

**Model PL-MF**  
**(Machine Code: G157)**

**SERVICE MANUAL**

Subject to change  
28 December 2005

## **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**

The printer and its peripherals must be serviced by a customer service representative who has completed the training course on those models.

### **WARNING**

- ⊗ Keep the machine away from flammable liquids, gases, and aerosols. A fire or an explosion might occur.

### **CAUTION**

1. 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.
2. The fax and memory expansion units contain lithium batteries, which can explode if replaced incorrectly. Replace only with the same or an equivalent type recommended by the manufacturer. Do not recharge or burn the batteries. Used batteries 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:



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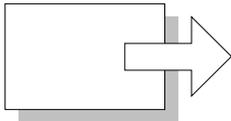
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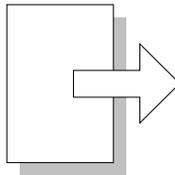
## Symbols and Abbreviations

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)**

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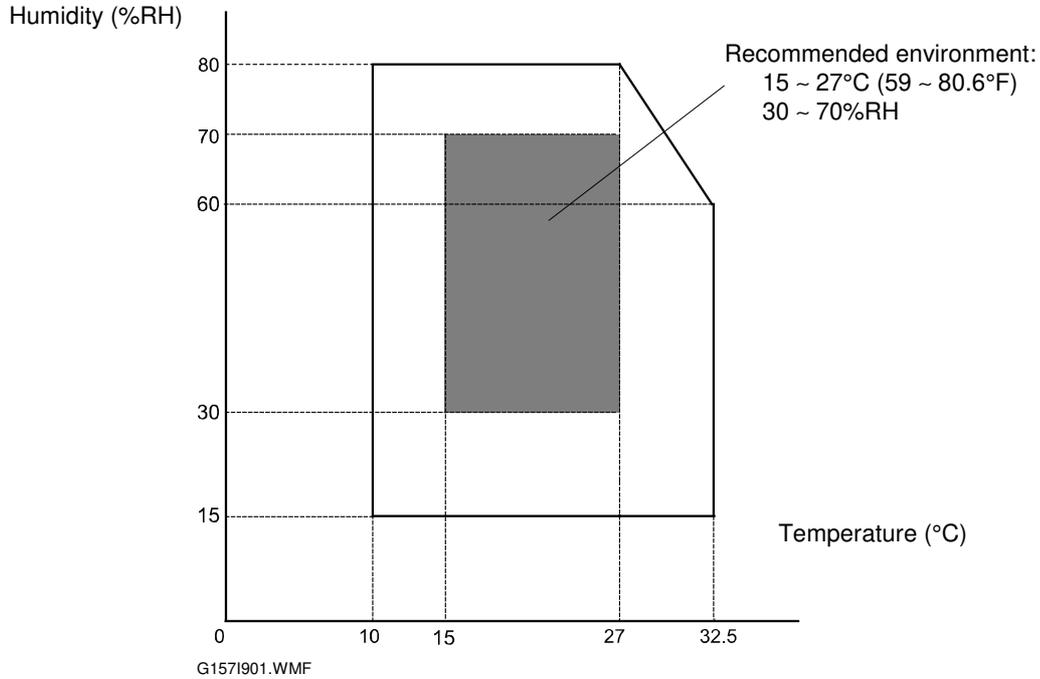
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# 1. INSTALLATION

## 1.1 INSTALLATION REQUIREMENTS

### 1.1.1 ENVIRONMENT



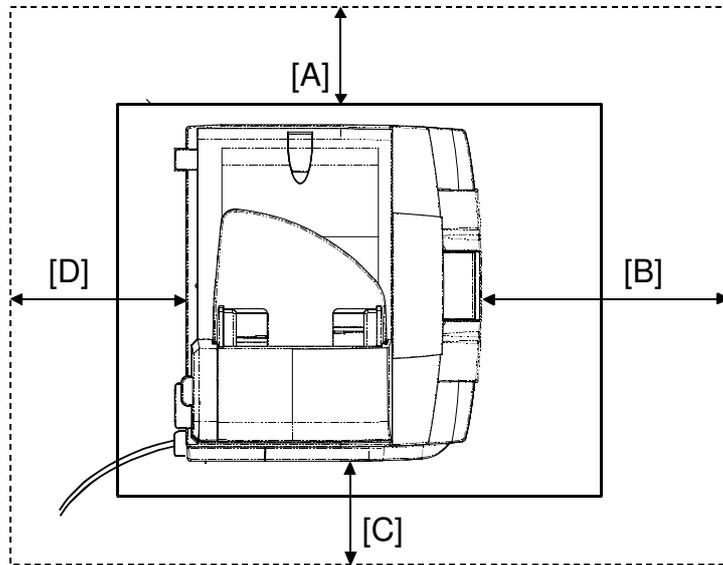
1. Temperature range: 10 ~ 32.5°C (50 ~ 90.5°F)
2. Humidity range: 15 ~ 80%RH
3. Do not install the machine areas that get direct sunlight.
4. Do not install the machine areas with bad airflow.
5. Do not let the machine get temperature changes from these:
  - 1) Direct cool air from an air conditioner
  - 2) Direct heat from a heater
6. Do not install the machine areas that can get corrosive gas.
7. Install the machine at locations lower than 2,500 m (8200 ft.).
8. Install the machine on a strong, level base.
9. Do not install the machine areas that get 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**



G1571002.WMF

[A] (Right): 500 mm (20")

[B] (Front): 700 mm (28")

[C] (Left): 200 mm (8")

[D] (Rear): 350 mm (14")

**NOTE:** The space for maintenance work is included.

**1.1.4 POWER REQUIREMENT**

<p><b>⚠ CAUTION</b></p> <p><b>1. Put the power plug tightly in the outlet.</b></p> <p><b>2. Do not use extension cords.</b></p> <p><b>3. Ground the machine.</b></p>
--

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

## 1.2 INSTALLATION PROCEDURE

### 1.2.1 INSTALLING THE COPIER

See the Quick Setup Guide.

### 1.2.2 EEPROM CUSTOMIZATION

At the factory:

- Maintenance function 74 (see section 5.2.3). This inputs a code for the region, such as Europe, Oceania, etc.

For customers in Europe and Oceania:

- Maintenance function 52 (see section 5.2.3). This procedure makes sure that the communication parameters obey the local communication standards for each country. The customers must input the correct setting is correct for their country after they install the machine.

## 1.3 MOVING THE MACHINE

Use caution when you move the machine:

You need two or more persons to move the machine. The machine weighs about 35 kg (77 lb) without optional units. Before you turn off the main power, move the CIS to the shipping position with Maintenance function 06 (see section 5.2.3).

**NOTE:** The customer can do maintenance function 06 themselves. But you must tell them to use this function before they move the machine.

2. Keep the machine level at the time 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. Use the padding in the original package.
5. Remove these units before you move the machine:
  - Photoconductor unit
  - Optional paper feed unit
  - Paper

**NOTE:** Do not remove the waste toner bottle. 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 copier.
8. Secure the paper tray and all exterior covers with tape.

## 2. PREVENTIVE MAINTENANCE

### 2.1 USER MAINTENANCE

#### *Page Count*

The table shows the components that require maintenance when the copier 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 life is decided by the number of developments. The number in the table is calculated for these conditions: ① A4 SEF, ② 5% image coverage ratio, ③ two pages per job, ④ 50% color ratio.

- 2) The user must **do user function 74 (OPC Belt)** after they replace the OPC belt unit: (☛ **User's Guide, Appendix C "Troubleshooting and Routine Maintenance", Replacing the consumable items**). This section of the User's Guide also contains procedures for replacing user-maintenance items.

## 2.2 SERVICE MAINTENANCE

### *Necessary Setting*

- You must do the PM counter initialization (**Service Mode > 36 CLEAR CARE**) after you replace these units:
  - Transfer belt unit
  - Transfer roller
  - Transfer **belt** cleaning unit
  - Paper feed roller
  - Separator pad
- You must **also** do **Service Mode > 36 CLEAR CARE** after you replace the fusing unit.

### *Page Count*

The table shows the components that need maintenance when the **copier** has output a certain number of pages.

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

#### MAIN FRAME

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 calculated for these conditions: ① A4 SEF, ② 5% image coverage ratio, ③ two pages per job, ④ 50% color ratio.
- 2) The life is decided by the number of developmetnts. The number in the table is calculated for the conditions above.
- 3) These are yield parts only. But the expected yield is the same as the machine durability under the target conditions.

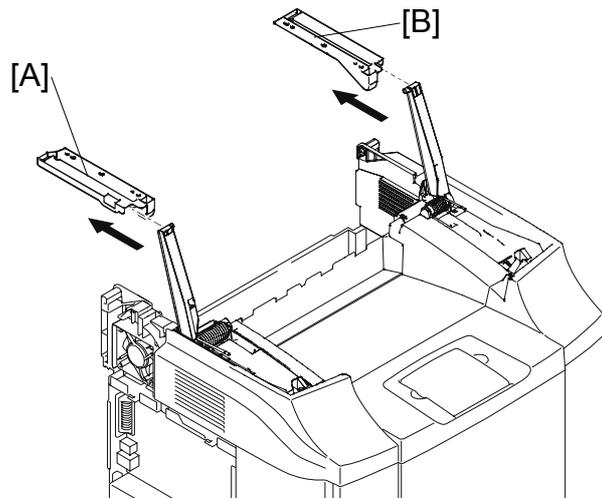
### 3. REPLACEMENT AND ADJUSTMENT

**⚠ CAUTION**  
 Set the power off and disconnect the copier before you remove parts of the copier.

#### 3.1 EXTERIOR COVERS

##### 3.1.1 TOP COVER

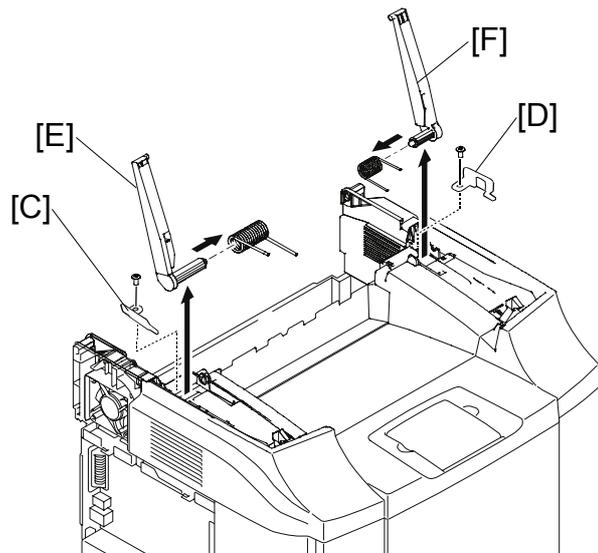
1. Scanner unit (☛ 3.2)
2. Scanner slider L [A] and R [B]  
**NOTE:** If you just remove the top cover, you can skip steps from 2 to 4.



G157R541.WMF

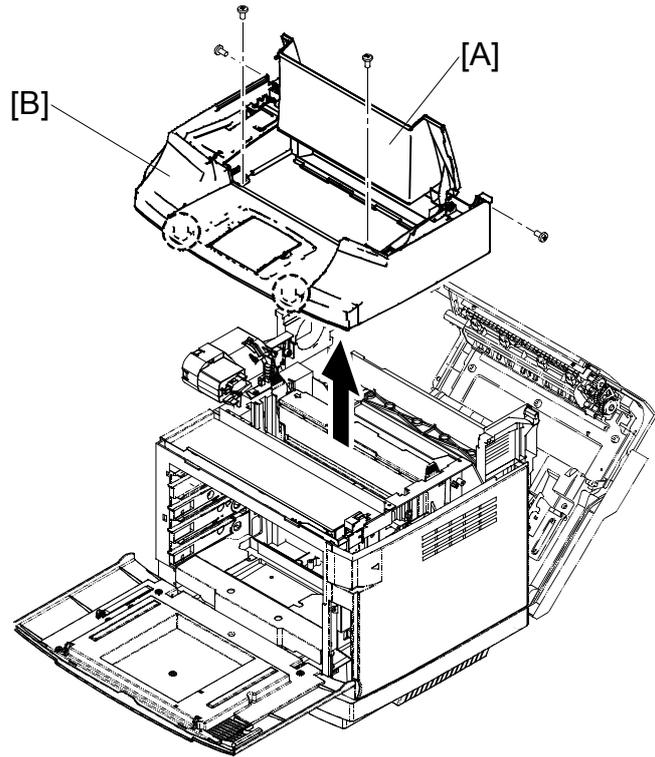
Replacement  
Adjustment

3. Arm holds [C] and [D] (⚙ x 1 each)
4. Pull arm L [E] and R [F] (two pull arm springs)



G157R542.WMF

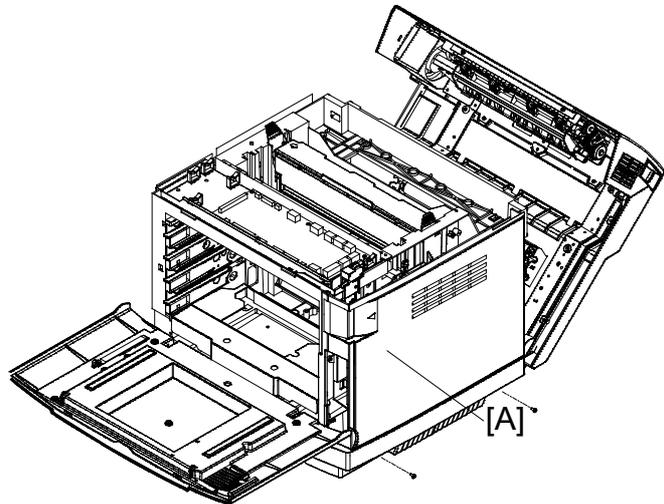
5. Open the center cover [A].
6. Top cover [B] (⚙️ x 4, two hooks)



G157R560.WMF

### 3.1.2 RIGHT COVER

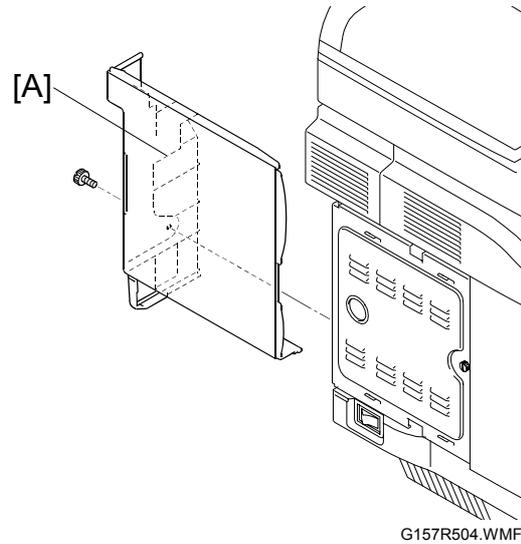
1. Top cover (☛ 3.1.1)
2. Open the front cover (☛ 3.1.6)
3. Open the rear cover (☛ 3.1.7)
4. Right cover [A] (⚙️ x 2)



G157R902.WMF

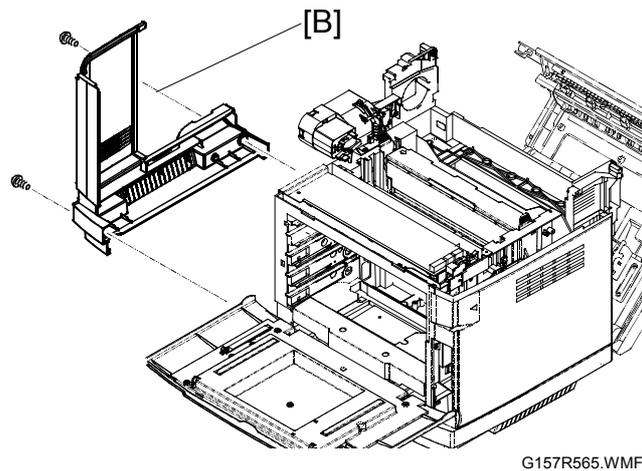
### 3.1.3 LEFT FRONT AND LEFT REAR COVER

1. Left rear cover [A] (🔩 x 1)



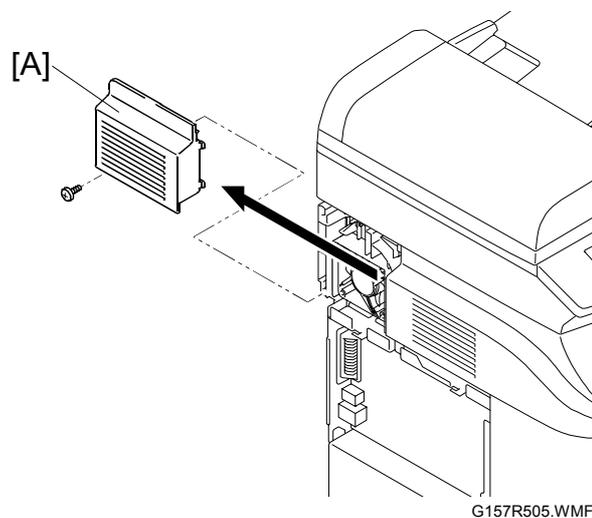
Replacement  
Adjustment

2. Top cover (☞ 3.1.1)
3. Open the front cover. (☞ 3.1.6)
4. Left front cover [B] (🔩 x 2)



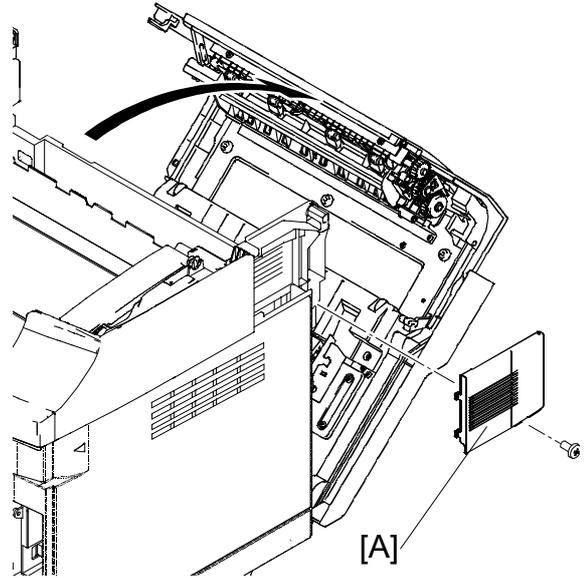
### 3.1.4 TOP SIDE L COVER

1. Left rear cover (☞ 3.1.3)
2. Top side L cover [A] (🔩 x 1)



### 3.1.5 TOP SIDE R COVER

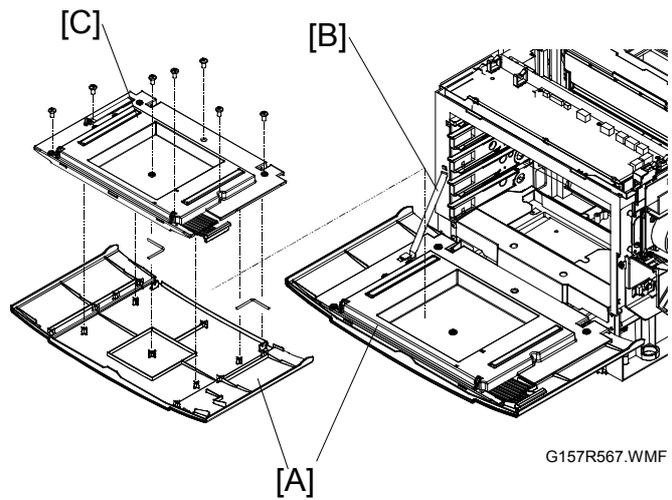
1. Open the rear cover. (☛ 3.1.7)
2. Top side R cover [A] (🔧 x 1)



G157R584.WMF

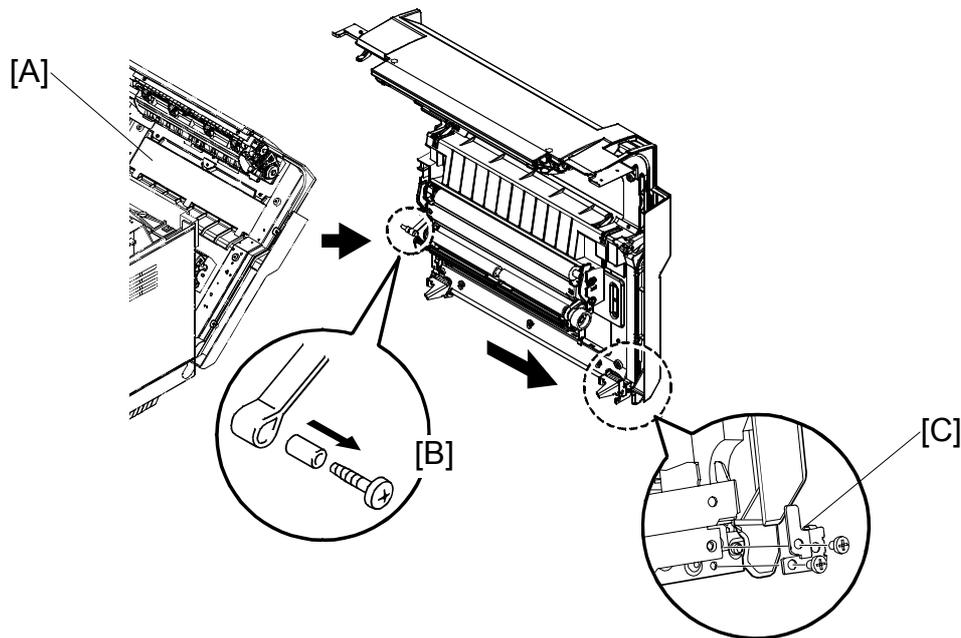
### 3.1.6 FRONT COVER

1. Open the front cover [A].
2. Front cover (🔧 x 8)
3. Release the securing band [B] from the machine's side.
4. Internal cover [C] (Pin x 2)



G157R567.WMF

### 3.1.7 REAR COVER

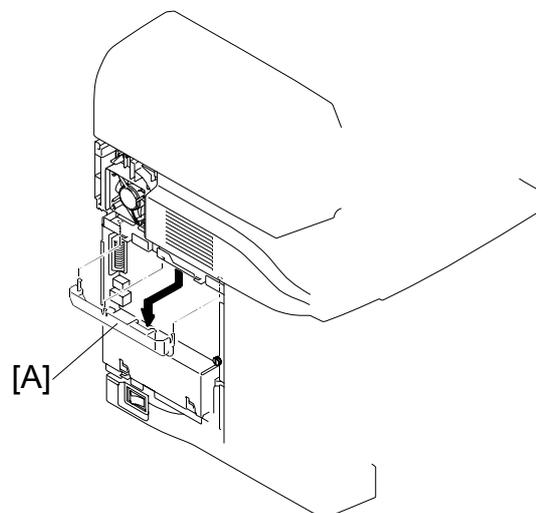


G157R564.WMF

1. Top cover (☛ 3.1.1)
2. Right cover (☛ 3.1.2)
3. Open the rear cover [A].
4. Transfer belt unit (☛ 3.8.1)
5. Release the strap [B] (🔩 x 1).
6. Support plate [C] (🔩 x 2)
7. Rear cover (with the transfer unit and the paper exit unit) [A] (🔩 x 1)

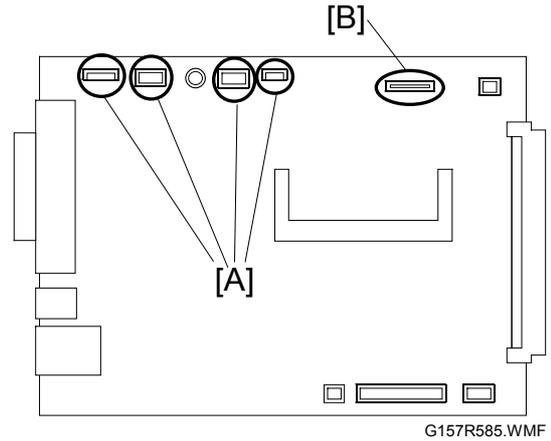
### 3.2 SCANNER UNIT

1. Left rear cover (☛ 3.1.3)
2. Controller box cover (☛ 3.13.2)
3. Top side L (☛ 3.1.4)
4. Harness cover [A] (three hooks)
5. Two ground cables (🔩 x 1)

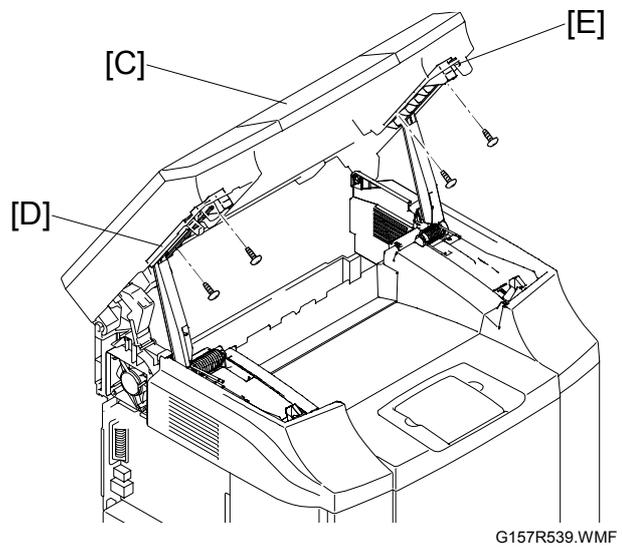


G157R507.WMF

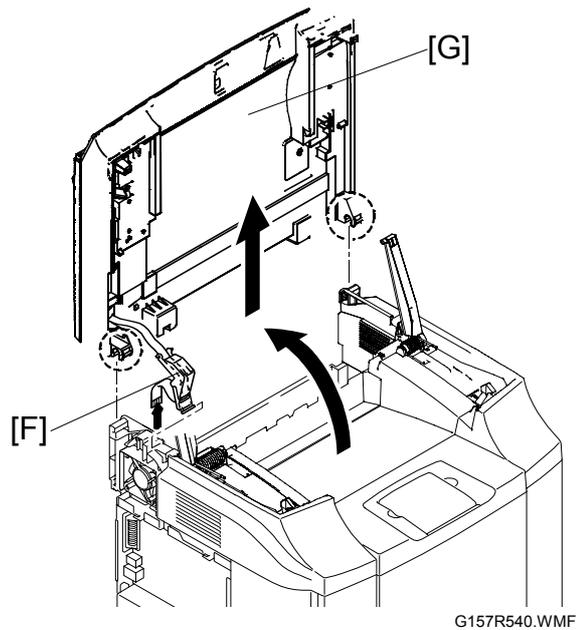
6. Disconnect the four harnesses [A] and one flat cable [B].



7. Open the scanner unit [C].
8. Scanner slider L [D] and R [E] (⚙️ x 2 each)



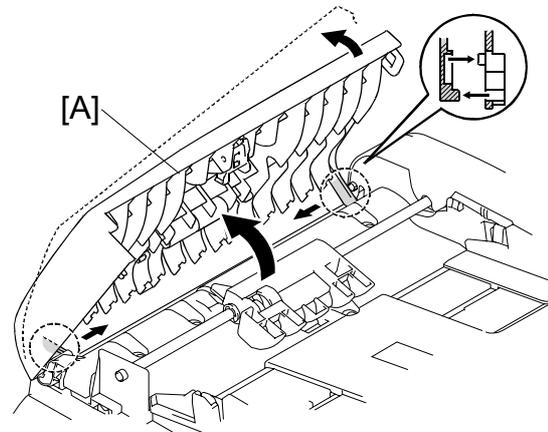
9. Cable cover [F]
10. Scanner unit [G]



### 3.3 ADF

#### 3.3.1 ADF COVER

1. ADF cover [A] (Two hooks)

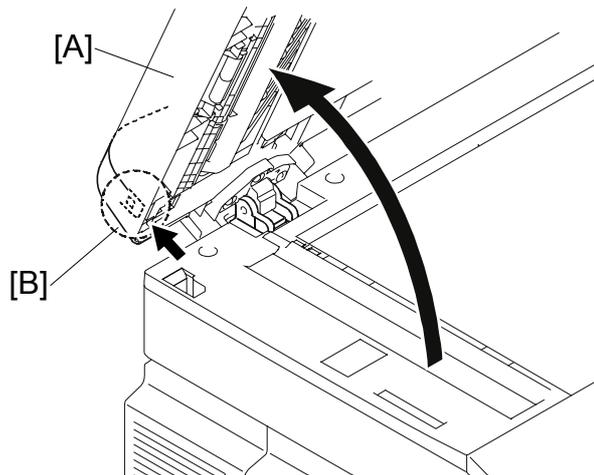


G157R511.WMF

Replacement  
Adjustment

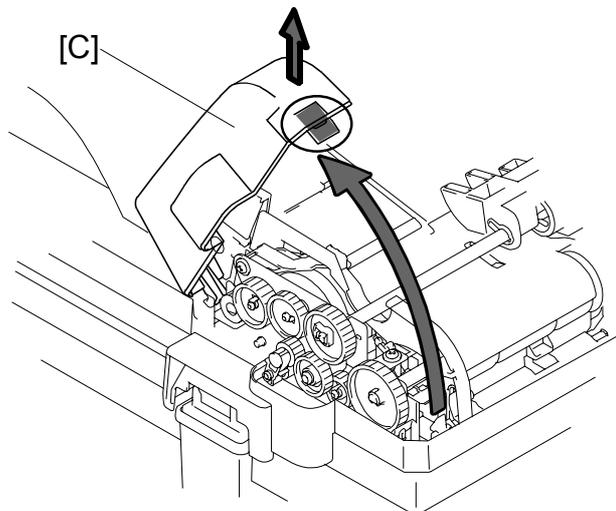
#### 3.3.2 GEAR COVER

1. Open the ADF unit [A].
2. Release the hook [B].



G157R514.WMF

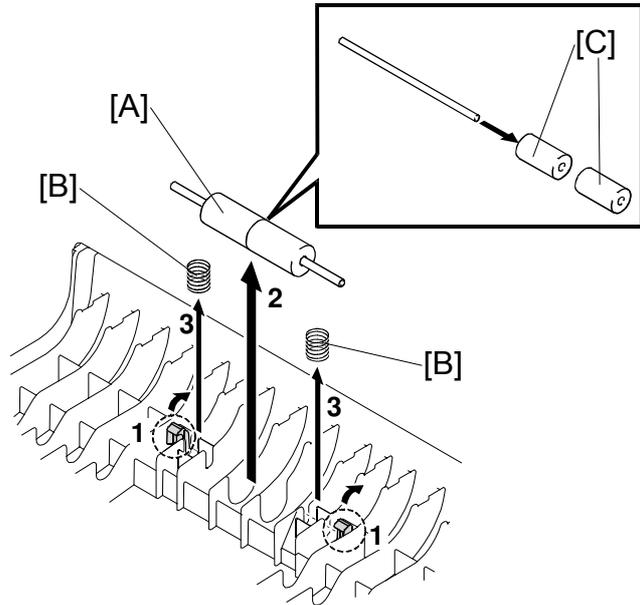
3. Gear cover [C]



G157R515.WMF

### 3.3.3 TRANSPORT PRESSURE ROLLER 1

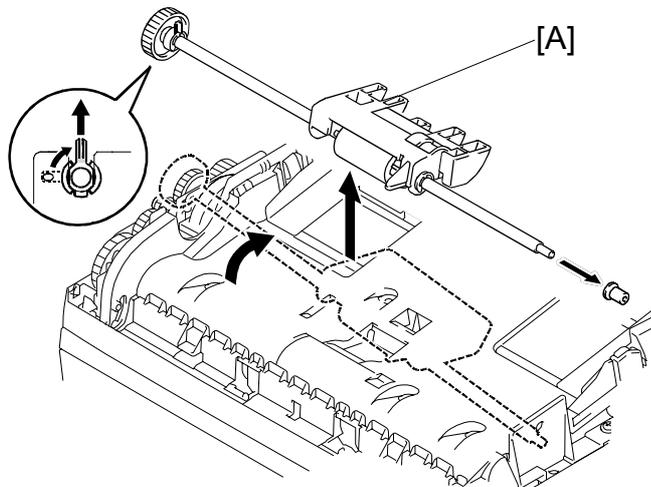
1. ADF cover (☛ 3.3.1)
2. Transport pressure roller 1 [A]  
(Two hooks)
3. Two springs [B]
4. Two pressure rollers [C]



G157R512.WMF

### 3.3.4 FEED ROLLER UNIT

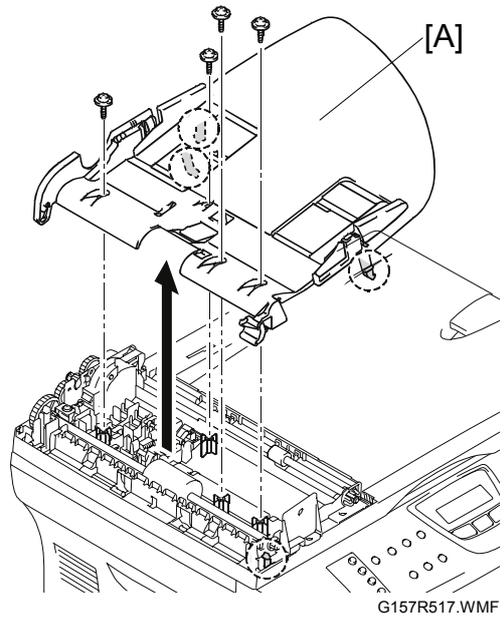
1. ADF cover (☛ 3.3.1)
2. Gear cover (☛ 3.3.1)
3. Feed roller unit [A]  
(Bushing x 1)



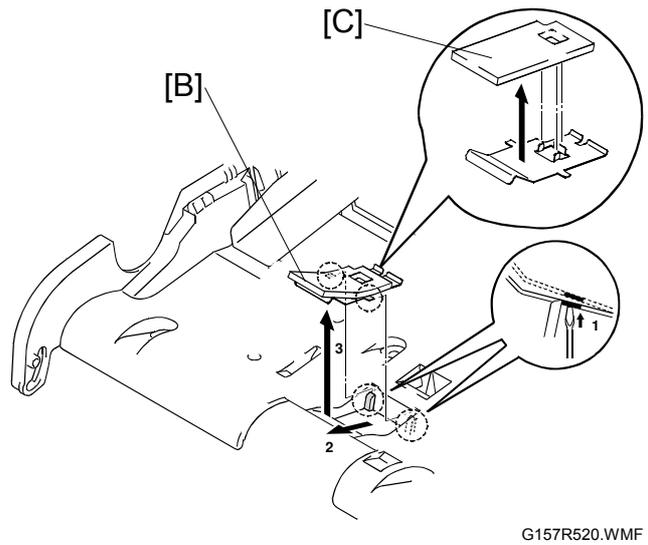
G157R516.WMF

### 3.3.5 SEPARATION PAD

1. Feed roller unit (☛ 3.3.4)
2. Original tray [A] (🔩 x 4, four hooks)

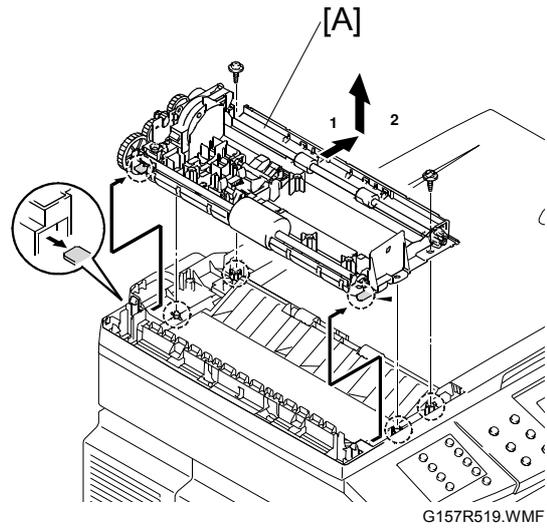


3. Separation pad unit [B]
4. Separation pad [C]



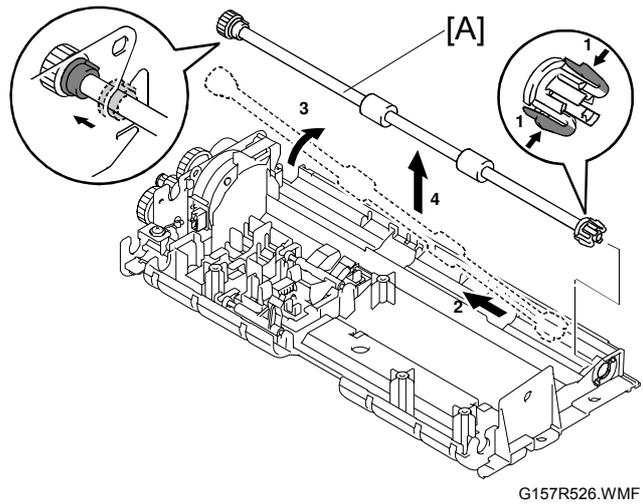
### 3.3.6 DOCUMENT GUIDE UNIT

1. Feed roller unit (☛ 3.3.4)
2. Original tray (☛ 3.3.5)
3. Document guide unit [A] (⚙️ x 3, 📏 x 2, one ground wire, two hooks)



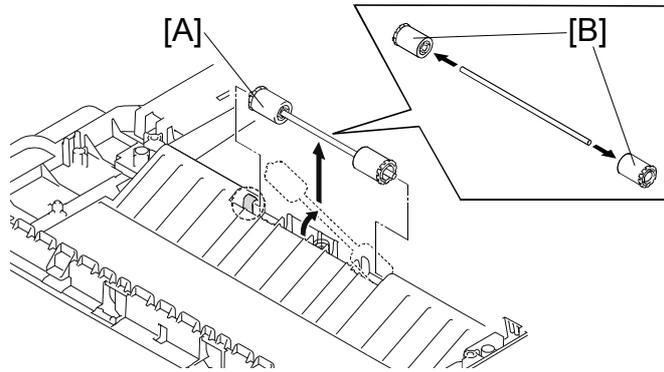
### 3.3.7 EXIT ROLLER

1. Feed roller unit (☛ 3.3.4)
2. Original tray (☛ 3.3.5)
3. Exit roller [A]



### 3.3.8 EXIT PRESSURE ROLLER

4. Feed roller unit (☛ 3.3.4)
5. Original tray (☛ 3.3.5)
6. Document guide unit (☛ 3.3.6)
7. Exit pressure roller unit [A] (One spring)
8. Exit pressure roller [B]

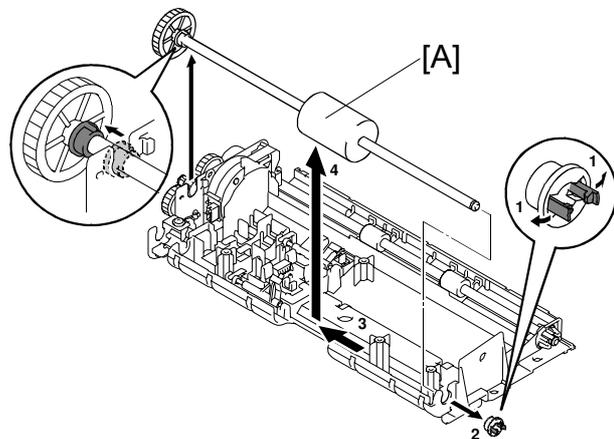


G157R522.WMF

Replacement Adjustment

### 3.3.9 TRANSPORT ROLLER

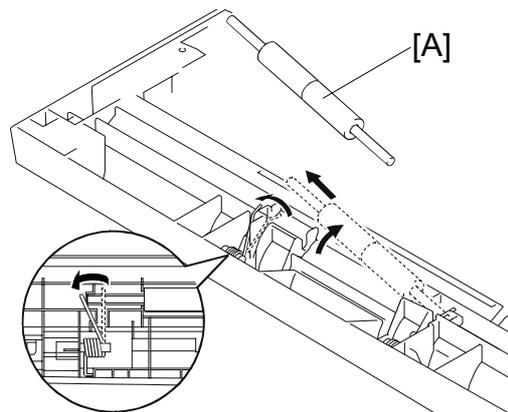
1. Feed roller unit (☛ 3.3.4)
2. Original tray (☛ 3.3.5)
3. Transport roller [A]



G157R525.WMF

### 3.3.10 TRANSPORT PRESSURE ROLLER 2

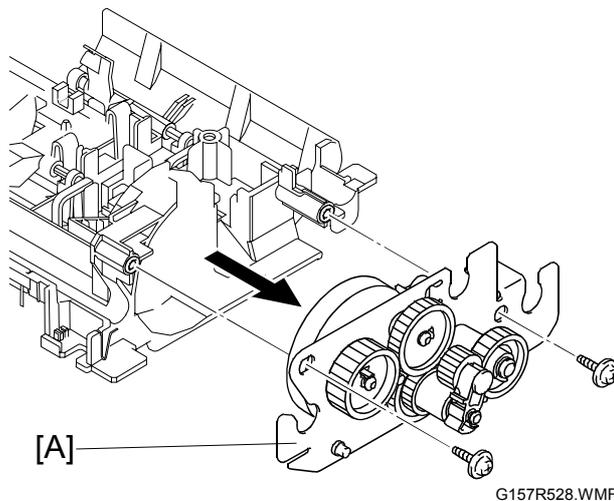
1. Open the ADF unit.
2. Transport pressure roller 2 [A] (Two springs)



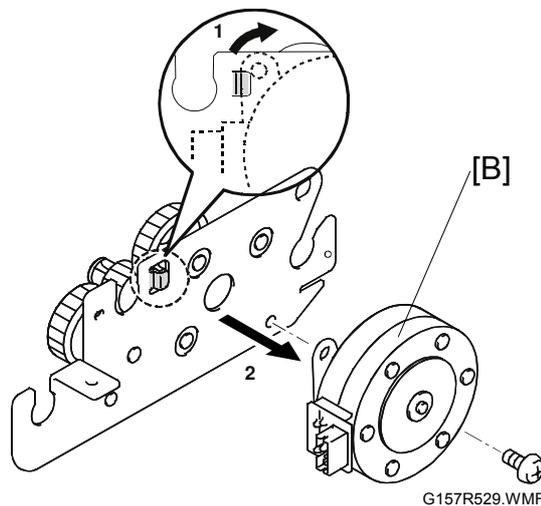
G157R536.WMFFF

### 3.3.11 ADF MOTOR

1. Feed roller unit (☛ 3.3.4)
2. Original tray (☛ 3.3.5)
3. Transport roller (☛ 3.3.9)
4. Exit roller (☛ 3.3.7)
5. ADF drive gear unit [A] (⚙️ x 3, 📏 x 1)

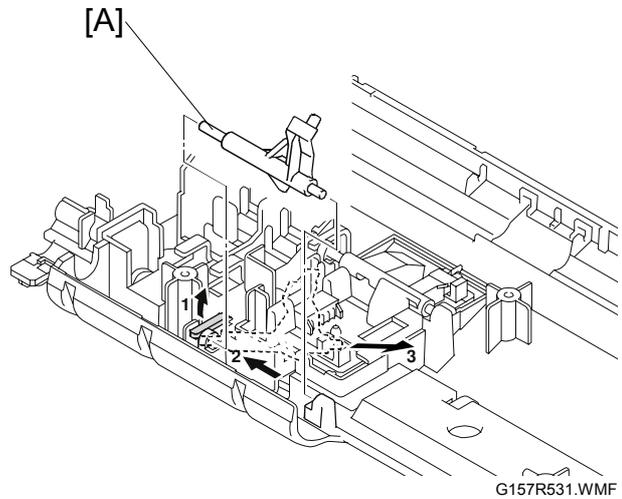


6. ADF drive motor [B] (⚙️ x 1)



### 3.3.12 LEADING EDGE AND TRAILING EDGE SENSOR BOARD

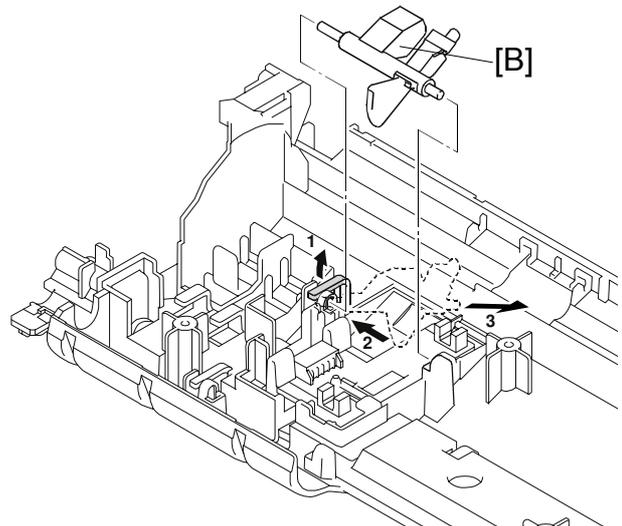
1. Feed roller unit  
(☛ 3.3.4)
2. Original tray (☛ 3.3.5)
3. Trailing edge sensor actuator  
[A]



G157R531.WMF

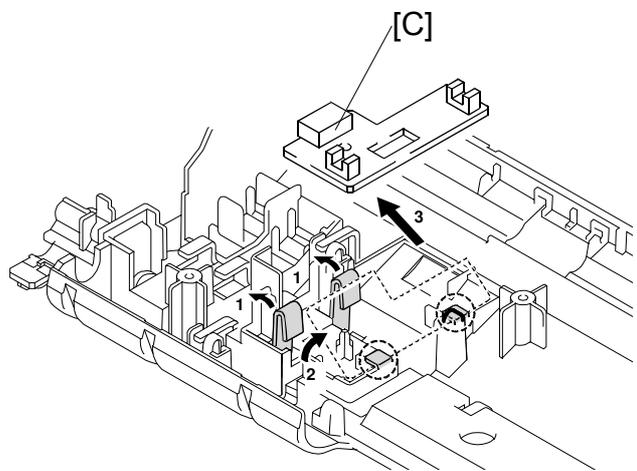
Replacement  
Adjustment

4. Leading edge sensor actuator  
[B]



G157R532.WMF

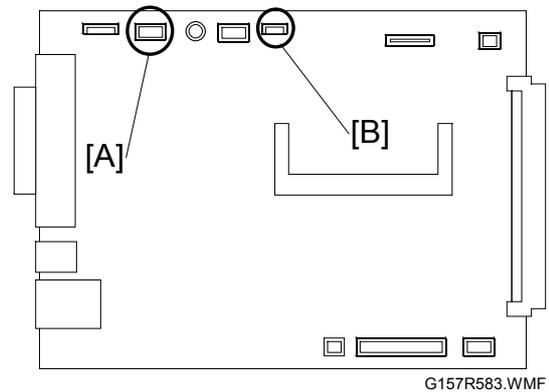
5. Leading edge and trailing edge sensor board [C] (☛ x 1)



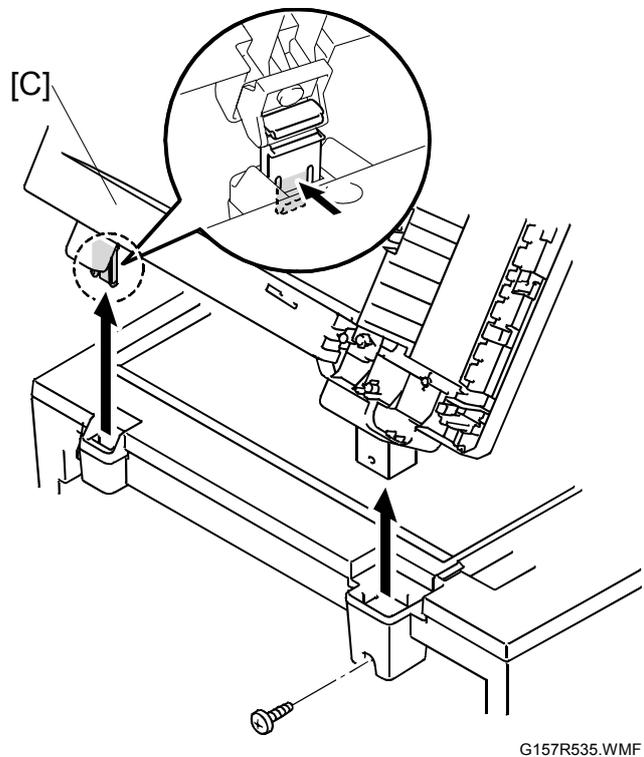
G157R533.WMF

### 3.3.13 ADF UNIT

1. Left rear cover (☛ 3.1.3)
2. Controller box cover (☛ 3.13.2)
3. Disconnect two ADF harnesses [A] [B] from the controller.



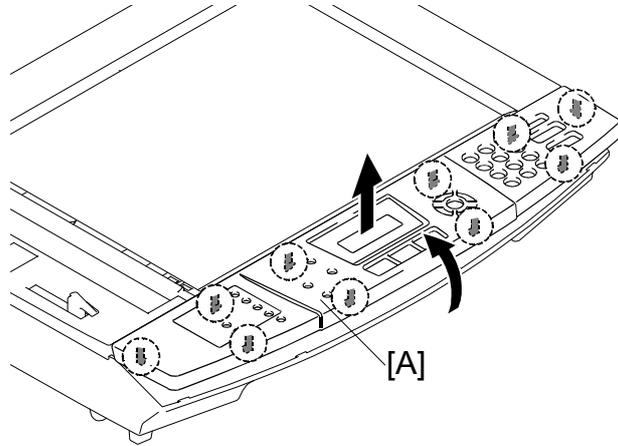
4. ADF unit [C] (☛ x 1)



### 3.4 OPERATION PANEL

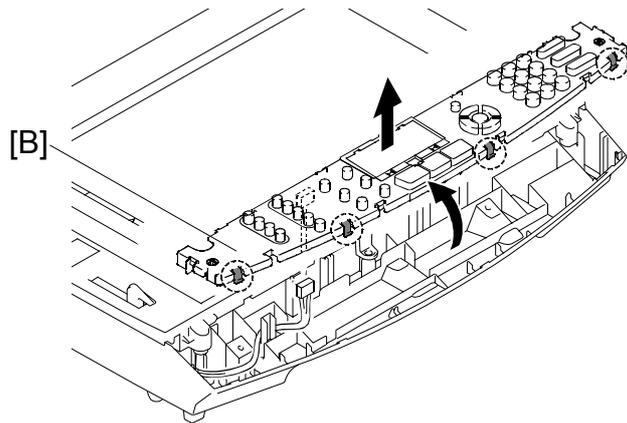
#### 3.4.1 OPERATION PANEL BOARD

1. Operation panel cover [A]



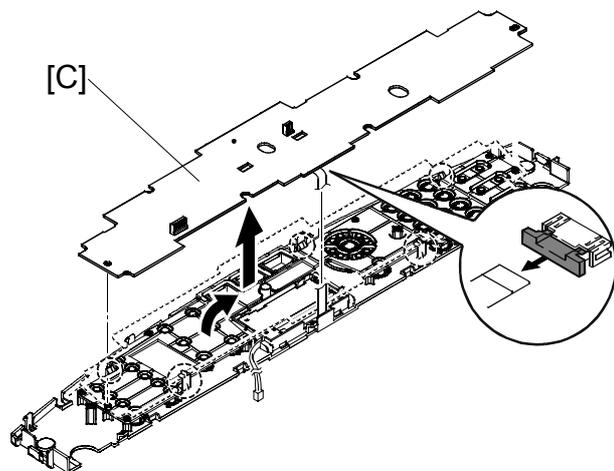
G157R545.WMF

2. Operation panel unit [B] (Ⓜ x 1)



G157R546.WMF

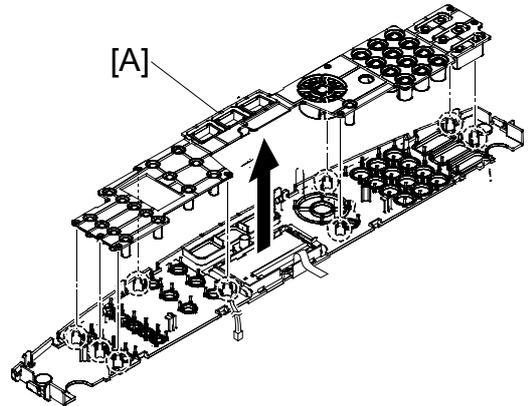
3. Operation panel board [C] (Ⓜ x 1, flat cable x 1, five hooks)



G157R548.WMF

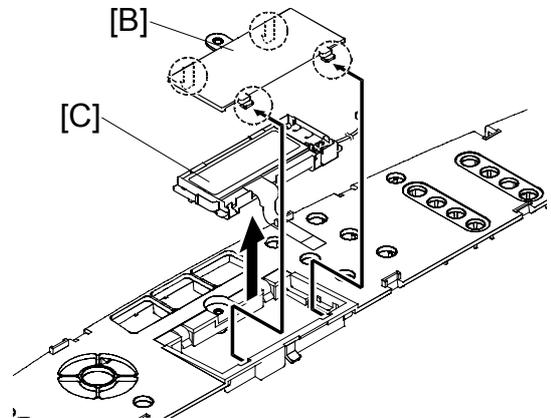
### 3.4.2 LCD PANEL

1. Operation panel board (☛ 3.4.1)
2. Operation panel rubber [A]



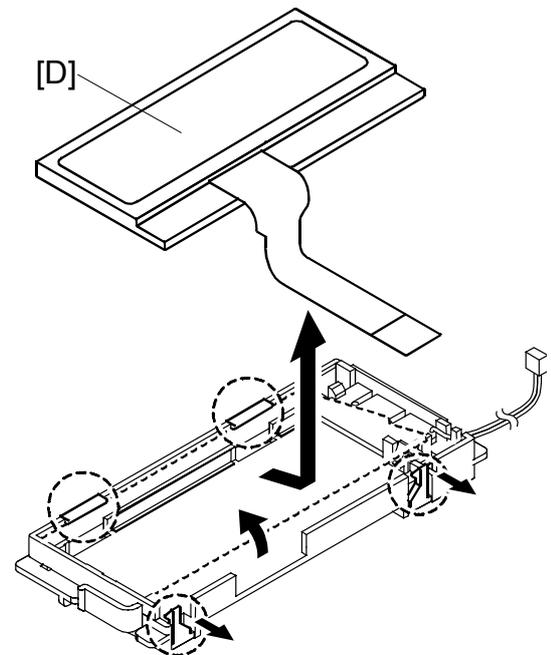
G157R550.WMF

3. LCD cover [B] (Four hooks)
4. LCD unit [C]



G157R551.WMF

5. LCD panel [D]



G157R552.WMF

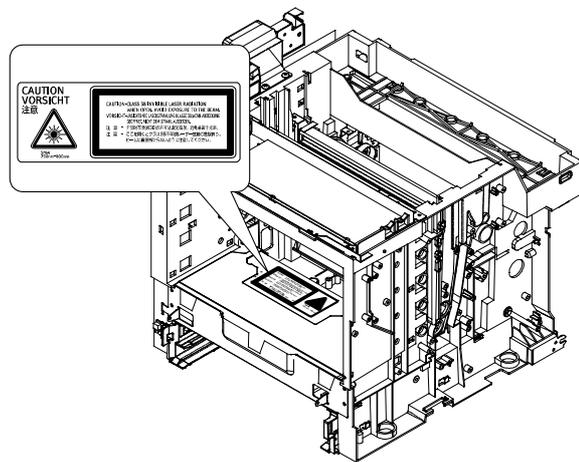
### 3.5 OPTICS UNIT

<p><b>⚠ WARNING</b></p> <ol style="list-style-type: none"> <li>1. Before starting the maintenance work described in this section, unplug the copier.</li> <li>2. Do not disassemble the laser optics unit. A class 3B invisible laser beam is produced in the unit.</li> <li>3. Do not adjust any part of the laser optics unit. Replace the unit as a whole.</li> <li>4. To prevent exposure to laser radiation, confirm that all covers have been attached before starting the machine.</li> </ol>
--

Replacement Adjustment

#### 3.5.1 CAUTION DECAL LOCATION

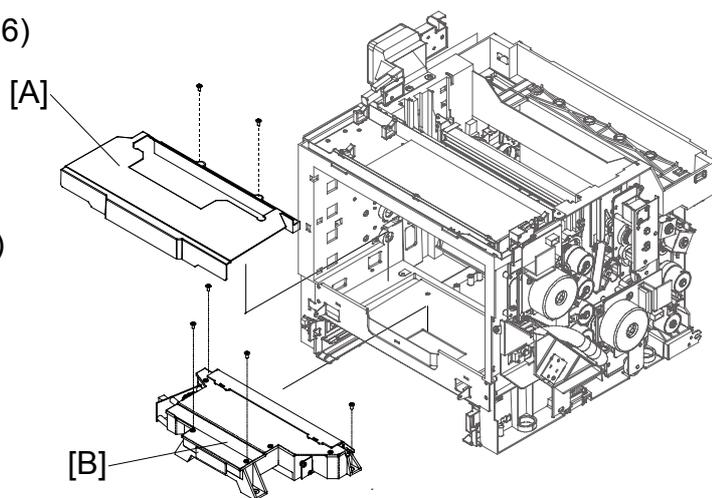
The caution decal is on the laser optics unit.



G157R906.WMF

#### 3.5.2 REMOVING THE LASER OPTICS UNIT

1. Open the front cover. (☞ 3.1.6)
2. All development units
3. OPC belt unit (☞ 3.6.1)
4. Optics unit cover [A] (🔧 x 2)
5. Optics unit [B] (🔧 x 1, 🛠️ x 4)



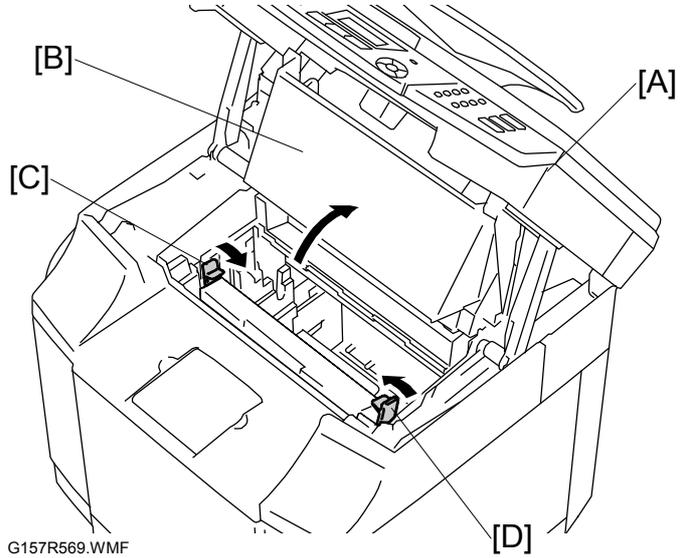
G157R907.WMF

## 3.6 OPC

### 3.6.1 OPC BELT UNIT

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

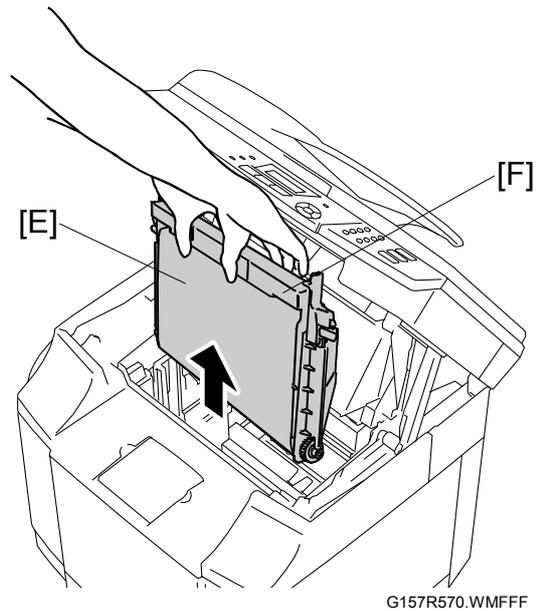
1. Open the scanner unit [A].
2. Open the center cover [B].
3. Release the locks [C] [D].



4. OPC belt unit [E]

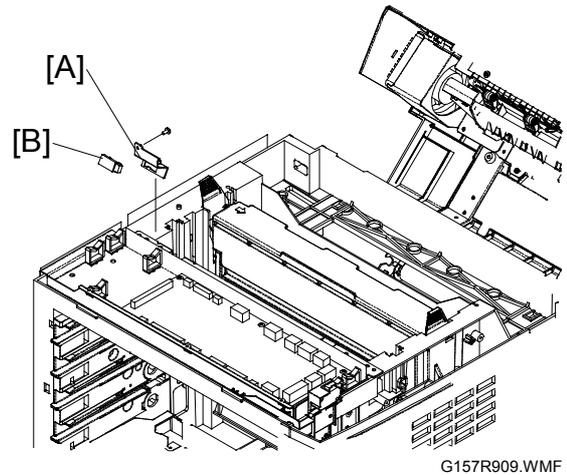
#### *Necessary Setting*

You must do the "CARED BL UNIT ?" procedure after you replace the OPC belt unit. (☛ 5.1.2 SERVICE MODE FUNCTIONS: "SERVICE MODE" > "CLEAR CARE" > "CARED BL UNIT ?")



### 3.6.2 OPC BELT SENSOR

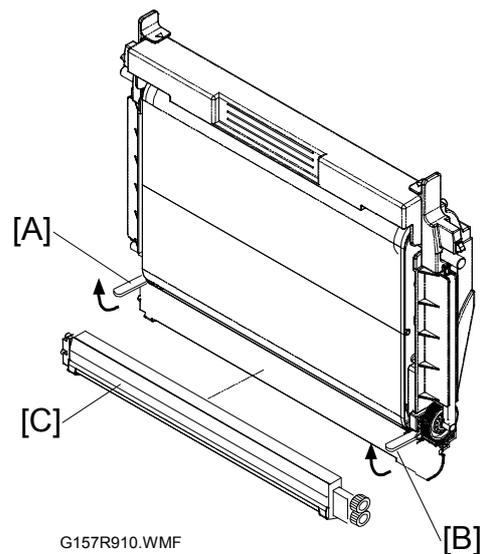
1. OPC belt (☛ 3.6.1)
2. Top cover (☛ 3.1.1)
3. Sensor bracket (with the OPC belt sensor) [A] (🔧 x 1, 📏 x 1)
4. OPC belt sensor [B]



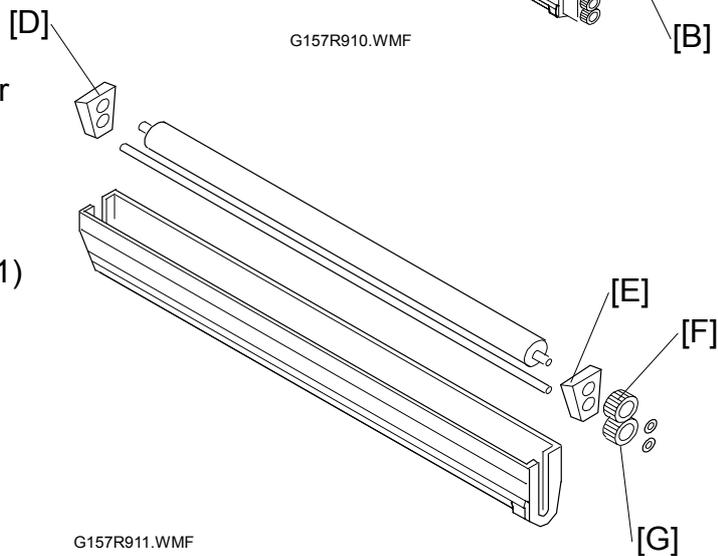
Replacement  
Adjustment

### 3.6.3 CHARGE ROLLER AND CLEANING ROLLER

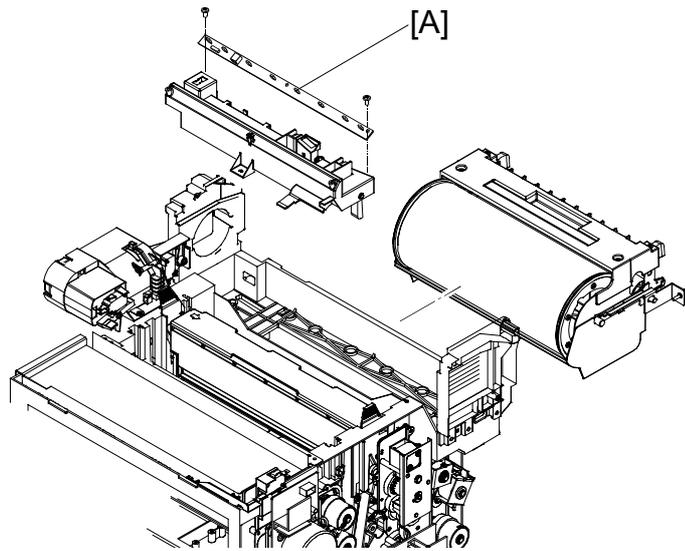
1. OPC belt unit (☛ 3.6.1)
2. Release the locks [A][B].
3. Charge roller and cleaning roller in the cover [C]



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



### 3.6.4 ERASE LAMP



G157R571.WMF

1. Open the scanner unit (☛ 3.2)
2. All development units
3. OPC belt unit (☛ 3.6.1)
4. Transfer belt unit (☛ 3.8.1)
5. Erase lamp [A] (☛ x 1, ☛ x 2)

### 3.7 DEVELOPMENT

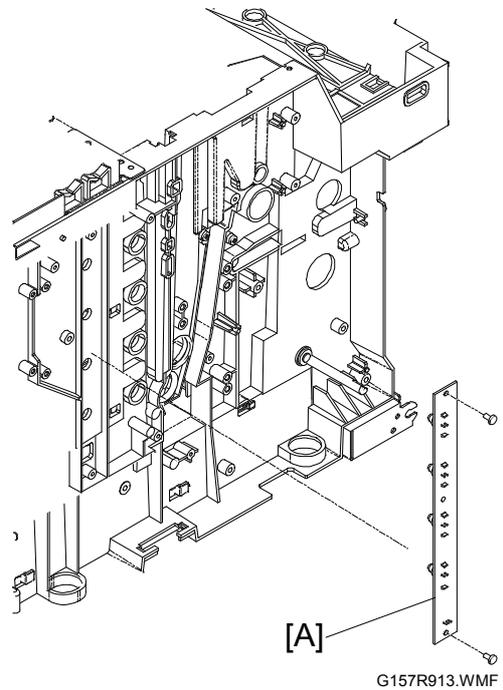
#### 3.7.1 TONER END SENSOR

##### *Emitter*

1. Top cover (☛ 3.1.1)
2. Right cover (☛ 3.1.2)
3. Development gear assembly (☛ 3.14.2)
4. Emitter of the toner end sensor [A] (🔩 x 2, 📏 x 1)

##### *Reassembling*

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

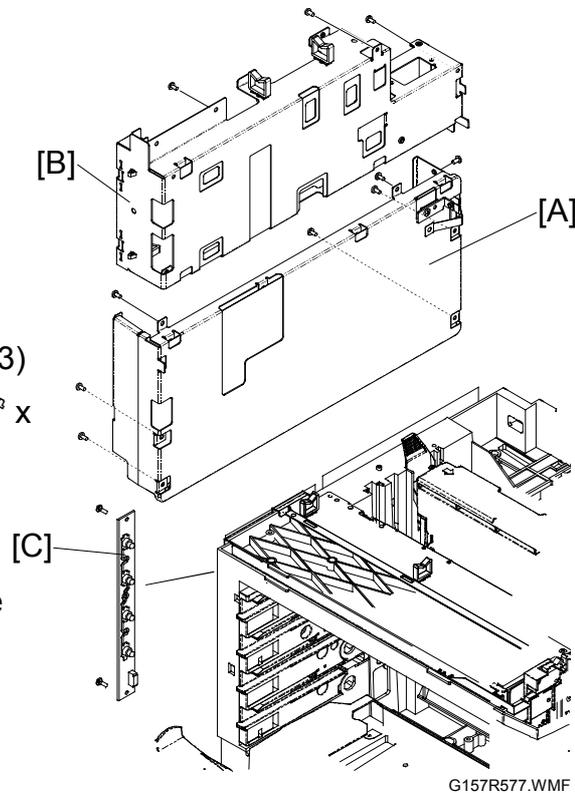


##### *Receptor*

1. Top cover (☛ 3.1.1)
2. Transfer belt unit (☛ 3.8.1)
3. Left front cover and Left rear cover (☛ 3.1.3)
4. Paper supply unit (☛ 3.13.5)
5. Power supply unit base [A] (🔩 x 7)
6. High voltage unit (☛ 3.13.6)
7. High voltage unit base [B] (📏 x 1, 🔩 x 3)
8. Receptor of the toner end sensor [C] (🔩 x 2, 📏 x 1)

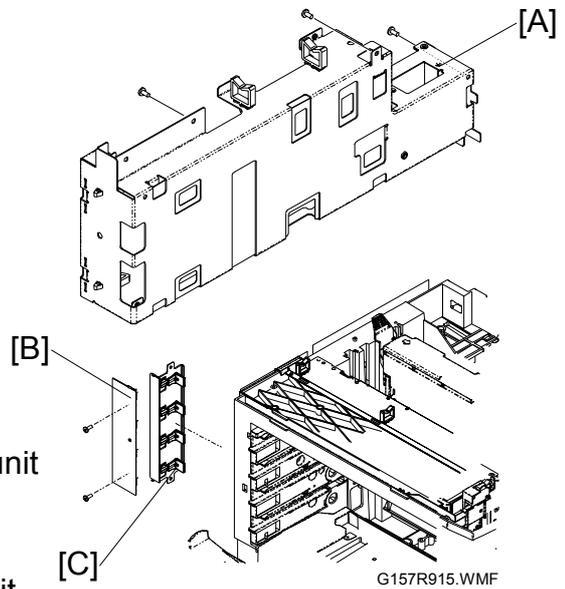
##### *Reassembling*

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

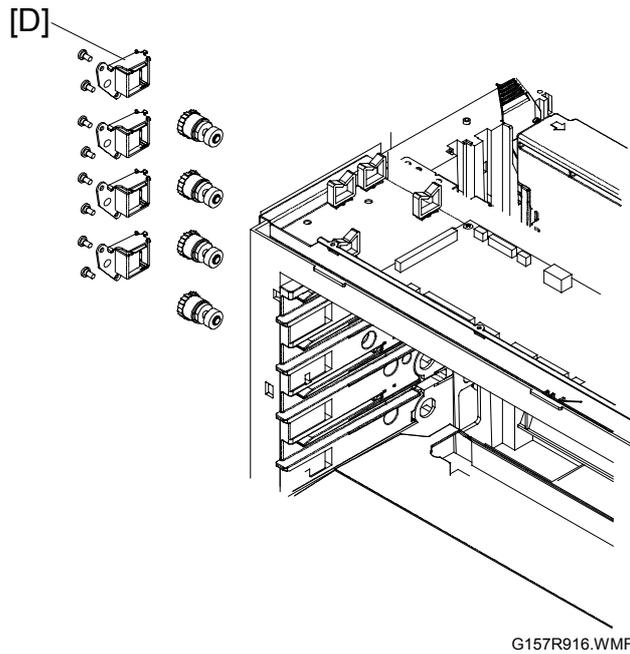


### 3.7.2 DEVELOPMENT UNIT SENSOR AND DEVELOPMENT CLUTCH

1. Top cover (☛ 3.1.1)
2. Transfer belt unit (☛ 3.8.1)
3. Left front cover and Left rear cover (☛ 3.1.3)
4. Power supply unit (☛ 3.13.5)
5. Power supply unit base (☛ 3.7.1)
6. High voltage unit (☛ 3.13.6)
7. High voltage unit base [A]  
(☛ x 1, ⚙ x 3)
8. Sensor bracket (with the development unit sensor) [B]  
(⚙ x 2)
9. Development unit sensor (with the circuit board) [C] (⚙ x 2)



10. Development clutch [D] (⚙ x 2)



## 3.8 TRANSFER BELT

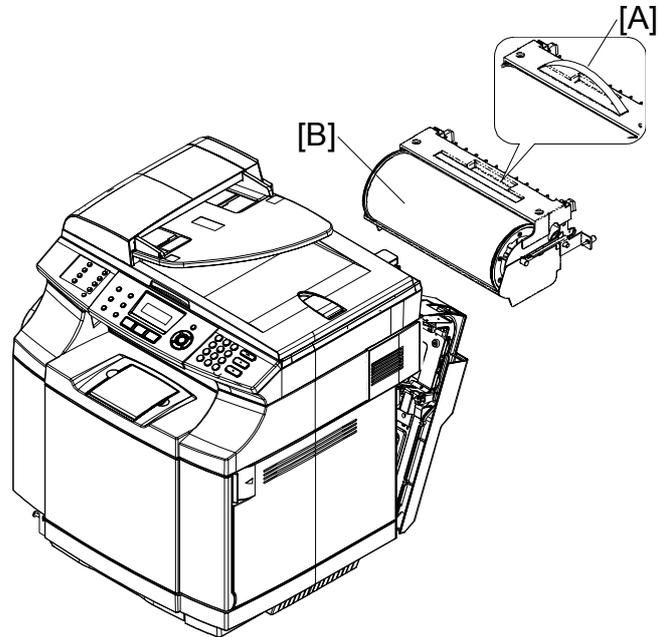
### 3.8.1 TRANSFER BELT UNIT

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

1. Open the rear cover. (☛ 3.1.7)
2. Transfer belt unit (🔧 x 2) [B]

#### *Necessary Setting*

You must clear the PM counter after you replace the transfer belt unit.  
(☛ 5.1.2 Service Mode Functions: "SERVICE MODE" > "CLEAR CARE" > "CARED 120k KIT?")

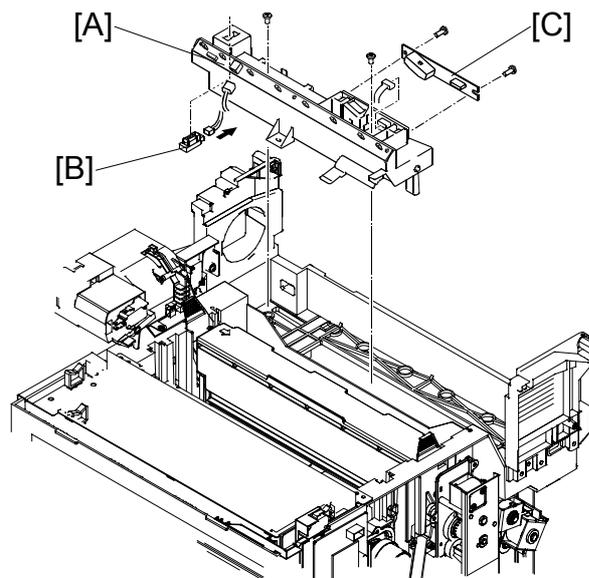


Replacement  
Adjustment

G157R572.WMF

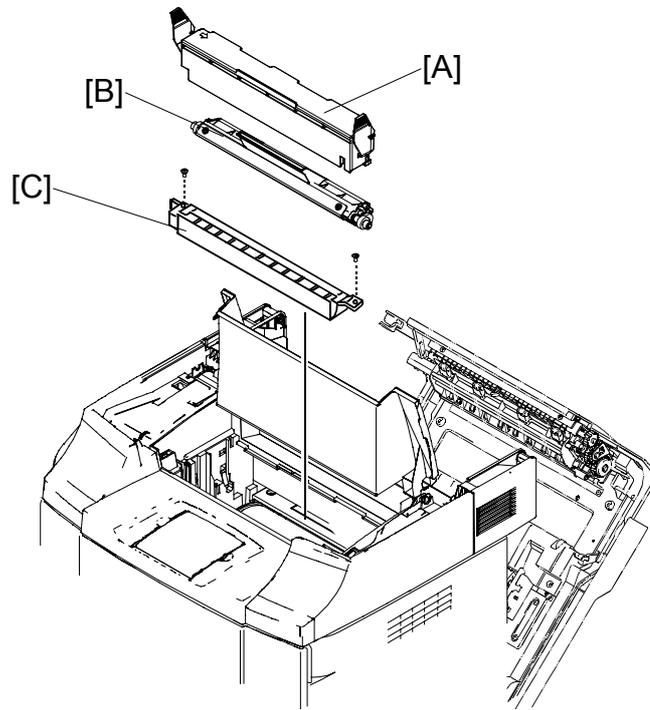
### 3.8.2 TRANSFER BELT SENSOR AND ID SENSOR

1. All development units
2. OPC belt unit (☛ 3.6.1)
3. Transfer belt unit (☛ 3.8.1)
4. Erase lamp base [A]  
(🔧 x 3, 🔧 x 2)
5. Transfer belt sensor [B]
6. ID sensor [C] (🔧 x 2)



G157R573.WMF

### 3.8.3 TRANSFER BELT CLEANING UNIT AND WASTE TONER DUCT



G157R574.WMF

1. Open the scanner unit.
2. Open the center cover
3. Cleaning unit cover [A].
4. Transfer belt cleaning unit [B].
5. Waste toner duct [C]. (⚙ x 2)

#### *Necessary Setting*

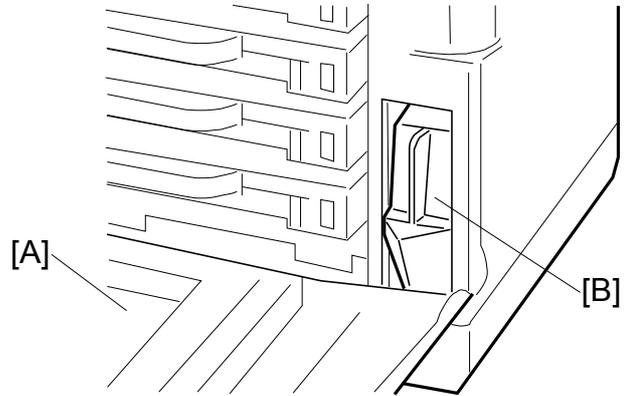
You must do clear the PM counter after you replace the transfer belt-cleaning unit. (☛ 5.1.2 SERVICE MODE FUNCTIONS: "SERVICE MODE" > "CLEAR CARE" > "CARED TR BELT?"). Note that this counter is also used for the transfer roller.

## 3.9 WASTE TONER COLLECTION UNIT

### 3.9.1 WASTE TONER BOTTLE

Discard waste toner in accordance with the local regulations.

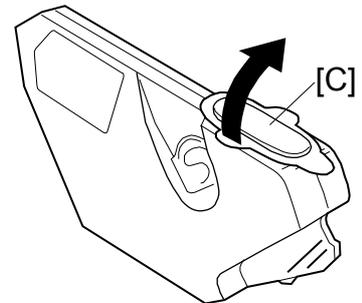
1. Open the front cover [A].
2. Waste toner bottle [B].



Replacement  
Adjustment

G157R920.WMF

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

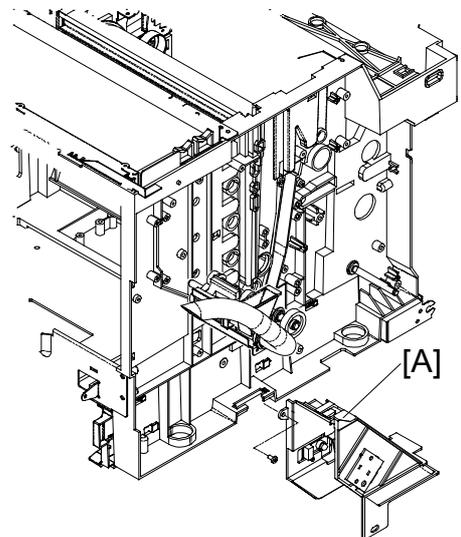


G157R921.WMF

### 3.9.2 WASTE TONER BOTTLE HOLDER

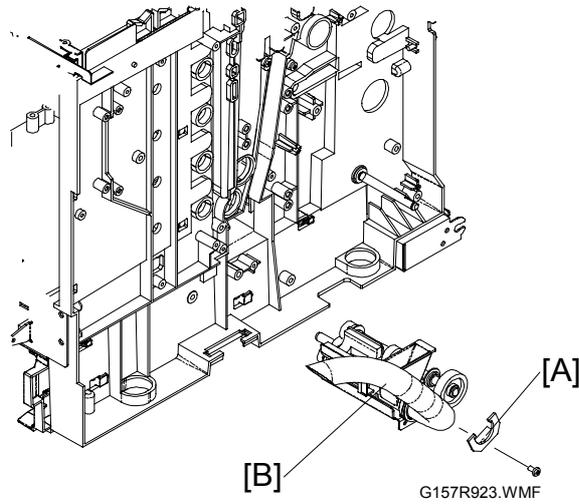
You cannot remove the waste toner sensor from the bottle holder. Replace the waste toner sensor with the bottle holder.

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



G157R922.WMF

### 3.9.3 WASTE TONER DUCT

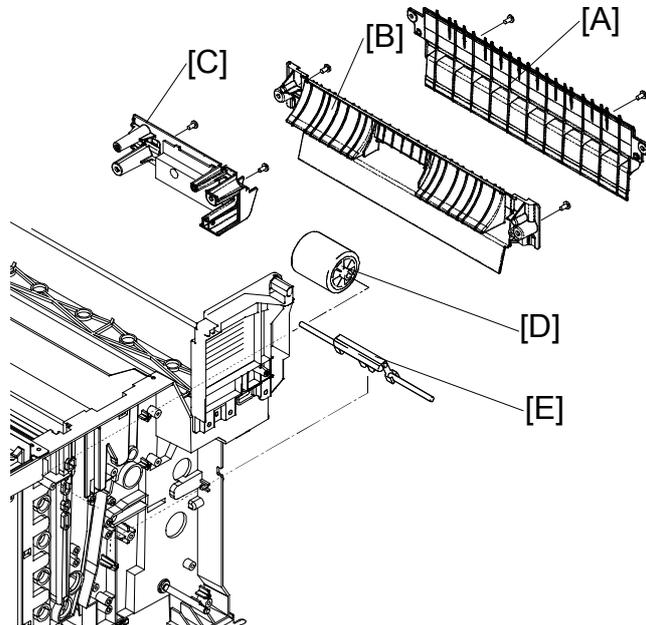


1. Waste toner bottle holder (☛ 3.9.2)
2. Cover the area below the waste toner duct with paper or cloth.  
**NOTE:** When you remove the waste toner duct, waste toner comes out of the duct.
3. Support bracket [A] (☛ x 1)
4. Waste toner duct [B]

## 3.10 PAPER FEED

### 3.10.1 PAPER FEED ROLLER AND SEPARATOR PAD

1. Paper tray 1
2. Rear cover (☞ 3.1.7)
3. Paper guide 1 [A] (⚙ x 2)
4. Paper guide 2 [B] (⚙ x 2)
5. Paper sensor assembly [C]  
(⚙ x 2)  
**NOTE:** You do not need to  
remove the connectors.
6. Paper feed roller [D]
7. Separator pad [E]



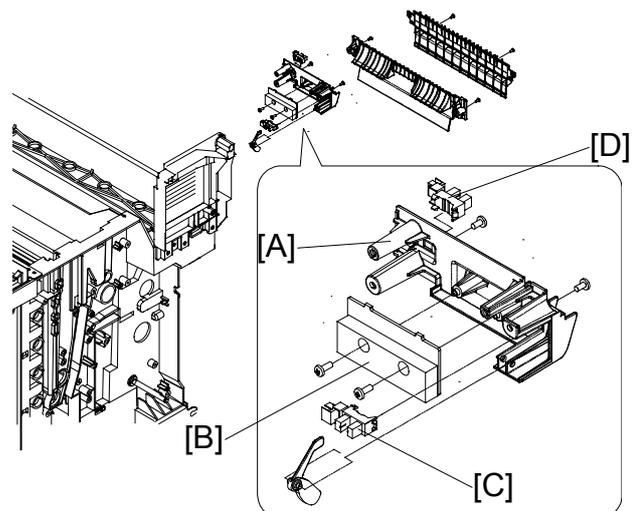
G157R578.WMF

#### *Necessary Setting*

You must reset the PM counter after you replace the paper feed roller and the separator pad. (☞ 5.1.2 SERVICE MODE FUNCTIONS: "SERVICE MODE" > "CLEAR CARE")

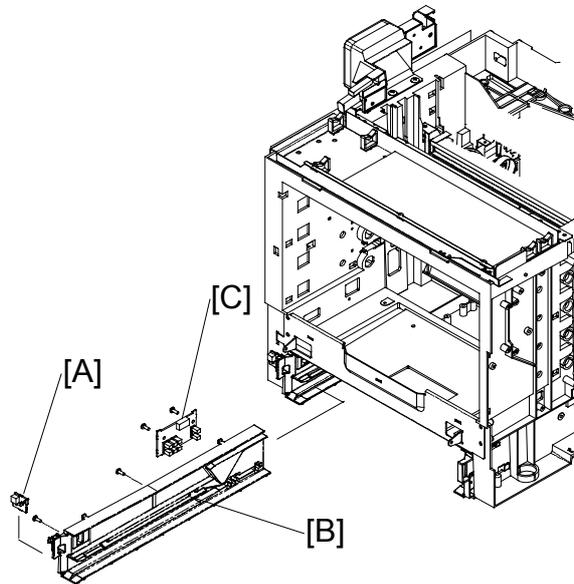
### 3.10.2 OHP SENSOR, PAPER END SENSOR, AND REGISTRATION SENSOR

1. Rear cover (☞ 3.1.2)
2. Paper guide 1 (☞ 3.10.2)
3. Paper guide 2 (☞ 3.10.2)
4. Paper sensor assembly [A]  
(⚙ x 2)
5. OHP sensor [B]  
(☞ x 1, ⚙ x 2)
6. Paper end sensor [C] (☞ x 1)
7. Registration sensor [D]  
(☞ x 1)



G157R925.WMF

### 3.10.3 TEMPERATURE SENSOR, PAPER SIZE SENSOR AND PAPER TRAY SENSOR



G157R926.WMF

1. Left front cover and Left rear cover (☛ 3.1.3)
2. Temperature sensor [A] (☛ x 1)
3. Paper tray
4. Power supply unit (☛ 3.13.5)
5. Power supply unit base (☛ 3.7.1)
6. Left rail of the paper tray [B] (☛ x 2)  
**NOTE:** The screws are behind the Power supply unit.
7. Paper size sensor and paper tray sensor [C] (☛ x 1, ☛ x 2)  
**NOTE:** Put the connector through the opening behind the Power supply unit.

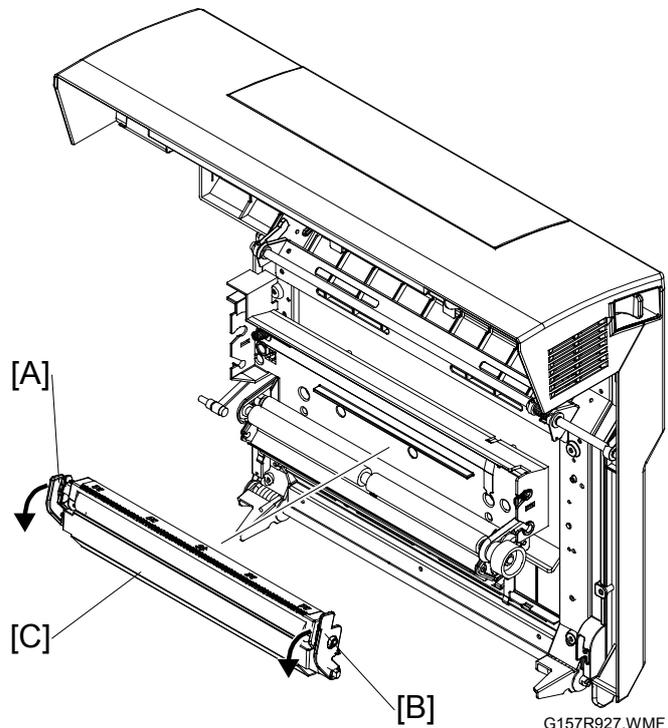
## 3.11 PAPER TRANSFER AND PAPER EXIT

### 3.11.1 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 [C]

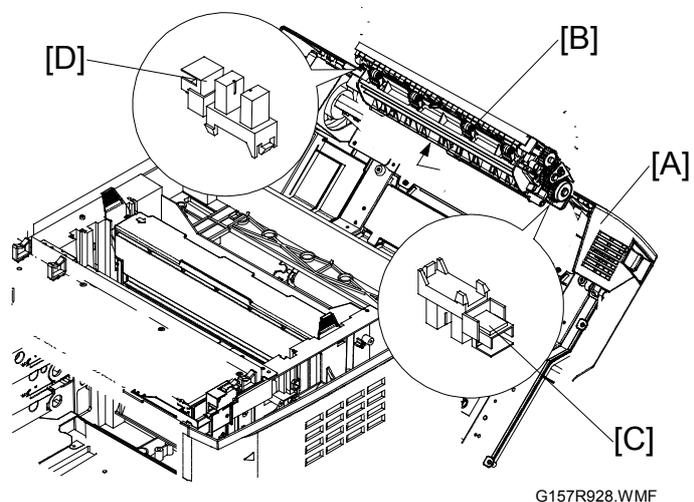
#### *Necessary Setting*

You must clear the PM counter after you replace the transfer roller unit. (☛ 5.1.2 SERVICE MODE FUNCTIONS: "SERVICE MODE" > "CLEAR CARE" > "CARED TR BELT?"). Note that this counter is also used for the transfer belt cleaning unit.



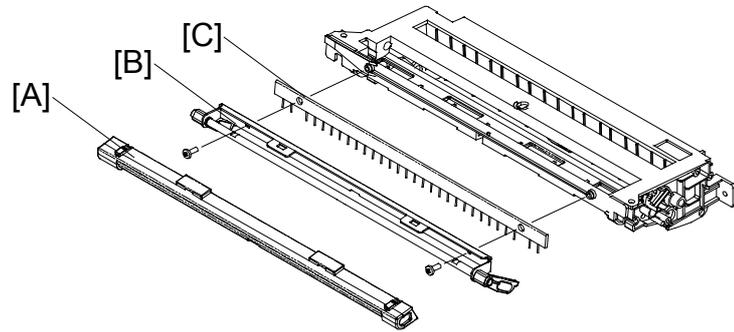
### 3.11.2 PAPER EXIT SENSOR AND PAPER OVERFLOW SENSOR

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



### 3.11.3 DISCHARGE BRUSH

1. Paper exit unit (☛ 3.11.2)
2. Lock shaft cover [A]
3. Lock shaft [B] (🔩 x 2)
4. Discharge brush [C]



G157R930.WMF

## 3.12 FUSING UNIT AND FUSING LAMP

### ⚠ CAUTION

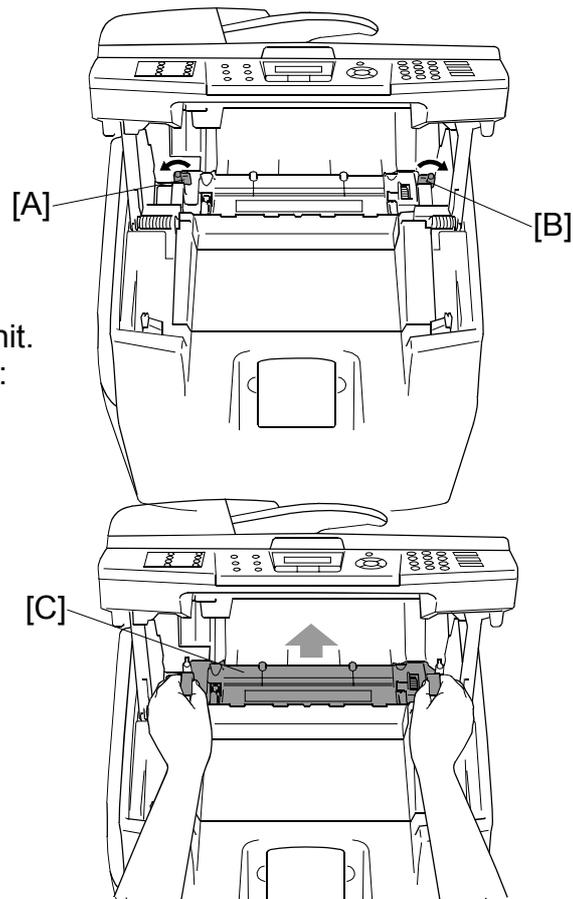
1. Before starting the maintenance work, turn off the main power switch and unplug the machine.
2. Use extreme caution when you touch the fusing unit. The fusing unit can be very hot.
3. Do not remove or adjust the tension bolts [Y] or the hot-roller guard [Z]. Normal operation is not guaranteed if you remove or adjust them.

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

### *Necessary Setting*

You must do the "CARED FU UNIT ?" procedure after you replace the fusing unit.

(☛ 5.1.2 SERVICE MODE FUNCTIONS:  
"SERVICE MODE" > "CLEAR CARE" >  
"CARED FU UNIT?")



G157R576.WMF

Replacement  
Adjustment



### 3.13 CIRCUIT BOARD

#### 3.13.1 BASE ENGINE CONTROL UNIT (BCU)

##### ***Before you Replace the BCU***

The engine setting data is cleared after you replace the BCU or initialize the NVRAM on the BCU. Also, you cannot move the memory chip from the old BCU to the new one.

Because of this, note the following settings before you replace the BCU or initialize the NVRAM if possible, and then set the initial settings after replacing or initializing.

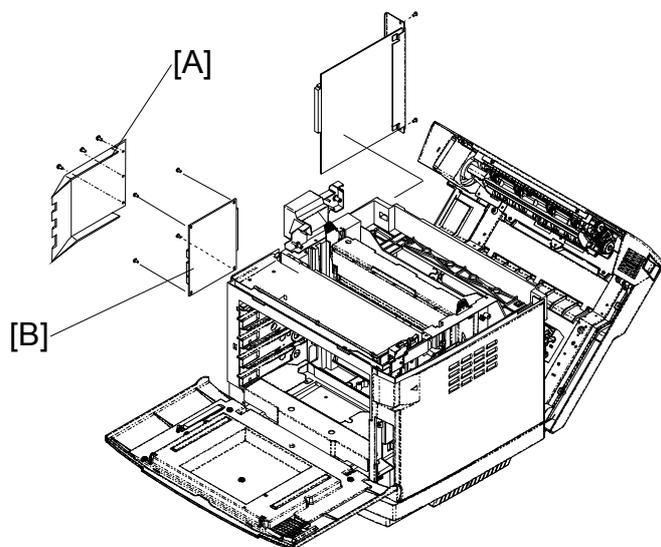
For details of these service modes, refer to "SERVICE MODE FUNCTIONS" (☛ 5.1.2)

Replacement Adjustment

Code No.	Mode Name	Confirmation Value
43	MARGIN ADJUST	Top Margin Set Value
		Left Margin Set Value
45	LP TUNE UP	Adjustment Value ("0" in ordinary cases)
	THV TUNE UP	Adjustment Value SIMPLEX (PPC/OHP/ENV/MTS/TS1/TS2) "0" DUPLEX (PPC/MTS/TS1/TS2) "0"
	DBV TUNE UP	Adjustment Value ("0" in ordinary cases)
	CBV TUNE UP	Adjustment Value ("0" in ordinary cases)
	FBV TUNE UP	Adjustment Value ("0" in ordinary cases)
47	TOTAL PAGE SET	Total Print Count
	DPL PAGE SET	Print Count from Duplex
48	EACH IMAGE SET	Formed Image Count of 4 Colors
49	NEXT LIFE SET	Print Count for Maintenance Replacement Parts
50	ID DATA SET	Engine Serial Number to be inputted.

##### ***Replacement Procedure***

1. Top cover (☛ 3.1.1)
2. Left front cover and Left rear cover (☛ 3.1.3)
3. BCU cover [A] (⚙ x 3)
4. BCU [B] (Flat cable x 1, All ⚙s, ⚙ x 5)



##### ***After you Replace the BCU***

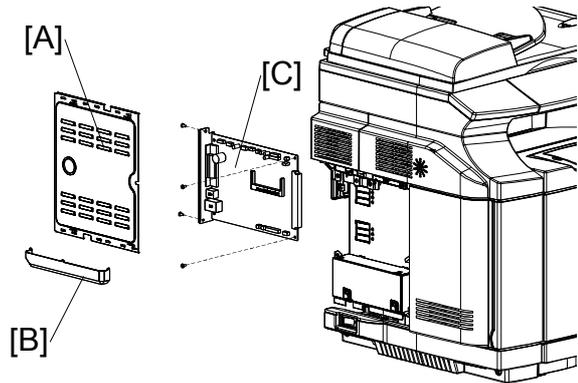
1. Start "SERVICE MODE".
2. Execute the service modes above.
3. Input the values that you noted previously for each of the above service modes.

G157R934.WMF

### 3.13.2 CONTROLLER

#### *Replacement procedure*

1. Start the "MAINTENANCE MODE".
2. Print the "Printout of firmware switch setting" (☛ 5.2.3 "Function mode 11").  
**NOTE:** Keep this printout. You cannot move these settings from the old controller to the new one.
3. Left rear cover (☛ 3.1.3)
4. Controller box cover [A] (🔩 x 1)
5. Harness guide [B]
6. Replace the controller [C] (🔩 x 6, All connectors) when the printer is off.



G157R580.WMF

#### *After replacement*

The controller setting data is cleared after you replace the controller board or initialize the NVRAM on the controller board. Do the following adjustments with the "MAINTENANCE MODE" (☛ 5.2.3) after you replace the controller board or initialize the EEPROM on the controller board.

The adjustments for replacing a controller board are different depending on the destination. Select the appropriate procedures from the table below.

Destination	Adjustment Procedure
EUROPE/ OCEANIA	Do Procedure 2, and then Procedure 1
USA/ ASIA	Do Procedure 1

#### *Procedure 1*

1. Plug in and turn on the main power switch of the machine if the machine does not turn on.
2. Hold down "1" and "3" at same time if "SET COUNTRY" and "PRESS SET KEY" appear alternately on the LCD. If not, skip this step.
3. Do the EEPROM Customizing (Function mode 74 in the "Maintenance mode" ☛ 5.2.3).  
**NOTE:** For Oceania or Europe version, skip this step.
4. Do the EEPROM Parameter Initialization (Function mode 01 or 91 in the "Maintenance mode" ☛ 5.2.3).
5. Do the ID Code Entry for the EEPROM.
  - 1) Enter the "Function Mode 80" in the "Maintenance mode" (☛ 5.2.3).
  - 2) Press "9", "4", "7" and "5" keys in this order.

- 3) The LCD switches to the "Edit Mode" with a cursor.
- 4) Enter the serial number, which is given on the right side of the machine, using the ten-key pad.
- 5) Press the "Menu/Set" key.

**NOTE:** The machine displays the newly entered ID code on the LCD for 0.5 second, and then returns to the initial stage of the maintenance mode. To cancel the ID code entry, press the "Stop/Exit" key instead of the "Menu/Set" key. The machine beeps for one second, and then returns to the initial stage of the maintenance mode.

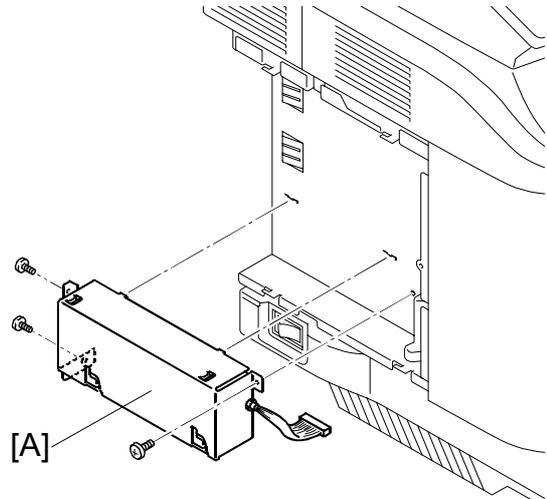
6. Do the CIS Scanner Area Setting (Function mode 55 in the "Maintenance mode" (☛ 5.2.3).
7. Set the firmware settings with "Function mode 10" (☛ 5.2.3).  
**NOTE:** Refer to the sheets, which have been printed in Step 2 of "Replacement procedure".
8. Print the "Printout of firmware switch setting" again.
9. Make sure that the settings are the same as before.

### *Procedure 2*

1. Plug in and turn on the main power switch of the machine.
2. "SET COUNTRY" and "PRESS SET KEY" appear alternately on the LCD.  
**NOTE:** 1) If the customer is not specified or the setting is uncertain and the country code setting needs to be done by the customer, press the "1" and "3" keys at same time. This skips the "EEPROM customizing". The next time that the main power is turned on, "EEPROM customizing" can be done if necessary.  
2) If these messages do not appear at this time, it means that the country setting has already been done. Even so, the customer can change the setting with "Function mode 74" in the Maintenance mode (☛ 5.2.3).
3. Press the "Menu/Set" key.
  - Oceania Version: "AUSTRALIA" and "SELECT ↑↓ & SET" appear alternately.
  - EUROPE version: "U.K" and "SELECT ↑↓ & SET" appear alternately.
4. Use the "▲" and "▼" keys to select the target country, and then press the "Menu/Set" key.
5. The machine displays "ACCEPTED" on the LCD and returns to the stand-by mode.
6. Do procedure 1.

### 3.13.3 NCU (NETWORK CONTROL UNIT)

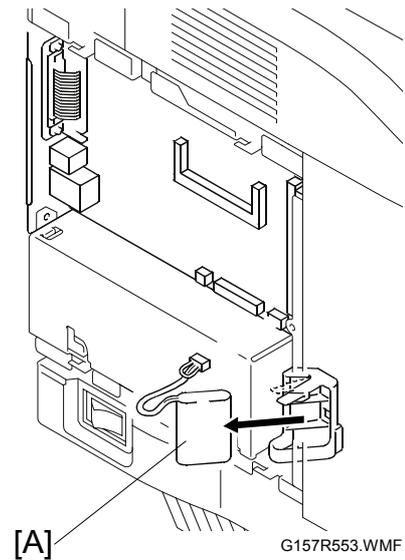
1. Left rear cover (☛ 3.1.3)
2. Controller box cover (☛ 3.13.2)
3. NCU [A] (🔩 x 3, 📏 x 1)



G157R556.WMF

### 3.13.4 NCU BATTERY

1. Left rear cover (☛ 3.1.3)
2. Controller box cover (☛ 3.13.2)
3. NCU battery [A] (📏 x 1)

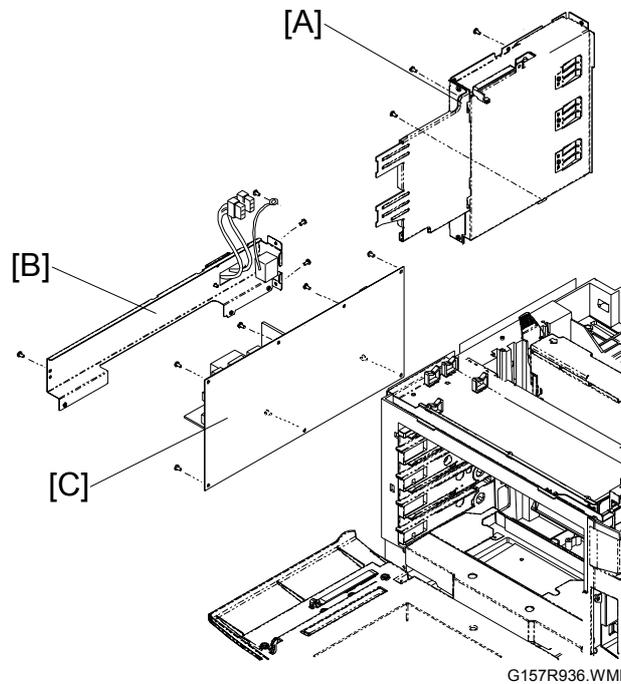


G157R553.WMF

### 3.13.5 POWER SUPPLY UNIT (DIRECT CURRENT)

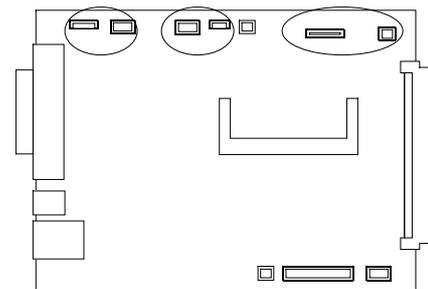
#### ⚠ CAUTION

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



G157R936.WMF

1. Top cover (☛ 3.1.1)
2. Left front cover and Left rear cover (☛ 3.1.3)
3. Controller box cover (☛ 3.13.2)
4. Disconnect cables as shown on the controller board (☛ x 5, flat cable x 1).
5. BCU cover (☛ 3.13.1)
6. All flat cables and ☛'s on the BCU
7. Controller box with BCU bracket [A] (☛ x 4; one screw for ground cable x 2)
8. Left frame [B] (☛ x 2, ☛ x 4, ground cable x 1)
9. Power supply board [C] (All ☛'s, ☛ x 7)



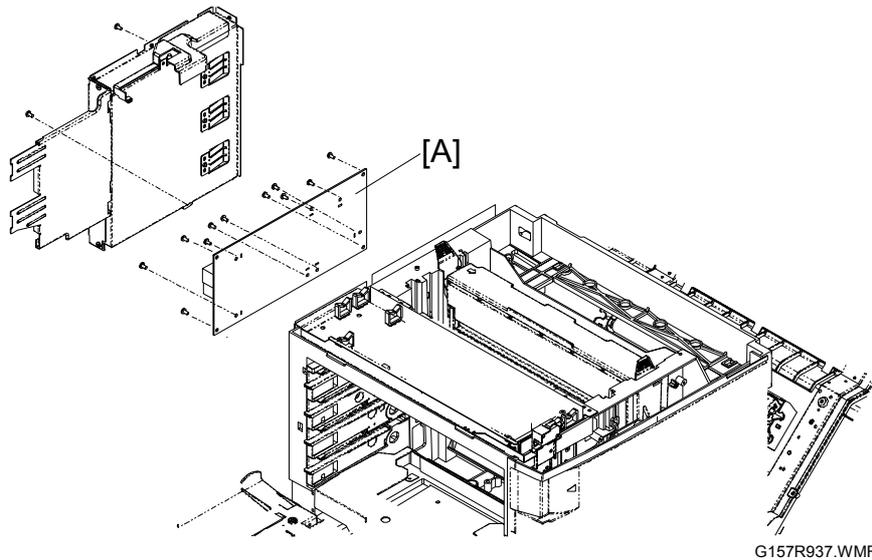
G157R510.WMF

Replacement  
Adjustment

### 3.13.6 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 power plug is connected.

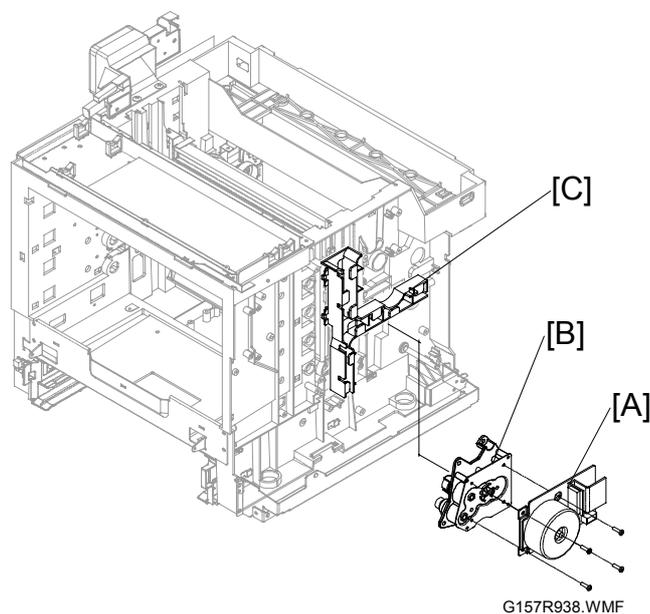


G157R937.WMF

1. Controller box with BCU bracket (☛ 3.13.5)
2. Fan cover (hook x 1)
3. High voltage board [A] (⚙ x 7 for terminals, ⚙ x 4)

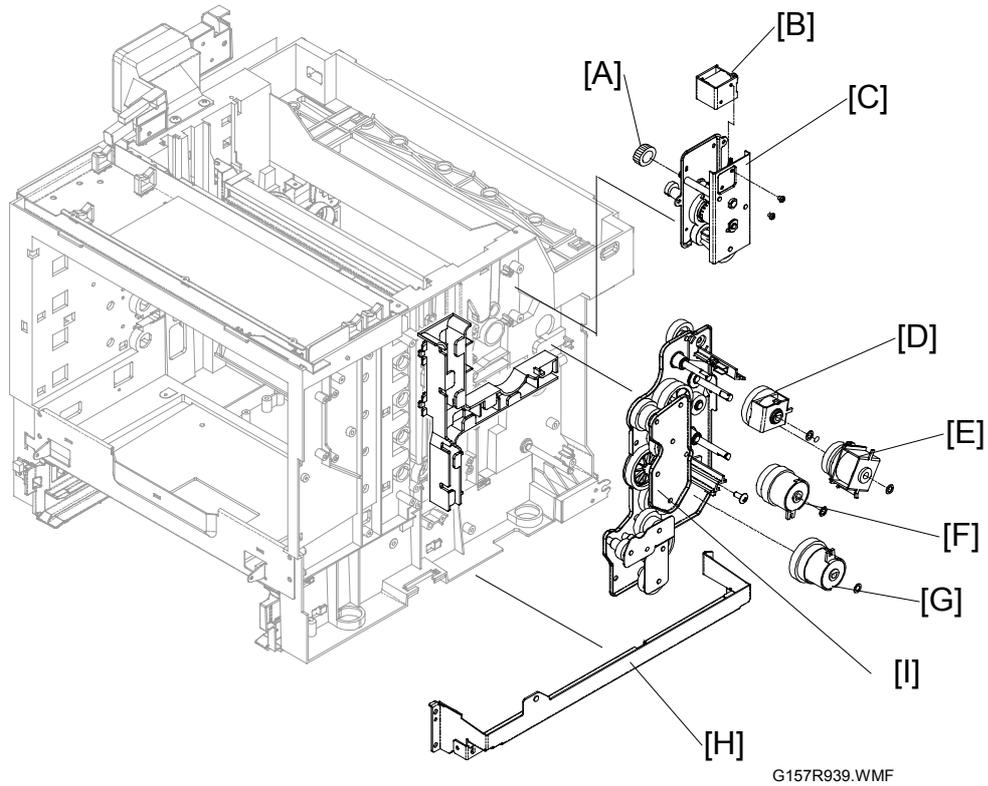
## 3.14 DRIVE PATH

### 3.14.1 MAIN MOTOR DRIVE PATH



Replacement  
Adjustment

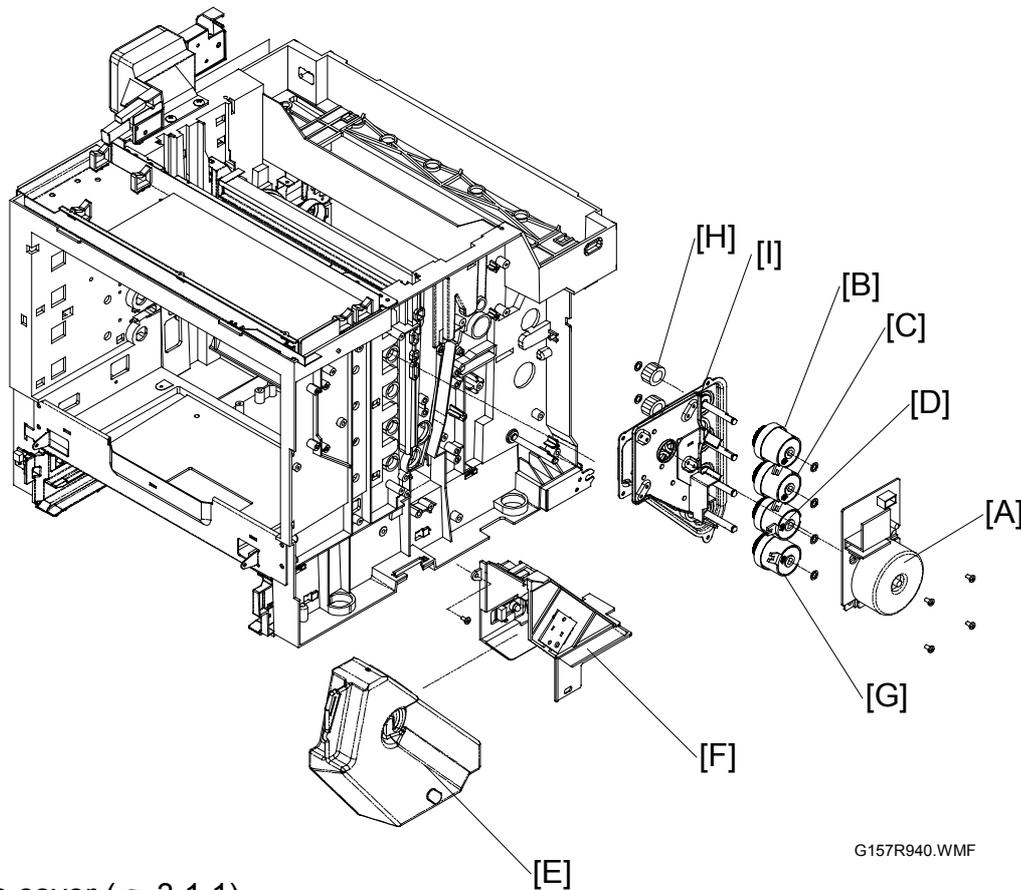
1. Top cover (☛ 3.1.1)
2. Right cover (☛ 3.1.2)
3. Main motor [A] (☛ x 4)
4. Gear box [B] (☛ x 4)
5. Release the cable holder [C] from the gear assemblies.



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6. Cleaning unit cover (☛ 3.8.3)
7. OPC belt unit (☛ 3.6.1)
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)

### 3.14.2 DEVELOPMENT MOTOR DRIVE PATH



Replacement  
Adjustment

G157R940.WMF

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)

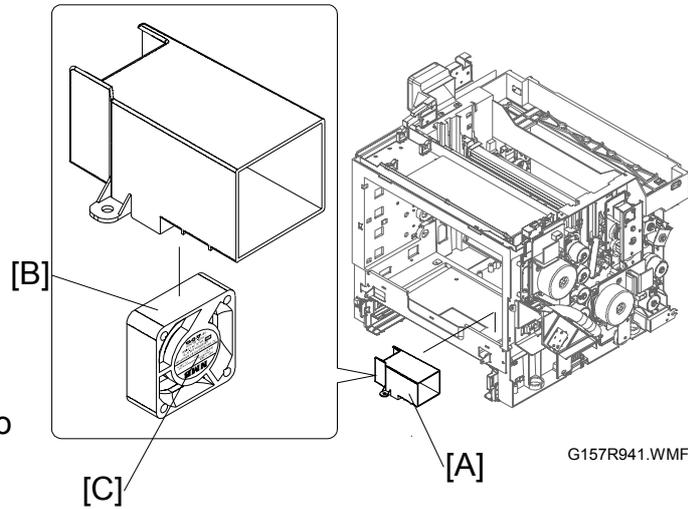
## 3.15 EXHAUST FAN

### 3.15.1 OPTICS UNIT FAN

1. Open the front cover.
2. All development units
3. Optics unit cover (☛ 3.5.2)
4. Optics unit fan assembly [A]  
(☛ x 1, ⚙ x 1)
5. Optics unit fan [B]

#### *Reassembling*

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

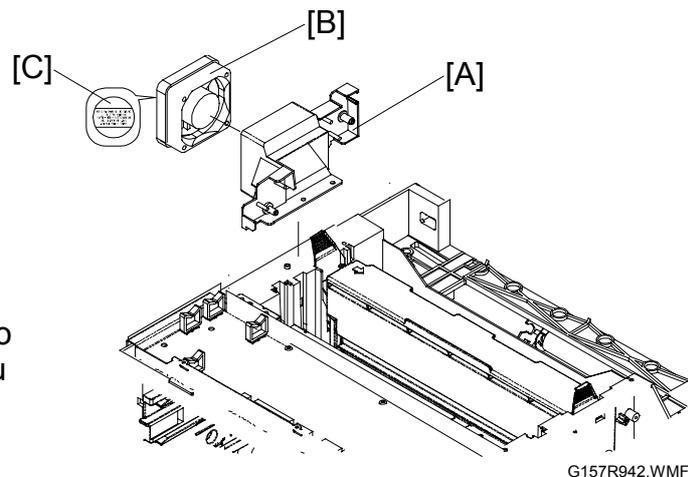


### 3.15.2 PSU FAN

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

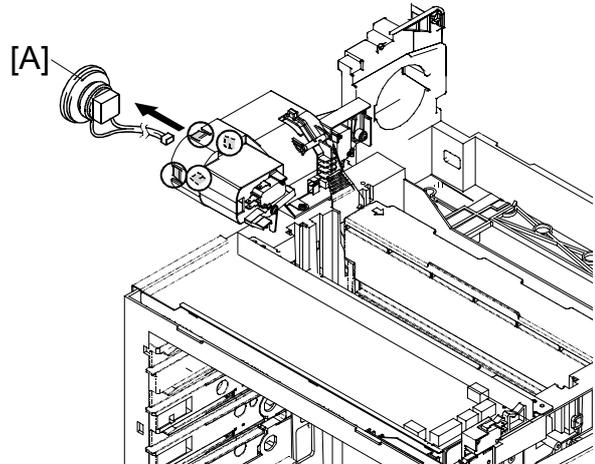
#### *Reassembling*

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



### 3.15.3 SPEAKER

1. Top cover (☛ 3.1.1)
2. Speaker [A] (Four hooks)

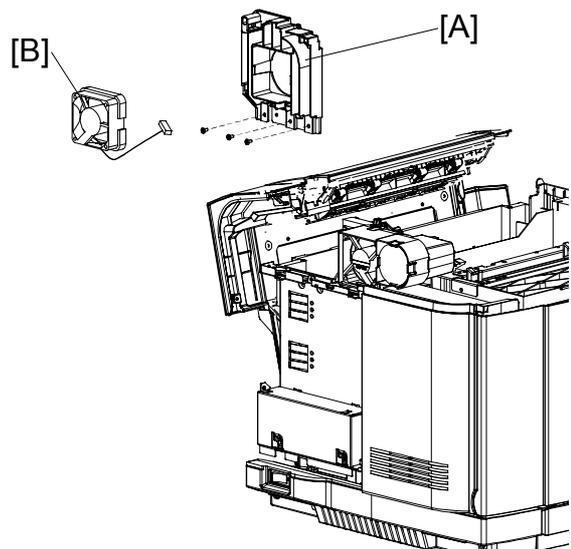


G157R566.WMF

Replacement  
Adjustment

### 3.15.4 FUSING FAN

1. Scanner unit (☛ 3.2)
2. Top cover (☛ 3.1.1)
3. Controller (☛ 3.13.2)
4. Fusing fan base [A] (🔧 x 3, 📏 x 1)
5. Fusing fan [B]

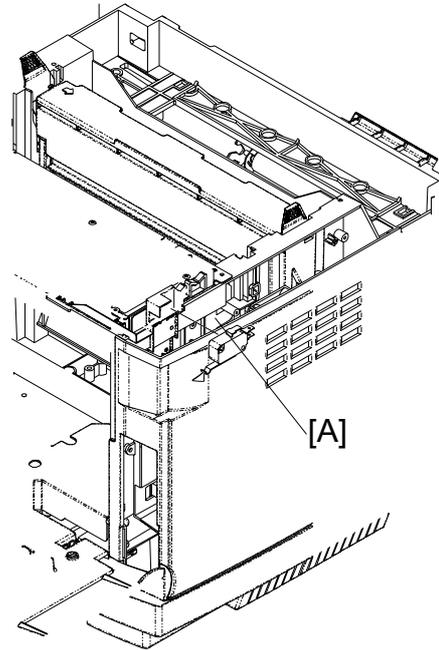


G157R581.WMF

### 3.16 INTERLOCK SWITCH

#### 3.16.1 FRONT COVER SWITCH

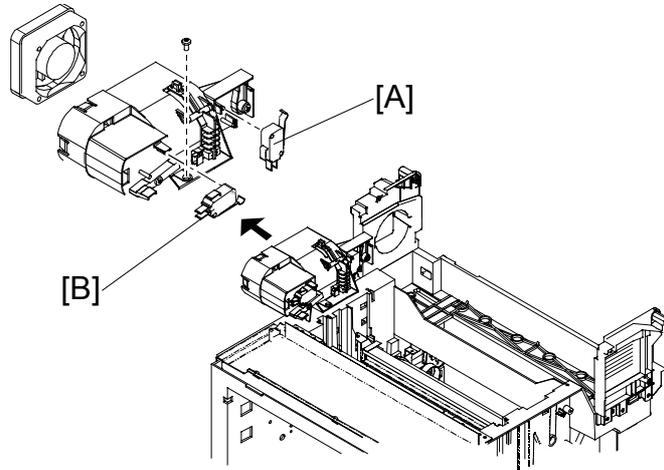
1. Top cover (☛ 3.1.1)
2. Front cover switch [A]



G157R944.WMF

#### 3.16.2 TOP AND REAR COVER SWITCHES

1. Top cover (☛ 3.1.1)
2. PSU fan assembly (☛ 3.15.2)
- 3.
- 4.
- 5.
6. )
7. Rear cover switch [A] (☛ x 1)
8. Top cover switch [B] (☛ x 1)



G157R582.WMF

### 3.17 REGISTRATION

#### 3.17.1 LEADING EDGE REGISTRATION

Service mode 43 "MARGIN ADJUST: TOP" (☛ 5.1.2 SERVICE MODE FUNCTIONS) adjusts the margin on the leading edge. The top margin gets wider when you set a greater value.

Default	☛ NOTE 2)
Maximum	+4.9 mm
Minimum	-4.9 mm
Step	0.7 mm

You can specify the values from -4.9 to +4.9.

The margin changes by 0.7 mm when the value increases or decreases by 1 in the SP. For example: ① when you specify "+5," the margin changes by +3.5 mm; ② when you specify "-4," the margin changes by -2.8 mm.

**NOTE:** Default depends on the adjustment in the factory.

#### 3.17.2 SIDE-TO-SIDE REGISTRATION

Service mode 43 "MARGIN Adjust: LEFT, LEFT1" (☛ 5.1.2 SERVICE MODE FUNCTIONS) adjusts the margin on the left edge. The left margin gets wider when you set a greater value. Specify the value for each tray and the duplex unit:

Default	Tray 1	☛ NOTE 2)
	Tray 2	
Maximum	+3.5 mm	
Minimum	-3.5mm	
Step	0.5 mm	

- Margin Adjust: Left                      Tray 1 (Standard paper tray)
- Margin Adjust: Left1                    Tray 2 (Optional paper feed unit)

**NOTE:** Default depends on the adjustment in the factory.

Replacement Adjustment

## 4. TROUBLESHOOTING

### 4.1 ERROR INDICATION

#### 4.1.1 EQUIPMENT ERRORS

To display the most recent error code, use maintenance-mode function code 82 described in 5.2.3, "Detailed Description of Maintenance Mode". Following the machine error, one of the error codes listed below will appear on the LCD.

If an equipment error occurs, the facsimile equipment emits an audible alarm (continuous beeping) for approximately 4 seconds and shows the error message on the LCD. For the error messages, see the "Error messages appearing on the LCD" below. To display detailed error information, use maintenance-mode function code 82. (☛ 5.2.3)

#### *Error messages appearing on the LCD*

ERROR MESSAGE	CAUSE	ACTION
Check Paper Size	Paper is not the correct size.	Load the correct size of paper (Letter, Legal or A4), and then press "Black Start" or "Color Start".
Check Tray #1 Check Tray #2	The indicated tray is not completely closed.	Close the indicated tray properly.
Comm.Error	Poor phone line quality caused a communication error.	Send the fax again or connect the machine to another telephone line. If the problem continues, call the telephone company and ask them to check your phone line.
Connection Fail	You tried to poll a fax machine that is not in polled waiting mode.	Check the other fax machine's polling setup.
Cover Open Close the rear cover (3)	The rear cover is not completely closed.	Close the rear cover of the machine.
Cover Open Close the front cover (2)	The front cover is not completely closed.	Close the front cover of the machine.
Cover Open Close the inside cover (1)	The center cover is not completely closed.	Close the center cover of the machine.
Data Remaining	Print data is left in the machine's memory.	Re-start printing from your computer.
	Print data is left in the machine's memory. The interface cable was unplugged while the computer was sending the data to the machine.	Press "Job Cancel". The machine will cancel the job and clear it from the memory. Try to print again.
Disconnected	The other person or other person's fax machine stopped the call.	Try to send or receive again.
Document Jam	The document was not inserted or fed properly, or the document scanned from the ADF was too long.	Remove the jammed document paper.

Trouble-shooting

<b>ERROR MESSAGE</b>	<b>CAUSE</b>	<b>ACTION</b>
DR Mode in Use	The machine is set to distinctive ring mode. You cannot change the receive mode from manual to another mode.	Set distinctive ring to off.
Near Waste Toner	The waste toner bottle is nearly full.	Replace the waste toner bottle.
No Fusing Unit	The fusing unit was not detected.	Please install one.
No OPC Belt	The OPC belt cartridge is not installed.	Install the OPC belt cartridge. Check that the charging roller (on the bottom of the OPC belt cartridge) is locked in place and the levers are closed.
No Paper Fed #1 No Paper Fed #2	The machine is out of paper or paper is not properly loaded in the indicated paper tray.	Refill the paper in the paper tray, and then press "Black Start" or "Color Start". - OR - Remove the paper and load it again, and then press "Black Start" or "Color Start".
No Response/Busy	The number you dialed does not answer or is busy.	Verify the number and try again.
No Toner X X = C, M, Y, BK	The toner cartridge is not installed properly.	Reinstall the X toner cartridge.
No TR Roller	The transfer roller is not installed.	Install the transfer roller.
Not Registered	You tried to access a one-touch or speed dial number that is not programmed.	Set up the one-touch or speed dial number.
Paper Jam X X = A1, A2, B or C	Remove the jammed paper. See the alphanumerical diagram to check on the location.	Remove the jammed paper.
Paper Type Error	The wrong media type is set in the paper tray.	Specify the correct media type in the paper tray.
Replace 120K Kit	It is time to replace the 120K kit.	Call a customer service to replace the 120K kit.
Replace Fuser	It is time to replace the fusing unit.	Replace the fusing unit.
Replace OPC Belt	It is time to replace the OPC belt cartridge.	Replace the OPC belt cartridge.
Replace PF Kit2	It is time to replace the PF kit2.	Call a customer service to replace the PF kit2.
Size Error Tray2	The wrong size of paper is set in the printer driver for tray2.	In the printer driver, specify the correct paper size for Tray2.
Stacker Full	The output tray is full of paper.	Remove the paper from the output tray.
Toner Empty X X = C, M, Y, BK,	The toner is used up and printing is not possible.	Replace the used toner cartridge with a new one.
Toner Error	The machine has detected an incompatible toner cartridge.	Use only RICOH genuine toner cartridges.

ERROR MESSAGE	CAUSE	ACTION
Toner Low X X = C, M, Y, BK (K: Black, C: Cyan, M: Magenta, Y: Yellow)	The indicated color toner is nearly empty.	Order a new toner cartridge now.
Unable to Init. (Initialize) Unable to Print Unable to Scan	The machine has a mechanical problem.	Turn off the machine's power switch and then on again. If the error message continues leave the machine for several minutes and then try it again. (The machine can be turned off for up to 60 hours without losing faxes stored in the memory. If the machine will be off longer than 60 hours, you can save the faxes in your PC.)
Waste Toner Full	The waste toner bottle is full.	Replace the waste toner bottle.
Check Paper Type	Paper type mismatch between the machine and the printer driver setting.	Put the correct paper type in Tray #1 (or Tray #2 if you have the optional lower tray) and set it using the machine's control panel ("Menu/Set", "1", "2"). Paper type = Plain paper, Transparencies, Thick paper, Thicker paper, Thin paper, Recycled paper
Calibrate Calibration Failed	Toner is getting low.	Check that the toner cartridges are not low and try again.
Out of Memory	The machine's memory is full.	(Fax sending or copy operation in progress) Press Black Start or Color Start to send or copy the scanned pages. -OR- Press Stop/Exit and wait until the other operations in progress have finished and then try again. -OR- Clear the faxes from the memory. (Printing operation in progress) Reduce print resolution. (See Advanced tab in the Software User's Guide on the CDROM.) -OR- Clear the faxes from the memory. -OR- Add more memory.

**MACHINE ERRORxx (xx indicates the error code number)**

<b>Error Code</b>	<b>Symptom</b>	<b>Possible Cause</b>	<b>Countermeasure</b>
20	Laser power error	Connector LCN3 is not properly connected.	Connect the connector properly.
		Laser unit defective	Replace the laser unit.
		BCU board defective	Replace the BCU board.
21	Beam detector error	Connector PCDN is not properly connected.	Connect the connector properly.
		Laser unit defective	Replace the laser unit.
		BCU board defective	Replace the BCU board.
22	NVRAM error	BCU defective	Replace the BC. If the problem remains, replace the controller.
23	Engine controller hardware error	Control error	Turn the main power switch off and on.
		BCU defective	Replace the BCU board.
24	Process timing clock error	Main motor defective	Replace the main motor.
		BCU defective	Replace the BCU board.
25	Development motor error	Toner cartridge gear defective	Replace the toner cartridge.
		Development gear unit defective	Replace the development gear unit.
		Development motor defective	Replace the development motor.
		BCU board defective	Replace the BCU board.
26	Main motor error	Main motor defective	Replace the main motor.
		BCU board defective	Replace the BCU board.
27	Scanner motor error	Connector PCDN is not properly connected.	Connect the connector properly.
		Laser unit defective	Replace the laser unit.
		BCU or controller board defective	Replace the BCU and/or controller board.
28	Charge HV unit error	HV power supply defective	Replace the high-voltage power supply PCB.
29	LVPS error	BCU board defective	Replace the BCU board.
		Direct current unit defective	Replace the direct current unit PCB.
2A	Fusing thermistor error	Fusing thermistor defective	Replace the fusing unit.
		BCU board defective	Replace the BCU board.
2B	Fusing lamp error	Defective fusing lamp ON/OFF circuit	Replace the direct current unit PCB.
		Defective temperature control circuit	Replace the BCU board.
2C	Fusing temperature low error at warming	Contact failure of harness connector	Check the connection of the harness connector.
		Low input voltage	Connect the machine to the rated voltage source.
2D	Fuser temperature low error	Low input voltage	Connect the machine to the rated voltage source.

2E	Fuser temperature high error	Breakdown of heater ON/OFF circuit	Replace the direct current unit PCB.
		Breakdown of temperature control circuit	Replace the BCU board.
2F	Fuser ACOFF error	Breakdown of heater ON/OFF circuit	Replace the direct current unit PCB.
		Breakdown of temperature control circuit	Replace the BCU board.
30	Erase LED error	Erase lamp defective	Replace the erase lamp.
		BCU board defective	Replace the BCU board.
31	Cooling fan error	Cooling fan defective	Replace the cooling fan.
		BCU board defective	Replace the BCU board.
32	Fusing fan error	Fusing fan defective	Replace the cooling fan.
		BCU board defective	Replace the BCU board.
33	Fusing fan error	Fusing fan defective	Replace the cooling fan.
		BCU board defective	Replace the BCU board.
34	Yellow development clutch error	Yellow development clutch defective	Replace the yellow development clutch.
		BCU board defective	Replace the BCU board.
35	Magenta development clutch error	Magenta development clutch defective	Replace the magenta development clutch.
		BCU board defective	Replace the BCU board.
36	Cyan development clutch error	Cyan development clutch defective	Replace the cyan development clutch.
		BCU board defective	Replace the BCU board.
37	Black development clutch error	Black development clutch defective	Replace the black development clutch.
		BCU board defective	Replace the BCU board.
38	Yellow development solenoid error	Toner cartridge defective	Replace the toner cartridge.
		Solenoid assy defective	Replace the solenoid assy.
		BCU board defective	Replace the BCU board.
39	Magenta development solenoid error	Toner cartridge defective	Replace the toner cartridge.
		Solenoid assy defective	Replace the solenoid assy.
		BCU board defective	Replace the BCU board.
3A	Cyan development solenoid error	Toner cartridge defective	Replace the toner cartridge.
		Solenoid assy defective	Replace the solenoid assy.
		BCU board defective	Replace the BCU board.
3B	Black development solenoid error	Toner cartridge defective	Replace the toner cartridge.
		Solenoid assy defective	Replace the solenoid assy.
		BCU board defective	Replace the BCU board.
3C	Transfer belt error	Transfer unit defective	Replace the transfer unit.

		Transfer belt sensor defective	Replace the transfer belt sensor.
		BCU board defective	Replace the BCU board.
3D	Transfer roller clutch error	Transfer roller clutch defective	Replace the transfer roller clutch.
		BCU board defective	Replace the BCU board.
3E	Transfer belt cleaning solenoid error	Transfer belt cleaning solenoid defective	Replace the transfer belt cleaning solenoid.
		BCU board defective	Replace the BCU board.
3F	Fusing unit clutch error	Fusing unit clutch defective	Replace the fusing unit clutch.
		BCU board defective	Replace the BCU board.
40	Transfer belt sensor error	Transfer belt sensor defective	Replace the sensor.
		BCU board defective	Replace the BCU board.
41	HVU connection error	Direct current unit PCB defective	Replace the direct current unit PCB.
		BCU board defective	Replace the BCU board.
42/43	Toner end sensor connection error 1, 2	Toner end sensor defective	Replace the toner end sensor.
		BCU board defective	Replace the BCU board.
44	Lower feeder unit connection error	Lower feeder unit connector damaged	Replace the lower feeder unit.
		BCU board defective	Replace the BCU board.
50	Cyan toner empty	The cyan toner cartridge is empty.	Replace the cyan toner cartridge with a new one.
51	Magenta toner empty	The magenta toner cartridge is empty.	Replace the magenta toner cartridge with a new one.
52	Yellow toner empty	The yellow toner cartridge is empty.	Replace the yellow toner cartridge with a new one.
53	Black toner empty	The black toner cartridge is empty.	Replace the black toner cartridge with a new one.
54	Cyan cartridge run out	No cyan toner cartridge is installed.	Install the cyan toner cartridge.
55	Magenta cartridge run out	No magenta toner cartridge is installed.	Install the magenta toner cartridge.
56	Yellow cartridge run out	No yellow toner cartridge is installed.	Install the yellow toner cartridge.
57	Black cartridge run out	No black toner cartridge is installed.	Install the black toner cartridge.
58	Illegal toner cartridge	A non-standard toner cartridge is installed.	Install a standard toner cartridge for this machine.
59	Cyan toner near-empty	The cyan toner cartridge is nearly empty.	—
5A	Magenta toner near-empty	The magenta toner cartridge is nearly empty.	—
5B	Yellow toner near-empty	The yellow toner cartridge is nearly empty.	—
5C	Black toner near-empty	The black toner cartridge is nearly empty.	—

5D~5F	Not used		
60	Stacker full	The output tray is full of paper.	Remove the paper from the output tray.
61	TMA & TMAM control	The automatic color calibration has failed.	Press the stop key to clear the error.
62~6F	Not used		
70	OPC belt not installed	The OPC belt is removed.	Install the OPC belt.
71	Fusing unit not installed	The fuser unit is not installed.	Install the fuser unit.
72	Transfer roller not installed	The transfer roller is not installed	Install the transfer roller.
73	Waste toner box full or not installed	The waste toner box is not installed.	Install the waste toner box.
		The waste toner box is full.	Replace the waste toner box with a new one.
74	OPC belt exchange	It is time to replace the OPC belt	Replace the OPC belt with a new one.
75	Fusing unit exchange	It is time to replace the fusing unit	Replace the fusing unit with a new one.
76	Transfer roller	It is time to replace the transfer roller	Replace the transfer roller with a new one.
77	Transfer belt	It is time to replace the transfer belt	Replace the transfer belt.
78	Paper feed rollers exchange	It is time to replace the paper feed rollers	Replace the paper feed rollers
79	Waste toner box near-full (exchange)	The waste toner box is nearly full.	Replace the waste toner box with a new one.
7A	Top cover open error	The top cover is opened.	Close the top cover.
7B	Rear cover open error	The rear cover is opened.	Close the rear cover.
7C~7F	Not used		
80	At the start of fax message printing, the controller detects that paper is smaller than A4 size in length.	Paper smaller than the specified size is loaded in the paper tray.	Load the correct size of paper.
		BCU or controller defective	Replace the BCU and/or controller.
81, 82	Not used		
83	Printing paper jam (the registration sensor comes ON too early in the paper feed operation.)	Paper is not correctly set in the paper tray	Reload paper.
		Separation pad damaged	Replace the paper tray.
		Registration sensor actuator unhooked	Set the registration sensor actuator in the correct place.
		BCU board defective	Replace the BCU board or the controller.
84	Printing paper jam (The registration	The paper exit roller does not rotate correctly.	Replace the paper exit roller.

	sensor stays ON after completion of paper ejection.)	Foreign materials in the paper path.	Remove foreign materials.
		Registration sensor actuator caught on the surrounding parts.	Correct the surrounding parts on which the actuator is caught.
		Registration sensor broken	Replace the sensor and/or sensor PCB.
		BCU or controller defective	Replace the BCU board or the controller.
85	No paper tray	—	—
86	Tray 2 open		
87	Paper type error	—	—
88	Printing paper jam (even after paper feed-in, the registration sensor is still OFF.)	Printing paper is not loaded correctly.	Instruct the user to load the paper in correct place.
		Registration sensor broken	Replace the registration sensor.
		Separation pad damaged	Replace the paper tray.
		Objects, such as bits of paper or chips, are in the paper tray.	Remove the objects from the paper tray.
		Paper feed roller defective	Replace the paper feed roller.
		Drive motor broken	Replace the main motor.
		BCU or controller defective	Replace the BCU board or the controller.
89	Not used		
8A~A0	Not used		
A1	Front cover (scanner unit open)	Hook of the open switch on the front cover broken	Replace the front cover.
		Front cover open switch broken	Replace the front cover open switch.
A2	Document length exceeding the scan limitation. During scanning, a document 90cm or longer is detected. During document feeding or ejecting, a document 400cm or longer is detected.	Document jam	Remove the jammed document.
		Trailing edge sensor actuator caught on the surrounding parts	Correct the surrounding parts on which the actuator is caught.
		Trailing edge sensor broken	Replace the trailing edge sensor.
A3	The trailing edge sensor does not come ON during document feed-in.	Document jam	Remove the jammed document
		Trailing edge sensor actuator caught on the surrounding parts	Correct the surrounding parts on which the actuator is caught.
		Trailing edge sensor broken	Replace trailing edge sensor.
A4	Not used	—	—

A5/A6	Fax scanning failure A5: (1st time) A6: (retry)	CIS defective The white-level reference film in the scanner cover is dirty	Replace the scanner cover (scanner unit).
		BCU or controller defective	Replace the BCU and/or controller.
A7~AA	Not used		
AB	CIS resolution failure	CIS defective	Replace the scanner cover (scanner unit).
AC	Not used	—	—
AD~AE	Not used		
AF	CIS positioning error	CIS flat cable broken or not connected	Correct the cable connection. Replace the scanner cover (scanner unit).
		CIS motor harness not connected properly	Correct the harness connection.
		CIS defective	Replace the scanner cover (scanner unit).
		BCU or controller defective	Replace the BCU and/or controller.
B0	Not used		
B1~B6	Not used	—	—
B7	A/D converter reference voltage error (at High level)	BCU or controller defective	Replace the BCU and/or controller.
B8	Not used	—	—
B9	Light emission intensity error of the LED array (exceeding the upper limit)	CIS defective	Replace the scanner cover (scanner unit).
		BCU or controller defective	Replace the BCU and/or controller.
BA	Not used		
BB	White level data error	CIS defective	Replace the scanner cover (scanner unit).
		BCU or controller defective	Replace the BCU and/or controller.
BC	Not used		
BD	Black level data error	CIS defective	Replace the scanner cover (scanner unit).
		BCU or controller defective	Replace the BCU and/or controller.
BE	Not used	—	—
BF~CF	Not used		
D0~DF	Mode error	BCU or controller defective	Replace the BCU and/or controller.
E0~E3	Not used		
E4	Not used	—	—
E5	Not used		
E6	Write error in EEPROM	BCU defective	Replace the BCU.
E7	Not used		

E8	Data scanning error during transmission	CIS defective	Replace the scanner cover (scanner unit).
		BCU or controller defective	Replace the BCU and/or controller.
E9	Not used		
EA	Document removed at phase B	Leading edge sensor actuator caught on the surrounding parts	Correct the surrounding parts on which the actuator is caught.
		Sensor PCB defective	Replace the sensor PCB.
		BCU or controller defective	Replace the BCU and/or controller.
EB~ED	Not used		
EE~F2	Not used		
F3, F5	Not used	—	—
F4	Not used		
F6	Not used	—	—
F7	Not used		
F8	Battery connection error	Disconnection	Connect the battery.
F9~FE	Not used		
FF	Not used	—	—

**Copier Errors**

No.	Error Code	Possible Cause	Countermeasure
1	SVC C3	NVRAM Error: Data in NVRAM on the BCU is found to be defective at the data confirmation process at power-on.	1. Do "NVRAM INITIAL" in the service mode. 2. Replace the BCU.
2	SVC C4	BCU Error: Data between ASIC and CPU is abnormal due to broken parts on BCU.	1. Replace the BCU.
3	SVC C7	Process Timing Error: Synchronization Signal from Main Motor for OPC belt unit is not inputted.	1. Check the harness. 2. Replace the Main Motor. 3. Replace the BCU.
4	SVC D1	Development Clutch (Y) Error: Connector is not properly connected with Clutch, and/or Harness is shorted or cut.	1. Check the harness connection. (MCN4: pin19, 20) 2. Replace the Development Clutch (Y). 3. Replace the BCU.
5	SVC D2	Development Clutch (M) Error: Connector is not properly connected with Clutch, and/or Harness is shorted or cut.	1. Check the harness connection. (MCN4: pin17, 18) 2. Replace the Development Clutch (M). 3. Replace the BCU.

No.	Error Code	Possible Cause	Countermeasure
6	SVC D3	Development Clutch (C) Error: Connector is not properly connected with Clutch, and/or Harness is shorted or cut.	<ol style="list-style-type: none"> <li>1. Check the harness connection. (MCN4: pin15, 16)</li> <li>2. Replace the Development Clutch (C).</li> <li>3. Replace the BCU.</li> </ol>
7	SVC D4	Development Clutch (K) Error: Connector is not properly connected with Clutch, and/or Harness is shorted or cut.	<ol style="list-style-type: none"> <li>1. Check the harness connection. (MCN4: pin21, 22)</li> <li>2. Replace the Development Clutch (K).</li> <li>3. Replace the BCU.</li> </ol>
8	SVC D5	Development Solenoid (Y) Error: Connector is not properly connected with Solenoid, and/or Harness is shorted or cut.	<ol style="list-style-type: none"> <li>1. Check the harness connection. (MCN5: pin4, 3)</li> <li>2. Replace the Development Solenoid (Y).</li> <li>3. Replace the BCU.</li> </ol>
9	SVC D6	Development Solenoid (M) Error: Same as D5 cause.	<ol style="list-style-type: none"> <li>1. Check the harness connection. (MCN5: pin6, 5)</li> <li>2. Replace the Development Solenoid (M).</li> <li>3. Replace the BCU.</li> </ol>
10	SVC D7	Development Solenoid (C) Error: Same as D5 cause	<ol style="list-style-type: none"> <li>1. Check the harness connection. (MCN5: pin8, 7)</li> <li>2. Replace the Development Solenoid (C).</li> <li>3. Replace the BCU.</li> </ol>
11	SVC D8	Development Solenoid (K) Error: Same as D5 cause	<ol style="list-style-type: none"> <li>1. Check the harness connection. (MCN5: pin2, 1)</li> <li>2. Replace the Development Solenoid (K).</li> <li>3. Replace the BCU.</li> </ol>
12	SVC E1	Development Motor (DM) Error: NOT READY signal (rotation error signal) is detected in case of the abnormal motor rotation.	<ol style="list-style-type: none"> <li>1. Check toner cartridges.</li> <li>2. Check the harness connection. (MCN3: pin 1 ~ 11)</li> <li>3. Replace the Development gear assembly.</li> <li>4. Replace the Development Motor.</li> <li>5. Replace the BCU.</li> </ol>
13	SVC E2	Main Motor (MM) Error: NOT READY signal (rotation error signal) is detected in case of the abnormal motor rotation.	<ol style="list-style-type: none"> <li>1. Check the harness connection. (MCN3: pin 12 ~ 24)</li> <li>2. Replace the Main Motor.</li> <li>3. Replace the BCU.</li> </ol>
14	SVC E3	Transfer Belt Error: Transfer Belt is not rotating stably; Color matching cannot be secured.	<ol style="list-style-type: none"> <li>1. Reinstall or replace the Transfer belt unit.</li> <li>2. Check the harness connection. (MCN9: pin 1, 3, 5)</li> <li>3. Replace the Transfer Belt Sensor.</li> <li>4. Replace the Power Supply Unit.</li> <li>5. Replace the BCU.</li> </ol>
15	SVC E5	Paper Transfer Clutch Error: Connector is not properly connected with Clutch, and/or Harness is shorted or cut.	<ol style="list-style-type: none"> <li>1. Check the harness connection. (MCN4: pin 5, 6)</li> <li>2. Replace the Paper Transfer Clutch.</li> <li>3. Replace the BCU.</li> </ol>

No.	Error Code	Possible Cause	Countermeasure
16	SVC E6	Cleaning Unit Solenoid Error: Connector is not properly connected with Solenoid, and/or Harness is shorted or cut.	<ol style="list-style-type: none"> <li>1. Check the harness connection. (MCN4: pin 1, 2)</li> <li>2. Replace the Cleaning Unit Solenoid.</li> <li>3. Replace the BCU.</li> </ol>
17	SVC E8	Fusing Clutch Error: Connector is not properly connected with Solenoid, and/or Harness is shorted or cut.	<ol style="list-style-type: none"> <li>1. Check the harness connection. (MCN4: pin 3, 4)</li> <li>2. Replace the Fusing Clutch.</li> <li>3. Replace the BCU.</li> </ol>
18	SVC E9	OPC Belt Sensor Error: Marker on OPC Belt is not properly detected by Belt Sensor.	<ol style="list-style-type: none"> <li>1. Place the machine on the level place</li> <li>2. Check the harness connection. (MCN 7: pin 1, 2, 5)</li> <li>3. Clean or replace the OPC Belt Sensor.</li> <li>4. Replace the OPC Belt Unit.</li> <li>5. Replace the BCU.</li> </ol>
19	SVC EL	Erase Lamp Error: LED wire of Erase board is cut, Connector is not properly connected, and/or Harness is shorted or cut.	<ol style="list-style-type: none"> <li>1. Check the harness connection. (MCN 8: pin 13, 14)</li> <li>2. Replace the Erase Lamp.</li> <li>3. Replace the BCU.</li> </ol>
20	SVC F0	PSU Fan Error: Fan motor fails to make the normal rotation, Connector is not properly connected, and/or Harness is shorted or cut.	<ol style="list-style-type: none"> <li>1. Check the harness connection. (MCN 11: pin 1 ~ 3)</li> <li>2. Replace the PSU Fan.</li> <li>3. Replace the BCU.</li> </ol>
21	SVC F3	Optics Unit Fan Error: Fan motor fails to make the normal rotation, Connector is not properly connected, and/or Harness is shorted or cut.	<ol style="list-style-type: none"> <li>1. Check the harness connection. (MCN 8: pin 7, 9, 11)</li> <li>2. Replace the Optics Unit Fan.</li> <li>3. Replace the BCU.</li> </ol>
22	SVC F4	Fusing Fan Error: Fan motor fails to make the normal rotation, Connector is not properly connected, and/or Harness is shorted or cut.	<ol style="list-style-type: none"> <li>1. Check the harness connection. (MCN 1: pin 10 ~ 12)</li> <li>2. Replace the Fusing Fan.</li> <li>3. Replace the BCU.</li> </ol>
23	SVC F5	High Voltage Unit Error: Output (BRV) of HV Voltage Unit is shorted, and/or Connector is not properly connected.	<ol style="list-style-type: none"> <li>1. Check that the Charge Roller Unit is properly installed.</li> <li>2. Check the harness connection. (HVCN: pin 4, 10, 11)</li> <li>3. Replace the High Voltage Unit.</li> <li>4. Replace the BCU.</li> </ol>
24	SVC F6	Power Supply Unit Error: Connector is not properly between Power Supply Unit and BCU.	<ol style="list-style-type: none"> <li>1. Check the harness connection. (LVCN)</li> <li>2. Replace the Power Supply Unit.</li> <li>3. Replace the BCU.</li> </ol>
25	SVC H0	Fusing Thermistor Error: Temperature signal from Thermistor is not detected. (Wire Cut Detection)	<ol style="list-style-type: none"> <li>1. Check the harness connection. (FUCN: pin 1 ~ 8)</li> <li>2. Replace the Fusing Unit.</li> <li>3. Replace the BCU.</li> </ol>

No.	Error Code	Possible Cause	Countermeasure
26	SVC H1	Fusing Lamp Error: Temperature detection circuit works when the fusing temperature becomes higher than the specified temperature.	1. Check the harness connection. (FUCN: pin 1 ~ 8) 2. Replace the Fusing Unit. 3. Replace the Power Supply Unit. 4. Replace the BCU.
27	SVC H2	Fusing Temperature Error (Warming-Up): Fusing temperature does not reach the specified temperature within the warming-up process.	Same as the countermeasures for H1.
28	SVC H3	Fusing Temperature Error (Printing): Fusing temperature declines during the printing process and cannot reach the specified temperature again after the lapse of certain time.	Same as the countermeasures for H1.
29	SVC H4	Fusing Temperature High Error: Fusing temperature rises during the printing process and cannot go down to the specified temperature after the lapse of certain time.	Same as the countermeasures for H1.
30	SVC HA	Fusing ACOFF Error (Relay Off): Temperature detection circuit works when the fusing temperature becomes the specified abnormal temperature (approximately 190 C.)	Same as the countermeasures for H1.
31	SVC L1	Beam Detector Error (BDT Error): Laser scanning beam is not detected by Beam Sensor.	1. Check the harness connection. (LCN1) 2. Replace the Optics Unit. 3. Replace the BCU.
32	SVC L2	Scanner Motor Error: NOT READY signal (rotation error signal) is detected in case of the abnormal motor rotation of Scanner Motor.	Same as the countermeasures for L1.
33	SVC LL	Laser Power Error: Detection circuit detects that the laser output is lower than the specified figure.	Same as the countermeasures for L1.
34	SVC N3	High Voltage Unit Connection Error: Connector Harness between BCU and High Voltage Unit is not properly connected.	1. Check the harness connection. (HVCN: pin 1) 2. Replace the High Voltage Unit. 3. Replace the BCU.
35	SVC N4	Toner End Sensor Error 1: Connector Harness between BCU and Toner End Sensor (the light emitting side) is not properly connected.	1. Check the harness connection. (MCN8: pin 1, 3, 5) 2. Replace the Emitter of the Toner End Sensor. 3. Replace the BCU.
36	SVC N5	Toner End Sensor Error 2: Connector Harness between BCU and Toner End Sensor (the light receiving side) is not properly connected.	1. Check the harness connection. (MCN8: pin 2, 4, 6, 8, 10, 12) 2. Replace the Receptor of the Toner End Sensor. 3. Replace the BCU.

<b>No.</b>	<b>Error Code</b>	<b>Possible Cause</b>	<b>Countermeasure</b>
37	SVC N6	Paper Feed Unit Connection Error: Connector Harness between BCU and PFU is not properly connected.	<ol style="list-style-type: none"><li>1. Check the harness connection. (MCN6: pin 13)</li><li>2. Replace the Paper Feed Unit.</li><li>3. Replace the BCU.</li></ol>

## 4.1.2 COMMUNICATION ERRORS

If a communication error occurs, the machine does these things:

- 1) Emits an audible alarm (intermittent beeping) for approximately 4 seconds,
- 2) Displays the corresponding error message, and
- 3) Prints out the transmission verification report, if the machine can send.

### *Definition of error codes on the communications list*

#### [1] Calling

Code 1	Code 2	Causes
10	08	Wrong number called.
11	01	No dial tone detected before start of dialing.
	02	Busy tone detected before dialing.
	03	2nd dial tone not detected.
	05	No loop current detected. <b>NOTE</b>
	06	Busy tone detected after dialing or after called.
	07	No response from the remote station during sending.
	10	Unobtainable tone detected after dialing.
17	07	No response from the calling station during receiving.

**NOTE:** Available in German models only.

Trouble-  
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#### [2] Command reception

Code 1	Code 2	Causes
20	01	Unable to detect a flag field.
	02	Carrier was OFF for 200 ms or longer.
	03	Abort detected ("1" in succession for 7 bits or more).
	04	Overrun detected.
	05	A frame of 3 seconds or longer was received.
	06	CRC error received.
	07	Error command received.
	08	Invalid command received.
	09	Command ignored once for document setting or for printing-out for turn-around transmission.
	0A	T5 time-out error
	0B	CRP received.
	0C	EOR and NULL received.

**[3] Compatibility (checking the NSF and DIS)**

Code 1	Code 2	Causes
32	01	Remote terminal only with V.29 capability in 2400 or 4800 bps transmission.
	02	Remote terminal not ready for polling.
	10	Remote terminal not equipped with password function or its password is switched OFF.
	11	Remote terminal not equipped with or not ready for confidential mailbox function.
	12	Remote terminal not equipped with or not ready for relay broadcasting function.
	13	No confidential mail in the remote terminal.
	14	The available memory space in the remote terminal is less than that required for reception of the confidential or relay broadcasting.
	18	Remote terminal not equipped with the color function.

**[4] Instructions received from the remote terminal (checking the NSC, DTC, NSS and DCS)**

Code 1	Code 2	Causes
40	02	Illegal compression system requested.
	03	Illegal printing width requested.
	05	ECM requested although not allowed.
	06	Polled while not ready.
	07	No document to send when polled.
	10	Country code or manufacturer code not the same.
	13	Polled by another manufacturers' terminal while waiting for secure polling.
	17	Invalid resolution selected.
	20	Invalid full-color mode requested.

**[5] Command reception (checking the NSF and DIS after transmission of NSS and DCS)**

Code 1	Code 2	Causes
50	01	Vertical resolution capability changed after compensation of background color.

**[6] ID checking**

Code 1	Code 2	Causes
63	01	Password plus "lower 4 digits of telephone number" not the same.
	02	Password not the same.
	03	Polling ID not the same.

**[7] DCN reception**

Code 1	Code 2	Causes
74		DCN received.

**[8] TCF transmission/ reception**

Code 1	Code 2	Causes
80	01	Fallback impossible.

**[9] Signal isolation**

Code 1	Code 2	Causes
90	01	Unable to detect video signal and commands within 6 seconds after CFR is transmitted.
	03	Received PPS containing invalid page count or black count.

**[10] Video signal reception**

Code 1	Code 2	Causes
A0	03	Error correction sequence not terminated even at the final transmission speed for fallback.
	11	Receive buffer empty. (5-second time-out)
	12	Receive buffer full during operation except for receiving into memory.
	13	Decoding error continued for 500 lines.
	14	Decoding error continued for 10 seconds.
	15	Time-out: 13 seconds or more for one-line transmission.
	16	RTC not found and carrier OFF signal detected for 6 seconds.
	17	RTC found but no command detected for 60 seconds.
	18	Receive buffer full during receiving into memory.
	19	No video data to be sent.
	20	Unable to continue to receive color fax (remaining toner insufficient).
A8	01	RTN, PIN or ERR received at the calling terminal. <b>NOTE</b>
A9	01	RTN, PIN or ERR received at the calling terminal. <b>NOTE</b>

**NOTE:** Available in German models only

**[11] General communication-related**

Code 1	Code 2	Causes
B0	02	Unable to receive the next-page data.
	03	Unable to receive polling even during turn-around transmission due to call reservation.
	04	PC interface error.

**[12] Maintenance mode**

Code 1	Code 2	Causes
E0	01	Failed to detect 1300 Hz signal during a burn-in operation.
	02	Failed to detect tone signals during a burn-in operation.

**[13] Equipment error**

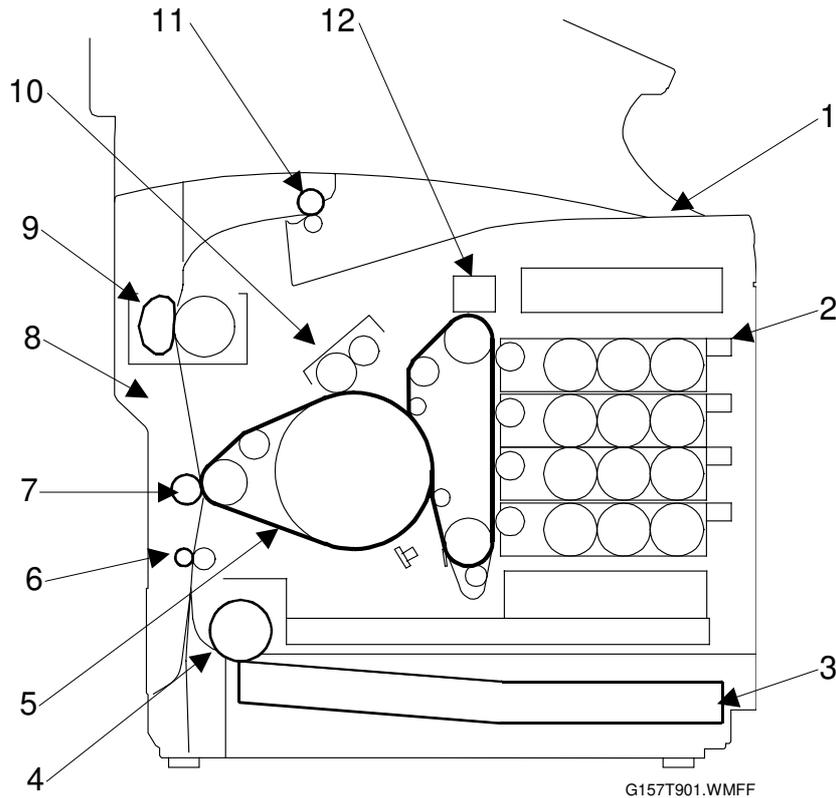
Code 1	Code 2	Causes
FF	XX	Equipment error (For XX, see 4.1.1 Machine Error xx)

## 4.2 PAPER TRANSPORT ERRORS

### 4.2.1 OVERVIEW

Paper is transported through the path shown below. Paper jams at the following locations are easily cleared.

- Paper Feed Area
- Transfer Area
- Fusing Area
- Paper Exit Area



Trouble-shooting

- |                                 |                          |
|---------------------------------|--------------------------|
| 1. Top cover                    | 7. Transfer roller ass'y |
| 2. Toner cartridge (K, Y, M, C) | 8. Rear cover ass'y      |
| 3. Paper tray                   | 9. Fusing Unit           |
| 4. Paper feed roller            | 10. Cleaning roller      |
| 5. Transfer belt                | 11. Paper roller ass'y   |
| 6. Registration roller ass'y    | 12. Belt cartridge       |

## 4.2.2 JAM RECOVERY PROCEDURES

### *Feed Jam*

Problem item	P/S*	Check item	Result	Corrective action
Print Paper	1	Is the print paper the recommended paper?	NO	Use the recommended paper.
	2	Is the print paper humid? (Has the paper been kept unused for a long time?)	YES	Replace the existing paper with new paper.
Paper Cassette PU	3	Is the print paper set in place?	NO	Set the paper in the proper place.
	4	Is the end plate properly set up?	NO	Set the end plate to meet the paper size.
Pick-up Roller PU	5	Is the print paper caught in the paper feeder part?	YES	Remove the paper being caught.
	6	Is the paper feed roller damaged?	NO	Replace the damaged paper feed roller.

**P/S:** This stands for "Procedure Step".

### *Inner Jam*

Problem item	P/S*	Check item	Result	Corrective action
Transportation Part		Open the rear cover assy PU for check.		
	1	Is there any paper inside the unit?	YES	Remove the paper inside.
	2	Is the transfer roller firmly locked by the lock lever?	NO	Secure the transfer roller with the lock lever.
Fusing Unit	3	Is the fusing unit properly locked?	NO	Secure the fusing unit with Fusing unit
	4	Is there any paper caught between the rollers?	YES	Remove the caught paper.

**P/S:** This stands for "Procedure Step".

### 4.3 SOFTWARE PROBLEMS

The machine may not print the data correctly if there are incorrect software settings.

<b>S-1</b>	"There was an error writing to LPT1: (or BRUSB) for the machine" appears.
------------	---

1. Check that the machine cable is not damaged or broken. Check also that the cable is connected to the correct interface connectors of both the machine and PC.
2. Check that the correct machine is selected if you have an interface-switching device.
3. Check that the appropriate printer driver is selected as 'Set as Default'. Check also that the correct printer port is set for the selected printer driver.
4. Check that the machine is not connected to the same port that is also connected to a mass storage device or scanner. Remove all other devices and connect the port to the machine only. Turn off the machine status monitor in the device options tab in the printer driver.
5. If the printer port is set up as an ECP port, change it to a normal port.
6. Try printing the test page.
7. Try resetting the factory settings.

Trouble-shooting

Possible cause	Step	Check	Result	Countermeasure
Failure inside the machine	1	Is it possible to print the test page with the above method?	No	Identify the error type, then refer to the specified section of this chapter.
Controller failure	2	Is it possible to print with another PC and printer cable?	No	Replace the BCU and/or controller.
			Yes	This problem may appear with some system environments. Check the environment that the user used.

<b>S-2</b>	Although the USB driver is installed, it is unable to find the BRUSB: port. (Windows98/Me only)
------------	---

1. Re-install the USB driver by following the steps below;
  - 1) Turn off the machine.
  - 2) Double-click the file "Deins USB.exe" in the USB directory of the CD-ROM.
  - 3) Re-boot the PC.
  - 4) Turn on the machine.
  - 5) "Add New Hardware Wizard" is launched again. Follow the instructions in the Wizard to re-install the driver.
2. Try to connect the machine directly to the computer if it is connected through a USB hub.

Possible cause	Step	Check	Result	Countermeasure
Computer Operating System	1	Windows 95 or Windows NT4.0?	Yes	The operating system does not support USB.
Computer settings	2	Does 'Universal Serial Bus Controllers' appear in the Device Manager tab of 'System Properties' in the Control Panel?	No	This problem can be caused by your computer settings. See the computer manual.
USB cable/ machine damage	3	Does "Add New Hardware Wizard" appear on the screen or Does test print complete?	No	The USB cable is damaged. Replace the cable. If the same problem appears, the machine is damaged.

## 4.4 IMAGE QUALITY

This section illustrates some examples of image quality troubles.

### 4.4.1 BACKGROUND

#### **Symptom**

The background is smeared.

#### **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.



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#### **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.

Trouble-  
shooting

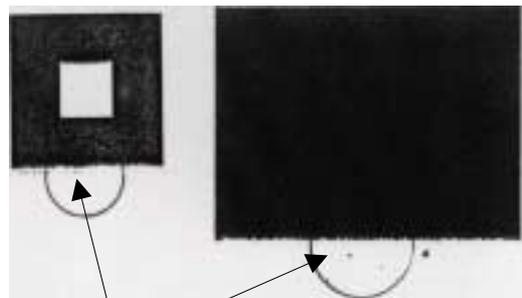
### 4.4.2 MISSING IMAGE AT EDGE

#### **Symptom**

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

#### **Possible Cause**

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



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#### **Countermeasures**

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

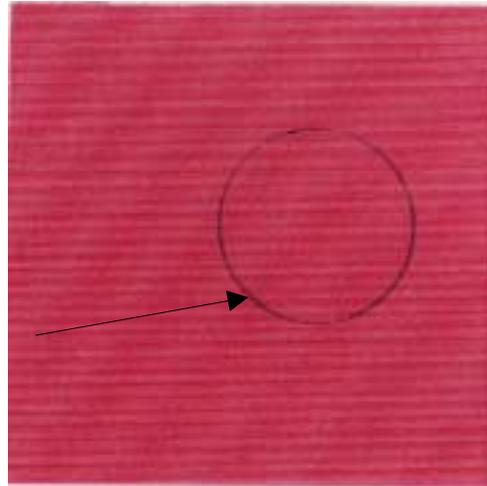
### 4.4.3 JITTER

#### **Symptom**

The image density changes at times and horizontal lines appear.

#### **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.



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#### **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.

### 4.4.4 RIBBING

#### **Symptom**

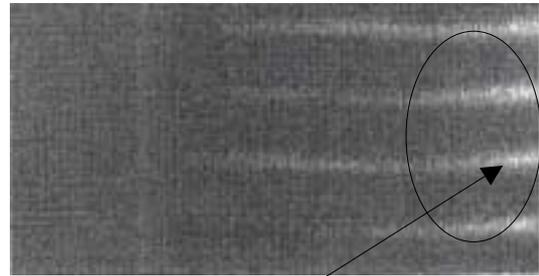
The image is weak on the right or left side.

#### **Possible Cause**

- 1) Small tilt on the surface where the copier 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.

#### **Countermeasures**

- 1) Check that the copier 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



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Trouble-  
shooting

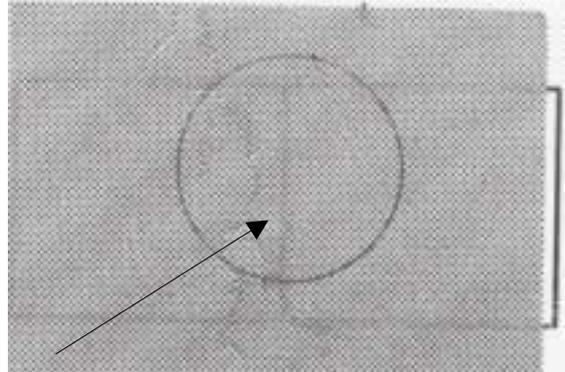
### 4.4.5 WRINKLE/IMAGE MIGRATION

#### **Symptom**

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

#### **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.



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#### **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.

### 4.4.6 WHITE LINE 1

#### **Symptom**

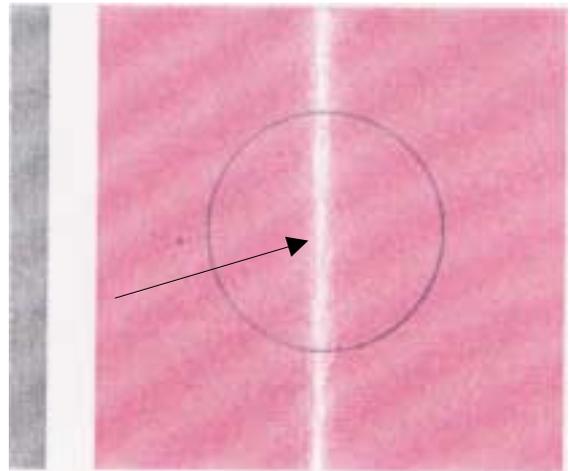
A vertical white line appears in a specified color area on a test print in the four-color mode (Stripe Mode).

#### **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.



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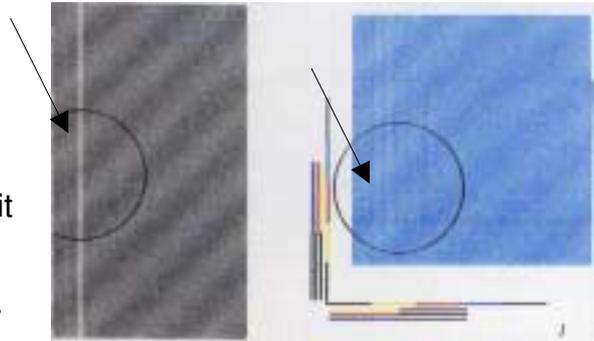
### 4.4.7 WHITE LINE 2

#### **Symptom**

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

#### **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.



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#### **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.

Trouble-  
shooting

### 4.4.8 VERTICAL WHITE BAND

#### **Symptom**

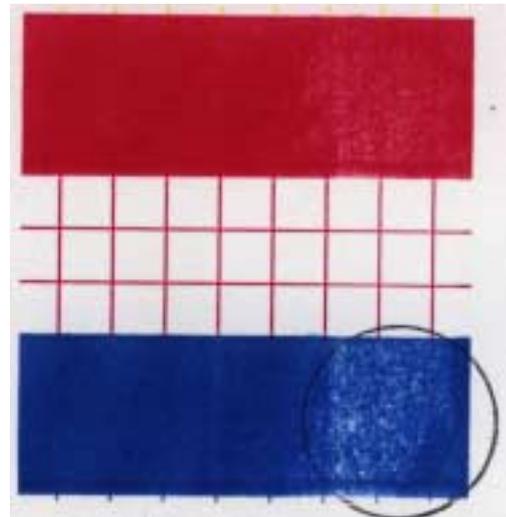
A vertical white band appears.

#### **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.



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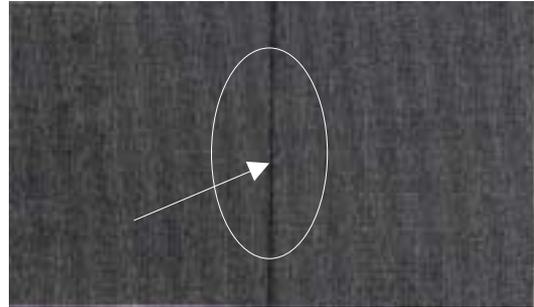
#### 4.4.9 BLACK LINE

##### **Symptom**

A fine black line appears.

##### **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.



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##### **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.

#### 4.4.10 VERTICAL LINE

##### **Symptom**

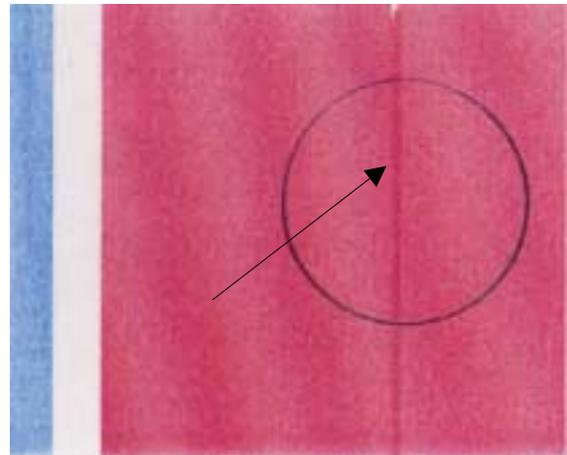
A vertical line appears.

##### **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.



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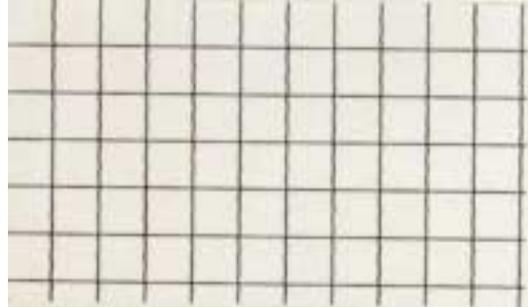
### 4.4.11 VERTICAL STAGGERING IMAGE

#### **Symptom**

Some images make wavy lines.

#### **Possible Cause**

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



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#### **Countermeasures**

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

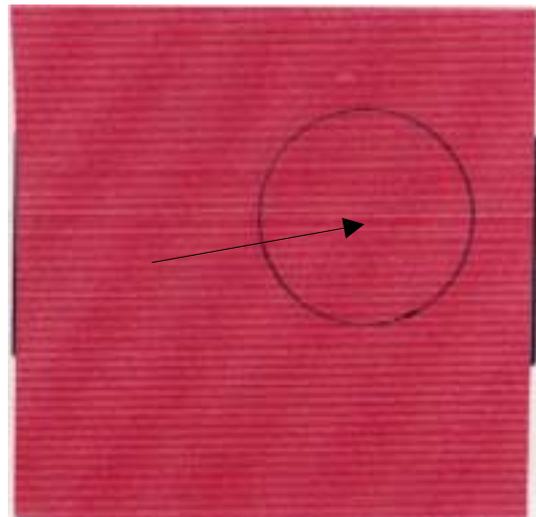
### 4.4.12 BANDING

#### **Symptom**

A horizontal band-like line appears.

#### **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.



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#### **Countermeasures**

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

### 4.4.13 WHITE BAND

#### **Symptom**

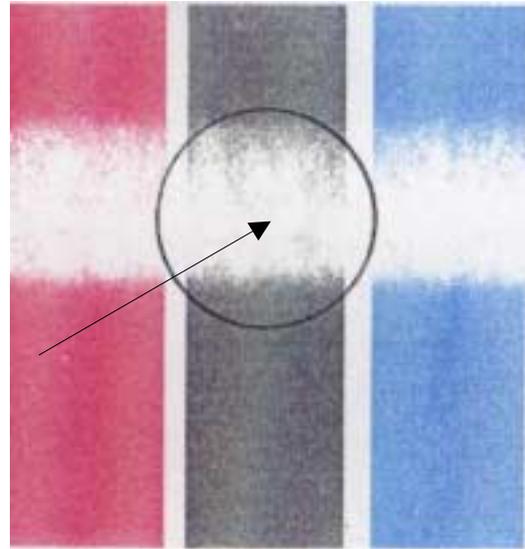
A horizontal white band appears.

#### **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.



G157T913.TIFF

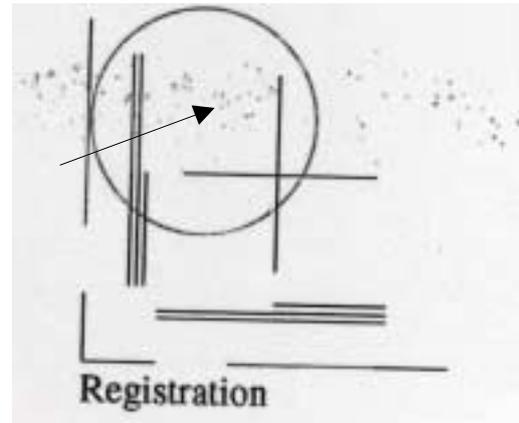
### 4.4.14 TONER DROP

#### **Symptom**

Irregular dot images appear.

#### **Possible Cause**

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



G157T914.TIFF

#### **Countermeasures**

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

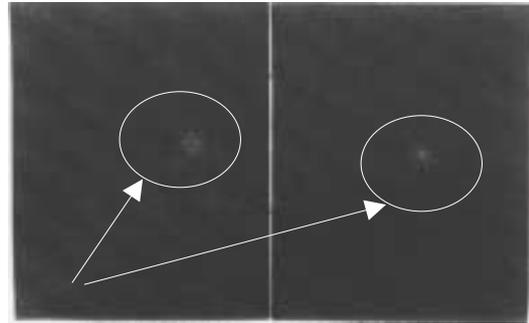
### 4.4.15 WHITE SPOT / BLACK SPOT

#### **Symptom**

A white spot or a black spot appears.

#### **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.



G157T915.TIFF

#### **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.

Trouble-shooting

### 4.4.16 MIXED COLOR IMAGE

#### **Symptom**

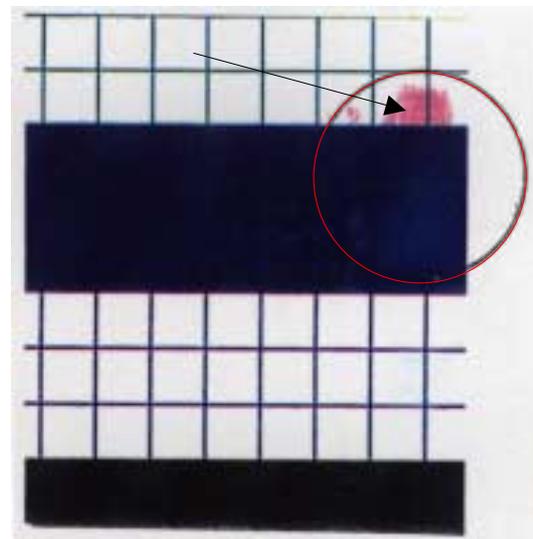
A mixed color image appears.

#### **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.
  - i) If it is on the OPC belt, the cause is the retract error of the toner cartridge.
  - j) 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.



G157T916.TIFF

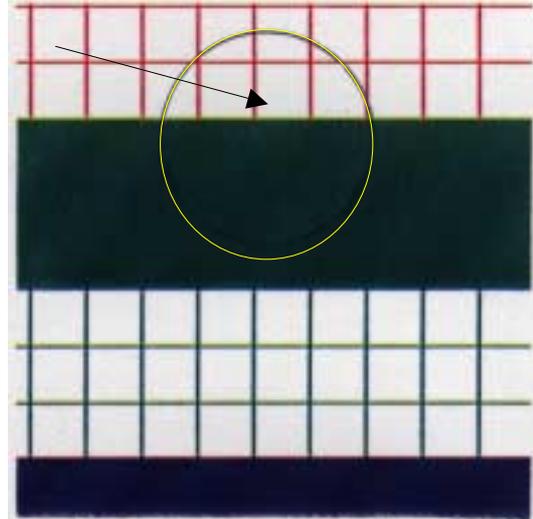
### 4.4.17 INCORRECT COLOR REGISTRATION

#### **Symptom**

Incorrect color registration is seen between the two colors.

#### **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.



G157T917.TIFF

#### **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.

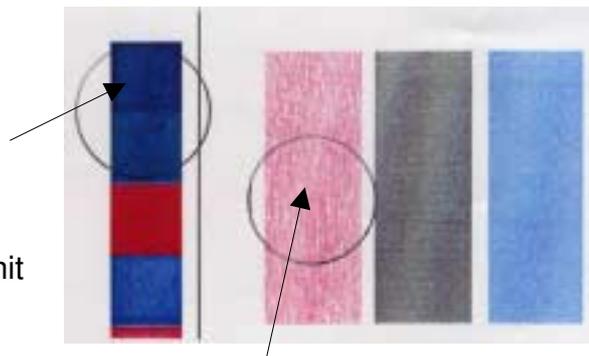
### 4.4.18 MOTTLING

#### **Symptom**

The image density varies.

#### **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.



G157T918.TIFF

#### **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.

### 4.4.19 RESIDUAL IMAGE

#### **Symptom**

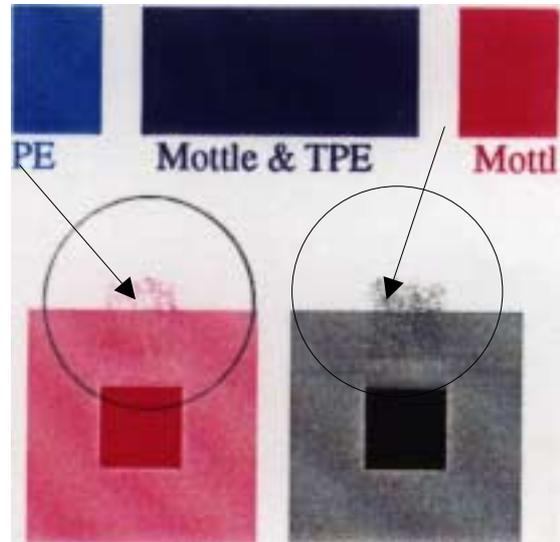
Part of the image on the previous page appears.

#### **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.



G157T919.TIFF

Trouble-shooting

### 4.4.20 INSUFFICIENT GLOSS

#### **Symptom**

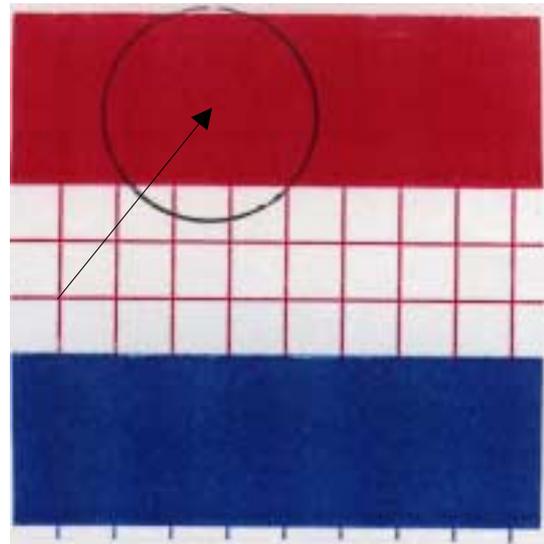
Part of the image is not glossy enough.

#### **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.



G157T920.TIFF

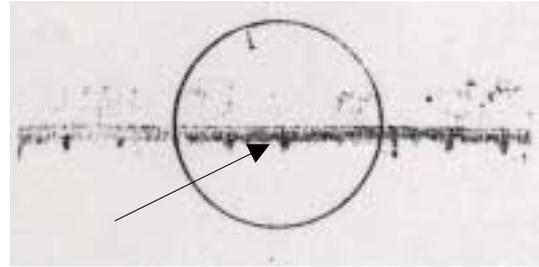
### 4.4.21 BACK STAIN

#### **Symptom**

The backside of the paper is stained.

#### **Possible Cause**

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



G157T921.TIFF

#### **Countermeasures**

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

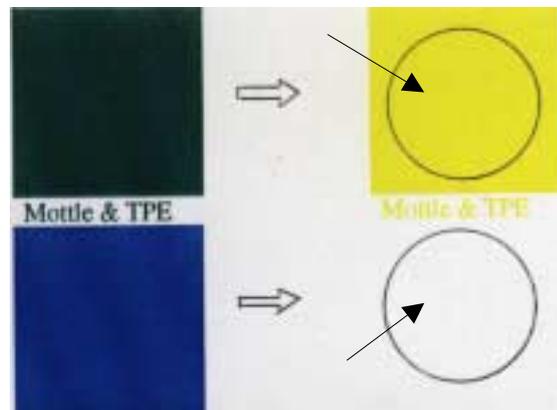
### 4.4.22 WHITE PRINT

#### **Symptom**

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

#### **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).



G157T922.TIFF

#### **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.

### 4.4.23 INSUFFICIENT FUSING

#### **Symptom**

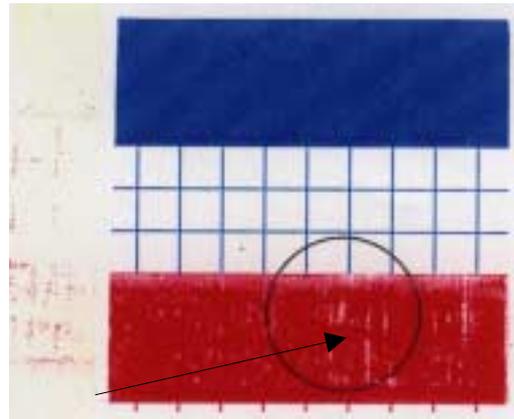
Parts of the image printed images are partially missing.

#### **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.



G157T923.TIFF

### 4.4.24 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.

#### **4.4.25 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 message "Belt marker sensor error" 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 copier operates even when the message " Belt marker sensor error " is displayed. In a condition like this, the image density on the outputs can be incorrect.

## 4.5 INCORRECT PRINTOUT

When the data is not printed correctly as it is seen on the PC screen, follow the procedures below.

<b>P-1</b>	The machine prints unexpectedly or it prints garbage.
------------	---

1. Check if the printer cable is not too long. It is recommended to use a parallel cable of less than 2 meters (6.6 feet) in length.
2. Check that the printer cable is not damaged or broken. Check also that the printer cable is connected to the correct interface connectors of both the machine and the PC.
3. If an interface-switching device is used, remove it and connect the computer directly to the machine and try again.
4. Check that the appropriate printer driver is selected as 'Set as Default'. Check also that the correct printer port is set for the selected printer driver.
5. Check that the machine is not connected to the same port that is also connected to a mass storage device or scanner. Remove all other devices and connect the port to the machine only. Turn off the machine status monitor in the device options tab in the printer driver.
6. If the printer port is set up as an ECP port, change it to a normal port.
7. Try printing the test page.
8. Try resetting the factory settings

**Trouble-  
shooting**

Possible cause	Step	Check	Result	Countermeasure
Failure inside the machine	1	Is it possible to print the test page?	No	Identify the error type, and then refer to the specified section of this chapter.

**NOTE:** If the machine prints garbage or incorrect fonts, see the Troubleshooting section of Appendix C in the User's Guide.

<b>P-2</b>	Unable to print all pages of a document and the “PRINT OVERRUN” message appears.
------------	--

1. Press the Black Start key on the operation panel to print the data remaining in the machine.
2. If this does not clear the error, reduce the complexity of your document or reduce the machine resolution.
3. Change the following setting in the machine driver and try again. The best combination of settings below will vary depending on your document.
  - Graphic Mode/ TrueType™ mode

**NOTE:** This problem may appear if the data is too complex. If it is not cleared by taking the actions above, it will be impossible to print such data under the machine specifications.

<b>P-3</b>	Unable to print all pages of a document and the “MEMORY FULL” message appears.
------------	--

1. Press the Start key on the operation panel to print the data remaining in the machine.
2. Reduce the complexity of your document or reduce the machine resolution.

**NOTE:** This problem may appear if the data is too complex.

Possible cause	Step	Check	Result	Countermeasure
Controller board failure	1	Is it possible to print after reducing the data?	Yes	Replace the BCU and/or controller.

<b>P-4</b>	Headers or footers are not printed out, but they can be seen on the PC screen.
------------	--

1. Most laser printers have a restricted area that cannot be printed on. Usually the first two lines and last two lines of text cannot print (leaving 62 printable lines).
2. Adjust the top and bottom margins in your document to allow for this.

<b>P-5</b>	The machine sometimes prints a couple of characters and then ejects the page.
------------	---

**For DOS environments only**

1. The application machine emulation setting and the machine's emulation do not match. Check in the application software which machine you have selected to make sure the machine is set up correctly.
2. Remember that the machine emulates a wide selection of machines:
  - HP Laser Jet 6P, HP Laser Jet 6P, Epson FX-850, IBM proprinter XL
3. Try setting the machine into HP emulation, and then select 'HP LaserJet 6P' in the application software.

## 4.6 NETWORK PROBLEMS

If an error related to the network occurs, refer to the following sections.

### 4.6.1 INSTALLATION PROBLEMS

The Ricoh print server is not found during setup of the network print software or from the printer driver of the Ricoh printer in Windows®.

Make sure you have completed the IP address setting of the Ricoh print server according to the "User's Guide" before installing the network print software or printer driver. Check the following:

1. Make sure that the machine is powered on, is on-line and ready to print.
2. Check if there is any LED activity. Ricoh print servers have two LEDs on the back panel of the machine. The upper LED shows link status. The lower LED shows activity (Receive/Transmit status).
  - No light: If both LEDs are off, then the print server is not connected to the network.
  - Link LED is green: The link LED indicates green if the print server is connected to a Ethernet network.
3. Print the printer settings page and check if the settings such as IP address settings are correct for your network. The problem may be the result of mismatched or duplicate IP addresses. Check that the IP address is correctly loaded into the print server. Also, make sure that no other devices on the network have this IP address.
4. Check that the print server is on your network, as follows:

Try pinging the print server from the host operating system command prompt with the command:

```
ping ipaddress
```

Where ipaddress is the print server IP address (note that in some instances it can take up to two minutes for the print server to load its IP address after setting the IP address).

5. If you have tried 1 to 4 above and it does not work, then reset the print server back to the default factory settings and try from the initial setup again. For information about how to reset to the default factory settings, see the following section of the Network User's Guide: '3. Front Panel Setup – LAN Main Setup Menu – Restoring the network settings to factory default'.
6. Check if a personal firewall such as ICF (Internet connecting firewall) for Windows XP is running on your computer. If it is running, temporarily turn it off and try again.

**NOTE:** If none of the above steps is successful, there is almost certainly a hardware or network problem.

## 4.6.2 PRINTING PROBLEMS

### ***Print job is not printed***

Check the status and configuration of the print server, as follows:

1. Make sure that the machine is powered on, is on-line and is ready to print.
2. Print the Printer Settings Page of the machine and check if the settings such as IP address settings are correct for your network. The problem may be the result of mismatched or duplicate IP addresses. Check that the IP address is correctly loaded into the print server. Also, make sure that no other devices on the network have this IP address.
3. Check that the print server is on your network, as follows:

### **For Windows®**

- 1) Try pinging the print server from the host operating system command prompt with the command:  
ping ipaddress

Where ipaddress is the print server IP address (note that in some instances it can take up to two minutes for the print server to load its IP address after setting the IP address).

- 2) If a successful response is received, then proceed to Windows® 95/98/Me and Windows NT® 4.0 Peer-to-Peer print (LPR) troubleshooting, and Windows® 2000/XP IPP troubleshooting. Otherwise, proceed to Step 4.
4. If you have tried 1 to 4 above and it does not work, then reset the print server back to the default factory settings and try from the initial setup again.

### ***Error during printing***

If you try to print while other users are printing large amounts of data (e.g. many pages or color pages with high resolution), the machine is unable to accept your print job until the ongoing job is finished. If the waiting time of your print job exceeds a certain limit, a time out occurs, which causes the error message. In such situations, do the print job again after the other jobs are completed.

### 4.6.3 PROTOCOL-SPECIFIC TROUBLESHOOTING

#### ***Windows® 95/98/Me and Windows NT® 4.0 Peer-to-Peer print (LPR) troubleshooting***

If you are having trouble printing on a Windows® 95/98/Me, Windows NT® 4.0 or later Peer-to-Peer network (LPR method), check the following:

1. Make sure that the Ricoh LPR Port driver is correctly installed and configured according to the Windows® 95/98/Me or Windows NT® 4.0 Peer-to-Peer chapters (section 4, Network Printing, in the Network User's Guide).
2. Try to turn the Byte Count on in the Configure port area of the printer driver properties.

You may find that during the installation of the software, the screen that prompts you for a Port name is not displayed. This may happen on some Windows® 95/98/Me and Windows NT® 4.0 computers. Press the ALT and TAB keys to make it appear.

#### ***Windows® 95/98/Me and Windows NT® 4.0 Peer-to-Peer print (NetBIOS) troubleshooting***

If you are having trouble printing on a Windows® 95/98/Me, Windows NT® 4.0 or later Peer-to-Peer network (NetBIOS), check the following:

1. Make sure that the NetBIOS Port driver is correctly installed and configured according to the Windows® 95/98/Me or Windows NT® 4.0 Peer-to-Peer chapters (section 4, Network Printing, in the Network User's Guide).  
You may find that during the installation of the port driver, the screen that prompts you for a Port name is not displayed. This happens on some Windows® 95/98/Me and Windows NT® 4.0 computers. Press the ALT and TAB keys to make it appear.
2. Make sure that the print server is configured to be in the same workgroup or domain as the rest of your computers. It may take several minutes for the print server to appear in the network neighborhood.

### **Windows® 2000/XP IPP troubleshooting**

#### **Want to use a different Port number than 631.**

If you are using Port 631 for IPP printing, you may find that your firewall may not let the print data through. If this is the case, use a different port number (port 80), or configure your firewall to allow Port 631 data through.

To send a print job using IPP to a machine using port 80 (the standard HTTP port) enter the following when configuring your Windows® 2000/XP system.

http://ip\_address/ipp

#### **Get More Info option in Windows® 2000 not working**

If you are using a URL of:

http://ip\_address:631 or http://ip\_address:631/ipp ,

the **Get More Info** option in Windows® 2000 will not function. If you wish to use the **Get More Info** option, use the following URL:

http://ip\_address

### **Web browser troubleshooting (TCP/IP)**

1. If you cannot connect to the print server using your web browser, check the proxy settings of your browser. Look in the exceptions setting and if necessary, type in the IP address of the print server. This will stop your PC from trying to connect to your ISP or proxy server every time you wish to look at the printer server.
2. Make sure that you are using the proper web browser. We recommend Netscape Navigator® version 4.0 or later/ Microsoft Internet Explorer® version 5.0 or later.

## 4.7 OPERATION PANEL

<b>L-1</b>	Nothing is displayed on the LCD.
------------	----------------------------------

1. Check if the power switch is turned off.

Possible cause	Step	Check	Result	Countermeasure
Connection between BCU and operation panel PCB	1	BCU, controller and operation panel PCB are properly connected.	No	Fix the connector properly.
Harness between BCU, controller, and operation panel PCB	2	Harness is damaged.	Yes	Replace the harness.
Connection between BCU and low-voltage power supply PCB	3	BCU and low-voltage power supply PCB are properly connected.	No	Fix the connection properly.
Harness between BCU and low-voltage power supply PCB LCD	4	Harness is damaged.	Yes	Replace the harness.
LCD	5	Replacement of LCD solves the problem.	Yes	Replace the LCD.
Operation panel PCB	6	Replacement of operation panel PCB solves the problem.	Yes	Replace the operation panel PCB.
Low-voltage power supply PCB	7	Replacement of low-voltage power supply PCB solves the problem.	Yes	Replace the direct current unit (low-voltage power supply PCB).
Controller	8	Replacement of PCB solves the problem.	Yes	Replace the BCU and/or controller.

<b>L-2</b>	The operation panel does not work.
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Possible cause	Step	Check	Result	Countermeasure
Key sticking	1	A key on the operation panel is stuck.	Yes	Clean the panel cover or remove the burrs from panel cover and panel keys
Connection between BCU, controller and operation panel PCB	2	BCU, controller, and operation panel PCB are properly connected.	No	Fix the connection.
Harness between BCU, controller and operation panel	3	Harness is damaged.	Yes	Replace the harness.
Rubber key	4	Replacement of rubber key solves the problem.	Yes	Replace the rubber key
Control panel PCB	5	Replacement of operation panel PCB solves the problem.	Yes	Replace the operation panel PCB.
Controller	6	Replacement of PCB solves the problem.	Yes	Replace the BCU and/or controller.

Trouble-shooting

## 4.8 FAX PROBLEMS

<b>F-1</b>	Cannot send a fax
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1. Check that the telephone cord is securely inserted.

Possible cause	Step	Check	Result	Countermeasure
Dialing mode setting	1	Dialing signal (PB or DP) comes out normally in each mode. (Use a telephone line emulator if necessary.)	Yes	Check the dialing mode setting at the customer's again. Check the telephone line cord between the machine and the line socket.
Connection between controller and NCU PCB	2	Controller and NCU PCB are properly connected.	No	Fix the connection.
Harness between controller and NCU PCB	3	Harness is damaged.	Yes	Replace the harness.
Connection between controller and operation panel PCB	4	Controller and operation panel PCB are properly connected.	No	Fix the connection.
Harness between controller and operation panel PCB	5	Harness is damaged.	Yes	Replace the harness.
Contact of rubber key	6	The rubber key works correctly.	No	Replace the rubber key.
NCU PCB	7	Replacement of NCU PCB solves the problem.	Yes	Replace the NCU PCB.
Control panel PCB	8	Replacement of operation panel PCB solves the problem.	Yes	Replace the operation panel PCB.
Controller	9	Replacement of PCB solves the problem.	Yes	Replace the BCU and/or controller.

<b>F-2</b>	Speed dialing and One-touch dialing can't be used.
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Possible cause	Step	Check	Result	Countermeasure
Speed dialing, One-touch dialing	1	A fax transmission can be made using the ten-key pad?	Yes	Replace the BCU and/or controller.
Dialing mode setting	2	Dialing signal (PB or DP) comes out normally in each mode. (Use a telephone line emulator if necessary.)	Yes	Check the dialing mode setting at the customer's again. Check the telephone line cord between the machine and the line socket.
Connection between controller and NCU PCB	3	Controller and NCU PCB are properly connected.	No	Fix the connection.
Harness between controller and NCU PCB	4	Harness is damaged.	Yes	Replace the harness.
Connection between controller and operation panel PCB	5	Controller and operation panel PCB are properly connected.	No	Fix the connection.
Harness between controller and operation panel PCB	6	Harness is damaged.	Yes	Replace the harness.
Rubber key	7	Replacement of rubber key solves the problem.	Yes	Replace the rubber key.
NCU PCB	8	Replacement of NCU PCB solves the problem.	Yes	Replace the NCU PCB.
Control panel PCB	9	Replacement of operation panel PCB solves the problem.	Yes	Replace the operation panel PCB.

Trouble-shooting

<b>F-3</b>	Fax messages can't be received.
------------	---------------------------------

1. Check that the telephone cord is securely inserted.

Possible cause	Step	Check	Result	Countermeasure
Receive mode setting	1	Receive mode is set to automatic receive mode.	No	Set the receive mode to automatic receive mode.
NCU PCB	2	Replacement of NCU PCB solves the problem.	Yes	Replace the NCU PCB.
Controller	3	Replacement of PCB solves the problem.	Yes	Replace the BCU and/or controller.

<b>F-4</b>	No ring tone.
------------	---------------

Possible cause	Step	Check	Result	Countermeasure
Ring delay	1	Ring delay is set to "0".	Yes	Set the ring delay to other than "0".
Ring volume	2	Ring volume is set to "OFF".	Yes	Set the ring volume to other than "OFF".
Connection between controller and scanner unit	3	Controller and scanner unit are properly connected.	No	Fix the connection.
Harness between controller and scanner unit	4	Harness is damaged.	Yes	Replace the harness.
Connection between controller and NCU PCB	5	Controller and NCU PCB are properly connected.	No	Fix the connection.
Harness between controller and NCU PCB	6	Harness is damaged.	Yes	Replace the harness.
Speaker	7	Replacement of speaker solves the problem.	Yes	Replace the speaker.
NCU PCB	8	Replacement of NCU PCB solves the problem.	Yes	Replace the NCU PCB.
Controller	9	Replacement of PCB solves the problem.	Yes	Replace the BCU and/or controller.

<b>F-5</b>	Speaker is silent during on-hook dialing.
------------	---

Possible cause	Step	Check	Result	Countermeasure
Connection between controller and speaker	1	Controller and speaker are properly connected.	No	Fix the connection.
Speaker	2	Replacement of speaker solves the problem.	Yes	Replace the speaker.
Connection between controller and NCU PCB	3	Controller and NCU PCB are properly connected.	No	Fix the connection.
Harness between controller and NCU PCB	4	Harness is damaged.	Yes	Replace the harness.
Connection between controller and operation panel PCB	5	Controller and operation panel PCB are properly connected.	No	Fix the connection.
Harness between controller and operation panel PCB	6	Harness is damaged.	Yes	Replace the harness.
NCU PCB	7	Replacement of NCU PCB solves the problem.	Yes	Replace the NCU PCB.
Controller	8	Replacement of PCB solves the problem.	Yes	Replace the BCU and/or controller.

Trouble-shooting

<b>F-6</b>	Dialing function does not switch between "tone" and "pulse".
------------	--

Possible cause	Step	Check	Result	Countermeasure
Connection between controller and NCU PCB	1	Controller and NCU PCB are properly connected.	No	Fix the connection.
Harness between controller and NCU PCB	2	Harness is damaged.	Yes	Replace the harness.
NCU PCB	3	Replacement of NCU PCB solves the problem.	Yes	Replace the NCU PCB.
Controller	4	Replacement of PCB solves the problem.	Yes	Replace the BCU and/or controller.

## 4.9 ELECTRICAL COMPONENT DEFECTS

### 4.9.1 SENSORS

#### *Reflective Photo Sensors*

Sensor	Connector	Condition	Symptom
ID	TACN	Abnormal	Image quality may deteriorate.
OPC belt	MCN7	Abnormal	<ul style="list-style-type: none"> <li>• SVC E9 ERROR (☛ 4.1.1)</li> <li>• The message "ALINE BELT CG" is displayed.</li> </ul>
Waste toner	MCN4	Abnormal	<ul style="list-style-type: none"> <li>• The waste toner bottle or the waste toner is not detected.</li> <li>• The message "CHECK WASTE TONER" is displayed.</li> </ul>
Toner end	MCN8	Abnormal	<ul style="list-style-type: none"> <li>• SVC N4 ERROR (☛ 4.1.1)</li> <li>• SVC N5 ERROR (☛ 4.1.1)</li> </ul>
Transfer belt	MCN9	Abnormal	<ul style="list-style-type: none"> <li>• The message "ALINE TRANSFER ROLLER" is displayed.</li> </ul>
OHP	MCN9	Abnormal	<ul style="list-style-type: none"> <li>• OHP sheets are not detected.</li> <li>• The paper types other than OHP sheets are not detected</li> </ul>

#### *Photo Sensors*

Sensor	Connector	Condition	Symptom
Development unit	MCN2	Interrupted	The message "Check Toner xxxxx" is displayed, where xxxxx indicates a color.
		Not interrupted	The message "Replace Toner xxxxx" is displayed, where xxxxx indicates a color.
Paper exit	MCN1	Interrupted	The paper stops in the paper exit unit and the message "Paper Jam C" is displayed.
		Not interrupted	The message "Paper Jam C" is displayed while no paper is in the path.
Registration	MCN9	Interrupted	The message "Paper Jam B" is displayed.
		Not interrupted	The message "Paper Jam B" is displayed while no paper is in the path.
Paper end	MCN9	Interrupted	The message "NO Paper Fed" 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	MCN7	Interrupted	The message "JAM-A" or "JAM-B" is displayed.
		Not interrupted	The message "Trayx Load zzzz" is displayed.

## 4.9.2 BLOWN FUSE CONDITION

The table lists the fuse on the power supply unit.

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

# 5. SERVICE TABLES

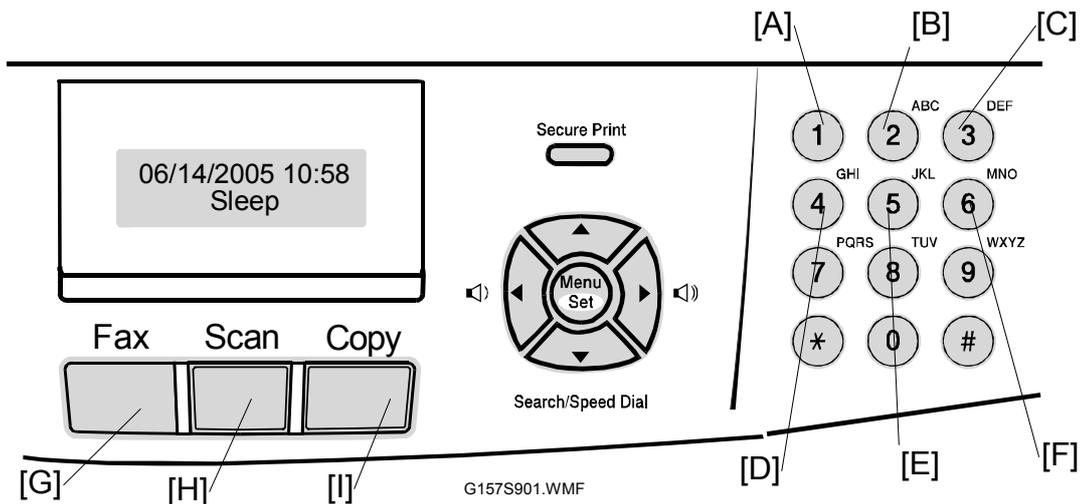
## 5.1 SERVICE MODE MENU

**⚠ CAUTION**  
 Before you go into the service program mode, check that the copier is not processing any data. The data in LED (↔) is turned off when the machine does not process data.

### 5.1.1 OPERATING SERVICE MODE

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

#### Activating the Service Menu



Service  
Tables

- [A] Online key
- [B] Media key
- [C] Clear key
- [D] Scroll (Left) key
- [E] Scroll (Right) key
- [F] Select key
- [G] Continuous List
- [H] Message
- [I] Media

- When the copier is turned off:
  1. Press the "Online" key and "⊗", and then hold them down.
  2. Turn on the main power switch. (Keep the two keys held down.)
  3. Wait until the message "Service Menu" shows.

**Selecting a Service Program**

1. Press the "Scroll (Left)" key or "Scroll (Right)" key to get one of these menus:

- TEST PRINT
- NEXT CARE INFO.
- CASSETTE TYPE
- TOTAL PAGE
- EACH IMAGE
- CLEAR CARE
- MEDIA MANAGE
- EXTENDED MEDIA
- FACTORY MODE

**NOTE:** See the next page for a detailed function list.

2. Press the "Select" key.
3. Press the "Scroll (Left)" key or "Scroll (Right)" key to get one of the sub menus.
4. Press the "Select" key.
5. Press the "Clear" key to go back to "TEST PRINT/NEXT" in the "Service Mode".

**Specifying a Setting**

1. Press the "Scroll (Left)" key or "Scroll (Right)" key to select a setting.
2. Press the "Select" key to keep the one you want to set.
3. Press the "Clear" key to go back to "TEST PRINT/NEXT" in the "Service Mode".

**Exiting the Service Menu**

1. Turn the main power switch OFF/ON.

## 5.1.2 SERVICE MODE FUNCTIONS

This device has service mode functions as shown below.

Main Mode	Code No.	Sub Mode/Description
<b>TEST PRINT</b>	31	Prints the Grid Pattern in B/W or two-color (RGB) mode and the Stripe Pattern in full color mode.
<b>NEXT CARE INFORMATION</b>	32	Displays the number of the developments or prints for each PM part.
<b>CASSETTE TYPE</b>	33	Selects the cassette type (North America, Europe, Japan).
<b>TOTAL PAGE</b>	34	Displays the number of total prints.
<b>EACH IMAGE</b>	35	Displays the number of developments for each color.
<b>CLEAR CARE</b>	36	Clears the number of the developments or prints for each PM part.
<b>MEDIA MANAGE</b>	37	Ignores the signal from the OHP sensor.
<b>EXTENDED MEDIA</b>	38	Sets the paper type.
<b>FACTORY MODE</b>	43	<b>MARGIN ADJUST</b>
		Adjusts the top margin and left margin on the printout.
	44	<b>LIFE PERIOD SET</b>
		Sets the PM parts life. <b>DFU</b>
	45	<b>NVRAM TUNE UP</b>
		Makes fine adjustments to the engine settings.
	46	<b>NVRAM INITIAL</b>
		Initializes all the data in the NVRAM on the BCU.
	47	<b>TOTAL PAGE SET</b>
Inputs the total number of prints in the NVRAM, after the NVRAM was reset.		
48	<b>EACH IMAGE SET</b>	
	Clears the number of total prints for each color in the NVRAM.	
49	<b>NEXT LIFE SET</b>	
	Sets the replacement timing for the PM parts.	

**Code 31: GRID PRINT**

This lets you print the following test prints:

- a) Grid Pattern in single-color or two-color (R, G, B) mode
- b) Stripe Pattern in full color

1. Press the "Select" key to select "TEST PRINT/NEXT".

SERVICE MODE
▶TEST PRINT/NEXT

2. For the grid pattern, select "GRID pattern" using the "Scroll" key, and then press the "Select" key.

31 GRID PRT
<▲ 2> pp

3. Select the desired color using the "Scroll" key, and then press the "Select" key.

31 GRID PRT	YM
A4	pp

4. The desired pattern in the selected color will be continuously printed after completion of the warming-up process.

5. Press the "Clear" key to stop printing. The LCD screen returns to "TEST PRINT/NEXT".

SERVICE MODE
▶TEST PRINT/NEXT

6. Press the "Online" key to return to the "ONLINE" mode.

01 WAIT	xx
A4	xx

**Code 32: NEXT CARE INFORMATION**

Information relating to the replacement timing of periodical replacement parts can be obtained, namely, the number of images and printouts.

- 1. Select "NEXT CARE INFO/" using the "Scroll" key.
- 2. Press the "Select" key.

SERVICE MODE
▶NEXT CARE INFO/

- 3. Use the "Scroll" key to select one of the codes below, depending on the desired information.

32 NEXT CARE
*23456789ABCDEFG

- |                         |                                    |
|-------------------------|------------------------------------|
| 3: Yellow toner (YT)    | A: Replacement Kit 120K (OW)       |
| 4: Magenta toner (MT)   | B: Waste toner bottle is full (WT) |
| 5: Cyan toner (CT)      | C: Paper exit tray is full (SF)    |
| 6: Black Cartridge (BC) | D: Pick-up Roller (PK)             |
| 7: Black Cartridge (BC) | E: Pick-up Roller in LFU (PL)      |
| 8: Fuser Unit (FU)      |                                    |
| 9: Transfer Belt (TB)   |                                    |

- 4. Press the "Select" key after selecting the desired information's code. Then, the number of images or printouts corresponding to the selected code is displayed.
- 5. Press the "Clear" key to return to "NEXT CARE INFO".
- 6. Press the "Online" key one more time to return to "SERVICE MODE".

NEXT FU UNIT
60000P

32 NEXT CARE
*23456789ABCDEFG

SERVICE MODE
▶TEST PRINT/NEXT



**Code 33: CASSETTE TYPE**

You can select the desired type of paper feed cassette.

1. Select "NEXT CARE INFO/" using the "Scroll" key.
2. Press the "Select" key.

```
SERVICE MODE
▶CASSETTE TYPE/T
```

3. Select the code of the desired cassette type (A, B, C, D, E, or F) using the "Scroll" key, and then press the "Select" key.

```
33 CASSETTE TYPE
<▶A / B / C / D / E / F>
```

A: NA, B: EU, C: DOM (Japan), D: FREE SIZE  
E/ F: Not used

4. Press the "Clear" key to return to "SERVICE MODE".

```
SERVICE MODE
▶TEST PRINT/NEXT
```

**Code 34: TOTAL PAGE**

You can check the total number of printouts.

1. Select "TOTAL PAGE" using the "Scroll" key.
2. Press the "Select" key.

```
SERVICE MODE
▶TOTAL PAGE/EACH
```

3. A six-digit number is displayed. This number represents the total number of pages that have been printed out.

```
34 TOTAL PAGE
XXXXXXp.
```

4. Press the "Clear" key to return to "SERVICE MODE".

```
SERVICE MODE
▶TEST PRINT/NEXT
```

**Code 35 EACH IMAGE**

This shows the number of images that have been created for each color during printing.

1. Select "EACH IMAGE" using the "Scroll" key.
2. Press the "Select" key.

SERVICE MODE  
▶EACH IMAGE/CLEA

3. Select the desired color using the "Scroll" key, and then press the "Select" key.

35 IMAGE OF  
▶Y / M / C / K

4. The number of created images for the selected color is displayed.

35 IMAGE OF Y  
XXXXXXp.

5. Press the "Clear" key to go back to the previous display ("35 IMAGEOF").
6. Press the "Scroll" key to select another color, and then press the "Select" key to check the number of images created for that color.

35 IMAGE OF  
▶Y / M / C / K

7. Press the "Clear" key to return to "SERVICE MODE".

SERVICE MODE  
▶TEST PRINT/NEXT

Service  
Tables

**Code 36 CLEAR CARE**

You can display a 'Care Code' in the LCD that corresponds to a PM part. Then you can reset the counter for that PM part. Make sure to do this when you replace a PM part.

1. Select "CLEAR CARE/MEDI" using the "Scroll" key.
2. Press the "Select" key.

```
SERVICE MODE
▶ CLEAR CARE/MEDI
```

3. Press the "Scroll" key to select the applicable 'care code', and then press "Select" key.

```
36 CLEAR CARE
*23456789ABCDEFG
```

4. To execute "CLEAR CARE", press the "Scroll" key to select "YES", and then press "Select" key.

```
CARED BL UNIT ?
▶ YES / NO
```

1~6, B, C, F, G: Not used

7: Belt Cartridge (BL): OPC belt unit

8: Fusing Unit (FU)

9: Transfer Belt Cleaning Unit /Transfer Roller (TR BELT)

A: Transfer Belt (120K KIT)

D: Paper Feed Roller (PICK ROL)

E: Paper Feed Roller (PICK LFU)

```
36 CLEAR CARE
▶ Y / M / C / K
```

5. The display returns to "CLEAR CARE" after clearing the PM counter.

```
36 CLEAR CARE
*23456789ABCDEFG
```

6. Press the "Scroll" key to select a PM part, and then press the "Select" key to clear the PM counter.

7. Press the "Clear" key to return to "SERVICE MODE".

```
SERVICE MODE
▶ TEST PRINT/NEXT
```

**Code 37 MEDIA MANAGE**

Signals from the OHP sensor can be ignored if the sensor is giving incorrect readings. However, this mode should not be used under normal circumstances.

1. Select "MEDIA MANAGE/EX" using the "Scroll" key.
2. Press the "Select" key.
3. Select "DEFIANCE" using the "Scroll" key, and then press the "Select" key if the OHP sensor signal should be ignored.  
**NOTE:** For normal operation, the mode is automatically preset to "MANAGE".
4. The display automatically returns to "SERVICE MODE".

SERVICE MODE
▶ MEDIA MANAGE/EX

37 MEDIA MANAGE
MANAGE ▶ DEFIANCE

SERVICE MODE
▶ TEST PRINT/NEXT

**Code 38 EXTEND MEDIA**

The paper type can be specified.

1. Select "MEDIA MANAGE/EX" using the "Scroll" key.
2. Press the "Select" key.
3. Select the desired media using the "Scroll" key, and then press the "Select" key.
4. Select the desired sub-type using the "Scroll" key.  
 PPC (plain paper): Normal or Thin  
 MTS (labels or medium-thick stock): Normal or Glossy  
 TS (thick stock): TS1 or TS2
5. Press the "Clear" key to return to the "SERVICE MODE".

SERVICE MODE
▶ EXTEND MEDIA/FA

38 EXTEND MEDIA
▶ PPC / MTS / TS

38 EXTEND PPC
▶ Normal / Thin

SERVICE MODE
▶ TEST PRINT/NEXT



**Code 39 FACTORY MODE**

This mode contains nine programs to check machine operation and to do the resetting functions that are necessary for maintenance.

FACTORY MODE	
43	MARGIN ADJUST
44	LIFE PERIOD SET <b>DFU</b>
45	NVRAM TUNE UP
46	NVRAM INITIAL
47	TOTAL PAGE SET
48	EACH IMAGE SET
49	NEXT LIFE SET
50	ID DATA SET <b>DFU</b>
51	OPT TUNE UP <b>DFU</b>

**Code 43 MARGIN ADJUST**

The position of the top margin and the left margin can be checked and adjusted.

1. Select "MARGIN ADJUST" in the "FACTORY MODE" using the "Scroll" key.
2. Press the "Select" key.
3. Select either TOP or LEFT/ LEFT1 using the "Scroll" key, and then press the "Select" key.  
 TOP: Top margin  
 LEFT: Left margin, standard tray  
 LEFT1: Left margin, optional tray

39 FACTORY MODE  
 ► MARGIN ADJUST/L

43 MARGIN ADJUST  
 ► TOP /LEFT /LEFT1

4. Select the amount of the adjustment by picking a displayed number with the "Scroll" key.

43 TOP            -2.8mm  
 - < 765\*32101 > +

**NOTE:** Top margin adjustment: The margin can be adjusted between - 4.9 mm and +4.9 mm of the reference value "0". Each number on the bottom line of the LCD represents an adjustment of 0.7 mm. (For example, -4 means -2.8 mm)  
 Left margin adjustment: The margin can be adjusted between - 3.5 mm and +3.5 mm of the reference value "0". The unit of adjustment is 0.5 mm.

43 TOP            +3.5mm  
 - < 101234\*67 > +

43 MARGIN ADJUST  
 ► TOP /LEFT /LEFT1

5. Press the Select key to set the adjustment.
6. Press the "Clear" key to terminate the "MARGIN ADJUST" mode.
7. Press the "Clear" key one more time to return to "FACTORY MODE".

39 FACTORY MODE  
 ► MARGIN ADJUST/L

**Code 44 LIFE PERIOD SET**

You can set the replacement interval for the PM parts.

**NOTE:** Do not use in the field.

1. Select "LIFE PERIOD SET" in the "FACTORY MODE" using the "Scroll" key.
2. Press the "Select" key.
3. Select one of the following codes using the "Scroll" key, and then press the "Select" key.
  - 1~6, B, C, F, G: Not used
  - 7: Belt Cartridge (BL)
  - 8: Fusing Unit (FU)
  - 9: Drum Cleaner/ Transfer Roller (TR)
  - A: Transfer Belt (120K)
  - D: Paper Feed Roller (PICK ROL)
  - E: Paper Feed Roller (PICK LFU)
4. Use the "Scroll" key to move the cursor, and use the "Select" key to input a value at the blinking digit.
 

**NOTE:** The minimum adjustable value is 100p.
5. Use the " Scroll" key to move the cursor to "SET", and then press the "Select" key to register the set value.
6. Press the "Clear" key to complete the setting operation.
7. Press the "Clear" key one more time to return to "FACTORY MODE".

39 FACTORY MODE
▶LIFE PERIOD SET

44 LIFE PERIOD
123456*:89ABCDEFG

PERIOD BL UNIT ?
060000p. SET

PERIOD BL UNIT ?
060000p. ▶SET

44 LIFE PERIOD
*23456789ABCDEFG

39 FACTORY MODE
▶MARGIN ADJUST/L



**Code 45 NVRAM TUNE UP**

This mode is not used during normal operation, but is used when fine adjustment is required. This mode consists of five sub-modes.

<b>45</b>	<b>NVRAM TUNE UP</b>	
	45-1	LP TUNE UP: Laser Power
	45-2	THV TUNE UP: Transfer Voltage
	45-3	DBV TUNE UP: Developer Bias Voltage
	45-4	CBV TUNE UP: OPC belt voltage
45-5	FBV TUNE UP: Drum cleaner voltage	

**Code 45-1 LP TUNE UP**

This mode can be used when image density, line thickness and/or color reproduction must be adjusted. The adjustment changes the laser power against the reference value 0 (zero) in the range between -7 and +7.

1. Use the "Scroll" key and "Select" key to select "NVM TUNE UP/NVR" in "FACTORY MODE". Then, select "LP TUNE UP" in "NVM TUNE UP/NVR".

39 FACTORY MODE  
▶NVM TUNE UP/NVR

2. Press the "Select" key after selecting "LP TUNE UP" (no.1).

45 LP TUNE UP  
▲23456789ABCDEFGG

3. Press the "Select" key after selecting the color to be adjusted.

45 LP TUNE UP 0  
▶Y /M /C /K

4. Press the "Select" key after selecting a number.

**NOTE:** The value can be adjusted within 14 steps between -7 and +7.

45 YELLOW 0  
- < 7654321▲1 > +

5. Press the "Clear" key to return to the "LP TUNE UP" mode.

45 LP TUNE UP 0  
▶Y /M /C /K

6. Press the "Clear" key one more time to return to the "NVM TUNE UP" mode.

45 LP TUNE UP  
▲23456789ABCDEFGG

7. Press the "Clear" key one more time to return to "FACTORY MODE".

39 FACTORY MODE  
▶MARGIN ADJUST/L

**Code 45-2 THV TUNE UP**

This mode can be used when transfer voltage needs to be adjusted because of insufficient transfer to the paper. The adjustment changes the transfer voltage. There can be a different voltage for each paper type. The voltage can be adjusted in the range between -4 and +4 of the reference value (0).

1. Use the "Scroll" key and "Select" key to select "NVM TUNE UP/NVR" in "FACTORY MODE". Then, select "THV TUNE UP" in "NVM TUNE UP/NVR".

39 FACTORY MODE  
▶NVM TUNE UP/NVR

2. Press the "Select" key after selecting "THV TUNE UP" (no.2).

45 THV TUNE UP  
1▲3456789ABCDEFGG

3. Press the "Select" key after selecting the paper type.

**<SIMPLEX>**

PPC: Adjustment for the first side of plain paper.

OHP: Adjustment for OHP.

LENV: Adjustment for envelopes.

MTS: Adjustment for Label / Middle Thick Stock mode.

TS1: Adjustment for Thick Stock 1 (1/3 speed).

TS2: Adjustment for Thick Stock 2 (1/4 speed).

45 THV TUNE UP  
▶SIMPLEX /DUPLEX

**<DUPLEX>**

PPC: Adjustment for the second side of duplexing on plain paper.

MTS: Adjustment for the second side of duplexing on Label/Middle Thick Stock.

TS1: Adjustment for the second side of duplexing on Thick Stock 1.

TS2: Adjustment for the second side of duplexing on Thick Stock 2.

45 THV TUNE UP  
←▶PPC /OHP /ENV→

4. Press the "Select" key after selecting a number.

**NOTE:** The value can be adjusted within 8 steps between -4 and +4.

45 LP TUNE UP 0  
▶Y /M /C /K

5. Press the "Clear" key twice to return to the "THV TUNE UP" mode.

45 LP TUNE UP  
▲23456789ABCDEFGG

45 THV (PPC) 0  
- < 4321▲1234 > +

6. Press the "Clear" key once again to return to the "NVM TUNE UP" mode.

45 THV TUNE UP  
▶SIMPLEX /DUPLEX

7. Press the "Clear" key once again to return to "FACTORY MODE".

45 LP TUNE UP  
▲23456789ABCDEFGG

39 FACTORY MODE  
▶MARGIN ADJUST/L

Service Tables

**Code 45-3 DBV TUNE UP**

This mode can be used when image density needs to be adjusted. This adjusts the development bias voltage in the range between -7 and +7 of the reference value (0).

1. Use the "Scroll" key and "Select" key to select "NVM TUNE UP/NVR" in "FACTORY MODE". Then, select "DBV TUNE UP" in "NVM TUNE UP/NVR".

39 FACTORY MODE  
▶NVM TUNE UP/NVR

2. Press the "Select" key after selecting "DBV TUNE UP" (no.3).

45 DBV TUNE UP  
12▲456789ABCDEFG

3. Press the "Select" key after selecting the color to be adjusted.

45 LP TUNE UP 0  
▶Y /M /C /K

4. Press the "Select" key after selecting a given number.

**NOTE:** The value can be adjusted within 14 steps between -7 and +7.

45 YELLOW 0  
- < 7654321▲1 > +

5. Press the "Clear" key to return to the "DBV TUNE UP" mode.

45 DBV TUNE UP 0  
▶Y /M /C /K

6. Press the "Clear" key one more time to return to the "NVM TUNE UP" mode.

45 LP TUNE UP  
▲23456789ABCDEFG

7. Press the "Clear" key one more time to return to "FACTORY MODE".

39 FACTORY MODE  
▶MARGIN ADJUST/L

**Code 45-4 CBV TUNE UP**

This mode can be used when there are image problems caused by the OPC belt voltage. This mode adjusts the OPC belt bias voltage in the range between -4 and +4 of the reference value (zero).

- 1. Use the "Scroll" key and "Select" key to select "NVM TUNE UP/NVR" in "FACTORY MODE". Then, select "CBV TUNE UP" in "NVM TUNE UP/NVR".

```

39 FACTORY MODE
▶NVM TUNE UP/NVR

```

- 2. Press the "Select" key after selecting " CBV TUNE UP" (no.4).

```

45 CBV  TUNE UP
1234▲6789ABCDEFGG

```

- 3. Press the "Select" key after selecting a number.
 

**NOTE:** The value can be adjusted within 8 steps between -4 and +4.

```

45 CBV  TUNE UP  0
- < 4321▲1234 > +

```

- 4. Press the "Clear" key one more time to return to the "NVM TUNE UP" mode.

```

45 LP  TUNE UP
▲23456789ABCDEFGG

```

- 5. Press the "Clear" key one more time to return to "FACTORY MODE".

```

39 FACTORY MODE
▶MARGIN ADJUST/L

```



**Code 45-5 FBV TUNE UP**

This mode can be used when there are image problems caused by the voltages at the transfer drum. This mode adjusts the drum cleaner bias voltage in the range between -4 and +4 of the reference value (zero).

1. Use the "Scroll" key and "Select" key to select "NVM TUNE UP/NVR" in "FACTORY MODE". Then, select "FBV TUNE UP" in "NVM TUNE UP/NVR".

39 FACTORY MODE  
▶NVM TUNE UP/NVR

2. Press the "Select" key after selecting "FBV TUNE UP" (no.5).

45 FBV TUNE UP  
12345▲789ABCDEFGG

3. Press the "Select" key after selecting a number.  
**NOTE:** The value can be adjusted within 8 steps between -4 and +4.

45 FBV TUNE UP 0  
- < 4321▲1234 > +

4. Press the "Clear" key one more time to return to the "NVM TUNE UP" mode.

45 LP TUNE UP  
▲23456789ABCDEFGG

5. Press the "Clear" key one more time to return to "FACTORY MODE".

39 FACTORY MODE  
▶MARGIN ADJUST/L

**Code 46 NVRAM INITIAL**

Use this mode to initialize (clear) all the data in the NVRAM on the BCU. Also use this mode to execute NVRAM CLEAR to clear a SVC C3 error when it occurs.

<p><b>⚠ CAUTION</b></p> <p><b>NVRAM INITIAL is not used under normal circumstances. If you do this mode, you will lose all the data in NVRAM.</b></p> <p><b>Therefore, all the data in NVRAM should be stored prior to executing NVRAM INITIAL. Also, make a note of the settings in the list at the bottom of this page, because you must input these again after the NVRAM is cleared.</b></p>
--

1. Select "NVRAM INITIAL/T" in the "FACTORY MODE" menu, using the "Scroll" key.
2. Press the "Select" key.
3. Select "YES" using the "Scroll" key if you wish to do "NVRAM INITIAL". If not, select "NO".
4. Press the "Select" key to execute "NVRAM INITIAL".  
**NOTE:** ALL data in the NVRAM are cleared.
5. The display returns to "FACTORY MODE" after completing the "NVRAM INITIAL" mode.

<p>39 FACTORY MODE</p> <p>▶ NVRAM INITIAL/T</p>
---

<p>46 NVRAM INITIAL</p> <p>▶ YES /NO</p>
--

<p>39 FACTORY MODE</p> <p>▶ MARGIN ADJUST/L</p>
---

The following settings must be input after executing the "NVRAM INITIAL".

- 43: MARGIN ADJUST
- 44 LIFE PERIOD SET
- 45 NVRAM TUNE UP
- 47: TOTAL PAGE SET
- 48: EACH IMAGE SET
- 49: NEXT LIFE SET



**Code 47 TOTAL PAGE SET**

This mode is used to input the total number of pages in the NVRAM. Do this after executing "NVRAM INITIAL" or replacing the BCU.

1. Select "TOTAL PAGE SET" in the "FACTORY MODE" using the "Scroll" key.
2. Press the "Select" key.
3. Use the "Scroll" key to move the cursor, and use the "Select" key to input values at the blinking digit.
4. Use the "Scroll" key to move the cursor to "SET", and then press the "Select" key to store the set value.
5. The display returns to "FACTORY MODE" after completing the "TOTAL PAGE SET" mode.

39 FACTORY MODE  
▶TOTAL PAGE SET/

47 TOTAL PAGE  
XXXXXXp. SET

47 TOTAL PAGE  
XXXXXXp. ▶SET

39 FACTORY MODE  
▶MARGIN ADJUST/L

**Code 48 EACH IMAGE SET**

This mode is used to input the total number of pages of each color in the NVRAM. Do this after executing "NVRAM INITIAL" or replacing the BCU.

1. Select "EACH IMAGE SET" in the "FACTORY MODE" using the "Scroll" key.
2. Press the "Select" key.
3. Select the desired color.
4. Use the "Scroll" key to move the cursor, and use the "Select" key to input values to the blinking digit.
5. Use the "Scroll" key to move the cursor to "SET", and then press the "Select" key to store the set value.
6. The display returns to "EACH IMAGE SET".
7. Press the "Clear" key to return to "FACTORY MODE".

39 FACTORY MODE  
▶EACH IMAGE SET/

48 IMAGE OF  
▶Y /M /C /K

48 IMAGE OF Y  
XXXXXXp. SET

48 IMAGE OF Y  
XXXXXXp. ▶SET

39 FACTORY MODE  
▶MARGIN ADJUST/L

**Code 49 NEXT LIFE SET**

This mode sets the replacement timing (number of prints) for the PM parts.

1. Select "NEXT LIFE SET" in the "FACTORY MODE" using the "Scroll" key.
2. Press the "Select" key.
3. Press the "Select" key after selecting a code.  
 1~6, B, C, F, G: Not used  
 7: Belt Cartridge (BL)  
 8: Fusing Unit (FU)  
 9: Drum Cleaner/ Transfer Roller (TR)  
 A: Transfer Belt (120K)  
 D: Paper Feed Roller (PICK ROL)  
 E: Paper Feed Roller (PICK LFU)
4. Use the "Scroll" key to move the cursor, and use the "Select" key to input a value at the blinking digit.
5. Use the "Scroll" key to move the cursor to "SET", and then press the "Select" key to store the set value.
6. The display returns to "NEXT LIFE SET".
7. Press the "Clear" key to return to "FACTORY MODE".

```

39 FACTORY MODE
▶NEXT LIFE SET/T
  
```

```

49 NEXT LIFE SET
123456*:89ABCDEFG
  
```

```

NEXT BL UNIT ?
XXXXXXp. SET
  
```

```

NEXT BL UNIT ?
XXXXXXp. ▶SET
  
```

```

49 NEXT LIFE SET
*:23456789ABCDEFG
  
```

```

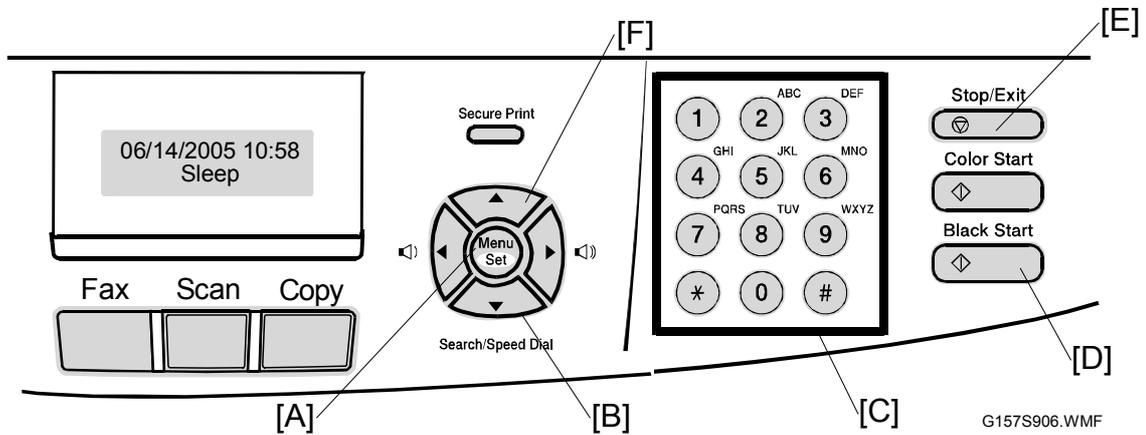
39 FACTORY MODE
▶MARGIN ADJUST/L
  
```



## 5.2 MAINTENANCE MODE

### 5.2.1 OPERATING MAINTENANCE MODE

#### *Activating Service Mode*



[A]: Menu/ Set key

[D]: Black Start key

[B]: Down key

[E]: Stop/ Exit key

[C]: Number keys

[F]: Up key

1. Press the "Menu/Set" key [A], "Black Start" key [D] and "Up" key [F] four times consecutively.
2. "■■Maintenance■■" shows in the LCD.

#### *Selecting a Service Program*

Input the function mode number with the "Number keys" [C] or press the "Up" key [F] and "Down" key [B] in the "Maintenance" mode.

#### *Exiting Function Mode*

Press the "Stop/Exit" key [D] to exit the function mode.

#### *Exiting Service Mode*

Input "99" with the "Number keys" or select "Maintenance 99" with the "Up" key and "Down" key in the "Maintenance" mode.

## 5.2.2 MAINTENANCE MODE FUNCTIONS

Function Mode No.	Function	Note
01	EEPROM Parameter Initialization	
05	Printout of Scanning Compensation Data	
06	Placement of CIS Unit Position for Transportation	User accessible
08	ADF Performance Test	
09	Test Pattern 1	User accessible
10	Firmware Switch Setting	User accessible
11	Printout of Firmware Switch Data	User accessible
12	Operational Check of the LCD	User accessible
13	Operational Check of the Operation Panel PCB	
32	Sensor Operational Check	
52	EEPROM Customizing (Entering the country code for Europe/Oceania.)	User accessible
53	Received Data Transfer Function	User accessible
54	Fine Adjustment of Scan Start/End Positions	User accessible
55	Acquisition of White Level Data and CIS Scanner Area Setting	
67	Paper Feed and Ejection Test	
74	EEPROM Customizing (Direct entering of the four-digit code.)	
80	Display of the Equipment's Log Information	User accessible
82	Machine Error Code Indication	User accessible
87	Output of Transmission Log to the Telephone Line	User accessible
91	EEPROM Parameter Initialization	
99	Exit from the Maintenance Mode	
-	Cancellation of the Memory Security Mode	

**NOTE:** The shaded functions can be accessed by users.



### 5.2.3 DETAILED DESCRIPTIONS OF MAINTENANCE MODE FUNCTIONS

#### ***EEPROM Parameter Initialization (Function mode 01 or 91)***

The machine initializes the parameters, user switches and firmware switches registered in the EEPROM, to the initial values. Entering the function mode "01" initializes all of the EEPROM areas, but entering "91" does not initialize some areas, as listed below.

Data item	Function Mode	
	01	91
Maintenance mode functions User switches Firmware switches	All of these will be initialized.	These will be initialized.
Remote activation code		These will not be initialized.
Station ID data Outside line number Telephone function registration One-touch dialing Speed dialing Group dialing		These will not be initialized.

**NOTE:** If you replace the controller board with one that was used in another machine, carry out this procedure, and then customize the EEPROM (with the maintenance mode function "74").

1. Enter the "Maintenance" mode.
2. Press "0" then "1", or press "9" then "1".
3. "PARAMETER INIT" appears on the LCD.
4. After the machine initializes the parameters, the machine returns to the initial display of the maintenance mode.
5. Turn the machine power off and on.

**NOTE:** If you press the "9" key twice to exit from the maintenance mode without turning the machine power off, the machine will not fully initialize the EEPROM.

**Printout of Scanning Compensation Data (Function mode 05)**

The machine prints out the white and black level data for scanning compensation.

**⚠ IMPORTANT**

**Always do a scanning operation before you do this function. This function cannot print out correct scanning compensation data if scanner initialization is not done first. This is because the scanner initializes white and black level data during initialization, and this is included in the scanning compensation reference data.**

1. Enter the "Maintenance" mode.
2. Press "0" then "5".
3. "WHITE LEVEL 1" appears on the LCD.
4. The machine prints out the scanning compensation data list. This contains the following:

a)	Black/white data graph	1 Byte
b)	Bright output adjustment value (REFH-PWM)	1 Byte
c)	Illuminant adjustment value (LED-DATA: R)	1 Byte
d)	Illuminant adjustment value (LED-DATA: G)	1 Byte
e)	Illuminant adjustment value (LED-DATA: B)	1 Byte
f)	Black level MIN data	1 Byte
g)	Black level MAX data	1 Byte
h)	White level MIN data (R)	1 Byte
i)	White level MIN data (G)	1 Byte
j)	White level MIN data (B)	1 Byte
k)	White level MAX data (R)	1 Byte
l)	White level MAX data (G)	1 Byte
m)	White level MAX data (B)	1 Byte
n)	Background color compensated data	1 Byte
o)	Black level data	4960 Byte
p)	White level data (R)	4960 Byte
q)	White level data (G)	4960 Byte
r)	White level data (B)	4960 Byte

Service Tables

5. After printing, the machine returns to the initial display of the maintenance mode.

**NOTE:** If any data is abnormal, its mode will be printed in inline style (white on black, for example:  ).

***Placement of CIS Unit Position for Transportation (Function mode 06)***

This function moves the CIS unit into position for transportation. This is at the right end. You must do this function before packing and shipping the machine.

**NOTE:** Please instruct end users to do this function if possible before packing and shipping the machine to a sales agent or a service dealer for repair.

1. Enter the "Maintenance" mode.
2. Press "0" then "6" keys. The CIS unit moves to the position for transportation located at the right end.
3. "MAINTENANCE 06" is displayed until the CIS unit is placed in position.
4. "SCAN LOCKED" appears on the LCD when the CIS unit is placed in the transportation position.
5. Open the document cover, and lock the scanner lock lever at the rear left of the scanner unit.
6. "SCAN LOCKED" appears when the scanner lock lever is locked.
7. Press the "Stop/Exit" key to terminate this operation.
8. The machine returns to the initial display of the maintenance mode.

***ADF Performance Test (Function mode 08)***

The machine counts the documents fed by the automatic document feeder (ADF) and displays the count on the LCD to check the ADF performance.

1. Set some originals. (Allowable up to the ADF capacity.)
2. "DOC. READY" appears on the LCD.
3. Press the "0" and "8" keys in this order.
4. While counting the documents, the machine feeds them in and out, displaying the current count on the LCD as shown below. "P.xx" indicates the current count.

ADF CHECK	P.xx
-----------	------

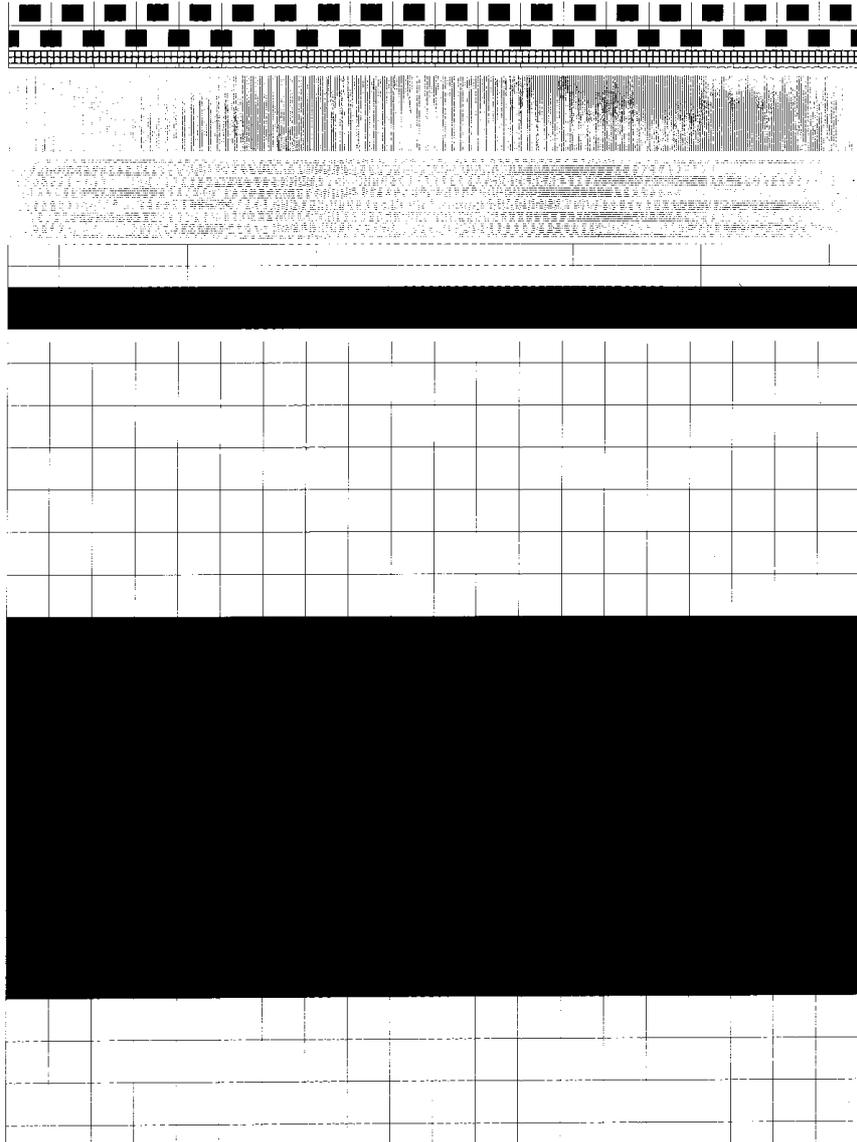
5. Press the "Stop/Exit" key to return the machine to the initial display of the maintenance mode.

**Test Pattern 1 (Function mode 09)**

This function, much like the copying function, prints out test pattern 1 to allow the service personnel to check for print quality problems.

1. Press the "0" and "9" keys in this order.

**NOTE:** The diagram below shows the test pattern.



Service  
Tables

**Firmware switch setting (Function mode 10)**

The machine has the following firmware switch functions, which may be activated using the operation panel. The firmware switches have been set at the factory to comply with the communications standards of each country. Do not adjust them unless it is necessary. For details about these switches, refer to the 5.2.4 "Firmware Switches".

**Firmware Switches (WSW01 through WAW60)**

WSW No.	Function	WSW No.	Function
WSW01	Dial pulse setting	WSW28	Function setting 6
WSW02	Tone signal setting	WSW29	Function setting 7
WSW03	PABX mode setting	WSW30	Function setting 8
WSW04	TRANSFER facility setting	WSW31	Function setting 9
WSW05	1st dial tone and busy tone detection	WSW32	Function setting 10
WSW06	<b>Redial/Pause</b> key setting and 2nd dial tone detection	WSW33	Function setting 11
WSW07	Dial tone setting 1	WSW34	Function setting 12
WSW08	Dial tone setting 2	WSW35	Function setting 13
WSW09	Protocol definition 1	WSW36	Function setting 14
WSW10	Protocol definition 2	WSW37	Function setting 15
WSW11	Busy tone setting	WSW38	V.34 transmission settings
WSW12	Signal detection condition setting	WSW39	V.34 transmission speed
WSW13	Modem setting	WSW40	V.34 modem settings
WSW14	AUTO ANS facility setting	WSW41	ON-duration of the scanning light source
WSW15	REDIAL facility setting	WSW42	Internet mail settings
WSW16	Function setting 1	WSW43	Function setting 21
WSW17	Function setting 2	WSW44	Speeding up scanning-1
WSW18	Function setting 3	WSW45	Speeding up scanning-2
WSW19	Transmission speed setting	WSW46	Monitor of power ON/OFF state and parallel port kept at high
WSW20	Overseas communications mode setting	WSW47	Switching between high- and full-speed USB
WSW21	TAD setting 1	WSW48	USB setup latency
WSW22	ECM and call waiting caller ID	WSW49	End-of-copying beep and print in black
WSW23	Communications setting	WSW50	SDAA settings
WSW24	TAD setting 2	WSW51	Function setting 16
WSW25	TAD setting 3	WSW52	Not used
WSW26	Function setting 4	WSW53	Function setting 17
WSW27	Function setting 5	WSW54-60	Not used

1. Enter the "Maintenance" mode.
2. Press the "1" and "0" keys in this order.
3. The machine displays "WSW00" on the LCD and is ready to accept a firmware switch number.

4. Enter the desired number from the firmware switch numbers (01 through 53).
5. The display shown below appears on the LCD.

Selector 1      Selector 8  
    ↓            ↓  
WSWxx=00000000

6. Use the "◀" and "▶" keys to move the cursor to the digit that you wish to modify.
7. Enter 0 or 1 using the "0" and "1" keys.
8. Press the "Menu/Set key". This operation saves the newly entered values to the EEPROM and prepares the machine to accept another firmware switch number.
9. Repeat the procedure until all desired modifications to the firmware switches is completed.
10. Press the "Stop/Exit" key to return the machine to the initial display of the maintenance mode.

- NOTE:** 1) To cancel this operation and return the machine to the initial display of the maintenance mode during the above procedure, press the "Stop/Exit key".
- 2) If there is a pause of more than one minute after a single-digit number is entered for double-digit firmware switch numbers, the machine will automatically return to the initial display of the maintenance mode.

**Printout of firmware switch data (Function mode 11)**

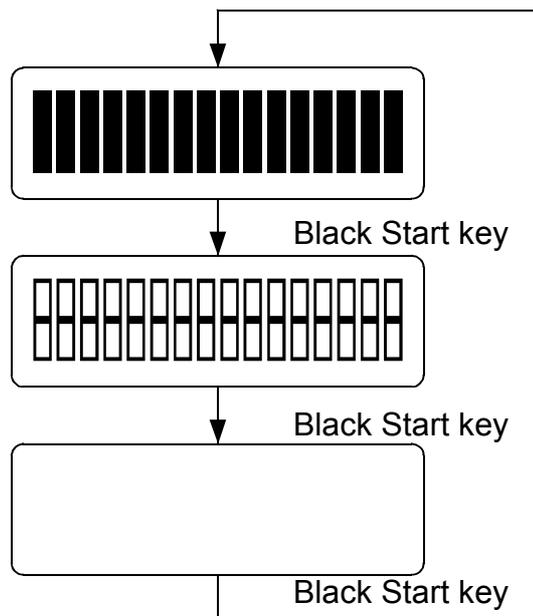
The machine prints out the settings of the firmware switches.

1. Enter the "Maintenance" mode.
2. Press the "1" key two times.
3. "PRINTING" appears on the LCD.
4. The machine prints out the configuration list.
5. After printing, the machine returns to the initial display of the maintenance mode.

**Operation Check of the LCD (Function mode 12)**

This function allows you to check if the LCD on the operation panel works normally.

1. Enter the "Maintenance" mode.
2. Press the "1" and "2" keys in this order.
3. The LCD changes as shown in the diagram.
4. Press the Black Start key. Each time you press the Black Start key, the LCD cycles through the displays shown at right.
5. Press the Stop/Exit key to return to the initial display of the maintenance mode.



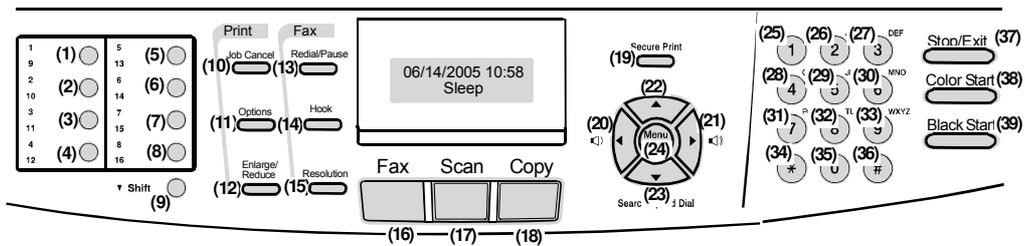
G157S907.WMF

**Operational Check of the Operation Panel PCB (Function mode 13)**

This function allows you to check if the operation panel PCB is working correctly.

1. Enter the "Maintenance" mode.
2. Press the "1" and "3" keys in this order.
3. "00 " will appear on the LCD.
4. Press the keys and buttons in the order shown in the illustration below.
5. The LCD shows the corresponding number in decimal notation each time a key or button is pressed. Check that the displayed number is correct by referring to the illustration below.

**NOTE:** If a key or button is pressed out of order, the machine beeps and displays "INVALID OPERATE" on the LCD. To make the machine ready again to accept key & button entry for operational check, press the "Stop/Exit key".



G157S909.WMF

6. The machine beeps for one second and returns to the initial display of the maintenance mode after the last number key or button is pressed.
7. Press the "Stop/Exit" key to terminate this operation.
8. The machine returns to the initial display of the maintenance mode.

Service Tables

**Sensor Operational Check (Function mode 32)**

This function allows you to check if the sensors work properly.

1. Enter the "Maintenance" mode.
2. Press the "3" and "2" keys in this order.
3. To test the speaker, the machine makes the following sequence of 1100 Hz and 400 Hz tones at different volumes, as shown below.  
 400 Hz: Low → Middle → High → OFF → 1100 Hz: Low → Middle → High → OFF → 400 Hz: Low → Continuous beeping.
4. Press the "Menu/Set" key to stop beeping.
5. If the sensor status are the same as listed in the table below, the LCD will show the following: "DFDRFCCVTORC", "C1P1C2P2RMRAPO" and "CCMCYCKCFUOBORTR" (to switch between each of these three, press the "Black Start" key.)

**NOTE:** If the optional paper tray unit has not been installed in the machine, "\*\*\*\*\*" shows instead of "C2P2".

The table below shows the relationship between the LCD indication, sensor name, and sensor status.

LCD	Sensors	Sensor status
DF	Document leading edge sensor	No document detected.
DR	Document trailing edge sensor	No document detected.
FC	Document cover open sensor	Document cover closed.
CV	Front cover open sensor	Front cover closed.
TC	Top cover open sensor	Top cover closed.
RC	Rear cover open sensor	Rear cover closed.
C1	Tray 1 cassette open sensor	Tray 1 closed.
P1	Tray 1 paper sensor	Paper detected.
C2	Tray 2 cassette open sensor	Tray 2 closed.
P2	Tray 2 paper sensor	Paper detected.
RM	Registration front sensor	No paper detected.
RS	Registration rear sensor	No paper detected.
PO	Paper ejection sensor	No paper jam.
CC	Cyan cartridge sensor	Cyan cartridge loaded.
MC	Magenta cartridge sensor	Magenta cartridge loaded.
YC	Yellow cartridge sensor	Yellow cartridge loaded.
KC	Black cartridge sensor	Black cartridge loaded.
FU	Fusing unit sensor	No fusing unit detected.
OB	OPC belt sensor	No OPC belt detected.
OR	OPC roller sensor	No OPC roller detected.
TR	Transfer roller sensor	No transfer roller detected.

6. Change the condition of the machine to check if the indication on the LCD changes.

**NOTE:** For instance, insert paper through the document front (or rear) sensor or the registration sensor (s), open the front cover or the document cover, remove the toner cartridge, put some paper at the paper outlet, insert paper from the manual feeder, load a paper tray, etc.

7. Press the "Stop/Exit key". The machine beeps for one second and returns to the initial display of the maintenance mode.

**NOTE:** If you have opened and closed the front cover during the above procedure, you must open and close the front cover again after you complete the procedure.

### ***EEPROM Customizing (Entering of the country code for Europe/Oceania.) (Function code 52)***

**NOTE:** This function is available only for the Oceania and Europe versions and is enabled only when a country code for Europe or Oceania is entered in Function code 74.

This function allows the user to change the country code if the country code for Europe or Oceania is entered.

1. Enter the "Maintenance" mode.
2. Press the "5" and "2" keys in this order.
3. "SET COUNTRY" and "PRESS SET KEY" appear alternately on the LCD.
4. Press the "Menu/Set key".

**NOTE:** 1) Oceania version:

"AUSTRALIA" and "SELECT ↑↓ & SET" appear alternately.

2) Europe version:

"U.K" and "SELECT ↑↓ & SET" appear alternately.

5. Use the "▲" and "▼" keys to select the target country.
6. Press the "Menu/Set key". The machine displays "ACCEPTED" on the LCD and goes back to standby mode.

***Received Data Transfer Function (Function mode 53)***

This function transfers received fax data to another machine. It is useful when the machine cannot print received data because the copier is not working.

**NOTE:** 1) The number of files that can be transferred at a time is 99. To transfer 100 files or more, carry out the following procedure more than one time.  
2) If there are both color and monochrome data in a file to be transferred, the monochrome data will be transferred first. If the receiver machine does not support the color function, the sender machine cannot transfer color data, resulting in an error.

1. Enter the "Maintenance" mode.
2. Press the "5" and "3" keys in this order.
3. "FAX TRANSFER" appears on the LCD.
4. Press one of the keys "1" to "5" to execute the following functions.
  - 1) To check the number of received files. "1.NO OF JOBS" appears.
    - a) Press the "Menu/Set" key.
    - b) The number of received files appears on the LCD.  
**NOTE:** This function is used only for checking the number of files.
  - 2) To transfer the activity report only. "2.ACTIVITY" appears.
  - 3) To transfer received files (together with the activity report).  
"3.DOCUMENTS" appears.
  - 4) To transfer the communication list for the latest communication.  
"4.COM.LIST (NEW)" appears.
  - 5) To transfer the communication list for last three errors.  
"5.COM.LIST (ERR3)" appears.
5. Press the "Menu/Set" key while "1.NO OF JOBS", "2.ACTIVITY," "3.DOCUMENTS," "4.COM.LIST (NEW)," or "5.COM.LIST (ERR3)" is displayed.
6. "ENTER NO. &SET" appears.
7. Enter the telephone number of the receiver machine and press the "Menu/Set" key again.

**NOTE:** Input the telephone number with the numerical keys. One-touch dialing is not allowed in this procedure. The machine displays "ACCEPTED" for approx. two seconds and starts dialing to transfer the data. No station ID will be attached. A cover page and end page will be automatically attached, instead.

***Fine Adjustment of Scan Start Position (Function mode 54)***

This function is to adjust the scan start position.

1. Enter the "Maintenance" mode.
2. Press the "5" and "4" keys in this order.
3. "SCAN START ADJ." appears on the LCD.
4. "1. ADF 2. FB" appears.
5. Select the device that needs an adjustment to the start position.
  - 1) "1": To adjust the start position of the ADF.
  - 2) "2": To adjust the start position for flat-bed scanning (FB: Flat Bed).
6. Press the "1" or "2" key to display the present adjustment value for the start position. The value can be adjusted in 11 steps from +5 to -5 (mm).
7. Press the "◀" key to increase the value, and the "▶" key to decrease it.
8. Press the "Stop/Exit" key to return the machine to the initial display of the maintenance mode without adjusting the value.
9. Press the "Menu/Set" key.
10. "ACCEPTED" appears on the LCD. One second later, the machine indicates "1. ADF 2. FB" on the LCD.

***Acquisition of White Level Data and CIS Scanner Area Setting  
(Function mode 55)***

This function allows the machine to obtain white level data for the CIS scanner and save it together with the CIS scanner area into the EEPROM on the controller board.

1. Enter the "Maintenance" mode.
2. Press the "5" key two times.
3. "SCANNER AREA SET" appears on the LCD. The machine automatically obtains white level data.
4. The machine returns to the initial display of the maintenance mode if this operation completes normally.

**NOTE:** "SCANNER ERROR" appears on the LCD if an error is detected. Press the "Stop/Exit" key to return the machine to the initial display of the maintenance mode.

***Paper Feed and Ejection Test (Function mode 67)***

This function allows you to check that a sheet of paper is fed and ejected correctly. During this test, paper is fed in, a 1-cm grid pattern is printed, and the page is fed out.

1. Enter the "Maintenance" mode.
2. Press the "6" and "7" keys in this order.
3. "SELECT TRAY1" appears on the LCD.
4. Choose "Tray1" or "Tray2" by pressing the "◀" or "▶" key.
5. The test printing starts and the grid pattern is printed.
6. Press the Stop/Exit key to return the machine to the initial display of the maintenance mode.

**NOTE:** If the front cover is opened, or if there is no paper in the tray during the test printing, the test printing is stopped.

***EEPROM Customizing (Function mode 74)***

This function allows you to customize the EEPROM according to language, function settings, and firmware switch settings. The customizing code list is given below.

Destination	Code No.
USA	0001
Europe	0054
Oceania	0056
Asia	0040

**NOTE:** If you replace the controller board, make sure to carry out this procedure.

1. Enter the "Maintenance" mode.
2. Press the "7" and "4" keys in this order.
3. The current customizing code (e.g., 0001 for the U.S.A model) appears.
4. Enter the desired customizing code (e.g., 0054 for the Europe model).
5. The newly entered code appears.

**NOTE:** The machine does not work properly when an incorrect code is entered.

6. Press the "Black Start" key for the machine to save the setting.
7. "PARAMETER INIT" appears on the LCD. The machine returns to the initial display of the maintenance mode.

**NOTE:** If you press the "Stop/Exit" key or no keys are pressed for one minute during the above procedure, the machine stops the procedure and returns to the initial display of the maintenance mode.

***Display of the Equipment's Log Information (Function mode 80)***

This displays the machine's log information on the LCD.

1. Enter the "Maintenance" mode.
2. Press the "8" and "0" keys in this order.
3. The USB serial number appears on the LCD.
4. Press the "Black Start" key. Each time the "Black Start" key is pressed, one of the following log information items appears on the LCD in the order given below.
  - 1) USB serial number
  - 2) Page count, indicating how many pages the OPC drum has printed.
  - 3) Total page count, indicating how many pages the machine has printed since it was produced.
  - 4) Toner change count, indicating how many times toner has been replaced.
  - 5) Copy page count, indicating how many copies have been made.
  - 6) PC print page count, indicating how many pages the machine has printed as an output device for a PC.
  - 7) Fax page count, indicating how many received fax pages have been printed.
  - 8) ADF jam count, indicating how many times a document jam has occurred.
  - 9) ADF page count, indicating how many documents have been fed.
  - 10) Error code of the most recent machine error  **NOTE:** 1)
  - 11) Error code of the most recent communications error  **NOTE:** 2)
5. To stop this operation and return the machine to the initial display of the maintenance mode, press the "Stop/Exit" key.

- NOTE:** 1) If you press the "Menu/Set" key while a "MACHINE ERR" error code is displayed, the last error code is displayed. Each time the "Menu/Set" key is pressed, up to the ten most recent error codes are displayed one by one in reverse order.
- 2) If you press the "Menu/Set" key while a "COMEER1" error is displayed, the last error, the previous error, and the second previous error are displayed in turn. The indication changes from "COMEER1", "COMEER2", to "COMEER3".

<b>Equipment Log</b>	<b>Description</b>
USB:	USB Serial No.
CCOVERAGE:	Average cyan color coverage
MCOVERAGE:	Average magenta color coverage
YCOVERAGE:	Average yellow color coverage
KCOVERAGE:	Average black color coverage
TTL_PG:	Total number of pages printed
TTL_CI:	Total number of cyan color pages printed
TTL_MI:	Total number of magenta color pages printed
TTL_YI:	Total number of yellow color pages printed
TTL_KI:	Total number of black color pages printed
TR1_PG:	Number of pages picked up from paper tray 1
TR2_PG:	Number of pages picked up from paper tray 2
COPY:	Number of copies made
PC PRINT:	Number of PC prints made
FAX:	Number of fax outputs made
A4:	Number of A4 size sheets picked up
LTR:	Number of Letter size sheets picked up
LG:	Number of Legal size sheets picked up
B5:	Number of B5 size sheets picked up
JISB5:	Number of B5 size sheets picked up
EXE:	Number of Executive size sheets picked up
COM10:	Number of B5 size sheets picked up
DL:	Number of B5 size sheets picked up
PCARD:	Number of B5 size sheets picked up
OTHER:	Number of other-size sheets picked up
CTNR_CH:	Number of times the cyan color toner cartridge has been replaced
CTNR_IMG1:	Number of pages printed with the current cyan color toner cartridge
CTNR_IMG2:	Number of pages printed with the previous cyan color toner cartridge
MTNR_CH:	Number of times the magenta color toner cartridge has been replaced
MTNR_IMG1:	Number of pages printed with the current magenta color toner cartridge
MTNR_IMG2:	Number of pages printed with the previous magenta color toner cartridge
YTNR_CH:	Number of times the yellow color toner cartridge has been replaced
YTNR_IMG1:	Number of pages printed with the current yellow color toner cartridge
YTNR_IMG2:	Number of pages printed with the previous yellow color toner cartridge
KTNR_CH:	Number of times the black color toner cartridge has been replaced
KTNR_IMG1:	Number of pages printed with the current black color toner cartridge
KTNR_IMG2:	Number of pages printed with the previous black color toner cartridge
OPCB_CH:	Number of times the OPC belt has been replaced
FSRU_CH:	Number of times the fusing unit has been replaced
120K_CH:	Number of times the 120K kit has been replaced
PFK2_CH:	Number of times the paper feed rollers have been replaced

<b>Equipment Log</b>	<b>Description</b>
WTNR_CH:	Number of times the waste toner cartridge has been replaced
WTNR_PG:	Number of pages printed since the most recent time that the waste toner cartridge was replaced
TTL_JAM:	Total number of jams
POSA1_JAM:	Number of jams at position A1
POSA2_JAM:	Number of jams at position A2
POSB_JAM:	Number of jams at position B
POSC_JAM:	Number of jams at position C
ADF_JAM:	Number of document jams that occurred at the ADF
ADF_PG:	Number of scanned pages from the ADF
FB_PG:	Number of scanned pages from the flat-bed scanner
MACHINEERR_ 01 to 10:	Last machine error code 01 to 10
COMERR1 to 3:	Last communication error code 1 to 3

***Machine Error Code Indication (Function mode 82)***

This function displays the last error on the LCD.

1. Enter the "Maintenance" mode.
2. Press the "8" and "2" keys in this order.
3. The LCD shows "MACHINE ERRORXX."
4. Press the "Stop/Exit" key to return to the initial display of the maintenance mode.

***Output of Transmission Log to the Telephone Line (Function mode 87)***

This function outputs the transmission log (that the machine has stored about the latest transmission) to the telephone line. It allows the service personnel to receive the transmission log of the user's machine at a remote location and use it for analyzing problems arising in the user's machine.

1. If the user's machine has a transmission-related problem, call the user's machine at a remote location from your machine.
2. If the line is connected, ask the user to do the following:
  - 1) Pick up the external phone.
  - 2) Press the "Menu/Set", "Black Start", "Menu/Set" keys in this order.
  - 3) Press the "8" and "7" keys. The above operation makes the user's machine send "CNG" to your machine.
3. Press the "Black Start" key of your machine if you hear the "CNG" sent from the user's machine.
4. Your machine starts to receive the transmission log from the user's machine.

***Cancellation of the Memory Security Mode  
(Not applicable to the Japanese model)***

This procedure can cancel the memory security mode. Use this procedure if the user forgets his/her password for memory security mode.

**NOTE:** Carrying out this procedure will lose passwords previously entered but retains fax messages that were received in the memory security mode. After you do this procedure, the user should print these messages, then store a new password.

1. When "SECURE MODE" is displayed on the LCD, press the "Menu/Set" key and "#" key together.
2. Within two seconds, start to press the "2", "7", "9", "0" and "0" keys.
3. The memory security mode is canceled and the machine returns to the calendar clock screen.

### 5.2.4 FIRMWARE SWITCHES

#### *WSW01 (Dial pulse setting)*

Selector No.	Function	Setting and Specifications
1, 2	Dial pulse generation mode	No. 1. 2. 0 0: N 0 1: N+1 1 0: 10-N 1 1: N
3, 4	Break time length in pulse dialing	No. 3. 4. 0 0: 60 ms 0 1: 67 ms 1 0: 40 ms (for 16 PPS) 1 1: 64 ms (at 106 ms interval)
5, 6	Inter-digit pause	No. 5. 6. 0 0: 800 ms 0 1: 850 ms 1 0: 950 ms 1 1: 600 ms
7	Switching between pulse (DP) and tone (PB) dialing by the function switch	0: Yes      1: No
8	Default dialing mode, pulse (DP) or tone (PB) dialing	0: PB      1: DP

#### *Selectors 1 and 2: Dial pulse generation mode*

These selectors set the number of pulses to be generated in pulse dialing.

N: Dialing "N" generates "N" pulses. (Dialing "0" generates 10 pulses.)

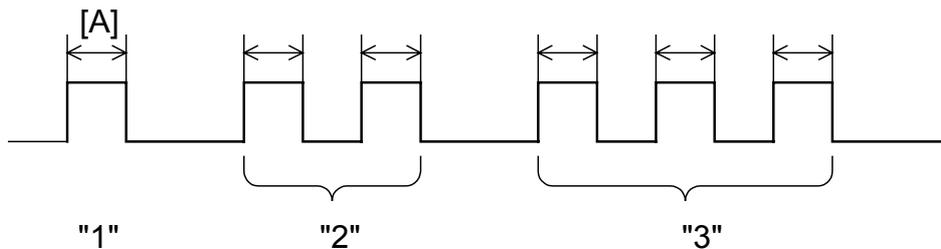
N + 1: Dialing "N" generates "N + 1" pulses.

10 - N: Dialing "N" generates "10 - N" pulses.

#### *Selectors 3 and 4: Break time length in pulse dialing*

These selectors set the break time [A] length in pulse dialing.

(Example: If "1," "2," and "3" are dialed when N is set by selectors 1 and 2.)

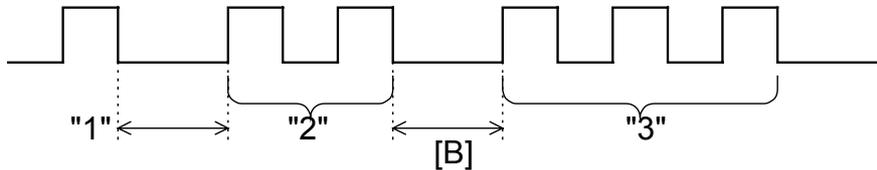


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***Selectors 5 and 6: Inter-digit pause***

These selectors set the inter-digit pause [B] in pulse dialing.

(Example: If "1," "2," and "3" are dialed when N is set by selectors 1 and 2.)



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***Selector 7: Switching between pulse (DP) and tone (PB) dialing, by the function switch***

This selector determines whether the dialing mode can be switched between the pulse (DP) or not and tone (PB) dialing by using the function switch.

***Selector 8: Default dialing mode, pulse (DP) or tone (PB) dialing***

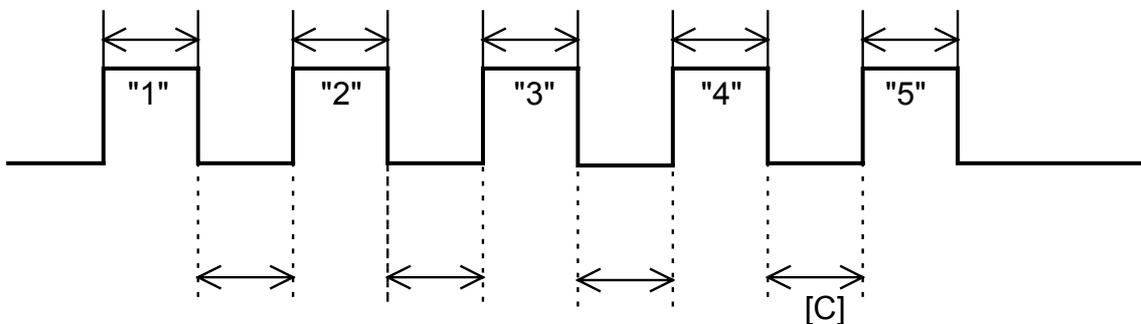
This selector sets the default dialing mode (pulse dialing or tone dialing) which can be changed by the function switch. If the user switches it with the function switch when selector 7 is set to "0," the setting specified by this selector will also be switched automatically.

**WSW02 (Tone signal setting)**

Selector No.	Function	Setting and Specifications
1, 2	Tone signal transmission time length	No. 1. 2. 0 0: 70 ms 0 1: 80 ms 1 0: 90 ms 1 1: 100 ms
3, 4	Min. pause in tone dialing	No. 3. 4. 0 0: 70 ms 0 1: 80 ms 1 0: 90 ms 1 1: 140 ms
5-8	Attenuator for pseudo ring backtone to the line (selectable in the range of 0-15 dB, in 1 dB increments)	No.5 0: 0 dB 1: 8 dB No.6 0: 0 dB 1: 4 dB No.7 0: 0 dB 1: 2 dB No.8 0: 0 dB 1: 1 dB

**Selectors 1 through 4: Tone signal transmission time length and Min. pause in tone dialing**

These selectors set the tone signal transmission time length and minimum pause [C] in tone dialing.  
 (Example: If "1," "2," "3," "4," and "5" are dialed.)



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**Selectors 5 through 8: Attenuator for pseudo ring backtone to the line**

These selectors are used to adjust the sound volume of a ring backtone in the F/T mode, an on-hold sound, or a beep generated as a signal during remote control operation or at the start of ICM recording. The larger the value specified by these selectors, the greater the attenuation.

**WSW03 (PABX\* mode setting)**

Selector No.	Function	Setting and Specifications
1, 5	CNG detection when sharing a modular wall socket with a telephone	No. 1. 5. 0 0: 0.5 cycle 0 1: 1.0 cycle 1 0: 1.5 cycle 1 1: 2.0 cycle
2-4	Detection time length of PABX* dial tone, required for starting dialing	(Not used.)
6, 7	Dial tone detection in PABX* (Private Automatic Branch Exchange)	(Not used.)
8	Not used.	

**NOTE:** Selectors 2 through 4, 6 and 7 are not applicable where no PABX is installed.

***Selectors 1 and 5: CNG detection when sharing a modular wall socket with a telephone***

These selectors determine whether or not the machine detects a CNG signal when a line is connected to a telephone sharing a modular wall socket with the machine. Upon detection of CNG signals by the number of cycles specified by these selectors, the machine interprets CNG as an effective signal and then starts FAX reception.

***Selectors 2 through 4: Detection time length of PABX dial tone, required for starting dialing (Not used.)***

Upon detection of the PABX dial tone for the time length set by these selectors, the machine starts dialing. These selectors are effective only when both selectors 6 and 7 are set to "1" (Detection).

***Selectors 6 and 7: Dial tone detection in PABX (Not used.)***

These selectors activate or deactivate the dial tone detection function which detects a dial tone when a line is connected to the PABX. Setting both of these selectors to "1" activates the dial tone detection function so that the machine starts dialing upon detection of a dial tone when a line is connected. Other setting combinations deactivate the dial tone detection function so that the machine starts dialing after the specified WAIT (3.5, 5.0, or 7.0 sec.) without detection of a dial tone when a line is connected.

**WSW04 (TRANSFER facility setting)**

Selector No.	Function	Setting and Specifications
1	Earth function in transfer facility	(Not used.)
2, 3	Dual tone detection frequency in ICM recording	No. 2. 3. 0 0: 350 and 440 Hz 0 1: 440 and 480 Hz 1 0: 480 and 620 Hz 1 1: 480 and 620 Hz
4	Dual tone detection sensitivity in ICM recording	0: Normal 1: High
5, 6	Earth time length for earth function	No. 5. 6. 0 0: 200 ms 0 1: 300 ms 1 0: 500 ms 1 1: 700 ms
7, 8	Break time length for flash function	No. 7. 8. 0 0: 80 ms 0 1: 110 ms 1 0: 250 ms 1 1: 500 ms

- NOTE:** 1) Selectors 1 and 5 through 8 are not applicable in those countries where no transfer facility is supported.  
 2) Selectors 2 through 4 are applicable to models equipped with built-in TADs.

***Selector 1: Earth function in transfer facility (Not used.)***

This selector determines whether or not the earth function is added to the transfer setting menu to be accessed by the function switch.

***Selectors 2 and 3: Dual tone detection frequency in ICM recording***

If the machine detects either of the frequencies set by these selectors in ICM recording, it disconnects the line. For example, if these selectors are set to "0, 0," the machine disconnects the line upon detection of 350 Hz or 440 Hz.

***Selector 4: Dual tone detection sensitivity in ICM recording***

Setting this selector to "1" increases the tone detection sensitivity in ICM recording.

***Selectors 5 and 6: Earth time length for earth function (Not used.)***

These selectors set the short-circuiting time length of the telephone line (La or Lb) to ground. This setting is effective only when the earth function is selected for the R key by using the function switch.

***Selectors 7 and 8: Break time length for flash function***

These selectors set the break time length.

This setting is effective only when the flash function is selected for the Search/Speed Dial key by using the function switch.

**WSW05 (1st dial tone and busy tone detection)**

Selector No.	Function	Setting and Specifications																																													
1-3	1st dial tone detection	<table border="0"> <tr> <td>No.</td> <td>1.</td> <td>2.</td> <td>3.</td> <td></td> </tr> <tr> <td></td> <td>0</td> <td>0</td> <td>0:</td> <td>3.5 sec. WAIT</td> </tr> <tr> <td></td> <td>0</td> <td>0</td> <td>1:</td> <td>7.0 sec. WAIT</td> </tr> <tr> <td></td> <td>0</td> <td>1</td> <td>0:</td> <td>10.5 sec. WAIT</td> </tr> <tr> <td></td> <td>0</td> <td>1</td> <td>1:</td> <td>14.0 sec. WAIT</td> </tr> <tr> <td></td> <td>1</td> <td>0</td> <td>0:</td> <td>17.5 sec. WAIT</td> </tr> <tr> <td></td> <td>1</td> <td>0</td> <td>1</td> <td>21.0 sec. WAIT</td> </tr> <tr> <td></td> <td>1</td> <td>1</td> <td>0</td> <td>24.5 sec. WAIT</td> </tr> <tr> <td></td> <td>1</td> <td>1</td> <td>1</td> <td>Detection (Without WAIT)</td> </tr> </table>	No.	1.	2.	3.			0	0	0:	3.5 sec. WAIT		0	0	1:	7.0 sec. WAIT		0	1	0:	10.5 sec. WAIT		0	1	1:	14.0 sec. WAIT		1	0	0:	17.5 sec. WAIT		1	0	1	21.0 sec. WAIT		1	1	0	24.5 sec. WAIT		1	1	1	Detection (Without WAIT)
No.	1.	2.	3.																																												
	0	0	0:	3.5 sec. WAIT																																											
	0	0	1:	7.0 sec. WAIT																																											
	0	1	0:	10.5 sec. WAIT																																											
	0	1	1:	14.0 sec. WAIT																																											
	1	0	0:	17.5 sec. WAIT																																											
	1	0	1	21.0 sec. WAIT																																											
	1	1	0	24.5 sec. WAIT																																											
	1	1	1	Detection (Without WAIT)																																											
4	Max. pause time allowable for remote ID code detection	0: 2 seconds    1: 1 second																																													
5, 6	Busy tone detection in automatic sending mode	<table border="0"> <tr> <td>No.</td> <td>5.</td> <td>6.</td> <td></td> </tr> <tr> <td></td> <td>0</td> <td>0:</td> <td>No detection</td> </tr> <tr> <td></td> <td>0</td> <td>1:</td> <td>Detection only after dialing</td> </tr> <tr> <td></td> <td>1</td> <td>0:</td> <td>No detection</td> </tr> <tr> <td></td> <td>1</td> <td>1:</td> <td>Detection before and after dialing</td> </tr> </table>	No.	5.	6.			0	0:	No detection		0	1:	Detection only after dialing		1	0:	No detection		1	1:	Detection before and after dialing																									
No.	5.	6.																																													
	0	0:	No detection																																												
	0	1:	Detection only after dialing																																												
	1	0:	No detection																																												
	1	1:	Detection before and after dialing																																												
7	Busy tone detection in automatic receiving mode	0: Yes    1: No																																													
8	Not used																																														

Service Tables

**NOTE:** Selectors 5 through 7 are not applicable in those countries where no busy tone detection is supported.

**Selectors 1 through 3: 1st dial tone detection**

These selectors activate or deactivate the 1st dial tone detection function which detects the 1st dial tone issued from the PSTN when a line is connected to the PSTN.

Setting all of these selectors to "1" activates the dial tone detection function so that the machine starts dialing upon detection of a dial tone when a line is connected. (However, in those countries which support no dial tone detection function, e.g., in the U.S.A., setting these selectors to "1" makes the machine start dialing after a WAIT of 3.5 seconds.) For the detecting conditions of the 1st dial tone, refer to WSW07 and WSW08.

Other setting combinations deactivate the dial tone detection function so that the machine starts dialing after the specified WAIT (3.5, 7.0, 10.5, 14.0, 17.5, 21.0, or 24.5 seconds) without detection of a dial tone when a line is connected to the PSTN.

***Selector 4: Max. pause time allowable for remote ID code detection***

This selector sets the maximum pause time allowable for detecting the second digit of a remote ID code after detection of the first digit in remote reception.

If selector 4 is set to "0" (2 seconds), for instance, only a remote ID code whose second digit is detected within 2 seconds after detection of the first digit will become effective so as to activate the remote function.

***Selectors 5 and 6: Busy tone detection in automatic sending mode***

These selectors determine whether or not the machine automatically disconnects a line upon detection of a busy tone in automatic sending mode.

Setting selector 6 to "0" ignores a busy tone so that the machine does not disconnect the line. Setting selectors 5 and 6 to "0" and "1," respectively, makes the machine detect a busy tone only after dialing and disconnect the line.

Setting both of selectors 5 and 6 to "1" makes the machine detect a busy tone before and after dialing and then disconnect the line.

***Selector 7: Busy tone detection in automatic receiving mode***

This selector determines whether or not the machine automatically disconnects the line upon detection of a busy tone in automatic receiving mode.

**WSW06 (Redial/Pause key setting and 2nd dial tone detection)**

Selector No.	Function	Setting and Specifications																																													
1-3	<b>"Redial/Pause"</b> key setting and 2nd dial tone detection	<table border="0"> <tr> <td>No.</td> <td>1.</td> <td>2.</td> <td>3.</td> <td></td> </tr> <tr> <td></td> <td>0</td> <td>0</td> <td>0:</td> <td>No pause</td> </tr> <tr> <td></td> <td>0</td> <td>0</td> <td>1:</td> <td>3.5 sec. WAIT</td> </tr> <tr> <td></td> <td>0</td> <td>1</td> <td>0:</td> <td>7.0 sec. WAIT</td> </tr> <tr> <td></td> <td>0</td> <td>1</td> <td>1:</td> <td>10.5 sec. WAIT</td> </tr> <tr> <td></td> <td>1</td> <td>0</td> <td>0:</td> <td>14 sec. WAIT</td> </tr> <tr> <td></td> <td>1</td> <td>1</td> <td>0</td> <td>2nd dial tone detection only in pulse dialing (DP) system</td> </tr> <tr> <td></td> <td>1</td> <td>0</td> <td>1</td> <td></td> </tr> <tr> <td></td> <td>1</td> <td>1</td> <td>1</td> <td>2nd dial tone detection both in DP and push-button (PB) dialing system</td> </tr> </table>	No.	1.	2.	3.			0	0	0:	No pause		0	0	1:	3.5 sec. WAIT		0	1	0:	7.0 sec. WAIT		0	1	1:	10.5 sec. WAIT		1	0	0:	14 sec. WAIT		1	1	0	2nd dial tone detection only in pulse dialing (DP) system		1	0	1			1	1	1	2nd dial tone detection both in DP and push-button (PB) dialing system
No.	1.	2.	3.																																												
	0	0	0:	No pause																																											
	0	0	1:	3.5 sec. WAIT																																											
	0	1	0:	7.0 sec. WAIT																																											
	0	1	1:	10.5 sec. WAIT																																											
	1	0	0:	14 sec. WAIT																																											
	1	1	0	2nd dial tone detection only in pulse dialing (DP) system																																											
	1	0	1																																												
	1	1	1	2nd dial tone detection both in DP and push-button (PB) dialing system																																											
4-6	Max. pause time allowable for remote ID code detection	<table border="0"> <tr> <td>No.</td> <td>4.</td> <td>5.</td> <td>6.</td> <td></td> </tr> <tr> <td></td> <td>0</td> <td>0</td> <td>0:</td> <td>50 ms</td> </tr> <tr> <td></td> <td>0</td> <td>0</td> <td>1:</td> <td>210 ms</td> </tr> <tr> <td></td> <td>0</td> <td>1</td> <td>0:</td> <td>500 ms</td> </tr> <tr> <td></td> <td>0</td> <td>1</td> <td>1:</td> <td>800 ms</td> </tr> <tr> <td></td> <td>1</td> <td>0</td> <td>0:</td> <td>900 ms</td> </tr> <tr> <td></td> <td>1</td> <td>0</td> <td>1</td> <td>1.5 sec.</td> </tr> <tr> <td></td> <td>1</td> <td>1</td> <td>0</td> <td>2.0 sec.</td> </tr> <tr> <td></td> <td>1</td> <td>1</td> <td>1</td> <td>2.5 sec.</td> </tr> </table>	No.	4.	5.	6.			0	0	0:	50 ms		0	0	1:	210 ms		0	1	0:	500 ms		0	1	1:	800 ms		1	0	0:	900 ms		1	0	1	1.5 sec.		1	1	0	2.0 sec.		1	1	1	2.5 sec.
No.	4.	5.	6.																																												
	0	0	0:	50 ms																																											
	0	0	1:	210 ms																																											
	0	1	0:	500 ms																																											
	0	1	1:	800 ms																																											
	1	0	0:	900 ms																																											
	1	0	1	1.5 sec.																																											
	1	1	0	2.0 sec.																																											
	1	1	1	2.5 sec.																																											
7	No. of 2nd dial tone detection cycles	0: 1 cycle      1: 2 cycle																																													
8	Allowable instantaneous interrupt during reception of 2nd dial tone	0: 30 ms      1: 50 ms																																													

Service Tables

**NOTE:** Selectors 4 through 8 are not applicable in those countries where no dial tone detection is supported, e.g., U.S.A.

***1 through 3: Redial/Pause key setting and 2nd dial tone detection***

<b>Selectors</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>Description</b>
	0	0	0	No WAIT is inserted even if the Redial/Pause key is pressed.
	0	0	1	If you press the Redial/Pause key during dialing, the machine will insert WAIT as defined in the above table. If the Redial/Pause key is pressed repeatedly, the machine inserts the specified WAIT multiplied by the number of depressions. It applies also in hook-up dialing.
	0	1	0	
	0	1	1	
	1	0	0	
	1	0	1	When these selectors are set to "1, 0, 1": <ul style="list-style-type: none"> <li>• Each time you press the Redial/Pause key in dialing, the machine will wait for the 2nd dial tone to be sent via the communications line regardless of pulse dialing or tone dialing.</li> </ul> When these selectors are set to "1, 1, 0": <ul style="list-style-type: none"> <li>• If you press the Redial/Pause key in pulse dialing, the machine will first wait for the 2nd dial tone to be sent via the communications line. After that, pressing the Redial/Pause key will cause the machine to insert a WAIT of 3.5 seconds. In tone dialing, the machine will insert a WAIT of 3.5 seconds.</li> </ul> When these selectors are set to "1, 1, 1": <ul style="list-style-type: none"> <li>• If you press the Redial/Pause key, the machine will first wait for the 2nd dial tone to be sent via the communications line regardless of pulse dialing or tone dialing. After that, pressing the Redial/Pause key will cause the machine to insert a WAIT of 3.5 seconds. (In those countries where no dial tone detection function is supported, setting these selectors to "1, 0, 1," "1, 1, 0," or "1, 1, 1" inserts a WAIT of 3.5 seconds.)</li> </ul>
	1	1	0	
	1	1	1	

***Selectors 4 through 6: Detection of international tone***

Upon detection of the 2nd dial tone for the time length specified by these selectors, the machine starts dialing.

This setting is effective only when the 2nd dial tone detection function is activated by selectors 1 through 3 (Setting 101, 110, or 111).

This function does not apply in those countries where no dial tone detection function is supported.

***Selector 7: No. of 2nd dial tone detection cycles***

This selector sets the number of dial tone detection cycles required for starting dialing.

***Selector 8: Allowable instantaneous interrupt during reception of 2nd dial tone***

This selector sets the allowable instantaneous interrupt period that should be ignored during reception of the 2nd dial tone.

**WSW07 (Dial tone setting 1)**

Selector No.	Function	Setting and Specifications
1, 2	Dial tone frequency band control	No. 1. 2. 0 0: Narrows by 10 Hz 0 1: Initial value 1 x: Widens by 10Hz
3	Line current detection	(Not used.)
4-6	Max. pause time allowable for remote ID code detection	No. 4. 5. 6. 0 0 0: -21 dBm 0 0 1: -24 dBm 0 1 0: -27 dBm 0 1 1: -30 dBm 1 0 0: -33 dBm 1 0 1: -36 dBm 1 1 0: -39 dBm 1 1 1: -42 dBm
7	Allowable instantaneous interrupt during reception of 1st dial tone	0: 30 ms      1: 50 ms
8	Not used.	

- NOTE:** 1) Selectors 1, 2, 4 through 7 are not applicable in those countries where no dial tone or line current detection is supported, e.g., U.S.A.  
 2) Selector 3 is not applicable to those models having no loop current detection function.



**Selectors 1 and 2: Dial tone frequency band control**

These selectors set the frequency band for the 1st dial tone and busy tone (before dialing) to be detected.

This setting is effective only when selectors 1 through 3 on WSW05 are set to "1,1,1".

**Selector 3: Line current detection (Not used.)**

This selector determines whether or not to detect a line current before starting dialing.

**Selectors 4 through 6: 2nd dial tone detection level**

These selectors set the detection level of the 2nd dial tone.

**Selector 7: Allowable instantaneous interrupt during reception of 1st dial tone**

This selector sets the allowable instantaneous interrupt period that should be ignored during reception of the 1st dial tone.

**WSW08 (Dial tone setting 2)**

Selector No.	Function	Setting and Specifications
1-3	1st dial tone detection time length	No. 1. 2. 3. 0 0 0: 50 ms 0 0 1: 210 ms 0 1 0: 500 ms 0 1 1: 800 ms 1 0 0: 900 ms 1 0 1 1.5 sec. 1 1 0 2.0 sec. 1 1 1 2.5 sec.
4, 5	Time-out length for 1st and 2nd dial tone detection	No. 4. 5. 0 0: 10 sec. 0 1: 20 sec. 1 0: 15 sec. 1 1: 30 sec.
6-8	Detection level of 1st dial tone and busy tone before dialing	No. 6. 7. 8. 0 0 0: -21 dBm 0 0 1: -24 dBm 0 1 0: -27 dBm 0 1 1: -30 dBm 1 0 0: -33 dBm 1 0 1 -36 dBm 1 1 0 -39 dBm 1 1 1 -42 dBm

**NOTE:** The WSW08 is not applicable in those countries where no dial tone detection is supported, e.g., U.S.A.

***Selectors 1 through 3: 1st dial tone detection time length***

Upon detection of the 1st dial tone for the time length set by these selectors, the machine starts dialing.

This setting is effective only when selectors 1 through 3 on WSW05 are set to "1,1,1."

***Selectors 4 and 5: Time-out length for 1st and 2nd dial tone detection***

These selectors set the time-out length for the 1st and 2nd dial tone detection so that the machine waits dial tone input for the specified time length and disconnects itself from the line when no dial tone is inputted.

**WSW09 (Protocol definition 1)**

Selector No.	Function	Setting and Specifications
1	Frame length selection	0: 256 octets    1: 64 octets
2	Use of non-standard commands	0: Allowed    1: Prohibited
3, 4	No. of retries	No.    3.    4. 0    0:    4 times 0    1:    3 times 1    0:    2 times 1    1:    1 time
5	T5 timer	0: 300 sec.    1: 60 sec.
6	T1 timer	0: 35 sec.    1: 40 sec.
7-8	Timeout for response from the called station in automatic sending mode	No.    7.    8. 0    0:    55 sec. (NA) 60 sec. (others) 0    1:    140 sec. 1    0:    90 sec. 1    1:    35 sec.

**NOTE:** Selectors 1 through 5 are not applicable in those models which do not support ECM.

***Selector 1: Frame length selection***

Usually a single frame consists of 256 octets (1 octet = 8 bits). For communications lines with higher bit error rate, however, set selector 1 to "1" so that the machine can divide a message into 64-octet frames.

**NOTE:** The error correction mode (ECM) is a facsimile transmission manner in which the machine divides a message into frames for transmission so that if any data error occurs on the transmission line, the machine retransmits only those frames containing the error data.

***Selector 2: Use of non-standard commands***

If this selector is set to "0," the machine can use non-standard commands (the machine's native-mode commands, e.g., NSF, NSC, and NSS) for communications. If it is set to "1," the machine will use standard commands only.

***Selectors 3 and 4: No. of retries***

These selectors set the number of retries in each specified modem transmission speed.

***Selector 5: T5 timer***

This selector sets the time length for the T5 timer.

***Selector 6: T1 timer***

This selector sets the time length for the T1 timer.

***Selectors 7 and 8: Timeout for response from the called station in automatic sending mode***

If the machine (calling station) receives no response (no G3 command) from the called terminal in automatic sending mode for the period specified by these selectors, it disconnects the line.

**WSW10 (Protocol definition 2)**

Selector No.	Function	Setting and Specifications	
1	Not used.		
2	Time length from transmission of the last dial digit to CML ON	0: 100 ms	1: 50 ms
3	Time length from CML ON to CNG transmission	0: 2 sec.	1: 4 sec.
4	Time length from CML ON to CED transmission (except for facsimile-to-telephone switching)	0: 0.5 sec.	1: 2 sec.
5, 6	No. of training retries	No. 5. 6.	0 0: 1 time 0 1: 2 times 1 0: 3 times 1 1: 4 times
5	T5 timer	0: 300 sec.	1: 60 sec.
6	T1 timer	0: 35 sec.	1: 40 sec.
7	Encoding system	MR	0: Allowed 1: Not allowed
8	(Compression)	MMR	0: Allowed 1: Not allowed

***Selector 2: Time length from transmission of the last dial digit to CML ON***

This selector sets the time length from when the machine transmits the last dial digit until the CML relay comes on.

***Selector 3: Time length from CML ON to CNG transmission***

This selector sets the time length until the machine transmits a CNG after it turns on the CML relay.

***Selector 4: Time length from CML ON to CED transmission***

This selector sets the time length until the machine transmits a CED after it turns on the CML relay. This setting does not apply to switching between facsimile and telephone.

***Selectors 5 and 6: No. of training retries***

These selectors set the number of training retries to be repeated before automatic fallback.

***Selectors 7 and 8: Encoding system (Compression)***

This selector determines whether or not to allow the use of the MR/MMR coding system.

**WSW11 (Busy tone setting)**

Selector No.	Function	Setting and Specifications
1, 2	Busy tone frequency band control	No. 1. 2. 0 0: Narrows by 10 Hz 0 1: Initial value 1 x: Widens by 10 Hz
3	ON/OFF time length ranges for busy tone (More than one setting allowed)	1: 250-750/250-750 ms
4		1: 400-600/400-600 ms
5		1: 175-440/175-440 ms
6		1: 100-1000 ms/17-660 ms
7		1: 110-410/320-550 ms
8		1: 100-660/100-660 ms

- NOTE:** 1) WSW11 is not applicable in those countries where no busy tone detection is supported.  
2) The setting of WSW11 is effective only when selectors 5 and 6 on WSW05 are set to "0, 1" or "1, 1" (Busy tone detection).

***Selectors 1 and 2: Busy tone frequency band control***

These selectors set the frequency band for busy tone to be detected.

***Selectors 3 through 8: ON/OFF time length ranges for busy tone***

These selectors set the ON and OFF time length ranges for busy tone to be detected. If more than one selector is set to "1", the ranges become wider. For example, if selectors 4 and 5 are set to "1", the ON and OFF time length ranges are from 175 to 600 ms.

**WSW12 (Signal detection condition setting)**

Selector No.	Function	Setting and Specifications
1, 2	Min. detection period required for interpreting incoming calling signal (CI) as OFF	No. 1. 2. 0 0: 1500 ms 0 1: 500 ms 1 0: 700 ms 1 1: 900 ms
3, 4	Max. detection period for incoming calling signal (CI) being OFF	No. 3. 4. 0 0: 6 sec. 0 1: 7 sec. 1 0: 9 sec. 1 1: 11 sec.
5, 6	Min. detection period required for acknowledging incoming calling signal (CI) as ON	No. 5. 6. 0 0: 800 ms (1000 ms*) 0 1: 200 ms 1 0: 250 ms 1 1: 150 ms 100 ms*: Chinese model
7	Line connection timing	(Not used.)
8	Not used.	

**Selectors 1 and 2: Min. detection period required for interpreting incoming calling signal (CI) as OFF**

**Selectors 3 and 4: Max. detection period for incoming calling signal (CI) being OFF**  
 If the machine detects the OFF state of a CI signal for the period greater than the value set by selectors 1 and 2 and less than the value set by selectors 3 and 4, it interprets the CI signal as OFF.

**Selectors 5 and 6: Min. detection period required for acknowledging incoming calling signal (CI) as ON**

These selectors set the period required to make the machine acknowledge itself to be called. That is, if the machine continuously detects a CI signal with the frequency set by selectors 1 through 4 on WSW14 during the period set by these selectors 5 and 6, then it acknowledges the call.

**WSW13 (Modem setting)**

Selector No.	Function	Setting and Specifications
1, 2	Cable equalizer	No. 1. 2. 0 0: 0 km 0 1: 1.8 km 1 0: 3.6 km 1 1: 5.6 km
3, 4	Reception level	No. 3. 4. 0 0: -43 dBm 0 1: -47 dBm 1 0: -49 dBm 1 1: -54 dBm
5-8	Modem attenuator	No.5 0: 0 dB 1: 8 dB No.6 0: 0 dB 1: 4 dB No.7 0: 0 dB 1: 2 dB No.8 0: 0 dB 1: 1 dB

The modem should be adjusted according to the user's line conditions.

***Selectors 1 and 2: Cable equalizer***

These selectors are used to improve the pass-band characteristics of analogue signals on a line. (Attenuation in the high-band frequency is greater than in the low-band frequency.)

Set these selectors according to the distance from the telephone switchboard to the machine.

***Selectors 3 and 4: Reception level***

These selectors set the optimum receive signal level.

***Selectors 5 through 8: Modem attenuator***

These selectors are used to adjust the transmitting level attenuation of the modem when the reception level at the remote station is improper due to line loss. This function applies for G3 protocol signals.

Setting two or more selectors to "1" produces addition of attenuation assigned to each selector. If selector 8 on WSW23 is set to "0", this setting is so limited that 10 dB (1 dB in France) or higher setting only is effective. Note that in Japan and China, 9 dB or higher and 2 dB or higher settings only are effective, respectively, regardless of whether selector 8 on WSW23 is set to "0".

**WSW14 (AUTO ANS facility setting)**

Selector No.	Function	Setting and Specifications
1, 2	Frequency band selection (lower limit) for incoming calling signal (CI)	No. 1. 2. 0 0: 13 Hz 0 1: 15 Hz 1 0: 23 Hz 1 1: 20 Hz
3, 4	Frequency band selection (upper limit) for incoming calling signal (CI)	No. 3. 4. 0 0: 30 Hz 0 1: 55 Hz 1 0: 70 Hz 1 1: 200 Hz
5–8	Modem attenuator	No. 5. 6. 7. 8. 0 0 0 0: Fixed to once 0 0 0 1: Fixed to 2 times 0 0 1 0: Fixed to 3 times 0 0 1 1: Fixed to 4 times 0 1 0 0: 1 to 2 times 0 1 0 1: 1 to 3 times 0 1 1 0: 1 to 4 times 0 1 1 1: 1 to 5 times 1 0 0 0: 2 to 3 times 1 0 0 1: 2 to 4 times 1 0 1 0: 2 to 5 times 1 0 1 1: 2 to 6 times 1 1 0 0: 1 to 10 times 1 1 0 1: 2 to 10 times 1 1 1 0: 3 to 5 times 1 1 1 1: 4 to 10 times

**Selectors 1 through 4: Frequency band selection for incoming calling signal (CI)**

These selectors are used to select the frequency band of CI for activating the AUTO ANS facility. In the French models, if the user sets the PBX to OFF from the control panel, the setting made by selectors 1 and 2 will take no effect and the frequency's lower limit will be fixed to 32 Hz. (Even if the setting made by these selectors does not apply, it will be printed on the configuration list.)

**Selectors 5 through 8: No. of rings in AUTO ANS mode**

These selectors set the number of rings to initiate the AUTO ANS facility.

**WSW15 (REDIAL facility setting)**

Selector No.	Function	Setting and Specifications
1, 2	Redial interval	No. 1. 2. 0 0: 5 minutes 0 1: 1 minutes 1 0: 2 minutes 1 1: 3 minutes
3-6	No. of redialings	No. 3. 4. 5. 6. 0 0 0 0: 16 times 0 0 0 1: 1 times 0 0 1 0: 2 times 0 0 1 1: 3 times 1 1 1 1: 15 times ↑↓
7	Not used.	
8	CRP option	0: Disable 1: Enable

**Selectors 1 through 6: Redial interval and No. of redialings**

The machine redials by the number of times set by selectors 3 through 6 at intervals set by selectors 1 and 2.

**Selector 8: CRP option**

If a command error occurs in the machine (calling station), the machine usually waits for three seconds and then makes a retry three times. This CRP option is a request command that can be sent from the called station for requesting the calling station to retry the failed command immediately.

**WSW16 (Function setting 1)**

Selector No.	Function	Setting and Specifications
1	Not used.	
2	ITU-T (CCITT) superfine recommendation	0: OFF      1: ON
3–6	Not used.	
7	Max. document length limitation	0: 400 cm      1: 90 cm
8	Stop/Exit key pressed during reception	0: Not functional      1: Functional

**NOTE:** Selector 7 is applicable to models equipped with ADF units.

***Selector 2: ITU-T (CCITT) superfine recommendation***

If this selector is set to "1," the machine communicates in ITU-T (CCITT) recommended superfine mode (15.4 lines/mm). If it is set to "0," it communicates in native superfine mode.

***Selector 7: Max. document length limitation***

This selector is used to select the maximum length of a document to be sent.

***Selector 8: Stop key pressed during reception***

If this selector is set to "1," pressing the Stop/Exit key can stop the current receiving operation. The received data will be lost.

**WSW17 (Function setting 2)**

Selector No.	Function	Setting and Specifications
1, 2	Off-hook alarm	No. 1. 2. 0 0: No alarm 0 1: Always valid 1 x: Valid except when "call reservation" is selected.
3, 4	Not used.	
5	Calendar clock type	0: U.S.A. type 1: European type
6	Not used.	
7	Non-ring reception	0: OFF 1: ON
8	Not used.	

***Selectors 1 and 2: Off-hook alarm***

These selectors activate or deactivate the alarm function which sounds an alarm when the communication is completed with the handset being off the hook.

***Selector 5: Calendar clock type***

If this selector is set to "0" (USA), the MM/DD/YY hh:mm format applies; if it is set to "1" (Europe), the DD/MM/YY hh:mm format applies: DD is the day, MM is the month, YY is the last two digits of the year, hh is the hour, and mm is the minute.

***Selector 7: Non-ring reception***

Setting this selector to "1" makes the machine receive calls without ringer sound if the Ring Delay is set to "0".

**WSW18 (Function setting 3)**

Selector No.	Function	Setting and Specifications
1	Not used.	
2, 3	Detection enabled time for CNG and no tone	No. 2. 3. 0 0: 40 sec. 0 1: 0 sec. (No detection) 1 0: 5 sec. 1 1: 80 sec.
4, 5	Not used.	
6	Registration of station ID	0: Permitted 1: Prohibited
7, 8	Tone sound monitoring	No. 7. 8. 0 x: No monitoring 1 0: Up to phase B at the calling station only 1 1: All transmission phases both at the calling and called stations

**Selectors 2 and 3: Detection enabled time for CNG and no tone**

After the line is connected via the external telephone or by picking up the handset of the machine, the machine can detect a CNG signal or no tone for the time length specified by these selectors. The setting specified by these selectors becomes effective only when selector 8 on WSW20 is set to "1".

**Selector 6: Registration of station ID**

Setting this selector to "0" permits the registration of station ID for Austrian and Czech models.

**Selectors 7 and 8: Tone sound monitoring**

These selectors set monitoring specifications of the tone sound inputted from the line.

**WSW19 (Transmission speed setting)**

Selector No.	Function	Setting and Specifications
1-3	First transmission speed choice for fallback	No. 1. 2. 3. No. 4. 5. 6. 0 0 0: 2400 bps 0 0 1: 4800 bps 0 1 0: 7200 bps 0 1 1: 9600 bps 1 0 0: 12000 bps 1 0 1       ↑ 1 1 0       14400 bps 1 1 1       ↓
4-6	Last transmission speed choice for fallback	
7	V.34 mode	0: Permitted   1: Prohibited
8	V.17 mode	0: Permitted   1: Prohibited

**NOTE:** Selector 7 takes effect only in models supporting V.34 mode.

**Selectors 1 through 6: First and last choices of transmission speed for fallback**

These selectors are used to set the MODEM speed range. With the first transmission speed choice specified by selectors 1 through 3, the machine attempts to establish the transmission link via the MODEM. If the establishment fails, the machine automatically steps down to the next lowest speed and attempts to establish the transmission link again. The machine repeats this sequence while stepping down the transmission speed to the last choice specified by selectors 4 through 6. If the MODEM always falls back to a low transmission speed (e.g., 4,800 bps), set the first transmission speed choice to the lower one (e.g., modify it from 12,000 bps to 7,200 bps) in order to deactivate the high-speed MODEM function and reduce the training time for shorter transmission time.

Generally, to save the transmission time, set the last transmission speed choice to a higher one.

Service Tables

**WSW20 (Overseas communications mode setting)**

Selector No.	Function	Setting and Specifications
1	EP (Echo protection) tone prefix	0: OFF      1: ON
2	Overseas communications mode (Reception)	0: 2100 Hz      1: 1100Hz
3	Overseas communications mode (Transmission)	0: OFF      1: Ignores DIS once.
4, 5	Min. time length from reception of CFR to start of transmission of video signals	No.    4.    5. 0    0: 100 ms 0    1: 200 ms 1    0: 300 ms 1    1: 400 ms
6, 7	At CNG detection, elimination of chattering noise (Not used.)	No.    6.    7. 0    0: 100 ms 0    1: 200 ms 1    0: 300 ms 1    1: 400 ms
8	Limitation on CNG detection	0: OFF      1: ON

**NOTE:** Selectors 6 and 7 are applicable to models equipped with SDAA circuits.

**Selector 1: EP tone prefix**

Setting this selector to "1" makes the machine transmit a 1700 Hz echo protection (EP) tone immediately preceding training in V.29 modulation system to prevent omission of training signals. Prefixing an EP tone is useful when the machine fails to transmit at the V.29 modem speed and always has to fall back to 4800 bps transmission. The setting made by this selector takes effect only when the Overseas Mode is set to ON.

**Selectors 2 and 3: Overseas communications mode**

These selectors should be used if the machine malfunctions in overseas communications. According to the communications error state, select the signal specifications.

Setting selector 2 to "1" allows the machine to use 1100 Hz CED signal instead of 2100 Hz in receiving operation. This prevents malfunctions resulting from echoes, since the 1100 Hz signal does not disable the echo suppressor (ES) while the 2100 Hz signal does.

Setting selector 3 to "1" allows the machine to ignore a DIS signal sent from the called station once in sending operation. This operation suppresses echoes since the first DIS signal immediately follows a 2100 Hz CED (which disables the ES) so that it is likely to be affected by echoes in the disabled ES state. However, such a disabled ES state will be removed soon so that the second and the following DIS signals are not susceptible to data distortion due to echoes. Note that some models when called may cause error by receiving a self-outputted DIS.

The setting made by selector 3 takes effect only when the Overseas Communications Mode is set to ON. (The setting made by selector 2 is always effective.)

**Selectors 8: Limitation on CNG detection**

If this selector is set to "1," the machine detects a CNG signal according to the condition preset by selectors 2 and 3 on WSW18 after a line is connected. If it is set to "0," the machine detects a CNG signal as long as the line is connected.

**WSW21 (TAD setting 1)**

Selector No.	Function	Setting and Specifications
1-5	Max. waiting time for voice signal	No. 1. 2. 3. 4. 5. 0 0 0 0 0: No detection 0 0 0 0 1: 1 sec. 0 0 0 1 0: 2 sec. 0 0 0 1 1: 3 times ↓ ↓ 0 1 0 0 0: 8 sec. ↓ ↓ 1 1 1 1 1: 31 sec.
6, 7	Taping the call	No. 6. 7. 0 0: Enable (signaling for U.S.A.) 0 1: Enable (signaling for countries except U.S.A.) 1 0: Enable (without signaling) 1 1: Disable
8	Erasure of message stored in the memory after the message transfer	0: Yes                      1: No

Service Tables

- NOTE:** 1) Selectors 1 through 5 are applicable to models equipped with ICM recorders.  
 2) Selectors 6 and 7 are applicable to models with internal TADs.  
 3) Selector 8 is applicable to models equipped with TADs.

**Selectors 1 through 5: Max. waiting time for voice signal**

In the TAD mode, the machine waits for voice signal for the time length specified by these selectors before it automatically shifts to the facsimile message receive mode or disconnects the line.

**Selectors 6 and 7: Taping the call**

These selectors select whether or not to tape the call. Setting them to "1, 0" enables taping the call without signaling to the calling station that the call is being taped.

**Selector 8: Erasure of message stored in the memory after the message transfer**

Setting this selector to "0" will erase the message recorded in the memory after the document retrieval feature transfers the message.

**WSW22 (ECM and call waiting caller ID)**

Selector No.	Function	Setting and Specifications
1	ECM* in sending	0: ON      1: OFF
2	ECM* in receiving	0: ON      1: OFF
3	Call Waiting Caller ID	0: ON      1: OFF
4	Not used.	
5-8	Acceptable TCF bit error rate (%) (Only at 4800 bps)	(Not used.)

\*ECM: Error correction mode

- NOTE:** 1) Selector 3 is applicable to the American models only.  
 2) Selectors 5 through 8 are applicable to the Chinese, Taiwanese and Asian models only.

***Selector 3: Call Waiting Caller ID***

Setting this selector to "0" allows the user to decide whether or not to interrupt the current call when a new call comes in. If Call Waiting Caller ID service is available in the area and the user subscribes to it, he/she can see information about his/her incoming call on the LCD.

***Selectors 5 through 8: Acceptable TCF bit error rate (%) (Not used.)***

Setting two or more selectors to "1" produces addition of percent assigned to each selector. If you set selectors 7 and 8 to "1," the acceptable TCF bit error rate will be 3%.

**WSW23 (Communications setting)**

Selector No.	Function	Setting and Specifications
1	Starting point of training check (TCF)	0: From the head of a series of zeros 1: From any arbitrary point
2, 3	Allowable training error rate	No. 2. 3. 0 0: 0% 0 1: 0.5% 1 0: 1% 1 1: 2%
4, 5	Decoding error rate for transmission of RTN	No. 4. 5. 0 0: 16% 0 1: 14% 1 0: 10% 1 1: 8%
6, 7	Not used.	
8	Limitation of attenuation level	0: Yes                      1: No

**NOTE:** Selector 8 is not applicable to the French models.

***Selector 1: Starting point of training check (TCF)***

At the training phase of receiving operation, the called station detects for 1.0 second a training check (TCF) command, a series of zeros which is sent from the calling station for 1.5 seconds to verify training and give the first indication of the acceptability of the line.

This selector sets the starting point from which the called station should start counting those zeros. If this selector is set to "0," the called station starts counting zeros 100 ms after the head of a series of zeros is detected.

If it is set to "1," the called station starts counting zeros upon detection of 10-ms successive zeros 50 ms after the head of a series of zeros is detected. In this case, if the detection of 10-ms successive zeros is too late, the data counting period will become less than 1.0 second, making the called station judge the line condition unacceptable.

***Selectors 2 and 3: Allowable training error rate***

The called station checks a series of zeros gathered in training (as described in Selector 1) according to the allowable training error rate set by these selectors. If the called station judges the line condition to be accepted, it responds with CFR; if not, it responds with FTT.

***Selectors 4 and 5: Decoding error rate for transmission of RTN***

The machine checks the actual decoding errors and then transmits an RTN according to the decoding error rate (Number of lines containing an error per page ÷ Total number of lines per page) set by these selectors.

***Selector 8: Limitation of attenuation level***

Setting this selector to "0" limits the transmitting level of the modem to 10 dB (1 dB in France). This setting has priority over the settings selected by WSW02 (selectors 5 through 8) and WSW13 (selectors 5 through 8).

**WSW24 (TAD setting 2)**

Selector No.	Function	Setting and Specifications
1, 2	Maximum OGM recording time	No. 1. 2. 0 0: 15 sec. 0 1: 20 sec. 1 0: 30 sec. 1 1: 50 sec.
3, 4	Time length from CML ON to start of pseudo ring backtone transmission	No. 3. 4. 0 0: 4 sec. 0 1: 3 sec. 1 0: 2 sec. 1 1: 1 sec.
5-8	Attenuator for playback of ICM/OGM to the line (Selectable from the range of 0-15 dB)	No.5 0: 0 dB 1: 8 dB No.6 0: 0 dB 1: 4 dB No.7 0: 0 dB 1: 2 dB No.8 0: 0 dB 1: 1 dB

***Selectors 1 and 2: Maximum OGM recording time***

These selectors set the allowable maximum recording time for an OGM.

***Selectors 3 and 4: Time length from CML ON to start of pseudo ring backtone transmission***

These selectors set the length of time from CML-ON up to the start of pseudo ring backtone transmission.

In models with OGM facilities, the settings made by these selectors also apply to the length of time from CML-ON up to the start of OGM transmission.

***Selectors 5 through 8: Attenuator for playback of ICM/OGM to the line***

Setting two or more selectors to "1" produces addition of attenuation assigned to each selector. This setting is not limited by selector 8 on WSW23.

**WSW25 (TAD setting 3)**

Selector No.	Function	Setting and Specifications
1-4	Not used.	
5-7	Pause between paging number and PIN	No. 5. 6. 7. 0 0 0: 2 sec. 0 0 1: 4 sec. 0 1 0: 6 sec. 0 1 1: 8 sec. 1 0 0: 10 sec. 1 0 1: 12 sec. 1 1 0: 14 sec. 1 1 1: 16 sec.
8	Not used.	

**NOTE:** Selectors 5 through 7 are applicable to the U.S.A. models only.

***Selectors 5 through 7: Pause between paging number and PIN***

These selectors set the pause time between a telephone number being paged and PIN (personal identification number) for the paging feature.

**WSW26 (Function setting 4)**

Selector No.	Function	Setting and Specifications
1, 2	Not used.	
3	Dialing during document reading into the temporary memory in in-memory message transmission	0: Disable      1: Enable
4, 5	No. of CNG cycles to be detected (when the line is connected via the external telephone except in the external TAD mode or via the built-in telephone)	No. 4. 5. 0 0: 0.5 0 1: 1 1 0: 1.5 1 1: 2
6, 7	No. of CNG cycles to be detected (when the line is connected via the external telephone in the external TAD mode, via the built-in telephone in the TAD mode, or via the machine in the automatic reception of the F/T mode)	No. 6. 7. 0 0: 0.5 0 1: 1 1 0: 1.5 1 1: 2
8	Not used.	

***Selector 3: Dialing during document reading into the temporary memory in in-memory message transmission***

If this selector is set to "0", the machine waits for document reading into the memory to complete and then starts dialing. This enables the machine to list the total number of pages in the header of the facsimile message.

***Selectors 4 and 5: No. of CNG cycles to be detected (when the line is connected via the external telephone except in the external TAD mode or via the built-in telephone)***

The machine interprets a CNG as an effective signal if it detects the CNG by the number of cycles specified by these selectors when the line is connected via the external telephone except in the external TAD mode or via the built-in telephone.

***Selectors 6 and 7: No. of CNG cycles to be detected (when the line is connected via the external telephone in the external TAD mode, via the built-in telephone in the TAD mode, or via the machine in the automatic reception of the F/T mode)***

The machine interprets a CNG as an effective signal if it detects the CNG by the number of cycles specified by these selectors when the line is connected via the external telephone in the external TAD mode, via the built-in telephone in the TAD mode, or via the machine in the automatic reception of the F/T mode.

**WSW27 (Function setting 5)**

Selector No.	Function	Setting and Specifications
1	Not used.	
2	Ringer OFF setting	0: Yes      1: No
3	Automatic playback of OGM when switched to the TAD mode	0: No      1: Yes
4, 5	Detection of distinctive ringing pattern	(Not used.)
6	Recording quality	0: Normal      1: High
7	Recording time for high recording quality	0: Short (9.6 kbps)    1: Long (8.8 kbps)
8	Not used.	

**NOTE:** Selectors 4 and 5 are applicable to the U.S.A. models only.

***Selector 2: Ringer OFF setting***

This selector determines whether or not the ringer can be set to OFF.

***Selector 3: Automatic playback of OGM when switched to the TAD mode***

This selector determines whether or not to automatically play back an OGM the moment the machine switches to the TAD mode.

***Selectors 4 and 5: Detection of distinctive ringing pattern (Not used.)***

If this selector is set to "1", the machine detects only the number of rings; if it is set to "0", the machine detects the number of rings and the ringing time length to compare the detected ringing pattern with the registered distinctive one.

***Selector 6: Recording quality***

This selector determines the recording quality for the OGM and ICM. Selecting "1" (High) increases the quality, sacrificing the recording time.

***Selector 7: Recording time for high recording quality***

This setting takes effect when selector 6 is set to "1" (High). Setting this selector to "0" (Short) further increases the recording quality, sacrificing the recording time. The recording quality and time to be applied when this selector is set to "1" (Long) are higher and shorter than the ones to be applied when selector 6 is set to "0" (Normal).

The recording quality and time determined by this selector being set to "1" (Long) are higher and shorter than the ones determined by selector 6 being set to "0" (Normal).

**WSW28 (Function setting 6)**

Selector No.	Function	Setting and Specifications
1-3	Transmission level of DTMF high-band frequency signal	No. 1. 2. 3. 0 0 0: 0 dB 0 0 1: +1 dB 0 1 0: +2 dB 0 1 1: +3 dB 1 0 0: 0 dB 1 0 1: -1 dB 1 1 0: -2 dB 1 1 1: -3 dB
4-6	Transmission level of DTMF low-band frequency signal	No. 4. 5. 6. 0 0 0: 0 dB 0 0 1: +1 dB 0 1 0: +2 dB 0 1 1: +3 dB 1 0 0: 0 dB 1 0 1: -1 dB 1 1 0: -2 dB 1 1 1: -3 dB
7, 8	Not used.	

**Selectors 1 through 6: Transmission level of DTMF high-/low-band frequency signal**

These selectors are intended for the manufacturer who tests the machine for the Standard. Never access them.

**WSW29 (Function setting 7)**

Selector No.	Function	Setting and Specifications
1-3	Compression threshold level for voice signals inputted via the telephone line in the built-in TAD operation	No. 1. 2. 3. 0 0 0: -47.0 dB 0 0 1: -48.5 dB 0 1 0: -50.0 dB 0 1 1: -51.5 dB 1 0 0: -53.0 dB 1 0 1: -54.5 dB 1 1 0: -56.0 dB 1 1 1: OFF
4-6	Compression threshold level for voice signals inputted via the handset in the built-in TAD operation	No. 4. 5. 6. 0 0 0: -44.0 dB 0 0 1: -45.5 dB 0 1 0: -47.0 dB 0 1 1: -48.5 dB 1 0 0: -50.0 dB 1 0 1: -51.5 dB 1 1 0: -53.0 dB 1 1 1: OFF
7	Impedance switching control in pulse dialing	0: OFF            1: ON
8	Prompt beep when the memory area for the activity report becomes full	0: No            1: Yes

- NOTE:** 1) Selectors 1 through 6 are applicable to models equipped with built-in TADs.  
2) Selectors 7 and 8 are applicable only to the European versions.

***Selectors 1 through 6: Compression threshold level for voice signals inputted via the telephone line in the built-in TAD operation***

If voice signals inputted via the telephone line are below the level specified by these selectors, the TAD interprets those received voice signals as no signal, compressing the recording time.

***Selector 8: Prompt beep for activity report***

This selector determines whether or not to beep if the memory area for the activity report becomes full, for prompting you to print out the report. (Printing it out will clear the memory area.)

**WSW30 (Function setting 8)**

Selector No.	Function	Setting and Specifications
1-3	Dial tone/busy tone detection level during recording of ICM	(Not used.)
4-7	Not used.	
8	Text copy density adjustment	0: Normal      1: Dark

***Selectors 1 through 3: Dial tone/busy tone detection level during recording of ICM (Not used.)***

If the machine (called station) detects dial tone (400 Hz continuously) or busy tone (400 Hz intermittently) exceeding the detection level specified by these selectors for the period specified by selectors 1 through 4 on WSW35, then it interprets the calling station as being disconnected. The machine stops TAD recording and disconnects the line.

***Selectors 8: Text copy density adjustment***

This function is used when a copied image of a dark document is still light even if adjusting using the contrast adjustment for the user operation.

**WSW31 (Function setting 9)**

Selector No.	Function	Setting and Specifications
1	Not used.	
2	Default reduction rate for failure of automatic reduction during recording	0: 100%      1: 70%
3	Not used.	
4	(Do not disturb this selector.)	
5	Minimum ON and OFF duration of ringer signals effective in distinctive ringing	0: 130 ms%      1: 90 ms
6–8	Not used.	

**NOTE:** Selector 5 is applicable only to the U.S.A. models.

***Selector 2: Default reduction rate for failure of automatic reduction during recording***

This selector sets the default reduction rate to be applied if the automatic reduction function fails to record one-page data sent from the calling station in a single page of the current recording paper.

If it is set to "0", the machine records one-page data at full size (100%) without reduction; if it is set to "1", the machine records it at 70% size.

***Selector 5: Minimum ON and OFF duration of ringer signals effective in distinctive ringing***

The ringer pattern consists of short and long rings, e.g., short-short-long rings. This selector sets the minimum ON and OFF duration of ringer signals that are required for the machine to interpret ringer signals as being ON or OFF. This is to prevent components of a ringer pattern from being misinterpreted due to chattering in distinctive ringing.

The machine monitors ringer signals at 10-ms intervals. If the signal is ON, the machine counts +1; if it is OFF, it counts -1. If the counter increments up to +5 or +13 when this selector is set to "1" (50 ms) or "0" (130 ms), respectively, the machine interprets the current signal as being ON.

If the counter returns to zero, the machine interprets the signal as being OFF.

If the Distinctive Ring is set to OFF, this selector is not effective.



**WSW32 (Function setting 10)**

Selector No.	Function	Setting and Specifications
1-4	Not used.	
5, 6	Default resolution	No. 5. 6. 0 0: Standard 0 1: Fine 1 0: Super fine 1 1: Photo
7, 8	Default contrast	No. 7. 8. 0 x: Automatic 1 0: Super light 1 1: Super dark

***Selectors 5 and 6: Default resolution***

These selectors set the default resolution which applies when the machine is turned on or completes a transaction.

***Selectors 7 and 8: Default contrast***

These selectors set the default contrast which applies when the machine is turned on or completes a transaction.

**WSW33 (Function setting 11)**

Selector No.	Function	Setting and Specifications
1-3	Detection threshold level of "no tone" during recording of ICM	No. 1. 2. 3. 0 0 0: -42.5 dBm 0 0 1: -44.0 dBm 0 1 0: -45.5 dBm 0 1 1: -47.0 dBm 1 0 0: -48.5 dBm 1 0 1: -50.0 dBm 1 1 0: -51.5 dBm 1 1 1: -53.0 dBm
4, 5	FAX receiving speed to be kept within the transmission speed limit to the PC	No. 4. 5. 0 0: 14400 bps 0 1: 12000 bps 1 0: 9600 bps 1 1: 7200 bps
6	Report output of polled transmission requests	0: Yes                      1: No
7, 8	Comfortable noise level	(Not used.)

**NOTE:** Selectors 1 through 3 are applicable to models equipped with internal TADs.

***Selectors 1 through 3: Detection threshold level of "no tone" during recording of ICM***

If the tone level during recording of ICM is less than the threshold setting made by these selectors, the tone is interpreted as "no tone". When the "no tone" state is kept for the period specified by selectors 1 through 5 on WSW21, the machine disconnects the line.

***Selectors 4 and 5: FAX receiving speed to be kept within the transmission speed limit to the PC***

To transmit FAX data being received from other machine to the connected PC, you may need to keep the FAX receiving speed within the transmission speed limit specified for the PC. In an initial negotiation sequence for transmission, the machine responds to the calling station with the allowable FAX receiving speed specified by these selectors.

***Selectors 7 and 8: Comfortable noise level (Not used.)***

These selectors set the level of noise to be added during playing-back of voice signals recorded with no-signal compression. If they are set to "0, 0", no noise will be added.

**WSW34 (Function setting 12)**

Selector No.	Function	Setting and Specifications
1-3	Erasing time length of ICM tone recorded preceding the tone detection starting point in the case of automatic line disconnection due to no voice signal received	No. 1. 2. 3. 0 0 0: 0 sec. 0 0 1: 1 sec. 0 1 0: 2 sec. 0 1 1: 3 sec. 1 0 0: 4 sec. 1 0 1: 5 sec. 1 1 0: 6 sec. 1 1 1: 7 sec.
4, 5	No. of CNG cycles to be detected (when the line is connected via the external telephone in the external TAD mode or via the machine in F/T mode)	No. 4. 5. 0 0: 0.5 0 1: 1 1 0: 1.5 1 1: 2
6, 7	Number of DTMF tone signals for inhibiting the detection of CNG during external TAD operation	No. 6. 7. 0 0: 3 0 1: 2 1 0: 1 1 1: 0
8	Not used.	

**NOTE:** Selectors 1 through 5 are applicable to models equipped with built-in TADs.

***Selectors 1 through 3: Erasing time length of ICM tone recorded preceding the tone detection starting point in the case of automatic line disconnection due to no voice signal received***

If the machine has disconnected the line after detection of disconnection tone in ICM recording, it erases tone recorded preceding the tone detection starting point for the time length set by these selectors.

***Selectors 4 and 5: No. of CNG cycles to be detected (when the line is connected via the external telephone in the external TAD mode or via the machine in F/T mode)***

The machine interprets a CNG as an effective signal if it detects a CNG signal by the number of cycles specified by these selectors when the line is connected via the external telephone in the external TAD mode or via the machine in F/T mode.

***Selectors 6 and 7: Number of DTMF tone signals for inhibiting the detection of CNG during external TAD operation***

If the machine receives this specified number of DTMF tone signals during external TAD operation, it will not detect CNG afterwards.  
 If these selectors are set to "1, 1," the CNG detection will not be inhibited.

**WSW35 (Function setting 13)**

Selector No.	Function	Setting and Specifications
1-4	Max. detection period of dial tone/busy tone during recording of ICM	No. 1. 2. 3. 4. 0 0 0 0: No detection 0 0 0 1: 1 sec. 0 0 1 0: 2 sec. 0 1 0 0: 3 sec. ↓ 1 1 1 1: 15 sec.
5-8	Not used.	

**NOTE:** Selectors 1 through 4 are applicable to models equipped with internal TADs.

**Selectors 1 through 4: Max. detection period of dial tone/busy tone during recording of ICM**

If the machine (called station) detects dial tone or busy tone exceeding the detection level specified by selectors 1 through 3 on WSW30 for the period specified by these selectors, then it disconnects the line.

**WSW36 (Function setting 14)**

Selector No.	Function	Setting and Specifications
1	ECP mode*	(Not used.)
2	Recovery from Inactive PC Interface	(Not used.)
3	PC Power-off Recognition Time	(Not used.)
4	Not used.	
5	Escape from phase C	0: Yes      1: No
6-8	Extension of incoming calling signal (CI) frequency band specified by selectors 1 through 4 on WSW14	No. 6. 7. 8. 0 0 0: 0 (Ignored) 0 0 1: 4 (448 Hz) 0 1 0: 8 (244 Hz) 0 1 1: 12 (162 Hz) 1 0 0: 16 (122 Hz) 1 0 1: 20 (97 Hz) 1 1 0: 24 (81 Hz) 1 1 1: 28 (69 Hz)

\*ECP: Enhanced Capabilities Port)

**Selector 1: ECP mode (Not used.)**

The ECP mode enhances the normal bidirectional communications between the machine and the connected PC for higher transmission speed.

(Continue to the next page)



***Selector 2: Recovery from Inactive PC Interface (Not used.)***

If the machine recognizes via the STB signal line that the connected PC is powered off, it will turn the PC interface outputs Low to protect the PC from hazards that could be caused by weak electric current accidentally flown from the machine. This selector determines whether or not the machine should recover from the inactive PC interface to normal interfacing state upon receipt of data from the PC.

***Selector 3: PC Power-off Recognition Time (Not used.)***

This selector sets the time length from when the machine detects the PC powered off until it recognizes the detected state as power-off. If selector 2 is set to "0", it is recommended that selector 3 be set to "1"; otherwise, the machine may mistakenly detect PC powered off.

***Selector 5: Escape from phase C***

This selector determines whether or not the machine will escape from phase C when it detects an RTC (Return to Control) in non-ECM mode or an RCP (Return to Control Partial page) in ECM mode.

***Selectors 6 through 8: Extension of incoming calling signal (CI) frequency band specified by selectors 1 through 4 on WSW14***

At the start of reception, if the machine detects the frequency of a CI signal specified by selectors 1 through 4 on WSW14, it starts the ringer sounding. However, the machine may fail to detect the CI signal normally due to noise superimposed at the time of reception. To prevent it, use selectors 6 through 8 on WSW36.

If the machine detects higher frequencies than the setting made here, it regards them as noise and interprets the detecting state as being normal, allowing the ringer to keep sounding according to the preset number of ringers (until it starts automatic reception of FAX data in the FAX mode or enters the TAD mode in the TEL mode).

**WSW37 (Function setting 15)**

Selector No.	Function	Setting and Specifications
1	Printout of the stored image data of an unsent document onto an error report	0: No      1: Yes
2	Erasure of the stored image data of an unsent document at the time of the subsequent in-memory message transmission	0: No      1: Yes
3–8	Not used.	

***Selector 1: Printout of the stored image data of an unsent document onto an error report***

This selector determines whether or not to print out the 1st-page image data of a document onto the error report if the document image data stored in the temporary memory cannot be transmitted normally.

***Selector 2: Erasure of the stored image data of an unsent document at the time of the subsequent in-memory message transmission***

If in-memory message transmission fails repeatedly when selector 1 is set to "1", the temporary memory will be occupied with image data. Setting selector 2 to "1" will automatically erase the stored 1st-page image data of an unsent document at the time of the subsequent in-memory message transmission only when recording paper or toner runs out.

**WSW38 (V.34 transmission settings)**

Selector No.	Function	Setting and Specifications
1, 2	Setting of the equalizer	No. 1. 2. 0 x: Automatic 1 0: Fixed to 4 points 1 1: Fixed to 16 points
3	Sending level of guard tone at phase 2	0: Normal -7 db 1: Normal
4	Stepping down the transmission speed at fallback each	0: 2400 bps 1: 4800 bps
5, 6	Automatic control of modem's EQM gain for proper transmission speed choice	No. 5. 6. 0 0: For higher transmission speed than the current setting 0 1: No change from the current setting 1 0: For lower transmission speed than the current setting 1 1: For further lower transmission than the setting made by 1, 0
7	Redialing when a communications error occurs	0: ON 1: OFF
8	Not used.	0: ON 1: OFF

**NOTE:** WSW38 takes effect only when the V.34 mode is permitted (WSW19, selector 7) in models supporting V.34 mode.

***Selectors 1 and 2: Setting of the equalizer***

These selectors set the equalizer's training level to be applied if the machine fails to send training due to weak line connection. If these selectors are set to "0, X", the modem will automatically set the appropriate training level.

***Selector 3: Sending level of guard tone at phase 2***

This selector sets the sending level of guard tone for 1800 Hz to be sent at Phase 2 in the V. 34 mode.

***Selector 4: Stepping down the transmission speed at fallback each***

This selector determines how much the modem steps down the transmission speed at fallback when called by the remote station. If this selector is set to "1", the modem may step down the transmission speed from 33600 bps to 28800 bps by one-time fallback.

***Selectors 5 and 6: Automatic control of modem's EQM gain for proper transmission speed choice***

These selectors determine how the modem controls the EQM (Eye Quality Monitor) gain for proper choice of the transmission speed, which applies if the modem selects higher transmission speed than the possible speed so that it always repeats falling back.

(Continue to the next page)

**Selector 8: Detection of CED for stopping CNG**

If this selector is set to "0", the detection time of CED specified by WSW43, selectors 4 and 5 will apply.

**WSW39 (V.34 transmission speed)**

Selector No.	Function	Setting and Specifications
1-4	First transmission speed choice for fallback	No. 1. 2. 3. 4. No. 5. 6. 7. 8. 0 0 0 0: 2400 bps 0 0 0 1: 4800 bps 0 0 1 0: 7200 bps 0 0 1 1: 9600 bps 0 1 0 0: 12000 bps 0 1 0 1: 14400 bps 0 1 1 0: 16800 bps 0 1 1 1: 19200 bps
5-8	Last transmission speed choice for fallback	1 0 0 0: 21600 bps 1 0 0 1: 24000 bps 1 0 1 0: 26400 bps 1 0 1 1: 28800 bps 1 1 0 0: 31200 bps 1 1 0 1: 33600 bps 1 1 1 0: 33600 bps 1 1 1 1: 33600 bps

Service Tables

**NOTE:** WSW39 takes effect only when the V.34 mode is permitted (WSW19, selector 7) in models supporting V.34 mode. For the transmission speed setting in other modes, refer to WSW19.

**Selectors 1 through 8: First and last choices of transmission speed for fallback**

These selectors are used to set the modem speed range. With the first transmission speed choice specified by selectors 1 through 4, the machine attempts to establish the transmission link via the modem. If the establishment fails, the machine automatically steps down to the next highest speed and attempts to establish the transmission link again. The machine repeats this sequence while stepping down the transmission speed to the last choice specified by selectors 5 through 8.

If the modem always falls back to a low transmission speed (e.g., 24,000 bps), set the first transmission speed choice to the lower one (e.g., modify it from 31,200 bps to 26,400 bps) in order to deactivate the high-speed modem function and reduce the training time for shorter transmission time.

WSW39 will be limited by selectors 3 through 8 on WSW40.

**WSW40 (V.34 modem settings)**

Selector No.	Function	Setting and Specifications			
1-2	Not used.				
3-8	Masking of symbol rate(s)		Not masking	Masking	
		No.3	0	1	3429 symbols/sec
		No.4	0	1	3200 symbols/sec
		No.5	0	1	3000 symbols/sec
		No.6	0	1	2800 symbols/sec
		No.7	0	1	Not used.
		No.8	0	1	2400 symbols/sec

**NOTE:** WSW40 takes effect only when the V.34 mode is permitted (WSW19, selector 7) in models supporting V.34 mode.

**Selectors 3 through 8: Masking of symbol rate(s)**

These selectors allow you to limit the transmission speed range in V.34 mode by masking the desired symbol rate(s). Transmission speeds assigned to the symbol rates are listed on the next page. The setting made by these selectors will limit the setting made by selectors 1 through 4 on WSW39.

If selector 3 is set to "1" to mask the 3429 symbols/second when the first transmission speed choice is 33600 bps (specified by selectors 1 through 4 of WSW39), for example, then the allowable maximum transmission speed will be limited to 31200 bps. If selector 8 is set to "1" to mask the 2400 symbols/second when the first transmission speed choice is 33600 bps, then the allowable maximum transmission speed remains 33600 bps.

If selector 8 is set to "1" to mask the 2400 symbols/second when the first transmission speed choice is 21600 bps (specified by selectors 1 through 4 on WSW39), then the allowable maximum transmission speed remains 21600 bps but the minimum transmission speed will be limited to 4800 bps.

Symbol rate	Speed (bps)								
2400	2400								
	4800	2800	4800	3000	4800	3200	4800	3429	4800
	7200		7200		7200		7200		7200
	9600		9600		9600		9600		9600
	12000		12000		12000		12000		12000
	14400		14400		14400		14400		14400
	16800		16800		16800		16800		16800
	19200		19200		19200		19200		19200
	21600		21600		21600		21600		21600
			24000		24000		24000		24000
			26400		26400		26400		26400
					28800		28800		28800
							31200		31200
									33600

**WSW41 (ON-duration of the scanning light source)**

Selector No.	Function	Setting and Specifications
1-3	ON-duration of the scanning light source at room temperature	(Not used.)
4	Not used.	
5-8	Modem attenuator	No. 5. 6. 7. 8. 0 0 0 0: -10 dBm 0 0 0 1: -11 dBm 0 0 1 0: -12 dBm 0 0 1 1: -13 dBm 0 1 0 0: -14 dBm ↓ 1 1 1 1: -25 dBm

**Selectors 1 through 3: ON-duration of the scanning light source at room temperature (Not used.)**

If the scanning operation is started when the scanning light source is off, then it will come on for scanning. These selectors determine how long the light source is ON after scanning.

If these selectors are set to "1, 1, 1," the light source goes off immediately after the scanning sequence.

**Selectors 5 through 8: Modem attenuator**

These selectors are used to adjust the transmitting level of the modem when the reception level at the remote station is improper due to line loss. This function applies to super G3 protocol signals.

Service Tables

**WSW42 (Internet mail settings)**

Selector No.	Function	Setting and Specifications
1	Access to the incoming mail (POP3) server (Periodical or on-demand)	0: Disable    1: Enable
2	Access to the outgoing mail (SMTP) server	0: Disable    1: Enable
3	I-FAX relay	0: Disable    1: Enable
4-8	Not used.	

**NOTE:** WSW42 is applicable to models equipped with LAN interface.

**WSW43 (Function setting 21)**

Selector No.	Function	Setting and Specifications
1	Not used.	
2, 3	Wait time for PC-Fax reception (Class 2) and FPTS command transmission	No. 2. 3. 0 0: 50 ms 0 1: 100 ms 1 0: 150 ms 1 1: 0 ms
4, 5	Detection time of 2100 Hz CED or ANSam	No. 4. 5. 0 0: 200 ms 0 1: 300 ms 1 0: 400 ms 1 1: 500 ms
6	Not used.	
7	Automatic start of remote maintenance	0: No      1: Yes
8	JPEG coding	0: Disable      1: Enable

**Selector 8: JPEG coding**

Setting this selector to "0" disables the machine from sending/receiving JPEG color images and from receiving JPEG monochrome images.

**WSW44 (Speeding up scanning-1)**

Selector No.	Function	Setting and Specifications
1-5	Not used.	
6-8	Effective time length of the white level compensation data obtained beforehand	(Not used.)

**Selectors 6 through 8: Effective time length of the white level compensation data obtained beforehand (Not used.)**

If you set documents in the ADF and the document front sensor detects them, the controller will make correction of the reference voltage to be applied to white level compensation for document scanning before the Copy key is pressed. These selectors determine how long compensation data obtained beforehand will keep effective.

**WSW45 (Speeding up scanning-2)**

Selector No.	Function	Setting and Specifications
1-3	Delay time from when documents are set until the ADF starts drawing them in	(Not used.)
4-6	Periodical correction intervals of the reference voltage to be applied to white level compensation for document scanning, during standby	(Not used.)
7	Standby position of the CIS unit	(Not used.)
8	Not used.	

**NOTE:** WSW45 is applicable only to models equipped with ADF units.

**WSW46 (Monitor of power ON/OFF state and parallel port kept at high)**

Selector No.	Function	Setting and Specifications
1-2	Monitoring the PC ON/OFF state	(Not used.)
3	Parallel port output pins kept at high level	(Not used.)
4	Previous filtering parameters for white level compensation	(Not used.)
5-8	Not used.	

**NOTE:** Selector 4 is not applicable to models equipped with flat-bed scanners.

**WSW47 (Switching between high- and full-speed USB)**

Selector No.	Function	Setting and Specifications
1	Handling paper at the occurrence of a paper feed timing error	0: Eject paper w/o print 1: Print on the current paper
2	Not used.	
3, 4	Delay of FAX line disconnection when switching to the pseudo-ringing external telephone	No. 3. 4. 0 0: 200 ms 0 1: 400 ms 1 0: 700 ms 1 1: 1000 ms
5	Disable the ringer of external telephone at non-ring reception	0: No            1: Yes
6	Not used.	
7	Disable the ringer of external telephone with CAR signal when caller ID service is available	0: No            1: Yes
8	Switching between high-speed USB and full-speed USB	0: Auto switching between high-speed USB (ver. 2.0) and full-speed USB (Ver. 1.1) 1: 1: Fixed to full-speed USB (ver. 1.1)

- NOTE:** 1) Selector 1 is applicable only to models equipped with flat-bed scanners.  
2) Selectors 3 and 4 are applicable only to models supporting pseudo-ringing of a connected external telephone.

***Selector 1: Handling paper at the occurrence of a paper feed timing error***

When feeding paper to the print start position, the machine might cause a feed timing error so that the registration sensor goes ON signaling the presence of paper. This selector determines whether the machine prints on the current paper or ejects the current paper without printing and prints on the next paper.

***Selectors 3 and 4: Delay of FAX line disconnection when switching to the pseudo-ringing external telephone***

When the machine receives a phone call, it can make the connected external telephone ring (so called pseudo-ringing). During pseudo-ringing, if you pick up the handset of the external telephone, the line might be disconnected due to cut-off of the line current.

To hold the line, the machine may supply line current by making use of the pulse generator circuit that forms a parallel loop. This way the FAX line disconnection may be delayed. These selectors determine the delay period.

**WSW48 (USB setup latency)**

Selector No.	Function	Setting and Specifications
1–5	Not used.	
6–8	USB setup latency	No. 6. 7. 8. 0 0 0: Default period 0 0 1: Shorter 1 0 1 0: Longer 1 0 1 1: Longer 2 1 0 0: Longer 3 1 0 1: Longer 4 1 1 0: Shorter 2 1 1 1: Shorter 3

**Selectors 6 through 8: USB setup latency**

These selectors should not be disturbed.

**WSW49 (End-of-copying beep and print in black)**

Selector No.	Function	Setting and Specifications
1, 2	Not used.	
3	End-of-copying beep	0: Yes      1: No
4, 5	Command flag detection time	No. 4. 5. 0 0: 150 ms 0 1: 350 ms 1 0: 550 ms 1 1: 750 ms
6–8	Not used.	

**Selectors 4 and 5: Command flag detection time**

After receiving a command flag, the machine will wait for the command that should follow for the time length specified by these selectors.

**WSW50 (SDAA settings)**

Selector No.	Function	Setting and Specifications
1, 2	Percentage voltage for interpreting the external telephone as being hooked up (based on the network's standard voltage)	(Not used.)
3	DC mask curve table to be applied when the line is connected	(Not used.)
4	AC impedance to be applied when the line is connected	(Not used.)
5, 6	Current control to be applied immediately after connection of the line	(Not used.)
7, 8	AC voltage threshold for detection of ring	(Not used.)

**NOTE:** WSW50 is applicable to models equipped with SDAA circuits.

**WSW51 (Function setting 16)**

Selector No.	Function	Setting and Specifications
1	Output of communications error report when transmission verification report is disabled	0: Enable      1: Disable
2–8	Not used.	

**WSW52 Selector**

Selector No.	Function	Setting and Specifications
1–8	Not used.	

**WSW53 (Function setting 17)**

Selector No.	Function	Setting and Specifications
1-4	Interval setting of engine calibration execution (The "engine calibration" is that the engine controls measuring the toner adhering amount periodically according to the number of the printed pages or time.)	No.1. 2. 3. 4. 0 0 0 1: 100, 200, 300, 300 0 0 1 0: 100, 200, 200, 300 0 0 1 1: 100, 100, 100, 100 0 1 0 0: 50, 200, 300, 300 0 1 0 1: 50, 200, 200, 200 0 1 1 0: 50, 100, 300, 300 0 1 1 1: 50, 100, 200, 200 1 0 0 0: 30, 60, 150, 250 1 0 0 1: 30, 60, 100, 200 1 0 1 0: 30, 60, 100, 100 1 0 1 1: 30, 60, 60, 200 1 1 0 0: 30, 60, 60, 100 1 1 0 1: 50, 50, 50, 50 1 1 1 0: The engine calibration is disabled. 1 1 1 1: All calibrations (engine and software) are disabled.
5	Idling mode setting when recording the fax message	0: OFF      1: ON
6-8	Not used.	

**Selectors 5: Idling mode setting when recording the fax message**

The idling mode is to print the fax message by reducing the recording speed (spacing) in order to prevent waste recording when a paper length error is occurred while recording the fax message.

When the idling mode is turned on, the recording speed is approximately half. (monochrome: 16ppm, color: 6.5ppm)

**WSW54-60**

Selector No.	Function	Setting and Specifications
1-8	Not used.	

Service Tables

## 5.3 FIRMWARE UPDATE

### 5.3.1 TYPE OF FIRMWARE

The table lists the firmware program used by this machine.

Firmware	Display
Controller Firmware	Axxxxxxx.14F7

**NOTE:** "XXXXX": Date of made

Example: "A0511141709:14F7" is the version A, which has been made at 17:09 on November 14th in 2005. "14F7" is a check sum.

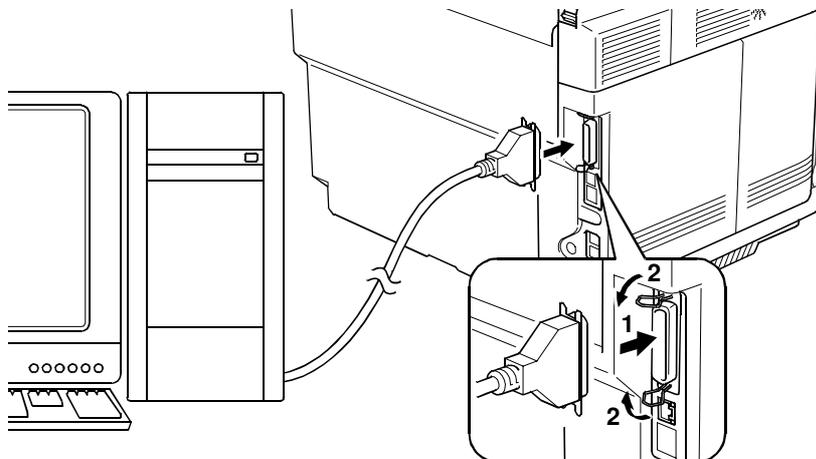
### 5.3.2 PRECAUTION

You need to prepare the following items before firmware update.

- Firmware
- Windows PC
- Parallel interface cable

### 5.3.3 PARALLEL INTERFACE CABLE CONNECTION

#### *Connecting the machine to your PC*

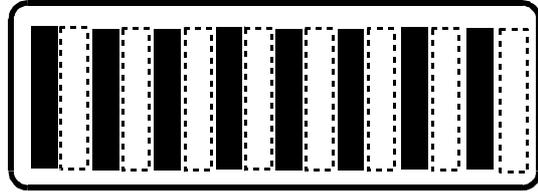


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1. Make sure that your PC is turned off.
2. Make sure that the power cord of the machine is unplugged from a wall socket or other power source.
3. Connect the parallel interface cable to the parallel port on the back of the machine and secure it with the lock wires.
4. Connect the other end of the interface cable to the machine port of your PC and secure it with the two screws.

### ***Setting up the machine and your PC***

1. Plug the power cord of the machine into a wall socket, and turn on the power switch while pressing the "5" key on the machine's control panel.
2. Check to see that the pattern shown at the right shows on the LCD. If it does not, go back to step 1.
3. Turn on your PC.



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### ***Firmware updating procedure***

1. Make a folder in your PC, and then copy the firmware to a folder.
2. Use the command prompt or MS-DOS prompt.
3. Change the current directory to the folder that has the firmware.
  - For example, the folder that has the firmware is in "C:¥temp>".
4. Input the following command to transfer the firmware to the copier.
  - C:¥temp> copy /xxxxxx.upd lpt1:
  - "xxxxxx" indicates the firmware filename.
5. Beep sound continues to sound during the data transmission.
6. The LCD display changes after completing the data transmission.
7. Turn the main power switch OFF and ON.

### **Important**

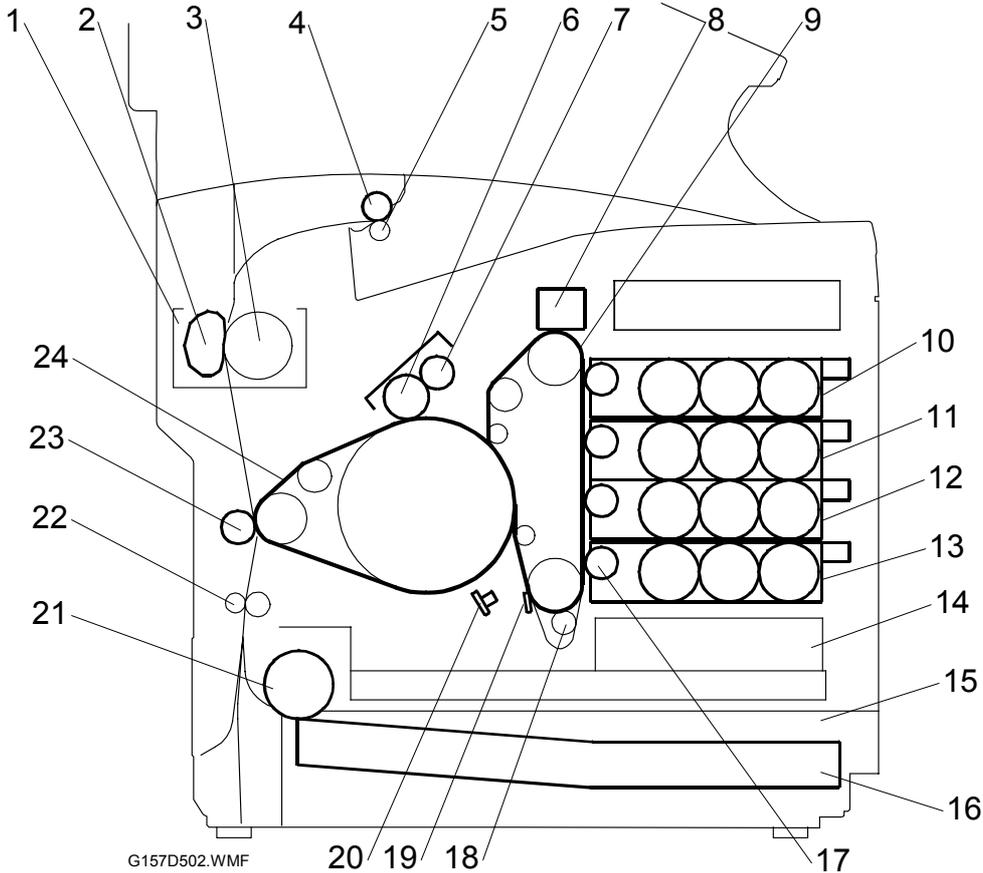
- For Europe, Oceania or Asia models, a destination code must be set with "EEPROM Customizing (Function mode 74)" in the service mode.
8. To show the current firmware version on the LCD, hold down the "⊗" and "⊕" keys at the same time when the machine is in the ready condition.
  9. Check if the firmware is updated correctly.

# 6. DETAILED DESCRIPTIONS

## 6.1 OVERVIEW

### 6.1.1 COMPONENT LAYOUT

#### Main Frame

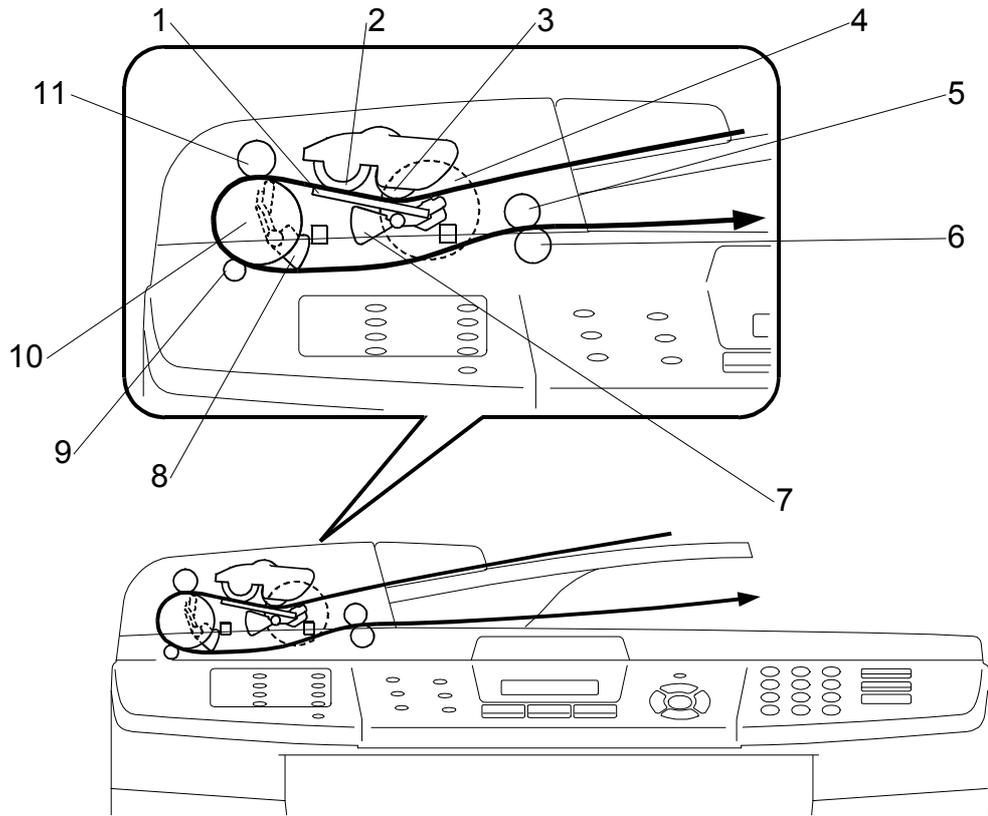


G157D502.WMF

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

Detailed Descriptions

**ADF**

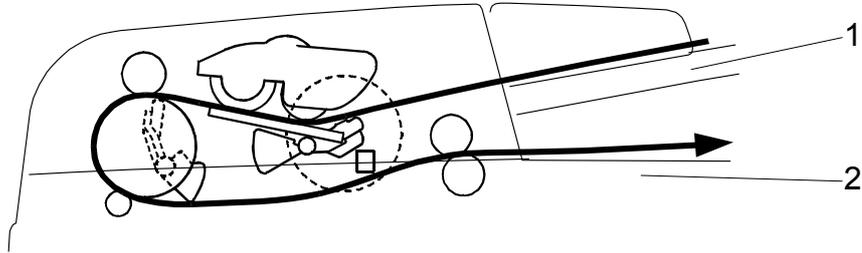


G157D508.WMFF

- |                         |                                  |
|-------------------------|----------------------------------|
| 1. Separation Pad       | 7. Leading Edge Sensor Actuator  |
| 2. Feed Roller          | 8. Trailing Edge Sensor Actuator |
| 3. Pick-up Roller       | 9. Transport Pressure Roller 2   |
| 4. ADF Motor            | 10. Transport Roller             |
| 5. Exit Roller          | 11. Transport Pressure Roller 1  |
| 6. Exit Pressure Roller |                                  |

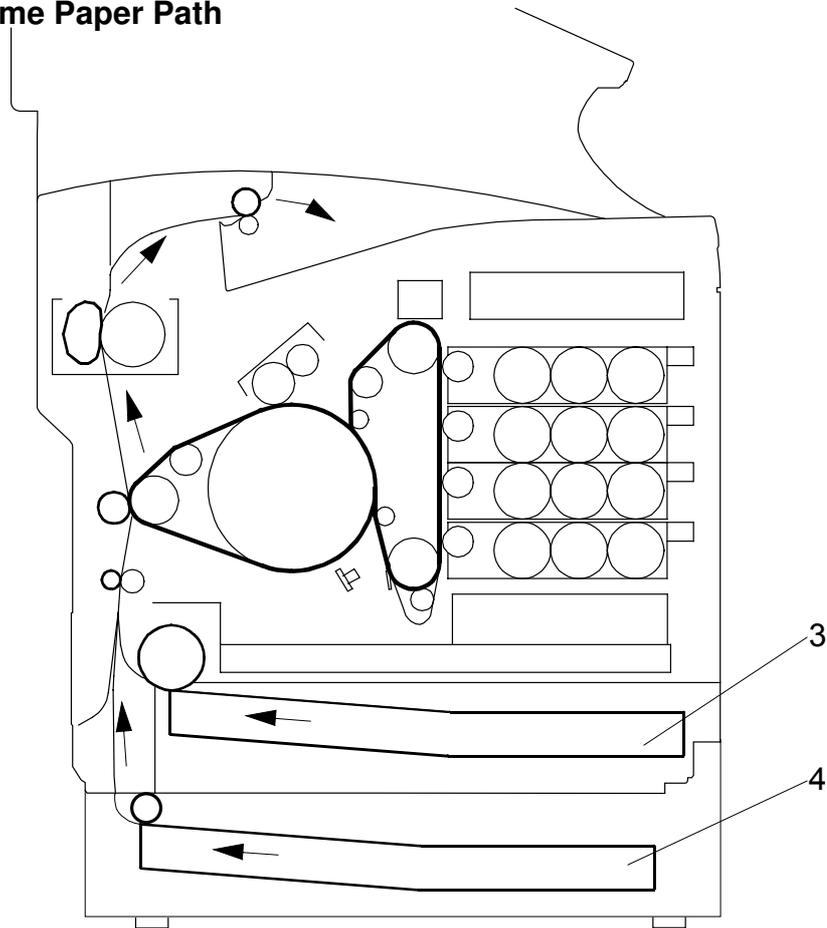
### 6.1.2 PAPER PATH

#### ADF Paper Path



G157D505.WMFF  
G157D505.WMF

#### Main Frame Paper Path



1. Original tray

2. Original exit tray

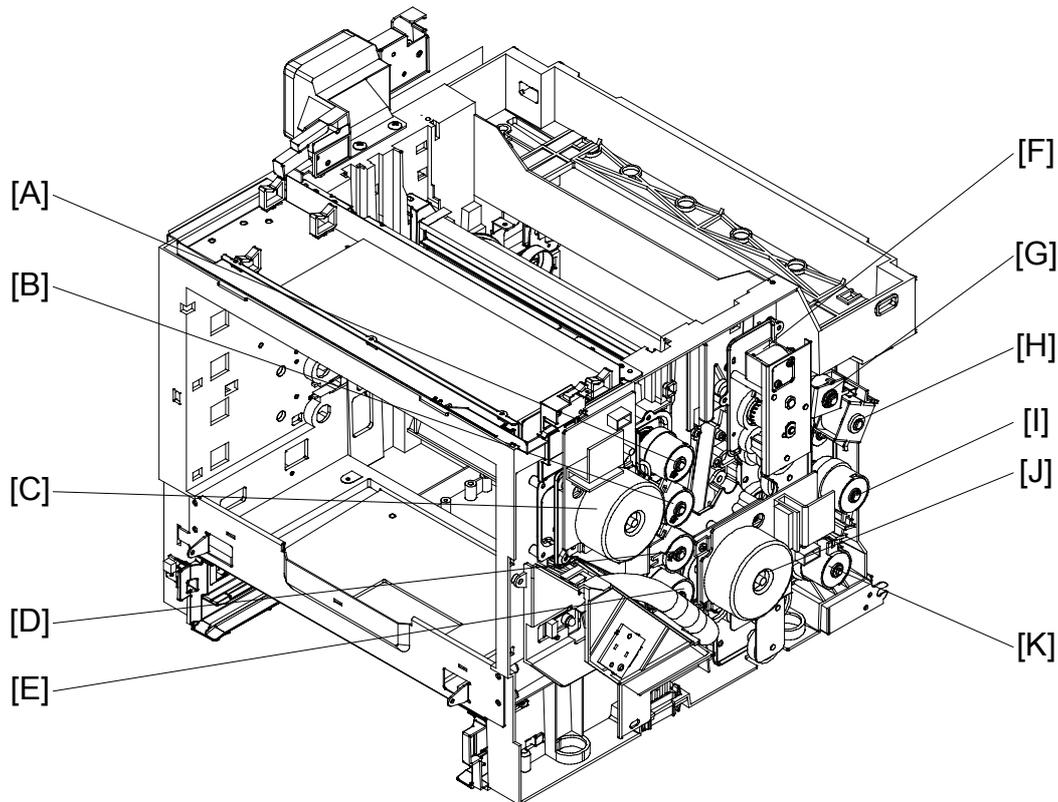
3. Paper tray (standard)

4. Paper tray (optional)

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

Detailed  
Descriptions

### 6.1.3 DRIVE LAYOUT



G157D903.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.

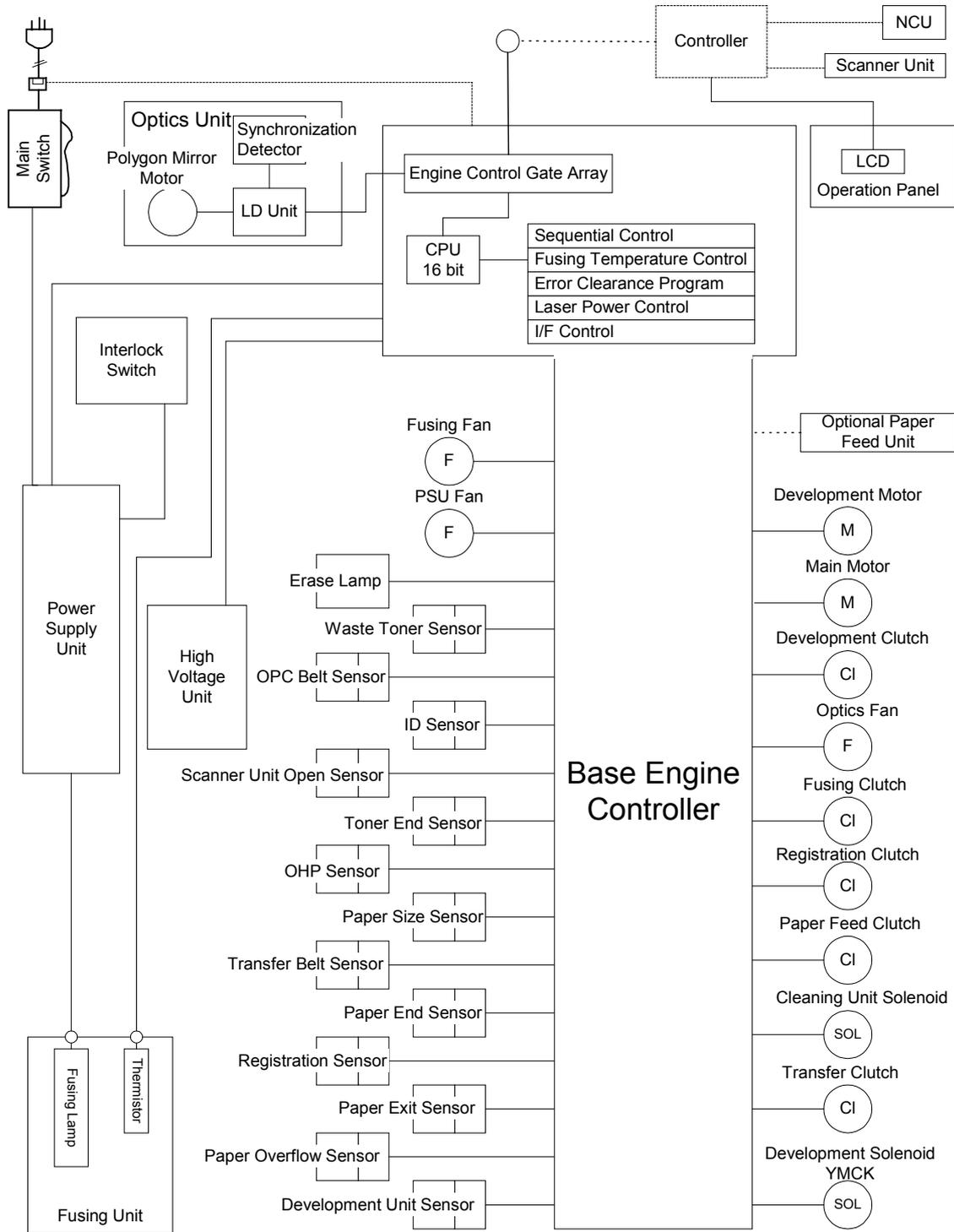
#### Main motor [J]

- 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



Detailed Descriptions

**Controller**

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

- Scanner Unit
- NCU (Network Control Unit)
- Operation Panel
- Standard: IEEE 1284, USB 2.0, IEEE 1394
- Optional: NA

You can install these optional components on the controller:

- SDRAM (64/128/256 MB)

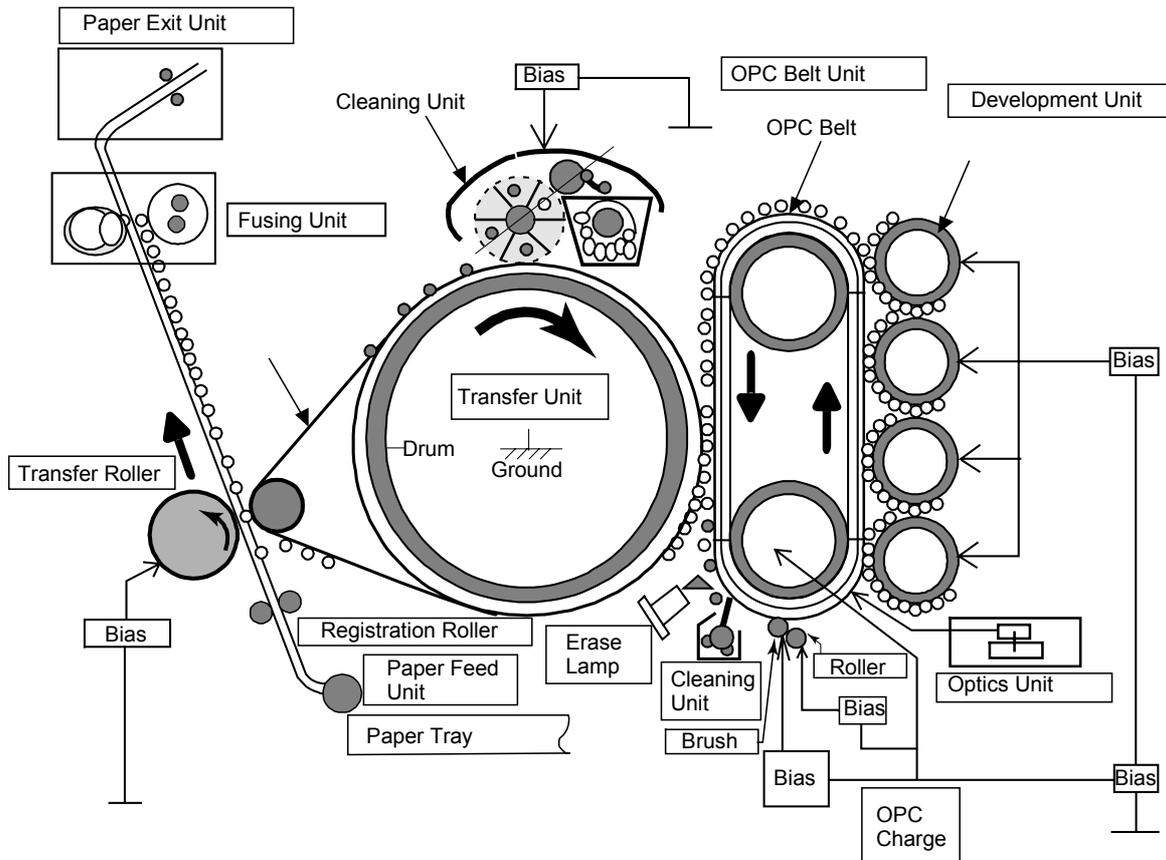
**Base Engine Control Unit (BCU)**

The BCU examines the power supply and the mechanical components. These include the optional paper feed unit.

**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



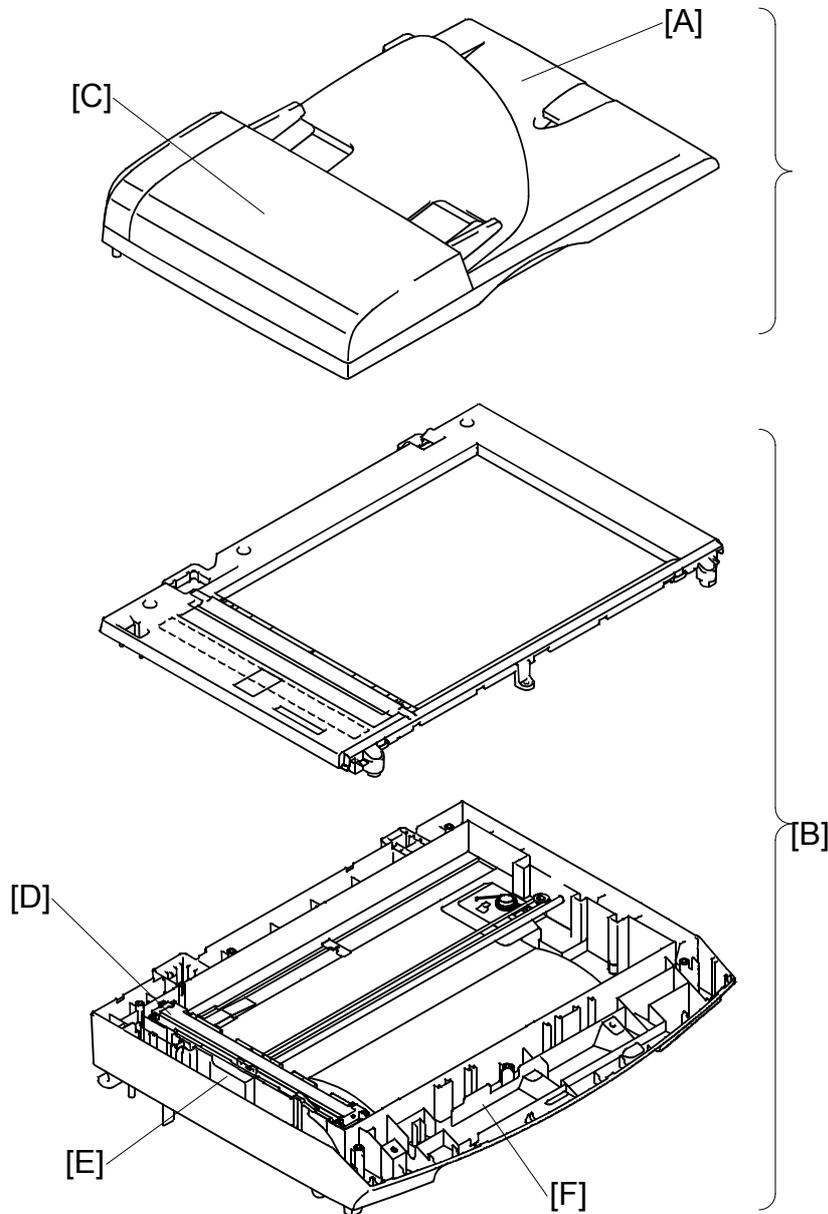
G157D905.WMFF

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 SCANNER MECHANISM

### 6.2.1 SCANNER COMPONENTS



G157D509.WMFF

Detailed  
Descriptions

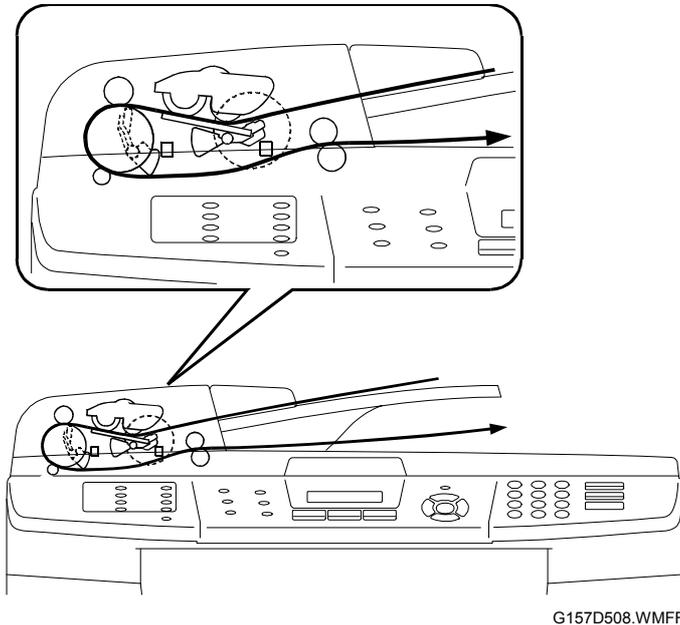
This mechanism consists of the document cover [A], the scanner unit [B] (scanner cover), and the automatic document feeder (ADF) [C].

The scanner unit consists of a scanner top cover, CIS unit [D], CIS drive assembly [E], and scanner base [F].

The detailed illustration in section 6.1.1 shows the components of the ADF and scanner.

## 6.2.2 SCANNING PROCESS

### *Basic Procedure*



G157D508.WMFF

1. ADF scanning: Document moves across stationary CIS unit  
 Placing a document **face up** in the document feeder activates the leading edge sensor, and the machine switches to ADF scanning. The CIS unit first moves to the white-level reference film for white level compensation and then to the ADF scanning position (it does this for each page).  
 The ADF motor then rotates the pick-up roller to pull the document into the ADF. The feed roller feeds the pages one at a time, **starting from the top page**, to the document transport roller, which rotates to move the page in a curve left, down, and right. The page is scanned as it passes over the CIS unit. It then leaves the machine **face down** onto the document cover.
2. Flat-bed scanning: CIS unit moves under stationary document  
 The user lifts the document cover, places a page (or open book) **face down** on the glass plate, and closes the document cover. The CIS unit first moves to the white-level reference film for white level compensation. It then moves right, scanning as it goes. It returns to its home position after the scan.

***CIS Drive Mechanism***

The contact image sensor (CIS) unit rides along the CIS rail, driven by the CIS drive belt. Clockwise motion of the CIS motor moves the unit to the left, and counterclockwise motion moves it to the right.

The CIS unit consists of the document illumination LED array, the self-focusing lens array (this gathers the light reflected from the scanned original), the CIS PCB (this converts the light input to pixel data output), and a glass cover.

The CIS unit can scan color documents. When scanning a color document, the unit turns on the three-color LED lines of red, green and blue (R, G, B) alternately and illuminates the document. When scanning a black/white document, it turns on the green LED line only to scan.

## 6.3 TONER MASS AMOUNT CONTROL

### 6.3.1 OVERVIEW

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

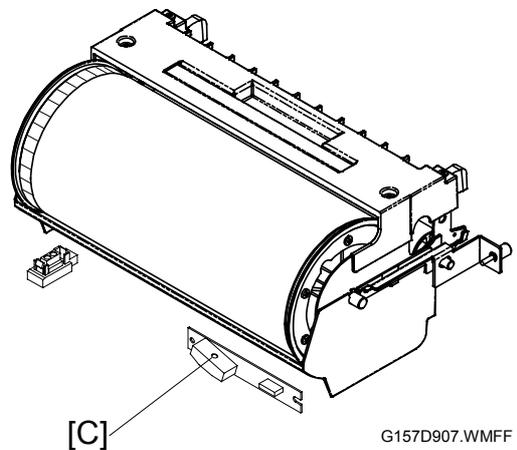
1. ID sensor calibration
2. Test pattern processing
3. Reference equation processing
4. Development bias adjustment

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

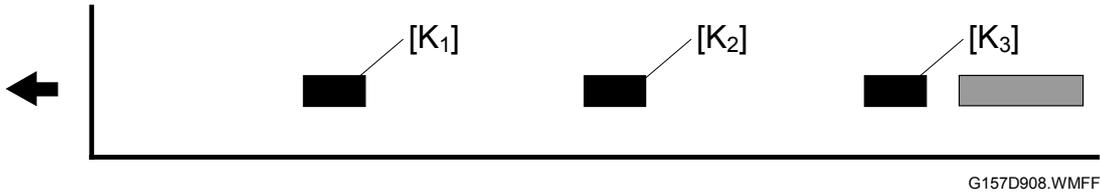
### 6.3.2 ID SENSOR CALIBRATION



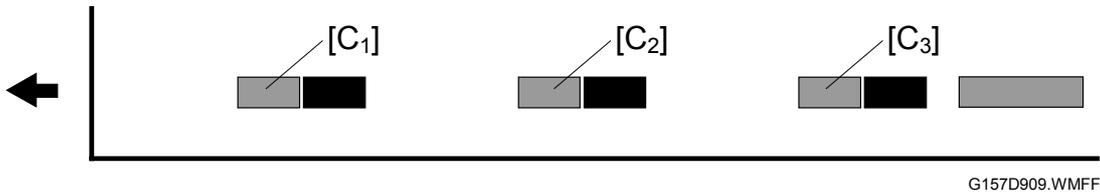
1. The cyan development unit makes a rectangular image [B].
2. This cyan image on the transfer belt [A] reflects the light from the ID sensor [C].
3. The controller examines the signal level from this sensor, and calibrates the ID sensor.



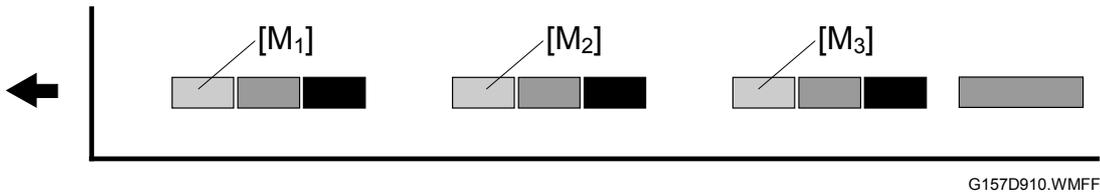
### 6.3.3 TEST PATTERN PROCESSING



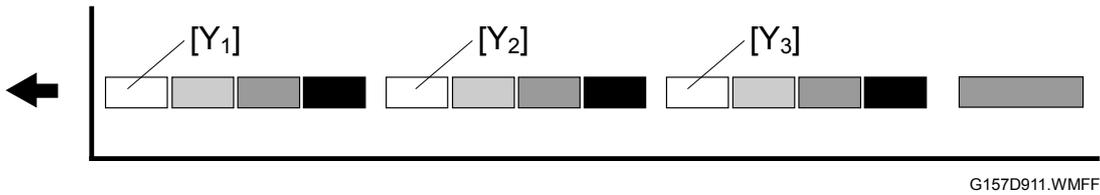
1. The black development unit changes the development bias to make three rectangular images. The first image [K<sub>1</sub>] is weaker than the second image [K<sub>2</sub>]. The second image is weaker than the third image [K<sub>3</sub>].



2. The cyan development unit changes the development bias to make three rectangular images. The first image [C<sub>1</sub>] is weaker than the second image [C<sub>2</sub>]. The second image is weaker than the third image [C<sub>3</sub>].



3. The magenta development unit changes the development bias to make three rectangular images. The first image [M<sub>1</sub>] is weaker than the second image [M<sub>2</sub>]. The second image is weaker than the third image [M<sub>3</sub>].



4. The yellow development unit changes the development bias to make three rectangular images. The first image [Y<sub>1</sub>] is weaker than the second image [Y<sub>2</sub>]. The second image is weaker than the third image [Y<sub>3</sub>].

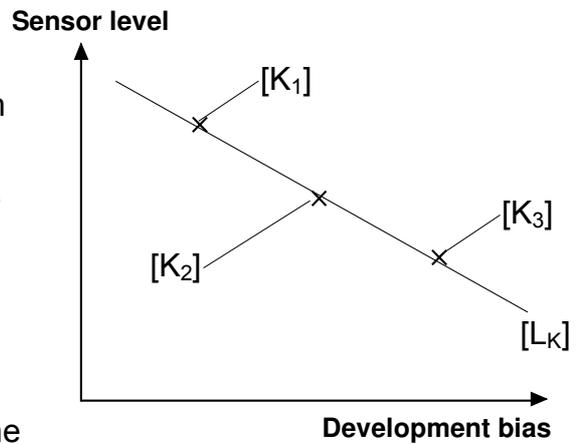
Detailed Descriptions

### 6.3.4 REFERENCE EQUATION PROCESSING

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

1. The three black rectangular images [K<sub>1</sub>][K<sub>2</sub>][K<sub>3</sub>] (see 6.3.3) reflect the light from the ID sensor.
2. The controller compares the signal levels from the ID sensor and finds a linear equation [L<sub>K</sub>].
3. The controller calculates the black development bias that is appropriate to realize the target ID sensor level.

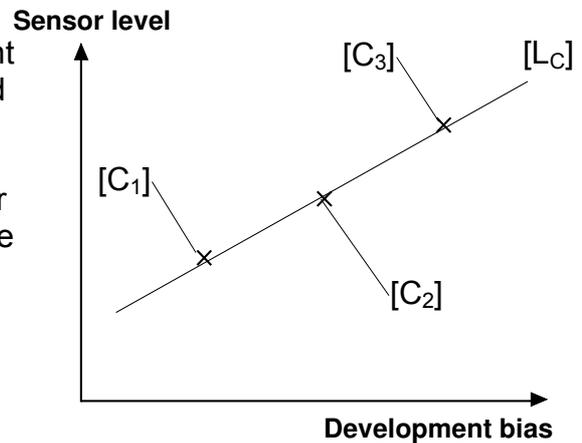
**NOTE:** The sensor level decreases as the black-image density increases.



G157D912.WMFF

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<sub>C</sub>]. The sensor level increases as the cyan-image density increases.



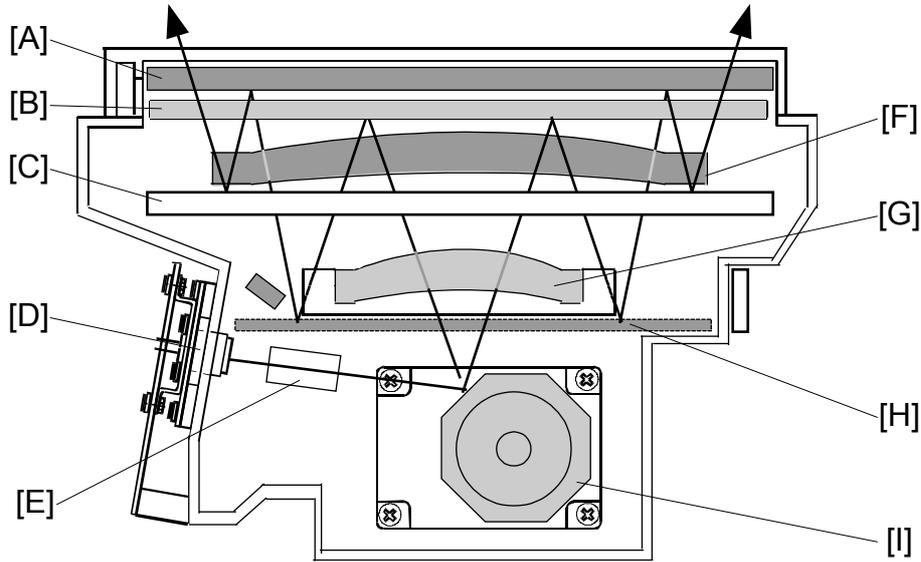
G157D913.WMFF

### 6.3.5 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.

## 6.4 OPTICAL HOUSING UNIT

### 6.4.1 OPTICAL PATH

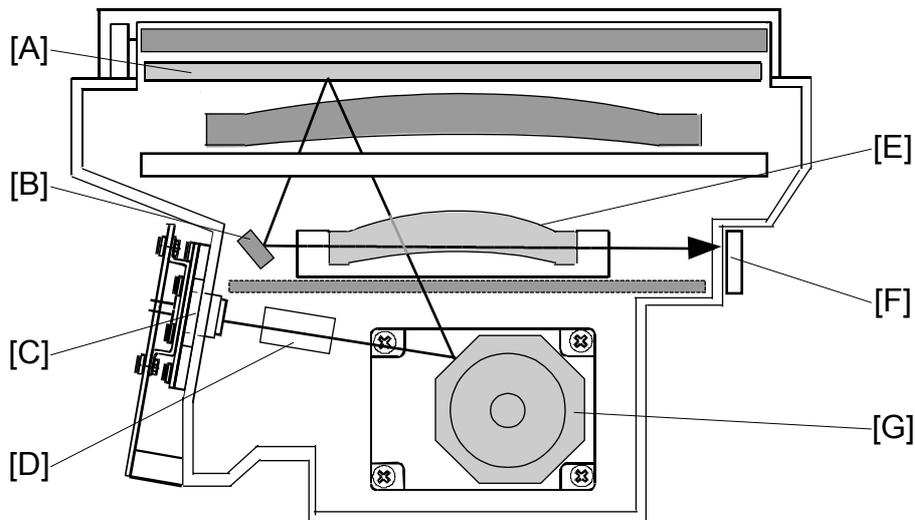


G157D914.WMFF

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- $\theta$  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.

## 6.4.2 LASER SYNCHRONIZATION



G157D915.WMFF

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].

## 6.4.3 SPECIFICATIONS

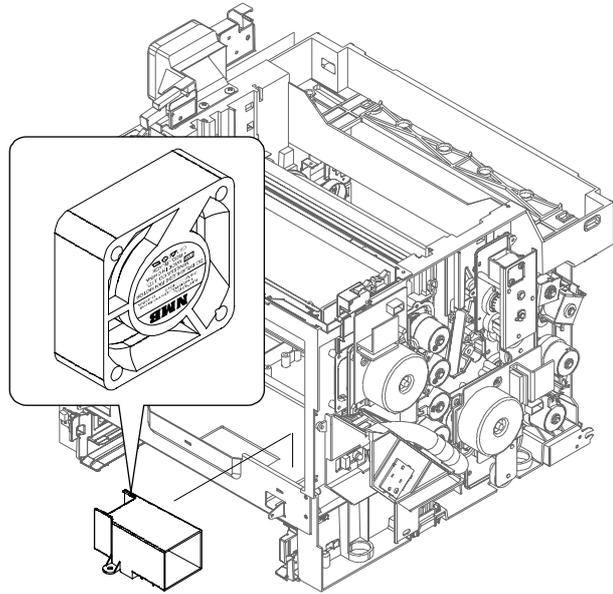
The table lists some specifications of the optical housing unit.

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

### 6.4.4 OPTICS UNIT FAN

The optics unit fan cools down the laser optics unit.

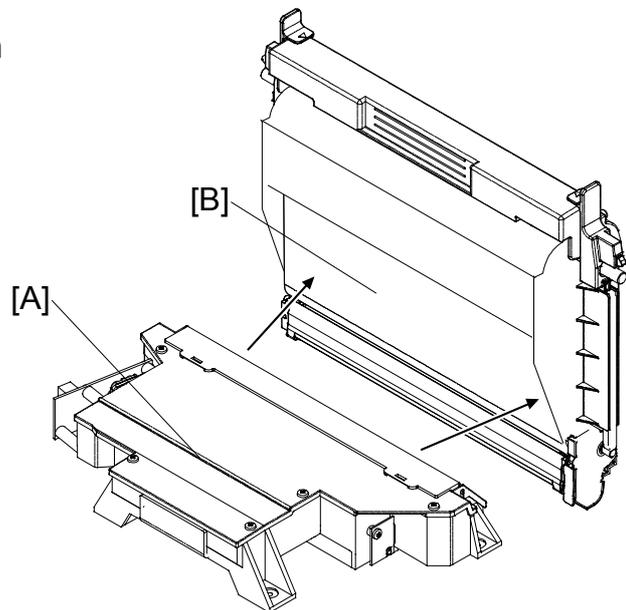
**NOTE:** The optics unit fans is necessary to decrease the temperature inside the machine.



G157D916.WMFF

### 6.4.5 LASER EXPOSURE

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



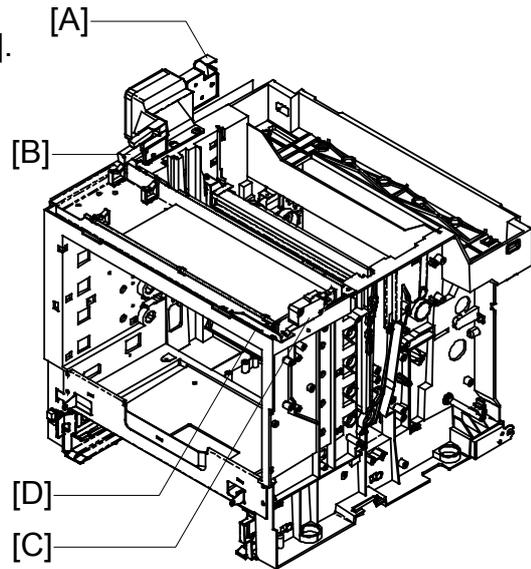
Detailed Descriptions

G157D917.WMFF

## 6.4.6 SAFETY SWITCH

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

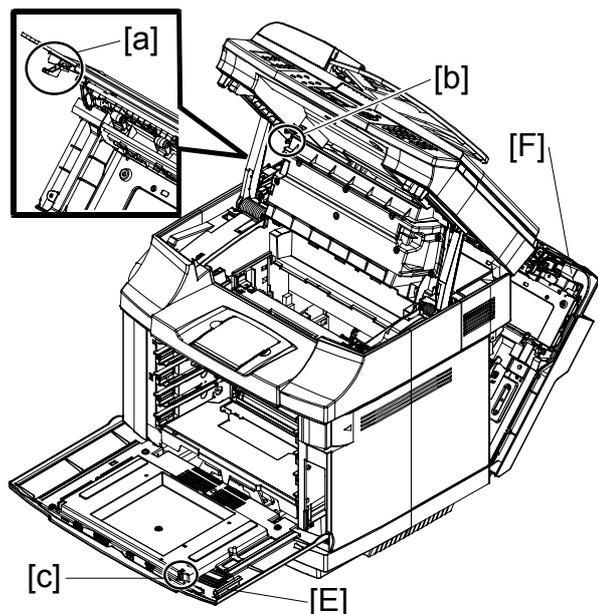
- [A]: Rear cover
- [B]: Center cover
- [C]: Front cover



G157D918.WMFF

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

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



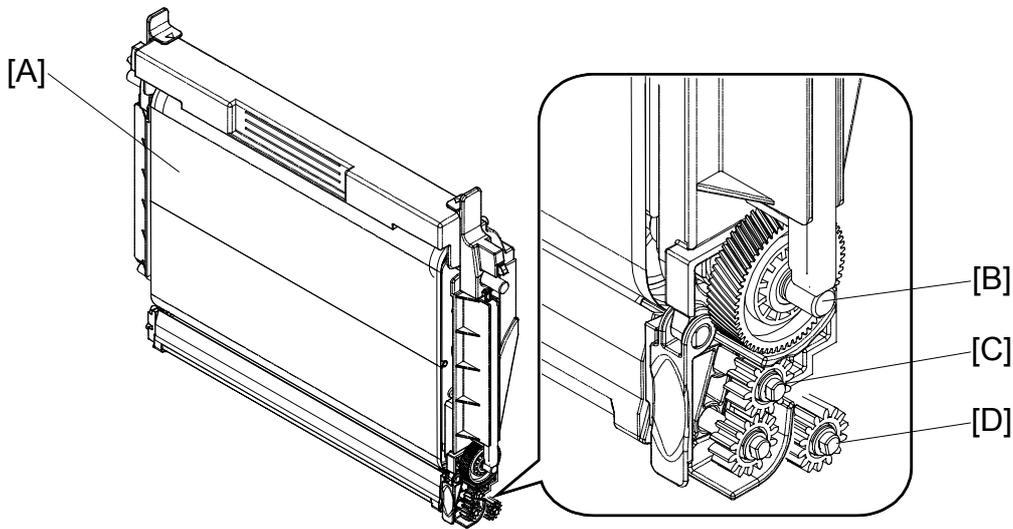
G157D506.WMFF

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 copier can operate even when you pull the lever (if the rear cover stays closed).

**NOTE:** The center cover does not have such a lever.

## 6.5 OPC BELT

### 6.5.1 DRIVE

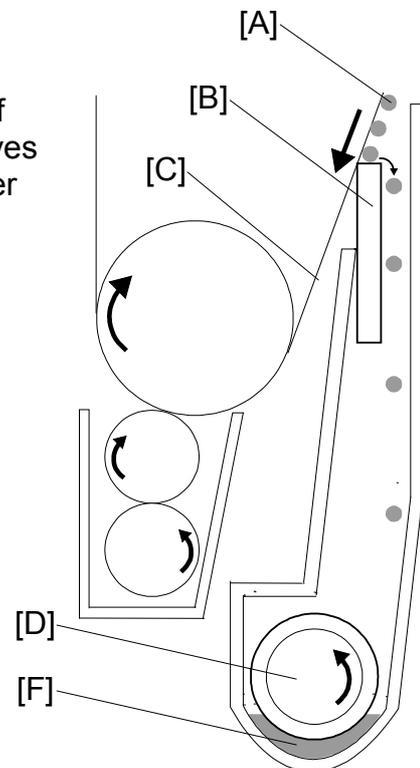


G157D920.WMFF

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] (☛ 6.7.4, Drive). The transfer belt sensor checks the drive speed (☛ 6.7.2).

### 6.5.2 OPC BELT CLEANING

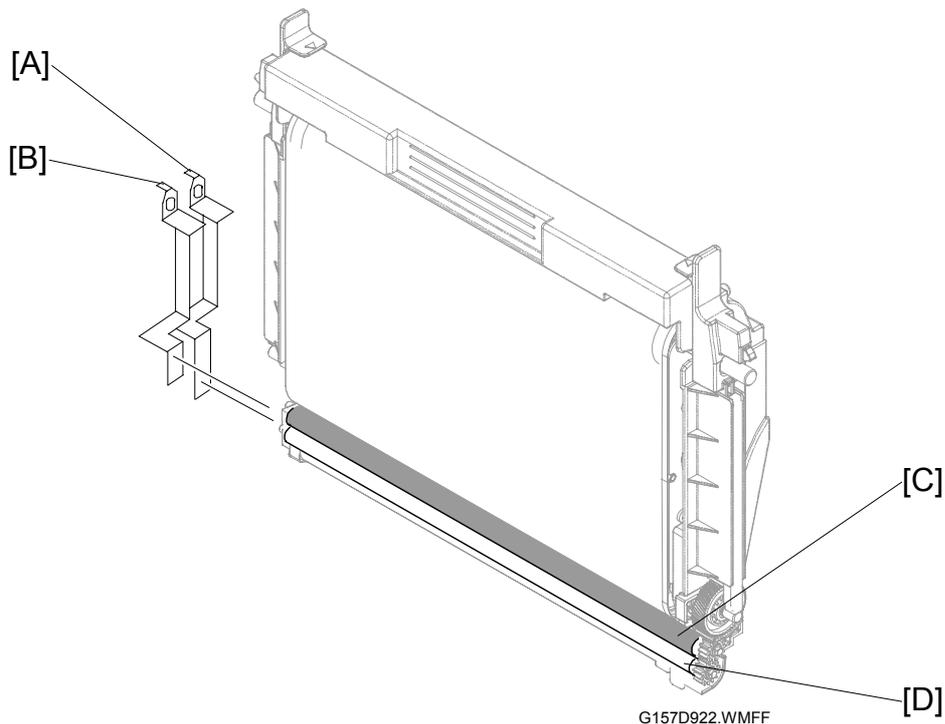
The OPC-belt cleaning blade [B] is near the bottom of the OPC belt [C]. The OPC-belt cleaning blade removes remaining toner [A] from the OPC belt. Removed toner (waste toner) goes into the waste toner duct [F]. The waste toner feeder [D] moves waste toner to the right end of the waste toner duct. At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



Detailed Descriptions

G157D921.WMFF

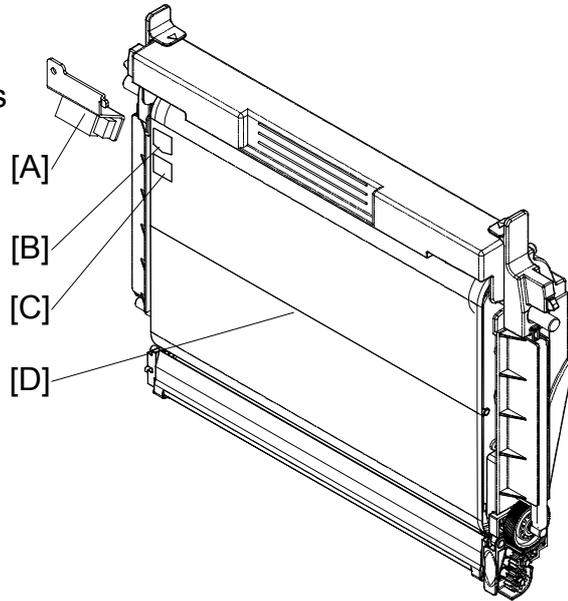
### 6.5.3 CHARGE ROLLER AND CLEANING ROLLER



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.

### 6.5.4 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 copier does not use the area around this line to make latent and toner images.

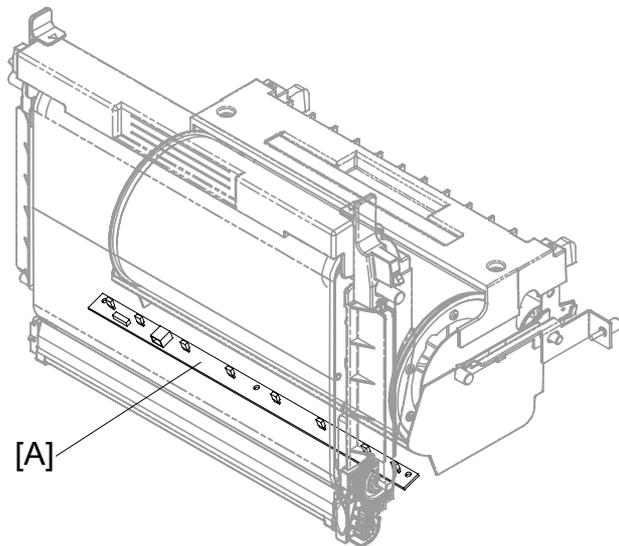


G157D923.WMFF

### 6.5.5 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 MCN8 on the BCU.

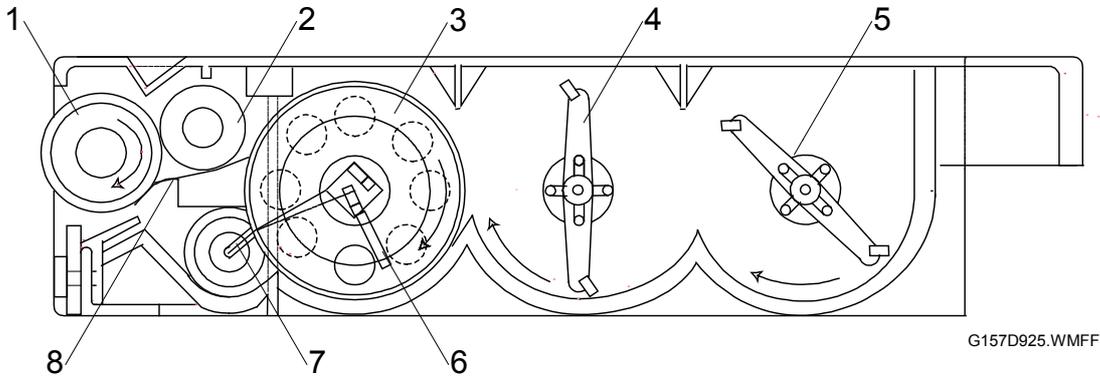


G157D924.WMFF

Detailed Descriptions

## 6.6 DEVELOPMENT UNIT

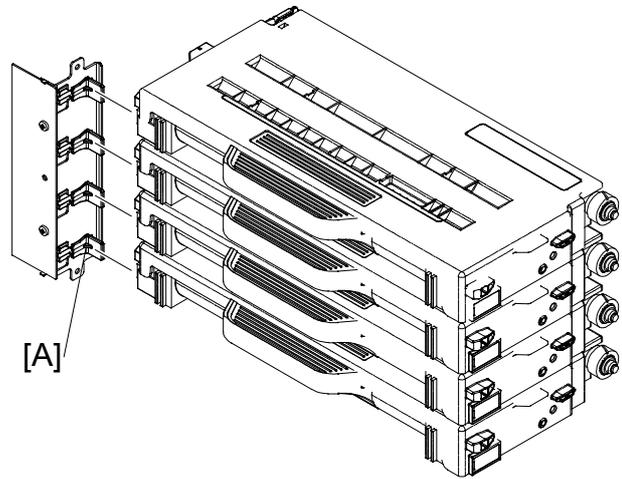
### 6.6.1 OVERVIEW



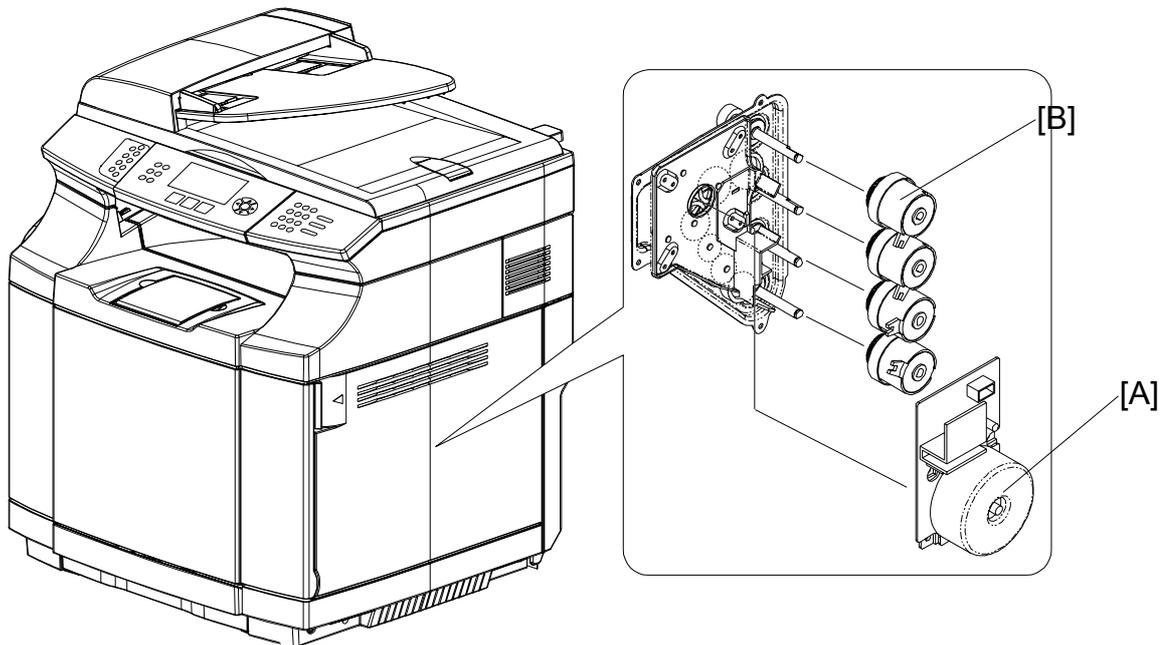
- |                           |                      |
|---------------------------|----------------------|
| 1. Development roller     | 5. Toner agitator 1  |
| 2. Toner supply roller    | 6. Toner agitator 3  |
| 3. Light interrupter gear | 7. Toner return duct |
| 4. Toner agitator 2       | 8. Doctor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

### 6.6.2 DEVELOPMENT UNIT SENSOR

There are four feelers [A] on the front left corner of the copier. 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 copier, 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.

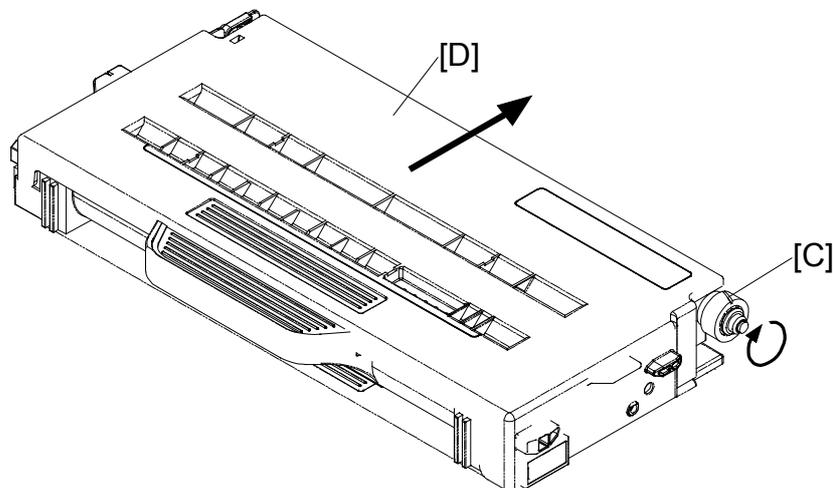


### 6.6.3 DRIVE



G157D927.WMFF

Model PL-MF 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].



G157D928.WMF

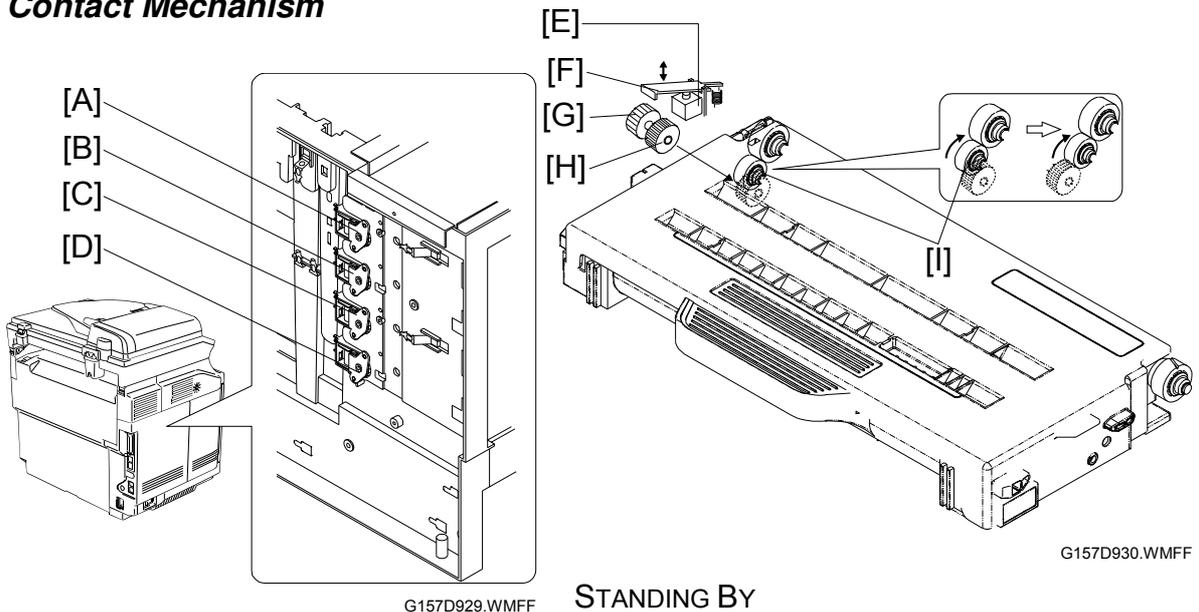
The development drive gear has two functions. First, the drive gear drives the development roller (see 6.6.1). Second, the drive gear moves the right side of each development unit [D] to the OPC belt.

**NOTE:** For the contact mechanism on the left side, (see section 6.6.4)

Detailed  
Descriptions

## 6.6.4 DEVELOPMENT UNIT CONTACT MECHANISM

### Contact Mechanism



Each development unit moves on the rails inside the copier. 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 (☛ 6.6.3).

#### LEFT SIDE

There are four development solenoids [A][B][C][D] on the left side of the copier: 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:

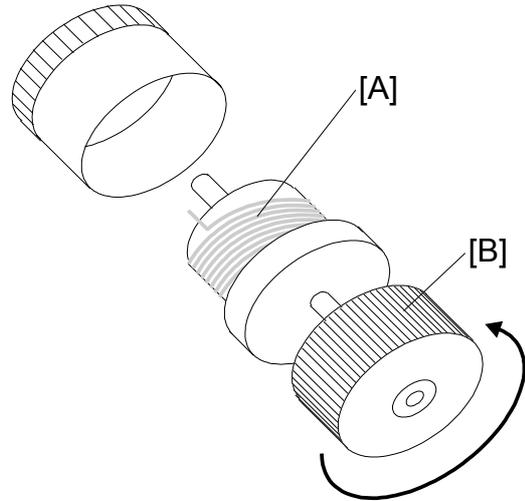
1. The drive power of the development motor is transferred to the development roller (☛ 6.6.3). This roller drives the toner return gear [I].
2. The development solenoid [E] goes on. The lever [F] holds the leftmost gear [G].
3. The spring clutch [H] stops when the leftmost gear stops. But the toner 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].

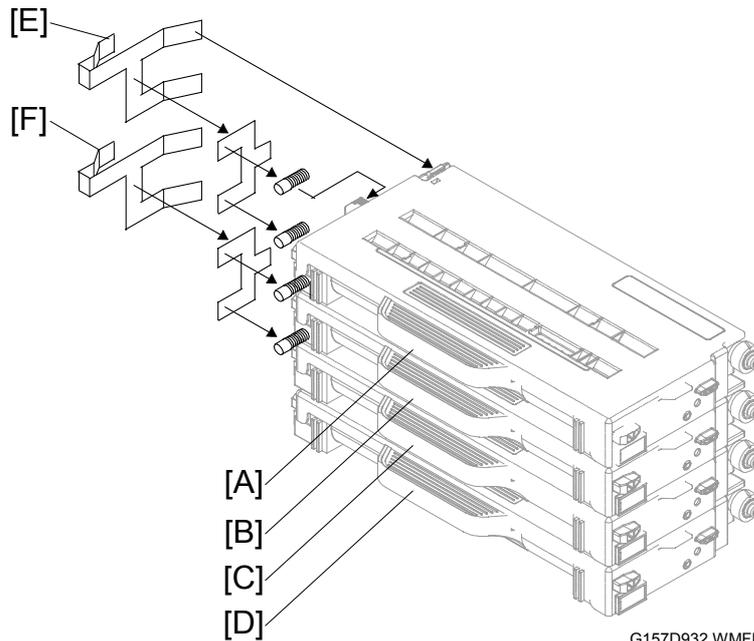
When the development solenoid goes on, the lever holds the leftmost gear. At this time, the spring clutch does this:

- 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.



G157D931.WMFF

### 6.6.5 DEVELOPMENT BIAS

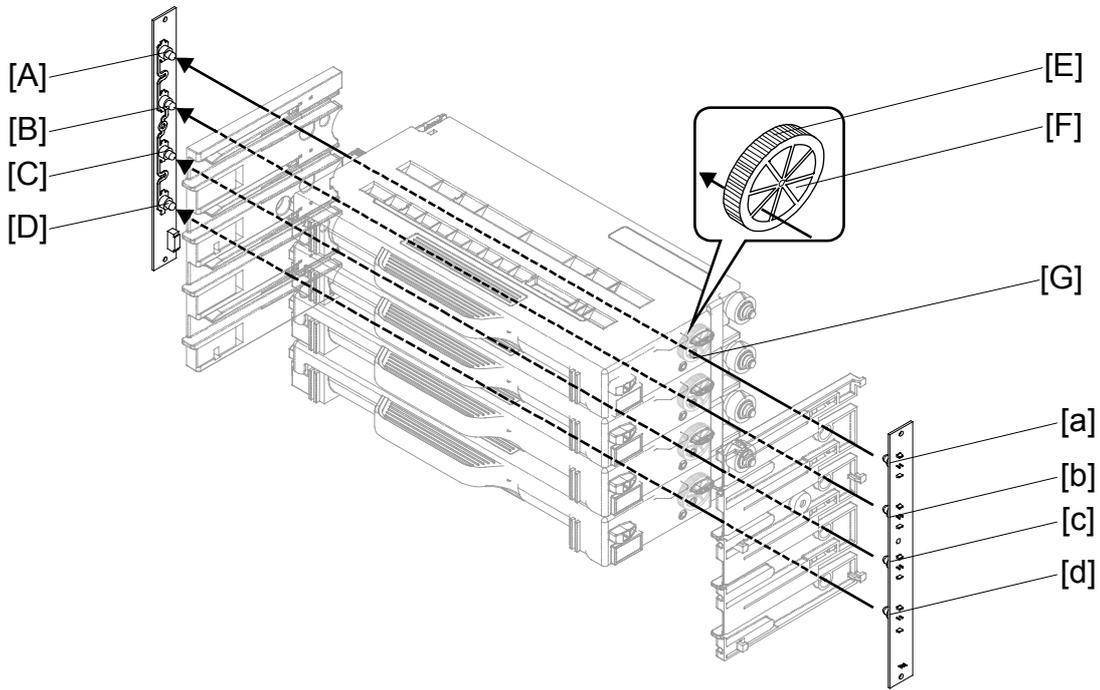


G157D932.WMFF

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.

Detailed Descriptions

## 6.6.6 TONER END SENSOR



G157D933.WMFF

### **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**



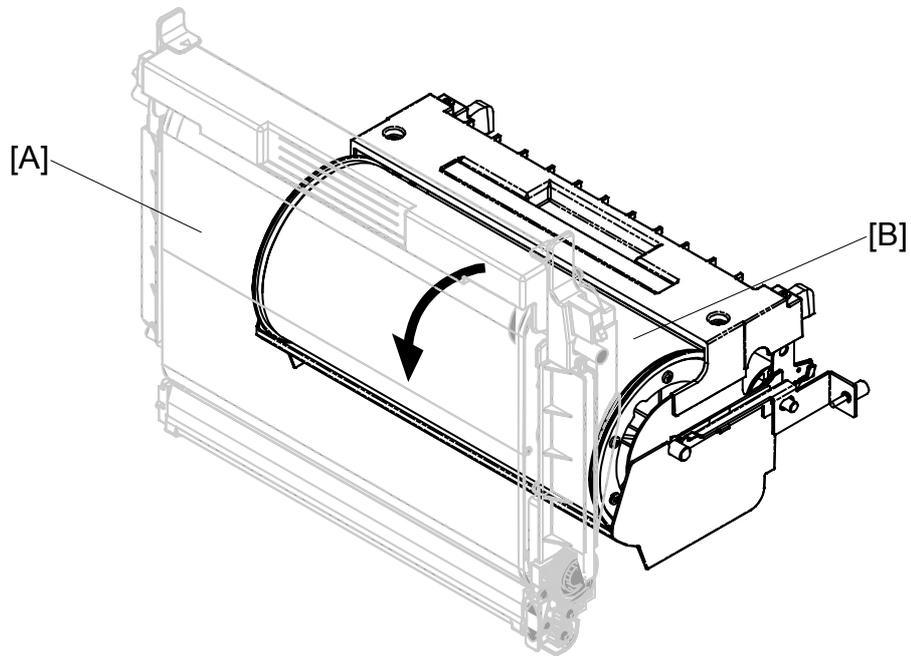
“Replace Toner x” shows when the toner is almost empty. “x” is the name of the color such as cyan and magenta. The development unit can make approximately 250 images after this message shows. The machine stops color prints jobs if one of the color development units (YMC) gets empty. At this time, the machine still prints black and white. The machine stops all print jobs when the K development unit gets empty.

**NOTE:** The number (250 images) is calculated under these conditions:

- ① A4/LT size
- ② two pages per job
- ③ 50% color ratio
- ④ 5% coverage.

## 6.7 TRANSFER BELT

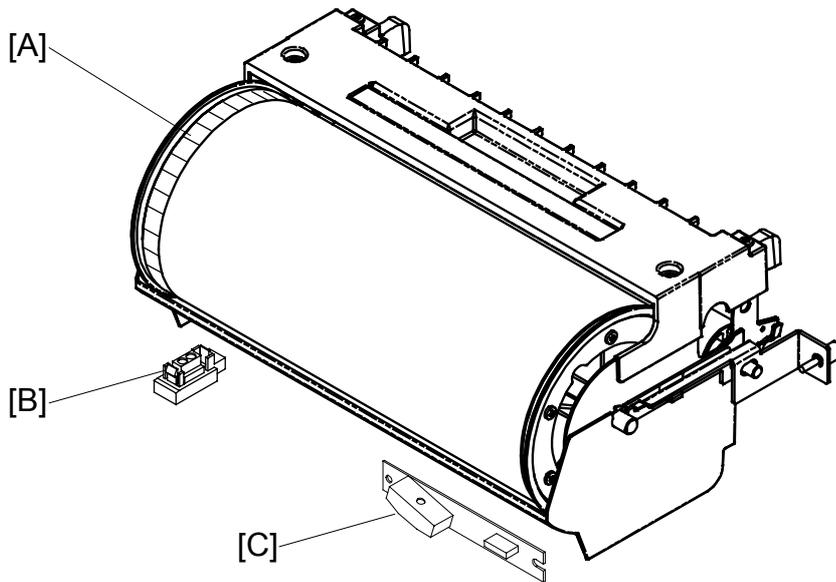
### 6.7.1 DRIVE



G157D934.WMFF

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.

## 6.7.2 TRANSFER BELT SENSOR AND ID SENSOR



G157D935.WMFF

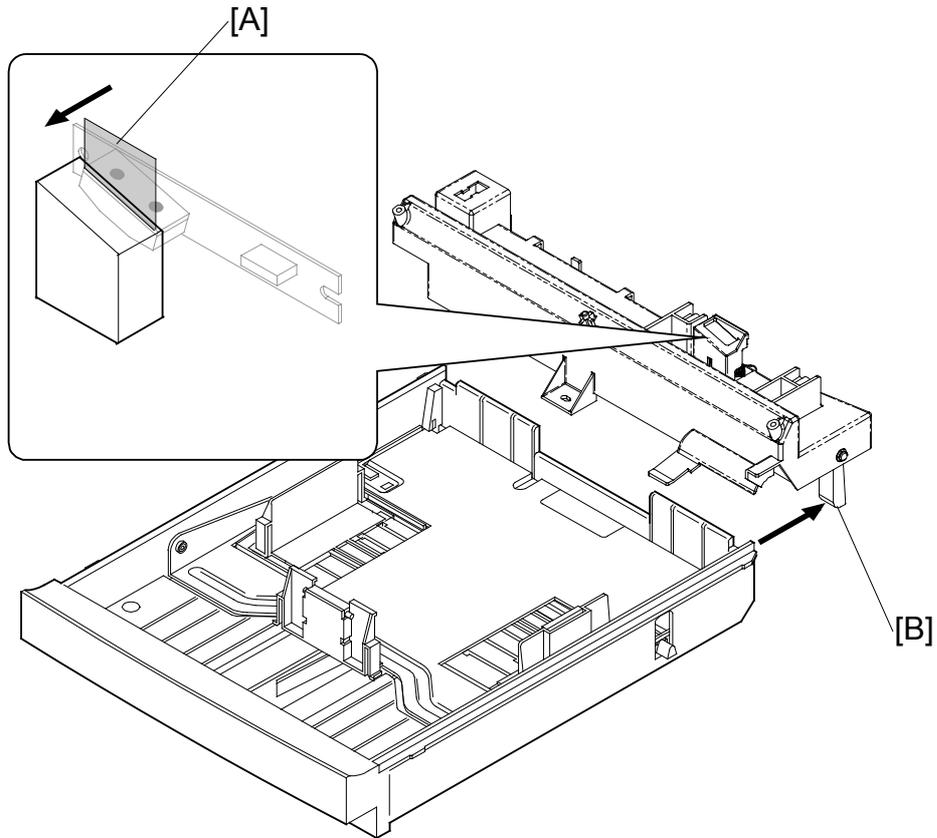
### ***Transfer Belt Sensor***

The copier 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 (☛ 6.7.1), 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**

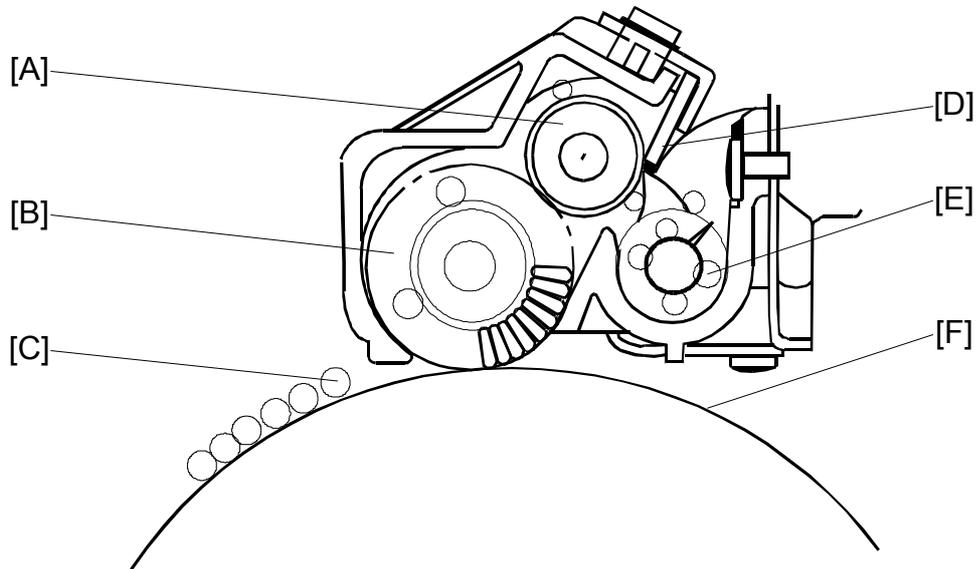
G157D936.WMFF

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 copier or pull it out of the copier, the cleaning Mylar cleans the surface of the protection Mylar.

## 6.7.3 TRANSFER BELT CLEANING

### *Cleaning Mechanism*



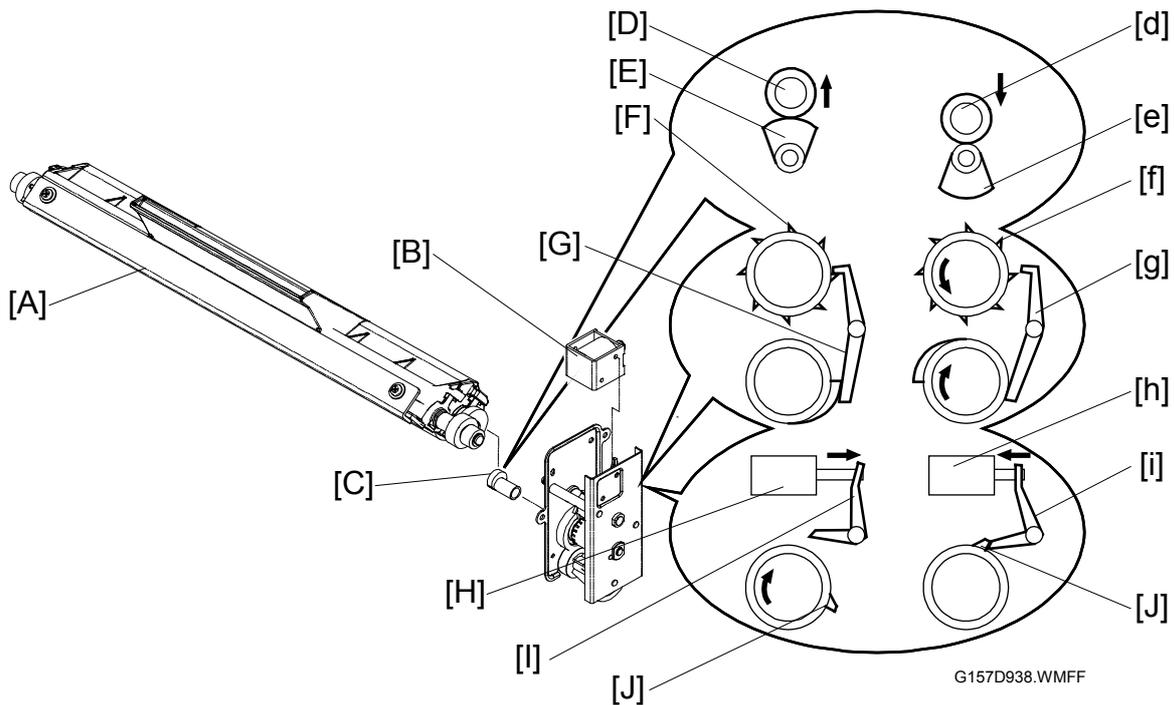
G157D937.WMFF

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.

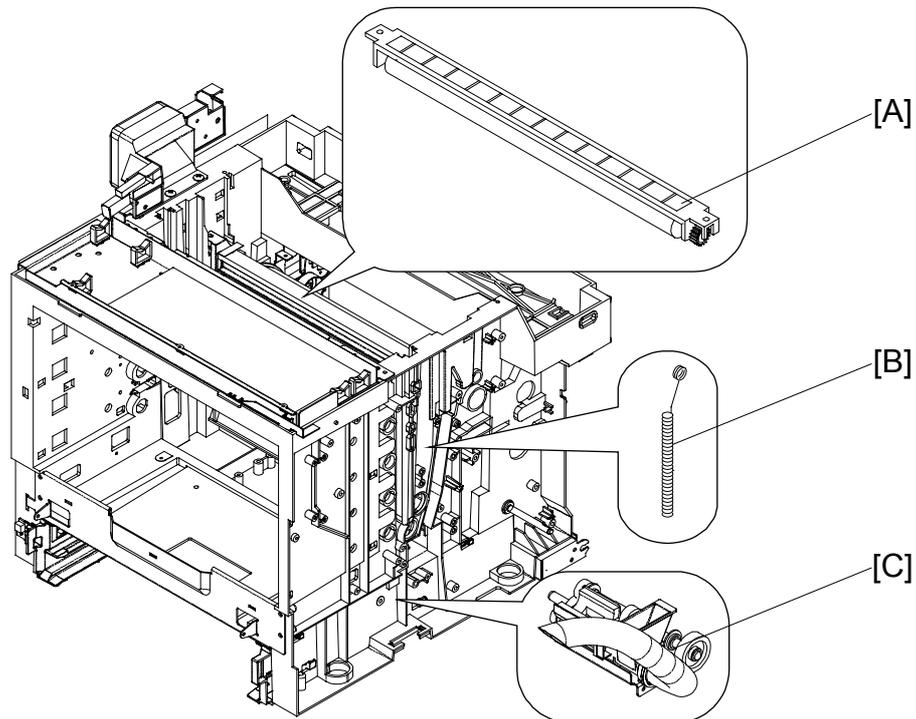
**Contact-Release Mechanism**

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 release pin [D].

When the cleaning unit solenoid is off [H], the front lever [I] releases the front latch [J] on the cam shaft. At the same time, 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 release pin [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. At the same time, 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 release pin [d]. As a result, the cleaning unit stays in contact with the transfer belt.

**Waste Toner Agitator**

G157D939.WMFF

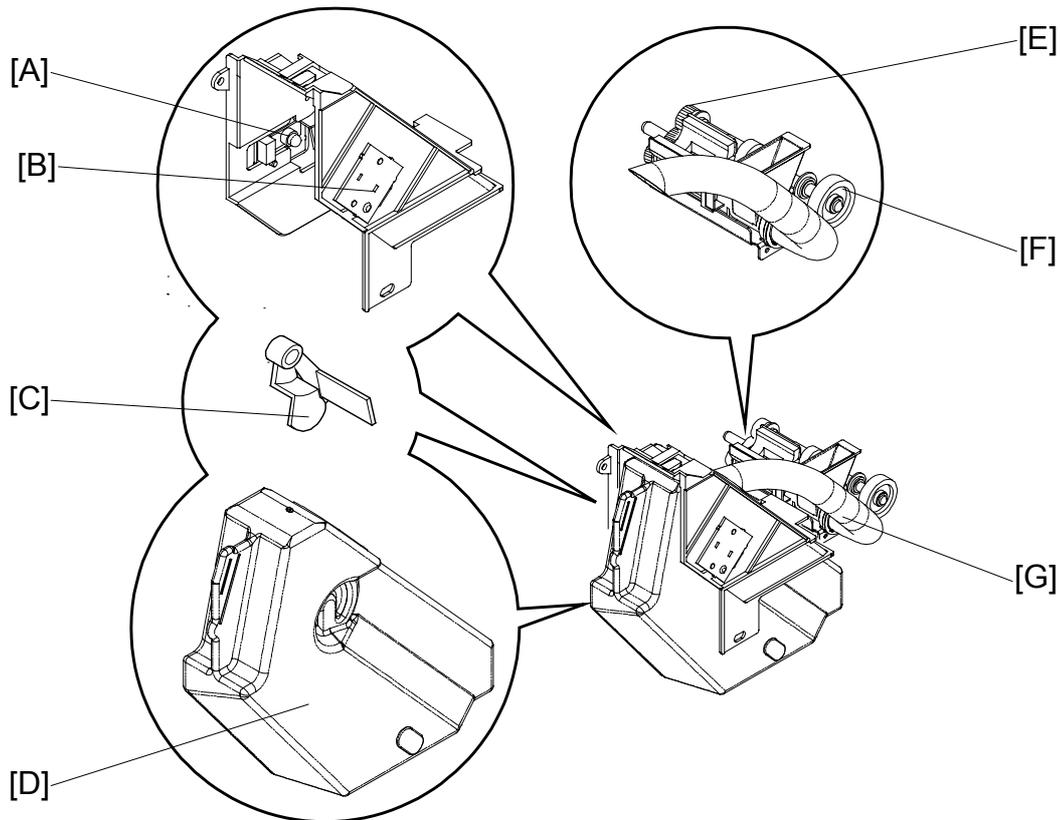
The copier has a vertical waste toner path on its right side. This path connects these two components:

- The waste toner path of the transfer-belt cleaning unit [A]
- The waste toner collection unit [C] (☛ 6.7.4)

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 ensures that the waste toner does not cause a blockage in the toner path.

## 6.7.4 WASTE-TONER COLLECTION UNIT



G157D940.WMFF

### 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 (☛ 6.5.2) 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 (☛ 6.5.1).

### ***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.

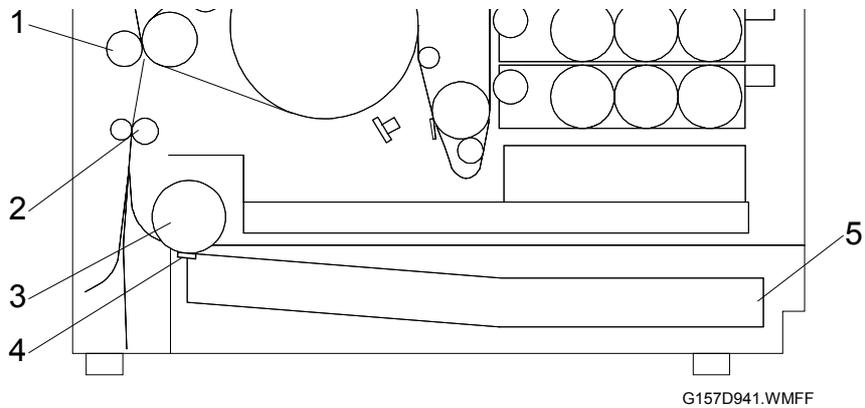
<b>Message</b>	<b>Condition</b>	<b>Possible Cause</b>
Near Waste Toner	The waste toner sensor is interrupted after warming up.	<ul style="list-style-type: none"> <li>• The waste toner bottle becomes nearly full during printing.</li> </ul>
Waste Toner Full	The waste toner sensor is already interrupted when the machine starts to warm up.	<ul style="list-style-type: none"> <li>• The waste toner bottle is not in place.</li> <li>• The waste toner bottle is nearly full when the machine starts to warm up.</li> </ul>

### ***Near-Full and Full***

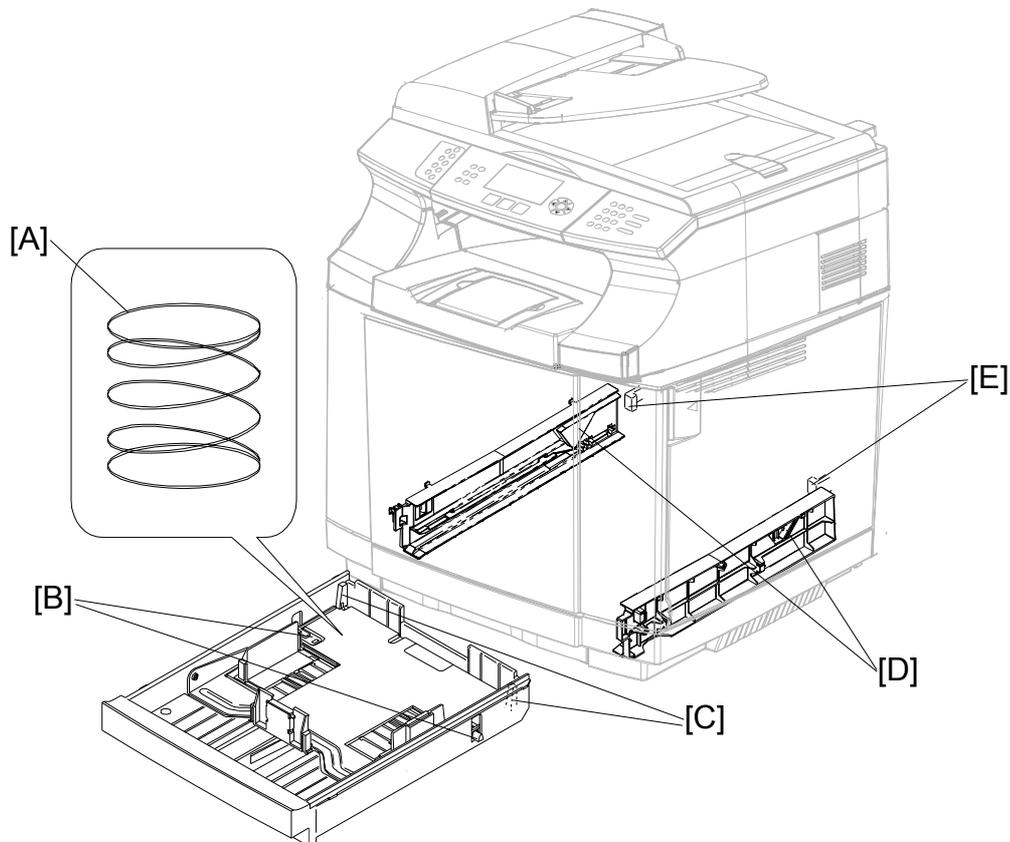
When the waste toner bottle becomes almost full, the machine shows the message "Waste Toner is Almost Full". The machine can make 200 developments after this message shows. The machine will not print until the waste toner bottle is replaced after it has made 200 developments.

## 6.8 PAPER TRAY UNIT

### 6.8.1 OVERVIEW



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

**6.8.2 PAPER LIFT**

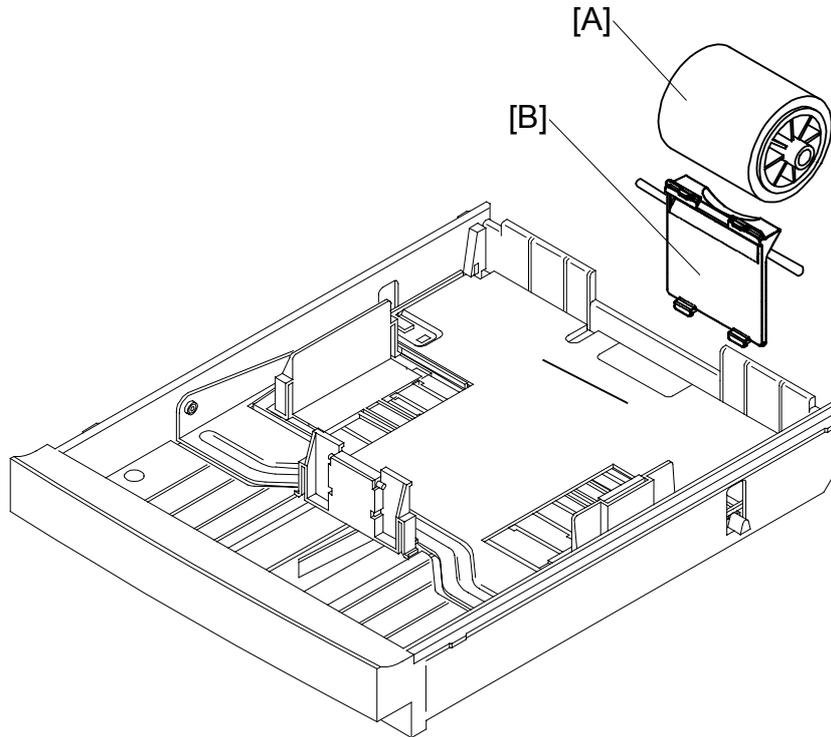
G157D942.WMFF

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 copier, the two hooks hold the bottom plate. The bottom plate is in its lowermost position.

When you push the paper tray into the copier, 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 copier, 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.

### 6.8.3 PAPER FEED



G157D943.WMFF

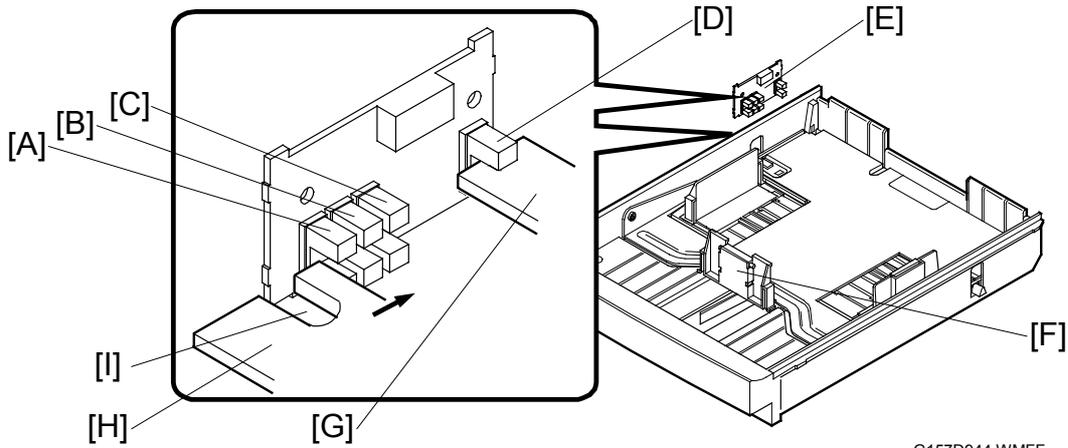
#### ***Paper Feed Roller***

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.

### 6.8.4 PAPER SIZE AND PAPER TRAY DETECTION



G157D944.WMFF

#### **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 copier, 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*

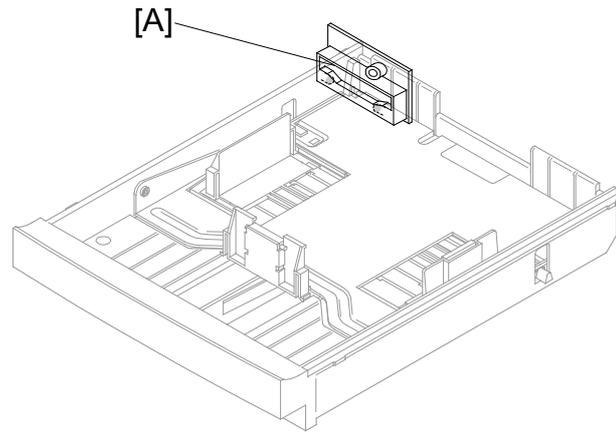
\* Optional legal-size tray

## 6.8.5 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. Then it 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.



G157D945.WMFF

### ***Configuration Page and Utilities***

The Configuration Page (User function menu > 55: User Settings) shows the user settings.

The utility software programs do not reference the OHP sensor.

***OHP Sensor, User Setting, and Printer Driver***

Paper types are detected with these components and programs:

- OHP sensor
- Printer driver on the computer

The machine does these if these are not consistent:

1. Gives priority to the OHP sensor for this condition (with one exception [☛ Step 2]):
  - The OHP sensor is not consistent with the printer driver’s setting.
2. Gives priority to the printer driver for these conditions:
  - The printer driver sets glossy paper.
  - The OHP sensor detects an OHP sheet.

**NOTE:** This is because the OHP sensor can incorrectly detect some types of glossy paper.

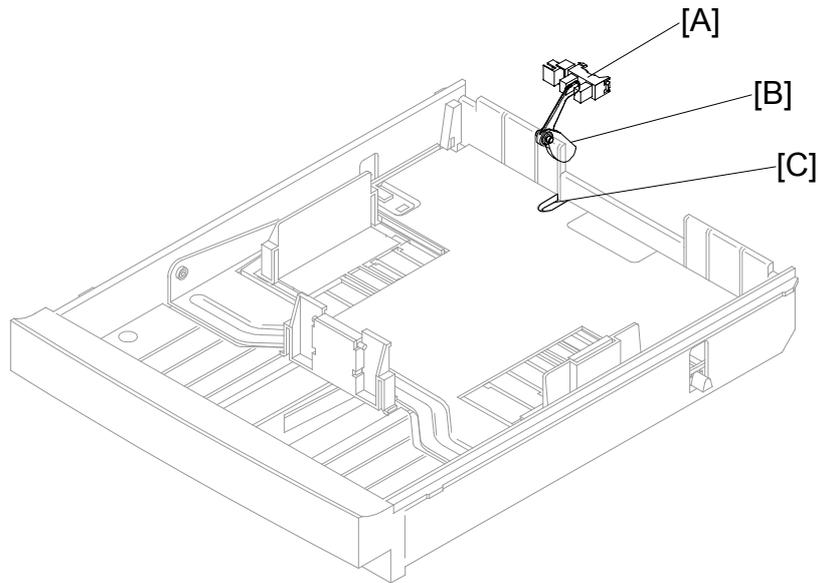
3. Sets that the paper type is *glossy* for these conditions:
  - The printer driver sets the same paper type other than OHP sheet.
  - The printer driver sets duplex printing.
  - The OHP sensor detects OHP sheets.

**NOTE:** The machine gives priority to the OHP sensor (2) when the printer driver sets simplex printing.

The table shows the times when the machine prints.

OHP Sensor	Printer Driver	Processed as	Remarks
OHP	OHP	OHP	No inconsistency
OHP	Glossy	Glossy	☛ Step 2
OHP	Not OHP	<ul style="list-style-type: none"> <li>• Simplex: OHP</li> <li>• Duplex: Glossy</li> </ul>	☛ Step 3
Not OHP	OHP	Not OHP	☛ Step 1
Not OHP	Glossy	Glossy	No inconsistency
Not OHP	Not OHP	Not OHP	No inconsistency

## 6.8.6 PAPER END SENSOR



G157D946.WMFF

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.

## 6.9 PAPER REGISTRATION AND PAPER TRANSFER

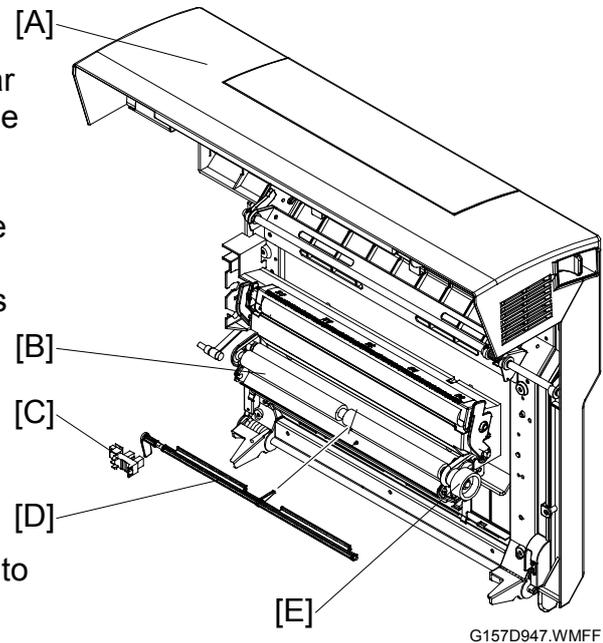
### 6.9.1 PAPER REGISTRATION

#### **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].



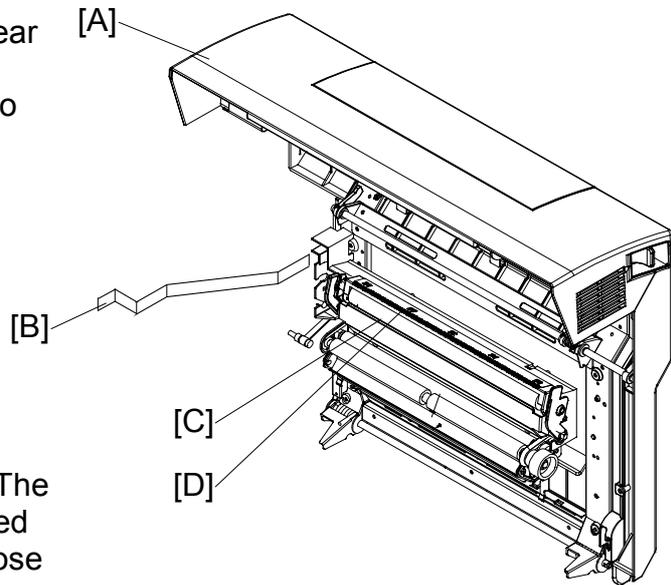
#### **Registration Sensor**

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 copier. 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.

## 6.9.2 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.



G157D948.WMFF

### **Paper Transfer Bias**

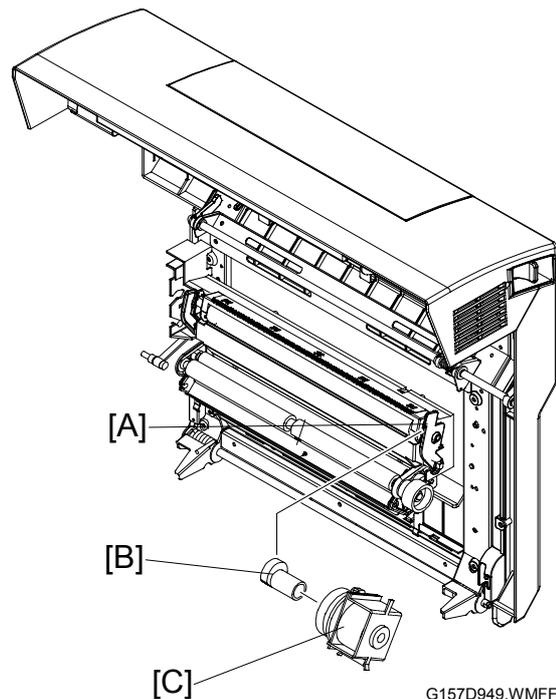
The high voltage unit (HVU) gives electricity to the transfer roller. The transfer roller is positively charged. The left end of the transfer unit is attached to THV [B] on the HVU when you close the rear cover.

### **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 copier does not print. When the copier 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.

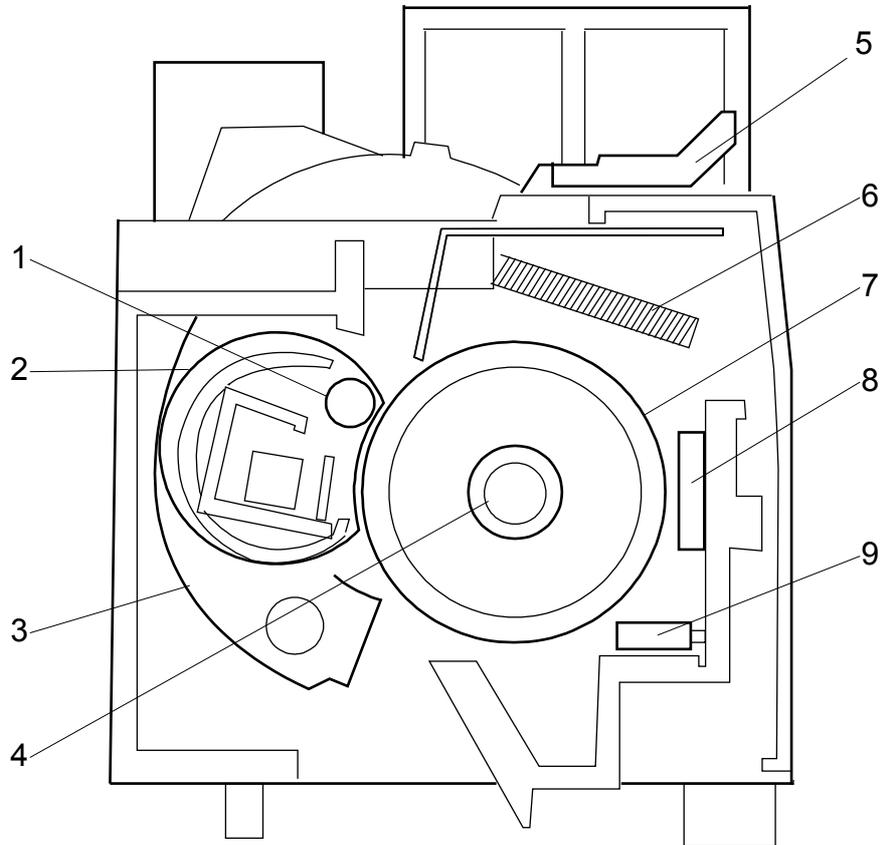


G157D949.WMFF

Detailed Descriptions

## 6.10 FUSING UNIT

### 6.10.1 OVERVIEW



G157D950.WMFF

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

### 6.10.2 DRIVE

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

### 6.10.3 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.

### 6.10.4 FUSING PROCESS

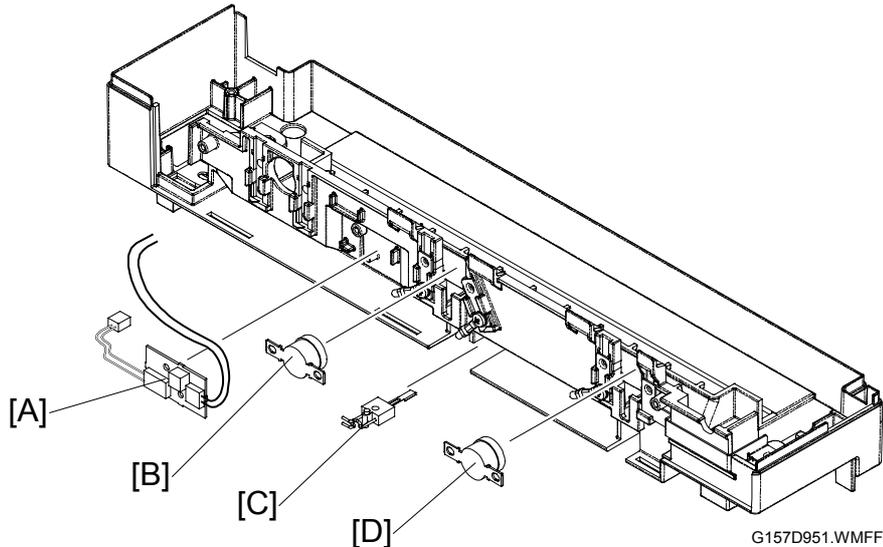
The hot roller and the pressure roller are approximately 150°C (302°F) during the fusing process. The pressure between these two rollers is approximately 300 N.

## 6.10.5 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

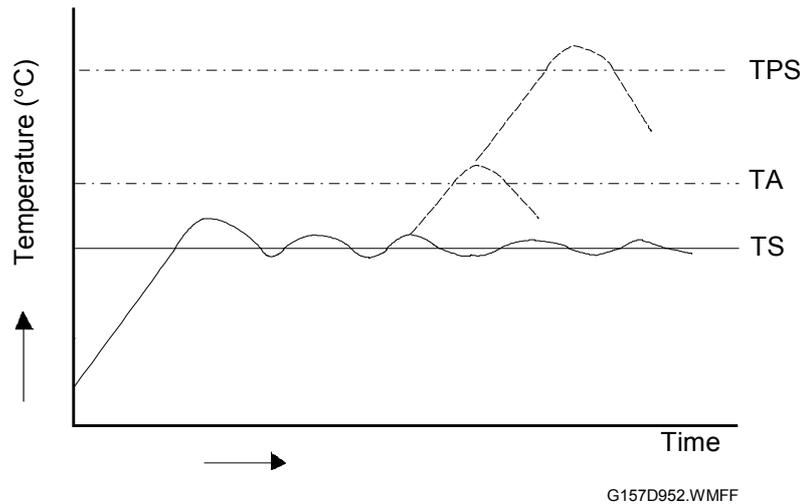


The fusing unit has these components for temperature control:

- 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 (①).
- 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 (②).

The two electrical circuits, circuit ① and circuit ② are not the same circuits.

## Temperature

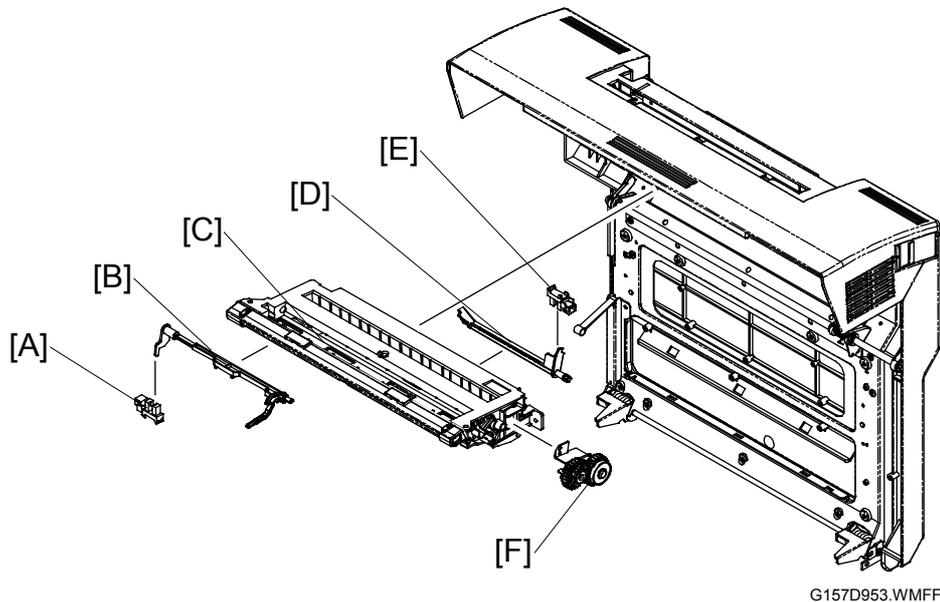


- TS (160°C): The controller sets the fusing lamp on and off to keep the fusing temperature.
- TA (185°C): The controller sets the relay (RY) off. The power supply to the fusing lamp is cut off. The copier will not print.
- TPS: The fusing thermostats break the electrical circuit to the fusing lamp. The copier will not print.

## Energy Saver Mode

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

## 6.11 PAPER EXIT UNIT



### **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 (➔ 6.10.2).

### **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.

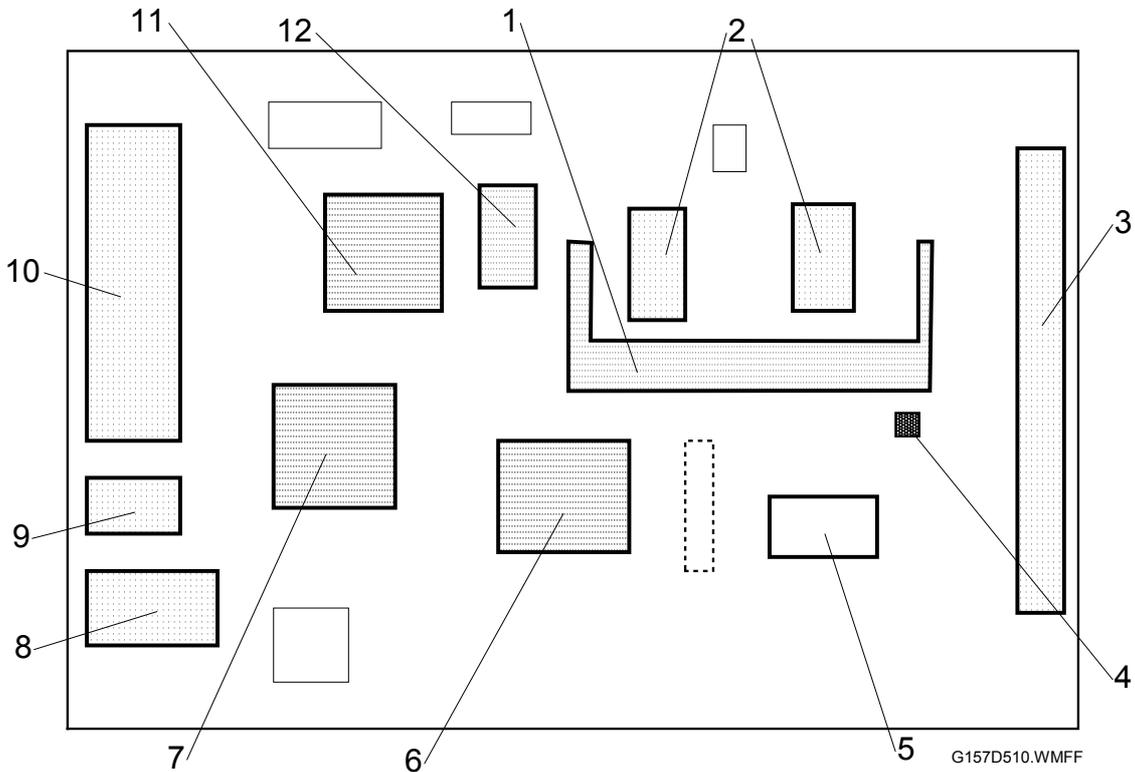
## 6.12 CONTROLLER

### 6.12.1 OVERVIEW

Component		Remarks
CPU	VR5500a (266 MHz)	
RAM	Standard: 64 MB Optional: 64 MB, 128 MB, 256 MB	Maximum: 576MB*1
Printer language	Windows GDI	
Hard disk	Standard: None Optional: None	
Network Interface	Standard: IEEE 1284, USB 2.0, Ethernet Optional: None	

\*1: One slot for memory expansion. The memory can be expanded up to 576 MB by installing a commercially available 512MB SO-DIMM although a 512MB memory is not prepared as an option.

### 6.12.2 BOARD LAYOUT



Detailed Descriptions

- |                      |                    |
|----------------------|--------------------|
| 1. Optional RAM slot | 7. ASIC (VALKYRIE) |
| 2. SDRAM (32 MB) x 2 | 8. Ethernet I/F    |
| 3. BCU I/F           | 9. USB 2.0 port    |
| 4. EEPROM            | 10. IEEE1284       |
| 5. LSI               | 11. ASIC (PEGASUS) |
| 6. ASIC (TAURUS)     | 12. DRAM           |

### 6.12.3 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:

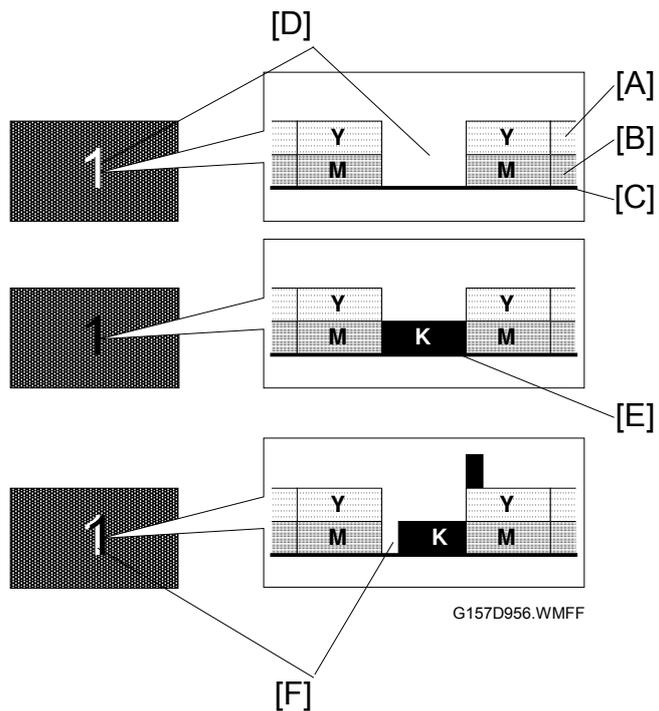
- Crispness can deteriorate because the black toner spreads out.
- More toner is consumed.
- The background color can be seen through black letters or lines.

#### **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.



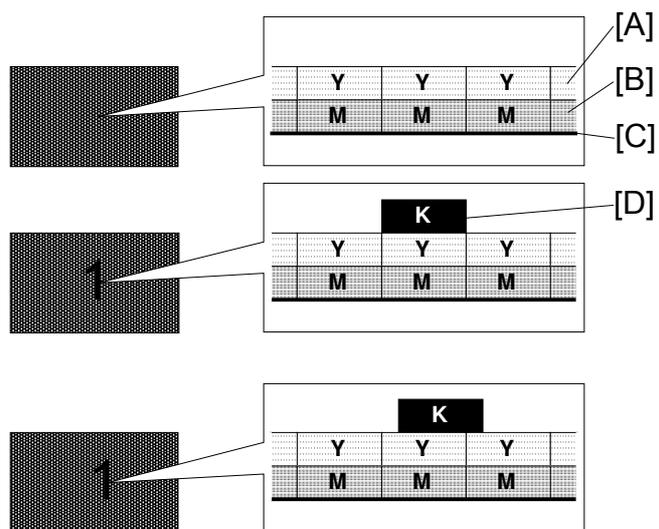
G157D956.WMFF

#### **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.

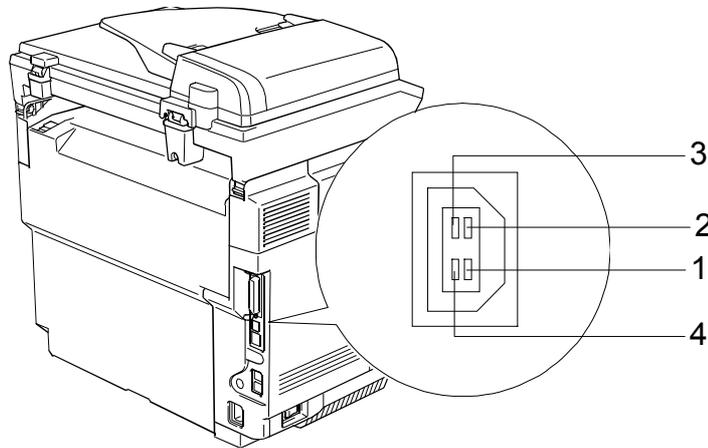


G157D957.WMFF

## 6.13 USB 2.0

### 6.13.1 PIN ASSIGNMENT

The machine has the type B interface.



G157D963.WMFF

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

### 6.13.2 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 copier as the same peripheral device.

Detailed Descriptions

# SPECIFICATIONS

## 1. GENERAL SPECIFICATIONS

### 1.1 ENGINE

Type:	Desktop
Technology:	Laser beam scanning & Electro photographic printing Single component toner development 1 drum method
Resolution:	600 x 600 dpi, 600 x 600 dpi Fine mode (2400 dpi quality)
Printing Speed:	8 ppm in Full Color mode (A4/LT SEF) 31 ppm in B/W mode (A4/LT SEF)
First Print Speed:	B/W mode: 14 sec. or less (A4/LT, LEF, Standard Tray) Full Color mode: 20 sec. or less (A4/LT, LEF, Standard Tray)
Dimensions (W x D x H)	MFP only: 482 (19") x 437 (17.4") x 534 (21") mm (inch) With PFU: 482 (19") x 437 (17.4") x 685 (27.4") mm (inch)
Weight:	MFP: Approximately 34.8 kg/76.6lb
Paper Capacity:	Standard Tray: 250 sheets (80 g/m <sup>2</sup> /20lb) Optional Paper Feed Unit: 530 sheets (80 g/m <sup>2</sup> ) Optional Legal-size cassette: 250 sheets (80 g/m <sup>2</sup> )
Output Paper Capacity:	250 sheets (face down)
Paper Size:	Standard Tray: A4, B5, Letter, EXE, Free size Optional Paper Feed Unit: A4, Letter, EXE, B5 Optional Legal-size cassette: A4, B5, Letter, EXE, Free size (☛ Supported Paper Sizes)
Media Type:	Standard Tray: Thick Paper (210 g/m <sup>2</sup> /55lb) Special Paper (Transparency, Envelope, Glossy, Label) Optional Paper Feed Unit: Plain Paper Optional Legal-size cassette: Thick Paper (210 g/m <sup>2</sup> /55lb) Special Paper (Transparency, Envelope, Glossy, Label)
Paper Weight:	Standard Tray: 60 ~ 210 g/m <sup>2</sup> (16 ~55 lb) Optional Paper Feed Unit: 60 - 105 g/m <sup>2</sup> (16 ~28 lb) Optional Legal-size cassette: 60 - 210 g/m <sup>2</sup> (16 ~55 lb)
ADF:	Capacity: 35 sheets (80g/m <sup>2</sup> /20lb) Original Width: 142 - 216 mm (5.8"-8.5") Original Length: 148 - 356 mm (5.8"-14") Original Weight: Multi page 64 - 90g/m <sup>2</sup> (17-24lbs.) Single page 52 - 90g/m <sup>2</sup> (14-24lbs.)

Power Source:	North America: 120 V, 60 Hz Europe/Asia/Oceania: 220 V - 240 V, 50/60 Hz
Power Consumption:	Standby: Average 155 W Operating: Average 615 W Energy saver: Average 16 W
Warm-up Time	When the main power switch is on: 45 sec. or less (Room temp. /Humidity 23°C/50%) When the MFP comes out of the energy saver mode: 15 sec. or less (Room temp. /Humidity 23°C/50%)
Noise Emission	Standby: 54 dB or less Operating: 67 dB or less Energy saver: 51 dB or less
CPU:	VR5500A 266MHz
Memory:	Standard: 64 MB Optional: 64 MB/128 MB/256 MB
Printer Languages:	GDI
Resident Fonts:	N/A
Host Interfaces:	Standard: USB 2.0, Parallel Port IEEE1284, IEEE 1394 Optional: N/A
Network Protocols:	TCP/IP, IPX/SPX, SMB (NetBEUI, Net BIOS over TCP/IP)
MIB support:	Private MIB: N/A Standard MIB (SMNP Printer): MIB-II(RFC1213), HostResource(RFC1514), PrinterMib(RFC1759)
Network/ Operating Systems:	Windows: 9x/Me, NT, 2000, XP, Server2003 Netware: 3.12, 3.2, 4.1, 4.11, 5.0, 5.1, 6
Controller print resolution:	Engine: 600 x 600 dpi Controller: 600 x 600 dpi, 1200 x 600 dpi
Language:	Operation panel drivers: NA; English, French EU; English, German, French, Italian, Spanish, Portuguese, Dutch, Swedish, Norwegian, Danish Asia/Oceania; English  Drivers: English, German, French, Italian, Spanish, Portuguese, Dutch, Swedish, Norwegian, Danish

## 1.2 COPIER

First copy speed:	B/W mode: 20 sec. or less (A4/LT, LEF, Standard Tray) Full Color mode: 30 sec. or less (A4/LT, LEF, Standard Tray)
Maximum original size:	Platen: A4, 8 1/2" x 11" ADF: Legal, 8 1/2" x 14"
Multi copy speed:	
Single document/ Multi printout	Platen: B/W mode 31 cpm, Full color mode 8 cpm ADF: B/W mode 31 cpm, Full color mode 8 cpm
Multi documents/ Single printout	ADF: B/W mode 21 cpm, Full color mode 7 cpm
Multiple copy:	Up to 99
Resolution (H x V):	Scanning: 600 x 300 dpi (Auto/Text), 600 x 600 dpi (Photo color) Printing: 600 x 600 dpi
Reduction/ Enlargement:	Fix: 50, 70, 78, 83, 85, 91, 94, 97, 104, 141, 200% Custom: 25 - 400% in 1%/step
Image density adjustment:	Yes
Copy mode:	Auto/ Text/ Photo
Memory copy:	Yes
Interrupt copy:	N/A
Combine copy:	2 in one, 4 in one, Poster

### 1.3 FAX

Compatibility:	ITU-T Group 3
Coding system:	MH/MR/MMR/JBIG
Modem speed:	Automatic Fallback: 33600 bps
Document size:	Platen: Length max 11.7" (297 mm) ADF: Width 142 - 216 mm (5.8" - 8.5") Length 148 - 356 mm (5.8" - 14")
Scanning width:	Max. 8.2" (208 mm)
Printing width:	Max. 8.2" (208 mm)
Gray scale:	256 levels
Polling type:	Standard, Sequential
Contrast control:	Automatic/ Light/ Dark (manual setting)
Resolution:	Horizontal: 203 dot/inch (8 line/mm) Vertical: Standard; 98 dot/ inch (3.85 line/mm) Fine/Photo; 196 dot/inch (7.7 line/mm)
One-touch dial:	16 (8 x 2)
Speed-dial:	200 stations
Broadcasting:	266 stations
Automatic redial:	1 time after 5 minutes
Auto answer:	0, 1, 2, 3 or 4 rings
Communication source:	Public switched telephone network
Memory transmission:	Up to 400 pages
Out of paper reception:	Up to 400 pages
PC Fax utility:	Yes

## 1.4 PRINTER

Printing speed:	B/W mode: 31 ppm (A4/LT, LEF, Standard Tray) Full Color mode: 8 ppm (A4/LT, LEF, Standard Tray)
1st print speed:	B/W mode: 14 sec. or less (A4/LT, LEF, Standard Tray) Full Color mode: 20 sec. or less (A4/LT, LEF, Standard Tray)
Resolution:	Normal mode: 600 x 600 dpi Fine mode: 2400 dpi level
Printer Language:	GDI
OS:	Windows98/ Me/ 2000/ XP/ WindowsServer2003
HDD:	N/A

## 1.5 SCANNER

Color/ Black:	Color/ Black
I/F:	USB2.0, 10/100 Base-TX, IEEE1284
TWAIN compliant:	TWAIN, WIA
Color depth:	48bit color processing (input), 24bit color processing (output)
Resolution:	Up to 9600 x 9600 dpi (interpolated) Platen: Up to 1200 x 2400 dpi (optical) ADF: Up to 1200 x 600 dpi (optical)
Document size:	Platen: Width max 8.5" (216 mm) Length max 11.7" (297 mm) ADF: Width 142 - 216 mm (5.8" - 8.5") Length 148 - 356 mm (5.8" - 14")
Scanning width:	Max. 8.5" (216 mm)
Gray scale:	256 levels
Scanner utilities & Drivers:	TWAIN Driver, Scanner utility (Control Center), Image viewer (Paper Port 9.0SE), OCR S/W (OmniPage OCR)

## 2. SUPPORTED PAPER SIZES

Paper size			MFP		PFU		LGL	
			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"						

MFP: 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.

### 3. SOFTWARE ACCESSORIES

#### 3.1 PRINTER DRIVERS

Operating System	Type	Printer Language
		GDI
Windows 9x/Me	–	Yes
Windows NT	WorkStation 4.0	Yes
	Server 4.0	No
	Server 4.0 TSE (*6)	No
	Server 4.0 Enterprise Edition	No
Windows 2000	Professional	Yes
	Server (*6)	No
	Advanced Server (*6)	No
	Datacenter Server	No
Windows XP	Professional	Yes
	Home Edition	Yes
Windows Server 2003	Standard	Yes (Only printer driver)
	Enterprise	Yes (Only printer driver)
	Web Edition	Yes (Only printer driver)
Mac OS		No

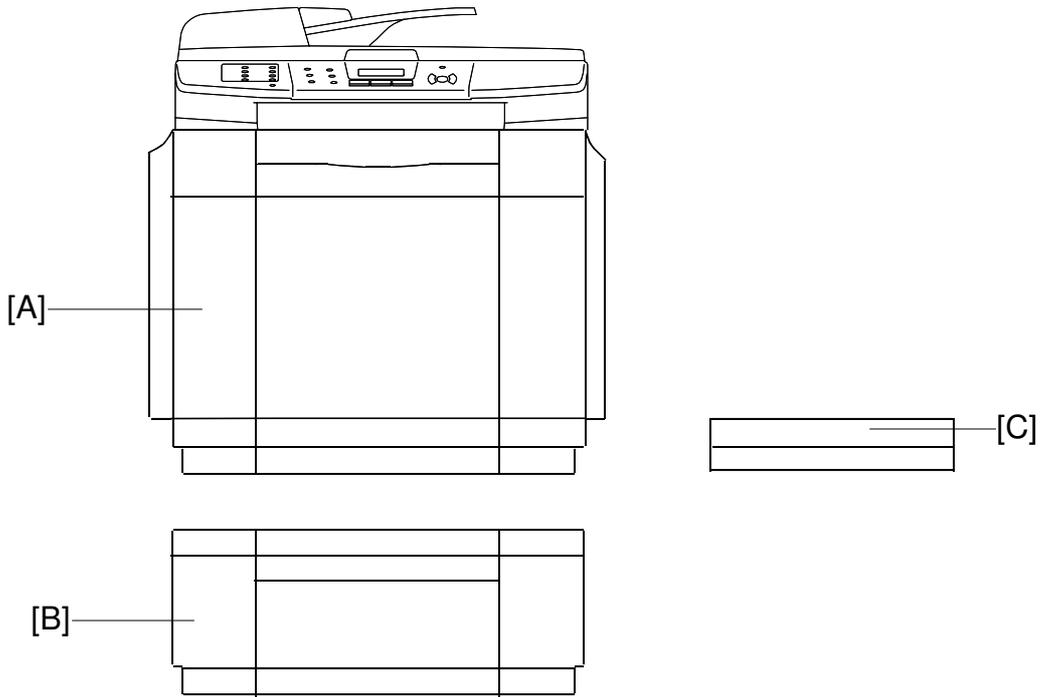
#### 3.2 UTILITY SOFTWARE

Multi-Function Suite includes Printer Driver, Scanner Driver, ScanSoft® PaperPort® 9.0SE, ControlCenter2 and ScanSoft® OmniPage®.

PaperPort® 9.0SE is a document management application for viewing scanned documents.

ScanSoft® OmniPage®, which is integrated into PaperPort® 9.0SE, is an OCR application that converts an image into text and inserts it into your default word processor.

### 4. MACHINE CONFIGURATION



G157V901.WMFF

Unit	M'Code	Diagram	Remarks
MFP	G157	[A]	
Paper feed unit	G389	[B]	
Legal paper tray	G391	[C]	For North America model only

## 5. OPTIONAL EQUIPMENT

### 5.1 PAPER TRAY UNIT

Paper Size:	Letter, A4, Executive, B5
Print Paper Weight:	60 ~ 105 g/m <sup>2</sup> (16 - 28lb)
Tray Capacity:	530 sheets
Paper Feed System:	Friction pad separation
Paper Height Detection:	Not available
Paper End Detection:	Available
Power Source:	24V dc (supplied by the MFP)
Dimensions (W x D x H):	550 mm x 564 mm x 265 mm (21.7" x 22.2" x 10.4")
Weight	Approx. 6.0 kg (13.2 lb)

### 5.2 LEGAL PAPER TRAY

Paper Size:	A4, B5, A5, Letter, Legal, HLT, Executive, Free size
Print Paper Weight:	60 ~ 210 g/m <sup>2</sup> (16 - 55lb)
Tray Capacity:	250 sheets
Dimensions (W x D x H):	276 mm x 408 mm x 55 mm (10.9" x 16.1" x 2.2")
Weight:	1.1 kg (2.5lb)