Server 2003 Web Edition			
Windows NT Server 4.0	✔	✔	✔*
Windows NT Workstation 4.0 (x86 processors required)			
Mac OS 8.6 or later			✔
Mac OS X Classic environment			
Mac OS X			✔

✔ : Supported
* : Service Pack 6 or later

3.2 UTILITY SOFTWARE

- Font Manager 2000

  Helps you to install new screen fonts or organize and manage fonts already installed on the system. For more information about Font Manager 2000, see the manual on the CD- ROM labeled *Printer Drivers and Utilities.*

- SmartDeviceMonitor for Admin

  Helps the system administrator to manage printers on the network. For more information about SmartDeviceMonitor for Admin, see *SmartDeviceMonitor for Admin Help.*

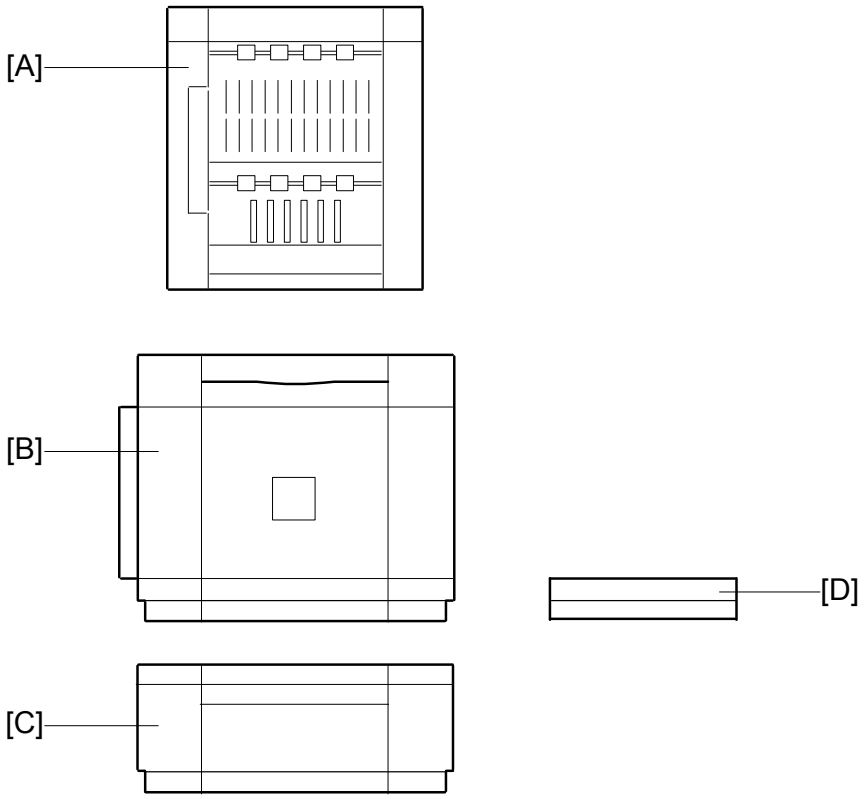
- SmartDeviceMonitor for Client

  Helps users to manage their own print status on the network. For more information about SmartDeviceMonitor for Client, see *SmartDeviceMonitor for Client Help.*

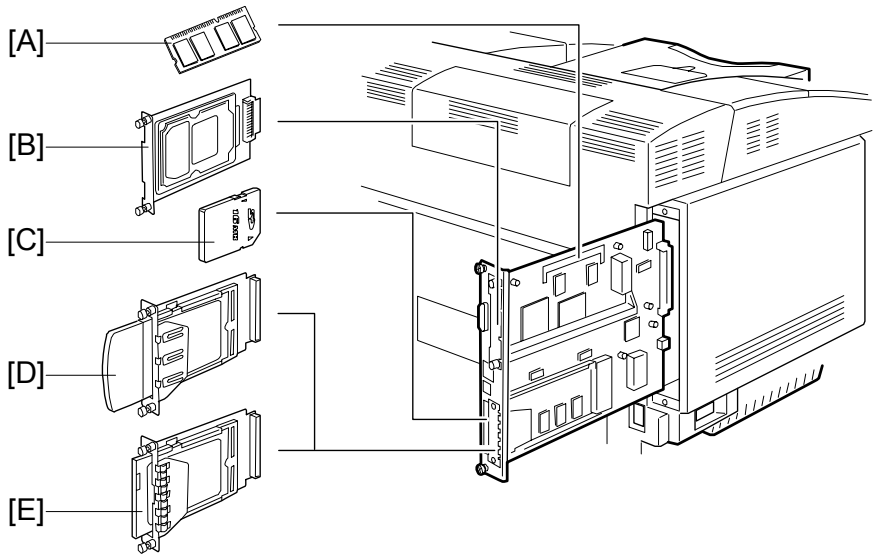
- USB Printing Support

  Provides USB connection to Windows 98 SE/Windows Me.

4. MACHINE CONFIGURATION



Unit	M'Code	Diagram	Remarks
Printer	G108	[B]	
Duplex unit	G390	[A]	
Paper feed unit	G389	[C]	
Legal paper tray	G391	[D]	For North America model only



G108V902.WMF

Component	M'Code	Diagram	Remarks
SDRAM (64 MB)	G330	[A]	One from the three
SDRAM (128 MB)	G331		
SDRAM (256 MB)	G332		
Hard disk drive	G575	[B]	
Network data protection unit	G394	[C]	Stored in an SD card
IEEE 802.11b interface unit	G682	[D]	One from the two
Bluetooth interface unit	G350	[E]	

5. OPTIONAL EQUIPMENT

5.1 PAPER TRAY UNIT

Paper Size:	Letter, A4, Executive
Print Paper Weight:	60 ~ 105 g/m^2
Tray Capacity:	500 sheets
Paper Feed System:	Friction pad separation
Paper Height Detection:	Not available
Paper End Detection:	Available
Power Source:	24V dc (supplied by the printer)
Dimensions (W x D x H):	460 mm x 467 mm x 185 mm (18.1" x 18.4" x 7.3")
Weight	Approx. 6.0 kg (9 lb)

5.2 LEGAL PAPER TRAY

Paper Size:	Width: 104.8 mm ~ 215.9 mm, 4.13" ~ 8.5" Length: 210 mm ~ 355.6 mm, 8.27" ~ 14" (☛ Supported Paper Sizes)
Print Paper Weight:	60 ~ 105 g/m^2
Tray Capacity:	250 sheets

5.3 DUPLEX UNIT

Paper Size:	A4, B5, Legal, Letter, Executive
Power Source:	24V dc (supplied by the printer)
Dimensions (W x D x H):	Duplex unit only: 345 mm x 185 mm x 406.2 mm With the printer: 480 mm x 522 mm x 440 mm
Weight	Duplex unit only: Approx. 5.3 kg With the printer: Approx. 35.8 kg