



**RICOH UNIVERSITY**

Learning ♦ Knowledge ♦ Performance



**B291/B295/B296/B297**  
**SERVICE MANUAL**

002927MIU

*Gestetner* **LANIER RICOH SAVIN**





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*Ricoh Corporation*



# LEGEND

PRODUCT CODE	COMPANY			
	GESTETNER	LANIER	RICOH	SAVIN
B291	DSm735eg	-----	Aficio MP 3500g	8035eg
B295	DSm745eg	-----	Aficio MP 4500g	8045eg
B296	DSm735e	LD335	Aficio MP 3500	8035e
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7.3 OPTIONAL EQUIPMENT .....	7-5

## **PUNCH UNIT B377**

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SEE SECTION B377 FOR DETAILED TABLE OF CONTENTS

## **1000-SHEET FINISHER B408**

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SEE SECTION B408 FOR DETAILED TABLE OF CONTENTS

## **BRIDGE UNIT B538**

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SEE SECTION B538 FOR DETAILED TABLE OF CONTENTS

## **PAPER TRAY UNIT B542**

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SEE SECTION B542 FOR DETAILED TABLE OF CONTENTS

## **LARGE CAPACITY TRAY B543**

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SEE SECTION B543 FOR DETAILED TABLE OF CONTENTS

## **1-BIN TRAY B544**

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SEE SECTION B544 FOR DETAILED TABLE OF CONTENTS

## **TWO-TRAY FINISHER B545**

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SEE SECTION B545 FOR DETAILED TABLE OF CONTENTS

## **BOOKLET FINISHER B546**

---

SEE SECTION B546 FOR DETAILED TABLE OF CONTENTS

## **AUTO REVERSE DOCUMENT FEEDER B714**

---

SEE SECTION B714 FOR DETAILED TABLE OF CONTENTS

## **FAX OPTION B779**

---

SEE SECTION B779 FOR DETAILED TABLE OF CONTENTS

## **PRINTER/SCANNER OPTION D315**

---

SEE SECTION D315 FOR DETAILED TABLE OF CONTENTS

## **IMPORTANT SAFETY NOTICES**

### **PREVENTION OF PHYSICAL INJURY**

1. Before disassembling or assembling parts of the copier and peripherals, make sure that the copier power cord is unplugged.
2. The wall outlet should be near the copier and easily accessible.
3. Note that some components of the copier and the paper tray unit are supplied with electrical voltage even if the main power switch is turned off.
4. If any adjustment or operation check has to be made with exterior covers off or open while the main switch is turned on, keep hands away from electrified or mechanically driven components.
5. If the Start key is pressed before the copier completes the warm-up period (the Start key starts blinking red and green alternatively), keep hands away from the mechanical and the electrical components as the copier starts making copies as soon as the warm-up period is completed.
6. The inside and the metal parts of the fusing unit become extremely hot while the copier is operating. Be careful to avoid touching those components with your bare hands.
7. To prevent a fire or explosion, keep the machine away from flammable liquids, gases, and aerosols.

### **HEALTH SAFETY CONDITIONS**

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

### **OBSERVANCE OF ELECTRICAL SAFETY STANDARDS**

1. The copier and its peripherals must be installed and maintained by a customer service representative who has completed the training course on those models.
2. The NVRAM on the system control board 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.

### 1. SAFETY AND ECOLOGICAL NOTES FOR DISPOSAL

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

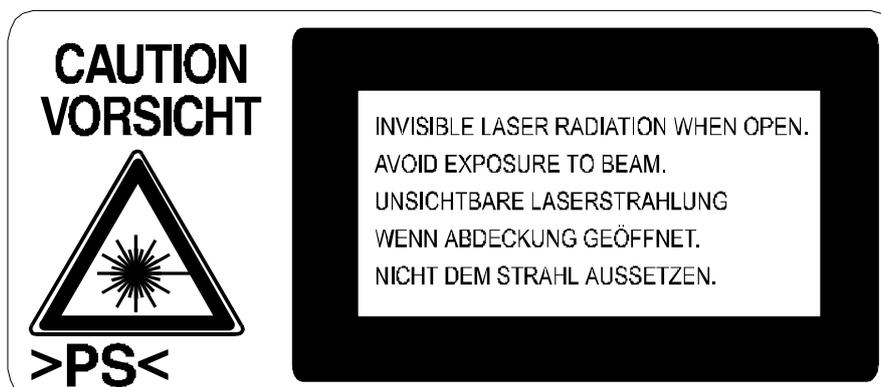
### WARNING

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

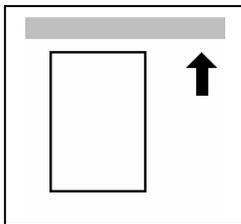
**CAUTION MARKING:**



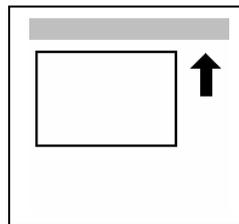
## Conventions Used in this Manual

This manual uses several symbols.

Symbol	What it means
	Refer to section number
	See Core Tech Manual for details
	Screw
	Connector
	E-ring
	Clip ring
	Clamp



Lengthwise, SEF  
(Short Edge Feed)



Sideways, LEF  
(Long Edge Feed)

### ***Cautions, Notes, etc.***

The following headings provide special information:

 <b>WARNING</b>
<b>FAILURE TO OBEY WARNING INFORMATION COULD RESULT IN SERIOUS INJURY OR DEATH.</b>

 <b>CAUTION</b>
<b>Obey these guidelines to ensure safe operation and prevent minor injuries.</b>

**NOTE:** This information provides tips and advice about how to best service the machine.



**INSTALLATION**

**AUTO REVERSE DOCUMENT FEEDER B714**

**FAX OPTION B779**

**TAB  
POSITION 1**

**PREVENTIVE MAINTENANCE**

**PAPER TRAY UNIT B542**

**TAB  
POSITION 2**

**REPLACEMENT AND ADJUSTMENT**

**LARGE CAPACITY TRAY B543**

**TAB  
POSITION 3**

**TROUBLESHOOTING**

**PUNCH UNIT B377  
1000-SHEET FINISHER B408  
TWO-TRAY FINISHER B545  
BOOKLET FINISHER B546**

**PRINTER/SCANNER OPTION D315**

**TAB  
POSITION 4**

**SERVICE TABLES**

**TAB  
POSITION 5**

**DETAILED DESCRIPTIONS**

**TAB  
POSITION 6**

**SPECIFICATIONS**

**1-BIN TRAY B544**

**TAB  
POSITION 7**

**BRIDGE UNIT B538**

**TAB  
POSITION 8**



# INSTALLATION

INSTALLATION REVISION HISTORY		
Page	Date	Added/Updated/New
74	08/23/2007	Data OverWrite Security Installation – Remove step 9

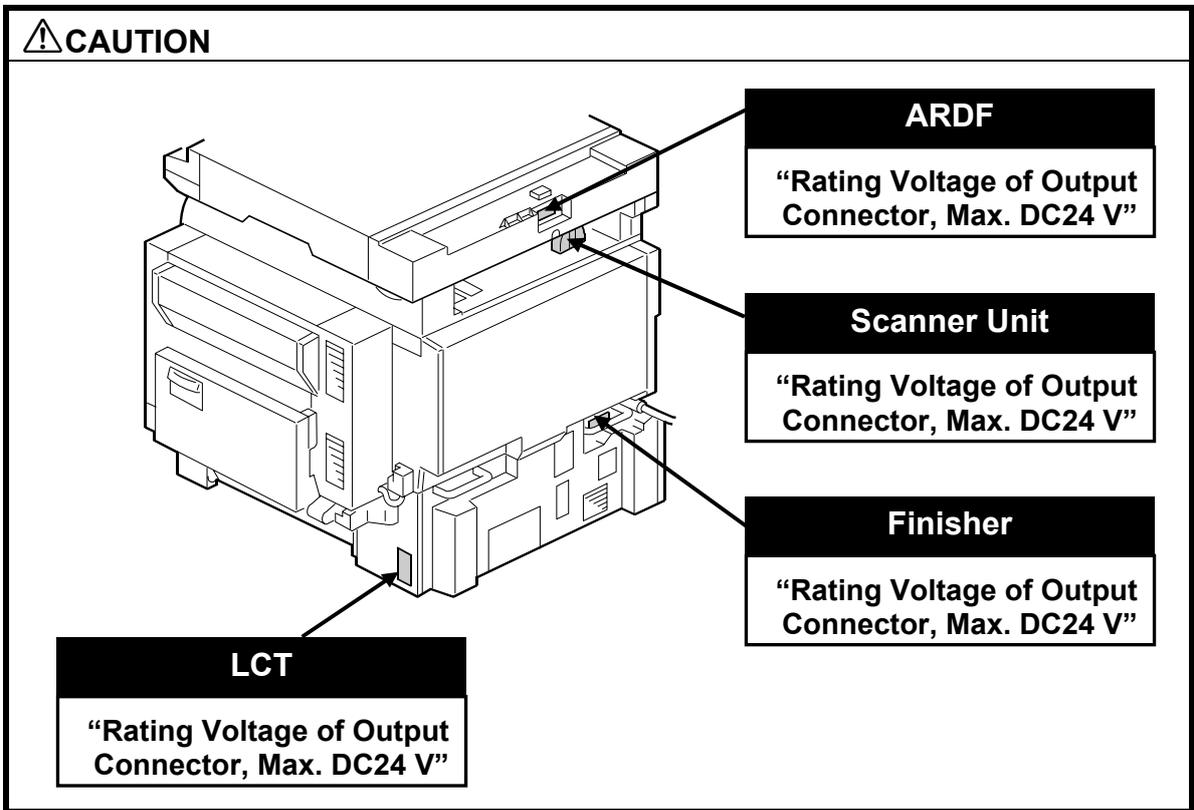


# 1. INSTALLATION PROCEDURE

**⚠ CAUTION**  
 Never turn off the main power switch when the power LED is lit or flashing. To avoid damaging the hard disk or memory, press the operation power switch to switch the power off, wait for the power LED to go off, and then switch the main power switch off.

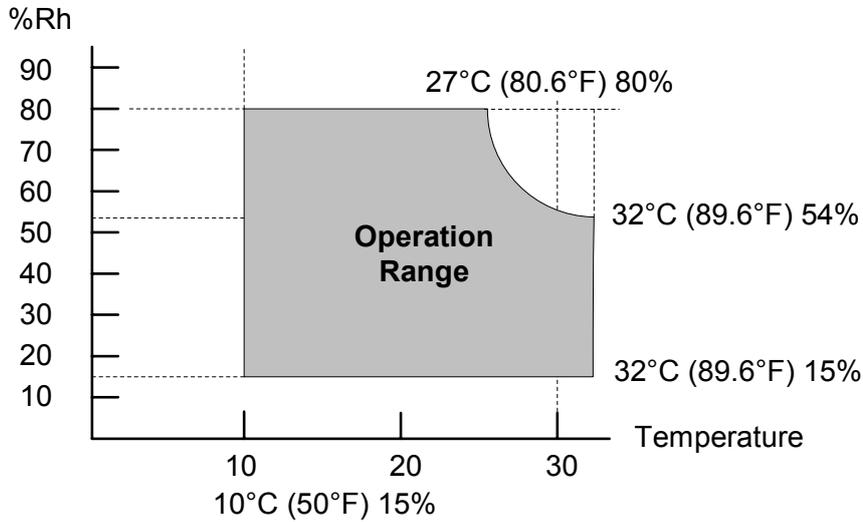
**NOTE:** The main power LED lights or flashes while the platen cover or ARDF is open, while the main machine is communicating with a facsimile or the network server, or while the machine is accessing the hard disk or memory for reading or writing data.

## 1.1 INSTALLATION REQUIREMENTS



# INSTALLATION REQUIREMENTS

## 1.1.1 ENVIRONMENT



1. Temperature Range: 10 °C to 32 °C (50 °F to 90 °F)
2. Humidity Range: 15% to 80% RH
3. Ambient Illumination: Less than 1,500 lux (do not expose to direct sunlight.)
4. Ventilation: Room air should turn at least 30 m<sup>3</sup>/hr/person
5. Ambient Dust: Less than 0.10 mg/m<sup>3</sup> (2.7 x 10<sup>-6</sup> oz/yd<sup>3</sup>)
6. Avoid areas exposed to sudden temperature changes:
  - 1) Areas directly exposed to cool air from an air conditioner.
  - 2) Areas directly exposed to heat from a heater.
7. Do not place the machine where it will be exposed to corrosive gases.
8. Do not install the machine at any location over 2,000 m (6,500 ft.) above sea level.
9. Place the main machine on a strong and level base. Inclination on any side should be no more than 5 mm (0.2").
10. Do not place the machine where it may be subjected to strong vibrations.

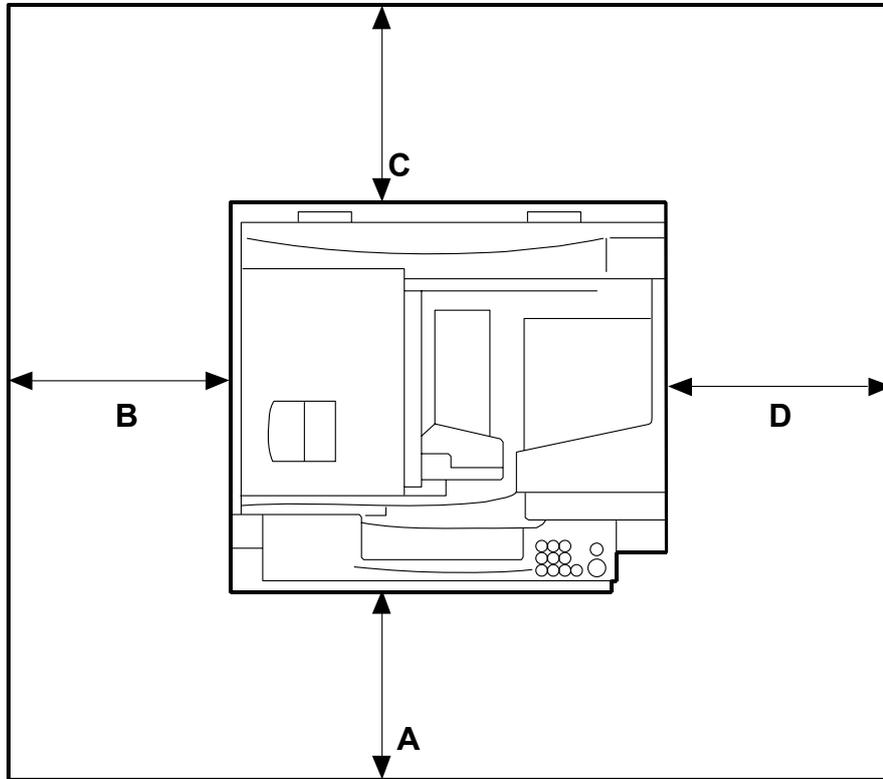
## 1.1.2 MACHINE LEVEL

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

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

### 1.1.3 MINIMUM SPACE REQUIREMENTS

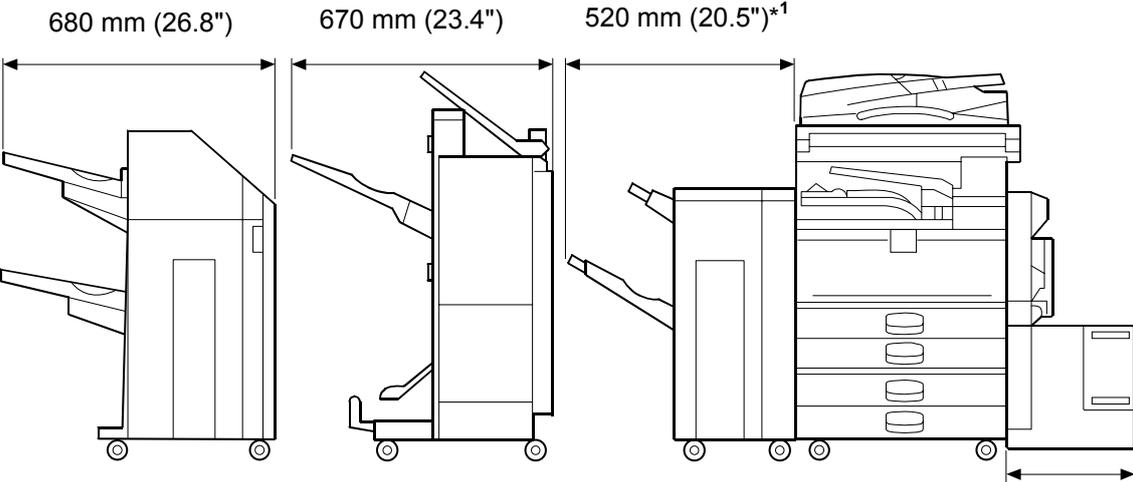
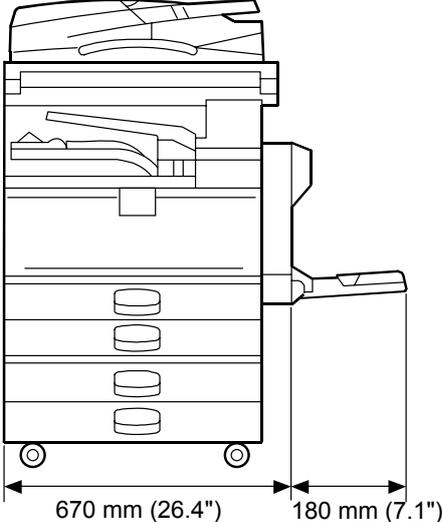
Place the main machine near the power source, providing clearance as shown:



- A: Front: >75 cm (29.6")
- B: Left: > 10 cm (4")
- C: Rear: > 10 cm (4")
- D: Right > 10 cm (4")

**NOTE:** The 75 cm (29.5") recommended for the space at the front is for pulling out the paper tray only. If the operator stands at the front of the main machine, more space is required.

INSTALLATION REQUIREMENTS



\*1 Without tray extended.

### 1.1.4 POWER REQUIREMENTS

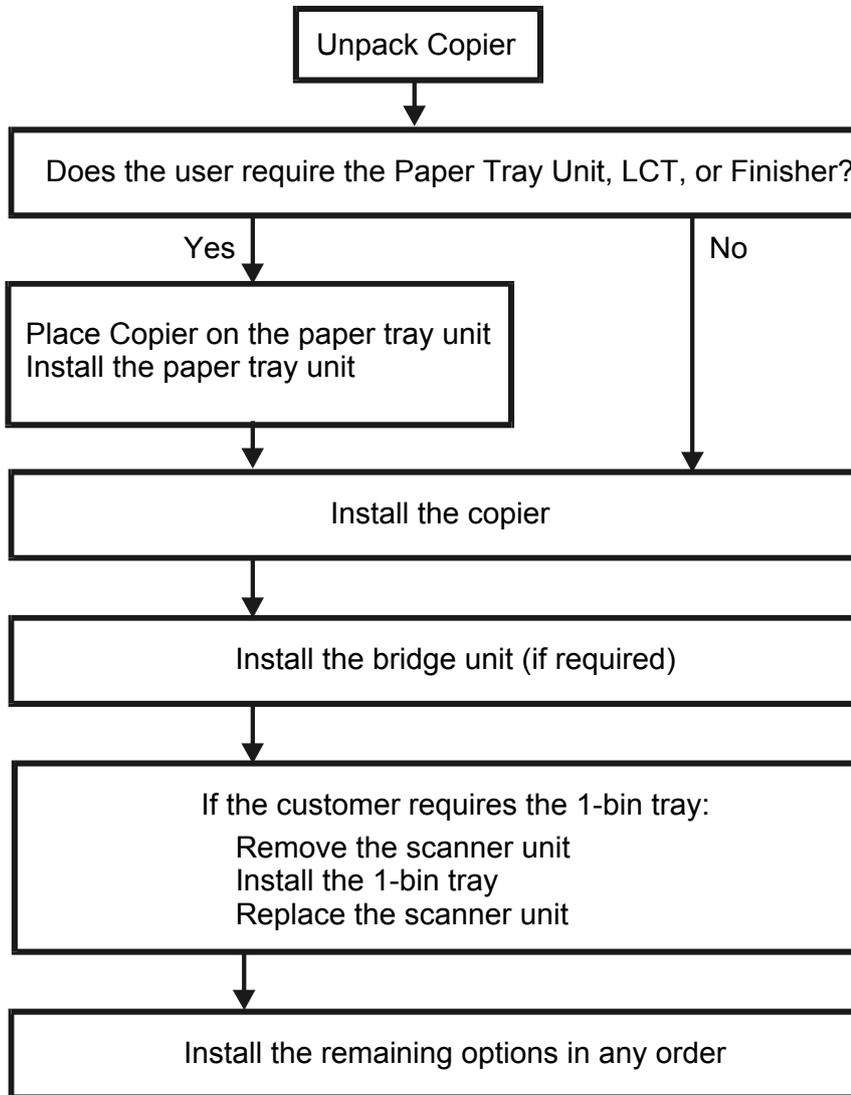
**⚠ CAUTION**

- 1. Make sure that the wall outlet is near the main machine and easily accessible. Make sure the plug is firmly inserted in the outlet.**
- 2. Avoid multi-wiring.**
- 3. Be sure to ground the machine.**

1. Input voltage level:  
North America 120 V, 60 Hz: More than 12.5 A  
Europe/Asia 220 V ~ 240V, 50 Hz/60 Hz: more than 6.8 A
2. Permissible voltage fluctuation: 10% to 15%
3. Never set anything on the power cord.

## 1.2 INSTALLATION FLOW CHART

The following flow chart shows how to install the optional units more efficiently.



**Bridge Unit:** Needed for the finishers and external output tray.

**Paper Tray Unit:** Needed for LCT and finishers.

**Other requirements:** See Overall Machine Information – Installation Option Table.

## 1.3 MAIN MACHINE INSTALLATION

### 1.3.1 ACCESSORY CHECK

Check the quantity and condition of the accessories in the box against the following list:

Description	Q'ty
1. Operation Instructions – System Setting.....	1
2. Operation Instructions – Copy Reference .....	1
3. Exposure Glass Cleaner Holder .....	1
4. Exposure Glass Cleaner .....	1
5. Paper Size Decal .....	1
6. Toner Supply Installation Decal .....	1
7. Middle Front Cover .....	1
8. HDD Caution Decals (-17, -29, -57 Machines).....	1
9. Model Name Decal (-17, -19, -29, -57 Machines) .....	1
10. Stamp (-17 Machine) .....	1
11. EU Safety Information (-26, -27, -57, -67 Machines) .....	1
12. Operation Panel Indicator Decals (-26, -27, -57, -67 Machines) .....	1
13. Gasket (for Optional ARDF (-26, -27, -29, -57, -67 Machines) .....	1
14. Ferrite Core (for Optional ARDF) (-26, -27, -29, -57, -67 Machines) .....	1

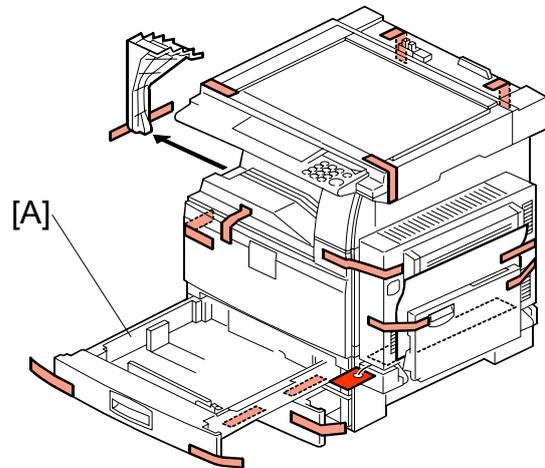
## MAIN MACHINE INSTALLATION

### 1.3.2 INSTALLATION PROCEDURE

1. Remove the main machine from the box, and remove all shipping retainers and tapes.

**NOTE:** Store all shipping retainers as you remove them. You will need them if the machine is moved to another location in the future.

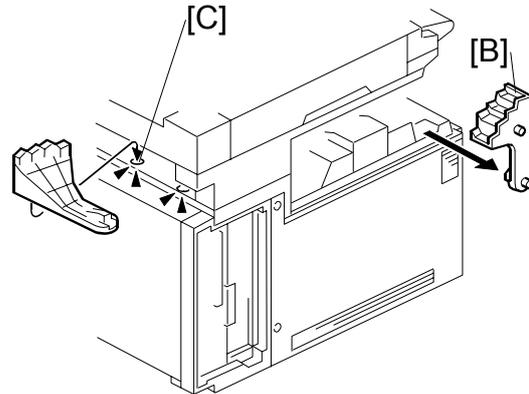
2. Pull out the paper trays and remove all shipping materials [A].



3. Remove scanner cushion [B].

**NOTE:** Do not discard the cushion. Store it inside the machine at [C]. You should install it the next time you move the machine.

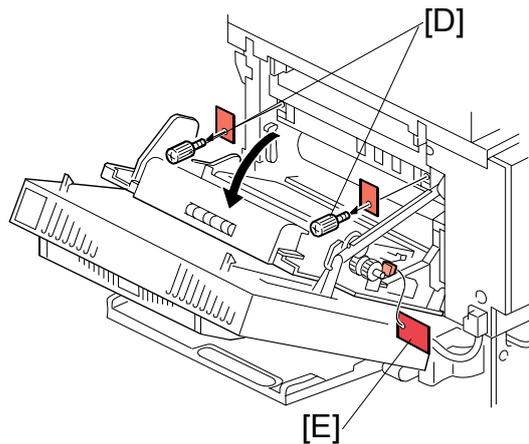
4. Remove the middle front cover from the 2nd tray.

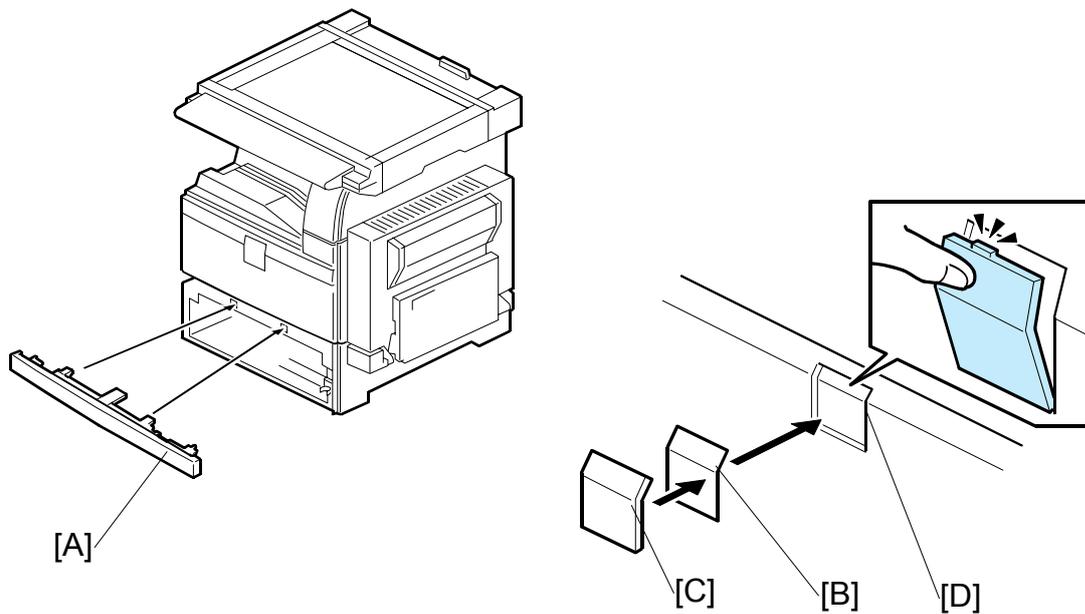


5. On the right side of the machine, open the by-pass tray, duplex unit, and transfer right cover.

6. Remove the shipping screws [D] (⚙ x2) and tags.

7. Remove the other shipping tag [E].  
**NOTE:** If the paper tray unit is to be installed, do this now. (➡1.4)

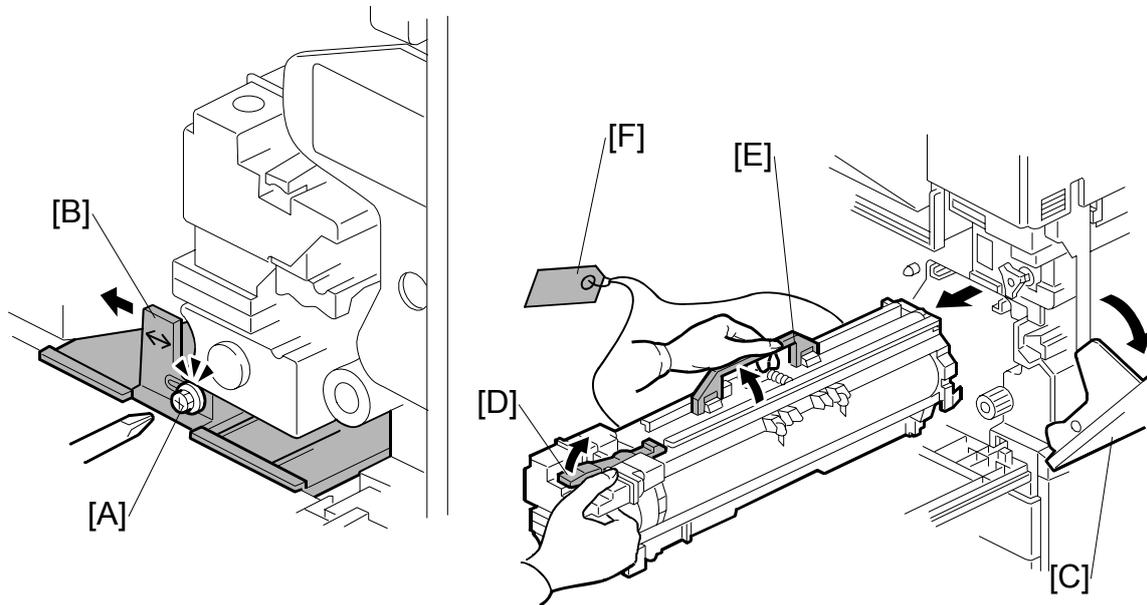




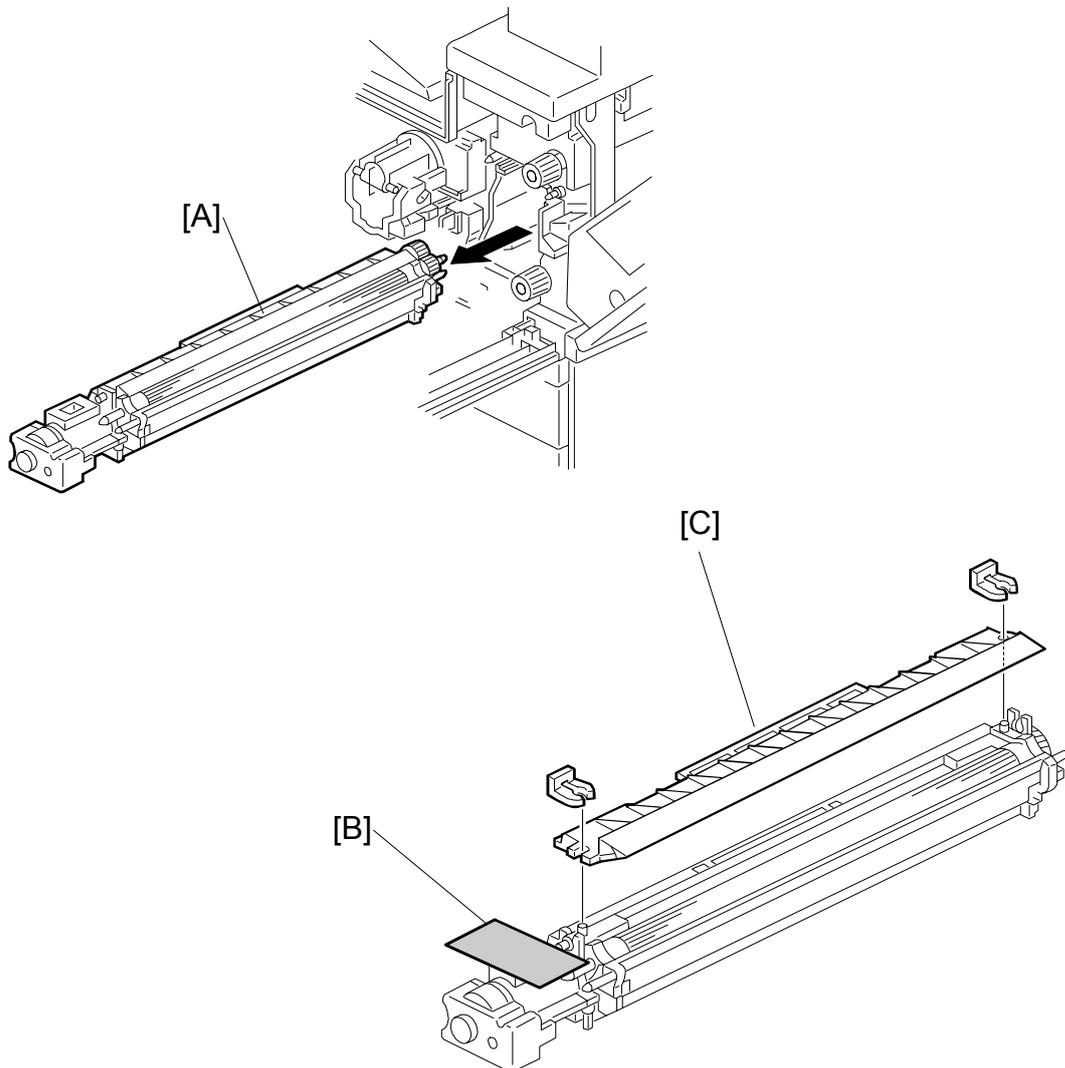
8. If the paper tray unit is not to be installed, install the middle front cover [A] (provided in the second paper tray).
9. Attach the emblem [B] and panel [C] to the front cover [D].
10. Push the panel in until the emblem and panel move into their positions with an audible click.

## MAIN MACHINE INSTALLATION

### ***Development Unit and PCU***

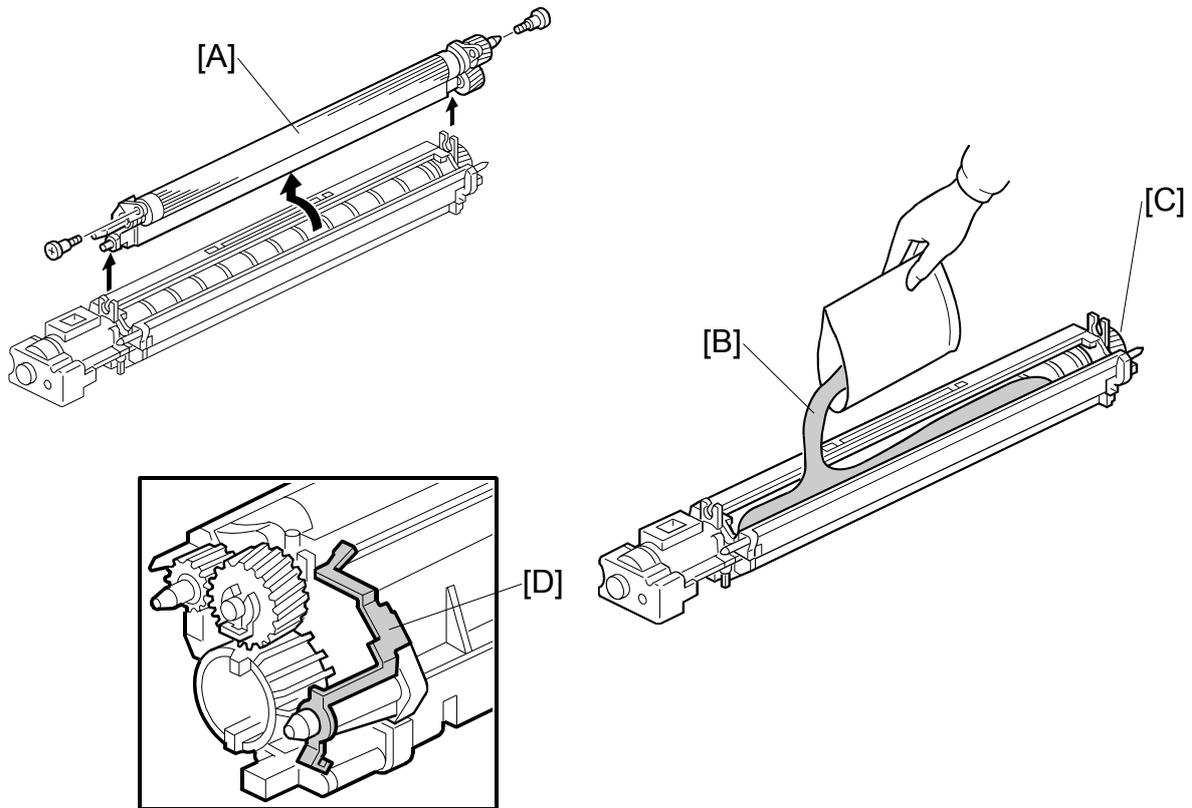


1. Open the front door.
2. Loosen [A] (⌀ x 1) (do not remove).
3. Push the base [B] to the left.
4. Open the right cover [C].
5. Raise the lever [D]
6. Pull out the PCU [E] and place it on a clean flat surface.
7. Remove clamps and wire [F].



8. Spread a large piece of paper on a flat surface.  
**NOTE:** Make sure the area is free of pins, paper clips, staples, etc. to avoid attraction to the magnetic development roller.
9. Slide the development unit [A] out and place it on the paper.
10. Remove the tape and tag [B] from the development unit
11. Remove the entrance seal plate [C] (🔧 x 2).

## MAIN MACHINE INSTALLATION



12. Remove the development roller unit [A], and set it on the paper.

13. Pour the developer [B] into the development unit.

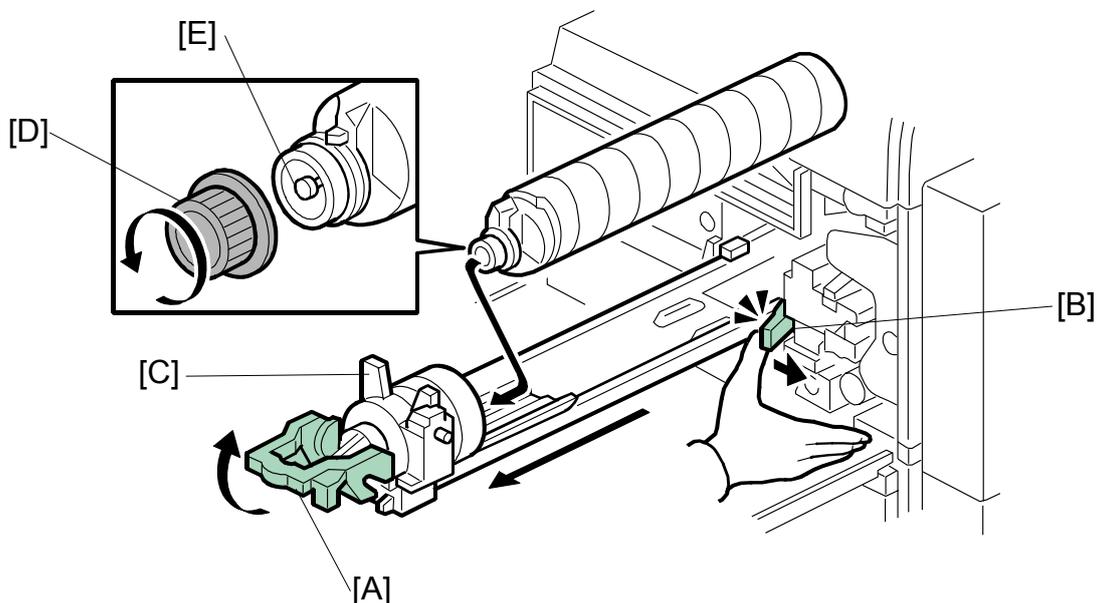
**NOTE:** The developer lot number is embossed on the end of the developer package. Do not discard the package until you have recorded the lot number. (●1-16)

- 1) Pour approximately 1/3 of the developer evenly along the length of the development unit.
- 2) Rotate the drive gear [C] to work the developer into the unit.
- 3) Repeat until all the developer is in the development unit.
- 4) Continue to turn the drive gear until the developer is even with the top of the unit.

14. Reassemble the development unit.

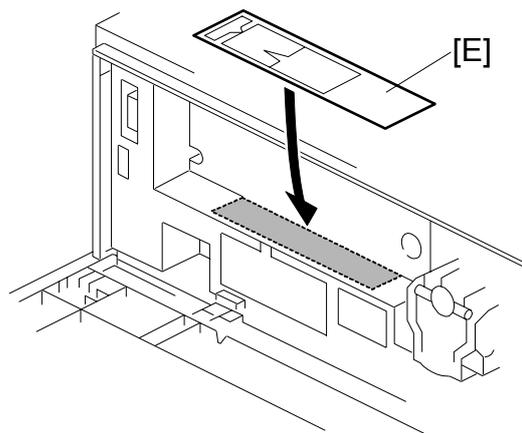
**NOTE:** Make sure that the earth plate [D] is positioned correctly.

15. Re-install the development unit and PCU.



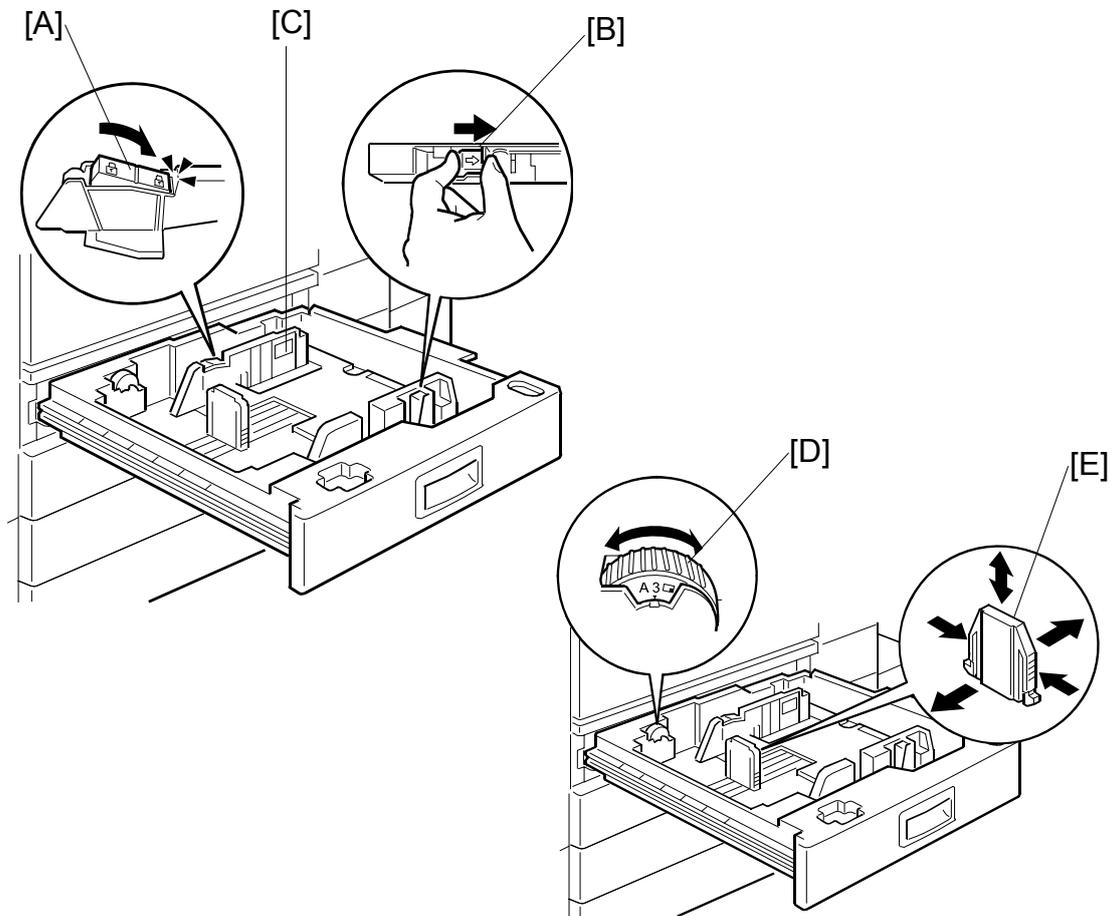
**Toner Bottle**

1. Raise the toner bottle holder lever [A], push the lever [B] to the side, and then pull out the toner bottle holder [C].
2. Unscrew the bottle cap [D] and set the bottle in the holder.  
**NOTE:** Do not touch the inner bottle cap [E].
3. Push the toner bottle holder into the main machine until it locks in place, and then lower the holder lever [A] to secure the toner bottle.  
**NOTE:** The holder lever cannot be lowered until the toner bottle has been installed.
4. Attach the toner supply installation decal [E].

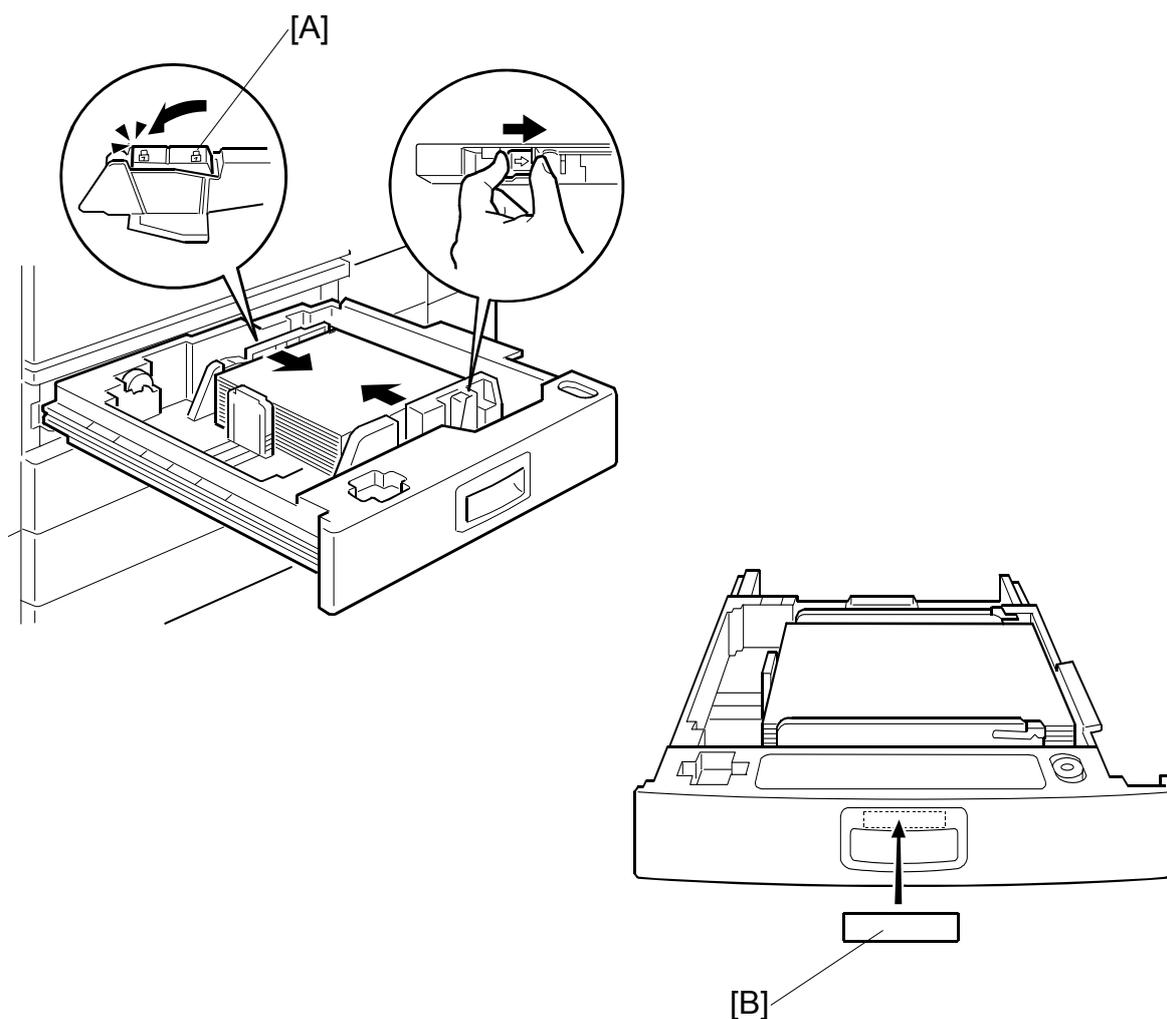


## MAIN MACHINE INSTALLATION

### Paper Trays



1. Open the 1st paper tray, and then press down on the right side of the lock [A] switch to unlock the side fences.
2. Press in on the sides of the fence release [B], and slide the side fences [C] to the appropriate mark for the paper size.
3. Turn the dial [D] to the correct setting for the paper size.
4. Pinch the sides of the bottom fence [E] and move it to the appropriate mark for the paper size, then load the paper.
5. Check the position of the stack.
  - Confirm that there is no gap between the stack and the side fences. If you see a gap, adjust the position of the side fences.
  - After loading the stack, confirm that the right side of the stack is not on top of both cushions.

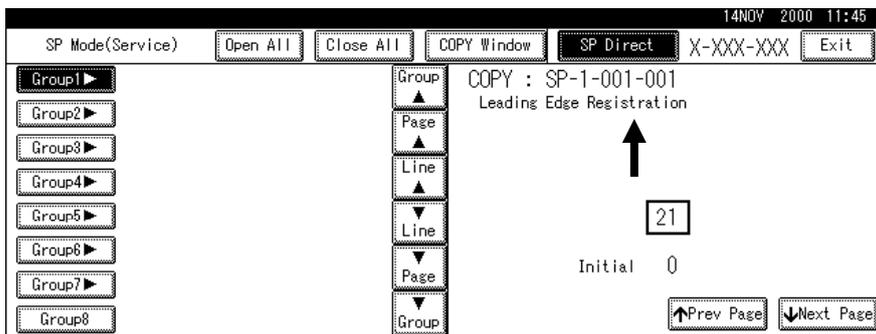


6. Press down the lock [A] to lock the side fences.
7. Attach the appropriate paper size decal [B] to the paper tray.
8. Paper size decals are also used for the optional paper tray unit. Keep any remaining decals for use with the paper tray unit.
9. Repeat this procedure to load paper in the 2nd paper tray.

## MAIN MACHINE INSTALLATION

### **Initialize TD Sensor and Developer**

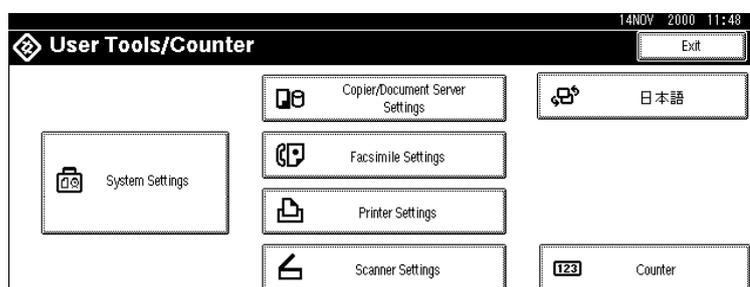
1. Connect the main machine to the power outlet, switch on the main machine, and wait for the fusing unit to warm up.
2. On the operation panel, press Clear Mode .
3. Use the number keys to enter 107.
4. Press and hold Clear/Stop  for three seconds.
5. On the touch-panel, press Copy SP.
6. Press SP Direct to highlight “SP Direct”, enter 2801, and then press .



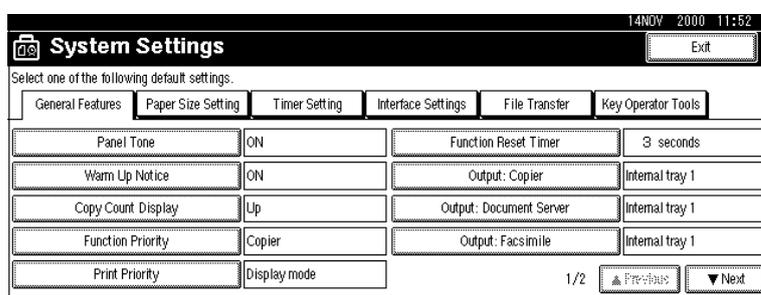
7. When the message prompts you to enter the lot number of the developer, enter the 7-digit lot number, press [Yes], and then press [Execute] on the touch-panel. This initializes the TD sensor.  
**NOTE:** The lot number is printed on the end of the developer package.  
Recording the lot number could help troubleshoot problems later. If the lot number is unavailable, enter any seven-digit number.
8. Press SP Direct to highlight “SP Direct” and enter 2805, press , and then press Execute on the touch-panel. This initializes the developer.
9. Press Exit twice to return to the copy window.

## Set Paper Size for Paper Trays

1. Press User Tools/Counter .



2. On the touch panel, press System Settings.



3. Press the Paper Size Setting tab.
4. Press the button for the tray to change.
5. Change the setting and press the [OK] button.
6. Repeat for each tray installed.
7. Press Exit twice to return to the main display
  - The 1st, 2nd, 3rd, and 4th paper trays are provided with paper size dial selectors. The dial settings on the paper trays have priority over the UP settings. However, if you select the asterisk (\*) position on the paper size dial, you can select the paper size with the UP setting.
8. Check the copy quality and machine operation.
 

**NOTE:** The test pattern print procedure is slightly different for this machine. Use SP2-902 and select 2 for the IPU Test Print or 3 for the Print Test Patterns. (☛ 5.2.3 Test Pattern Printing)

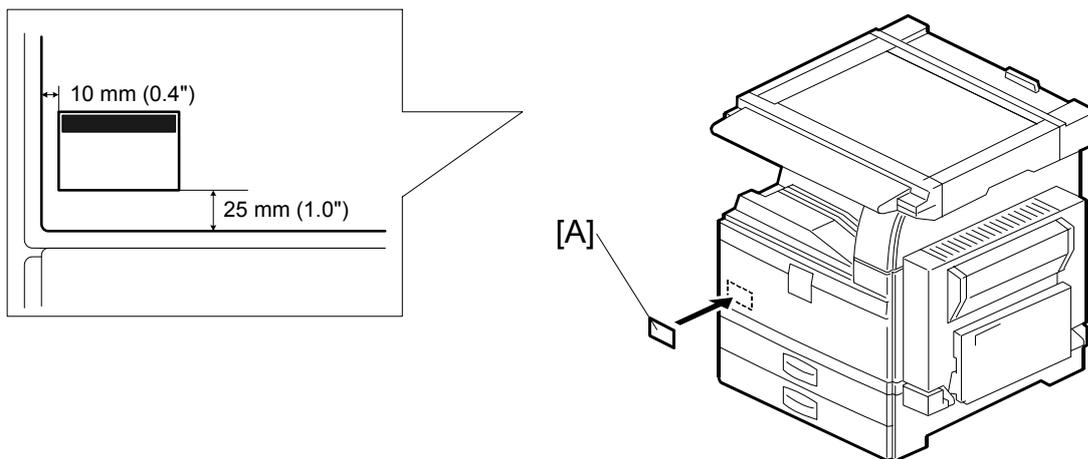
## MAIN MACHINE INSTALLATION

### ***Electrical Total Counter***

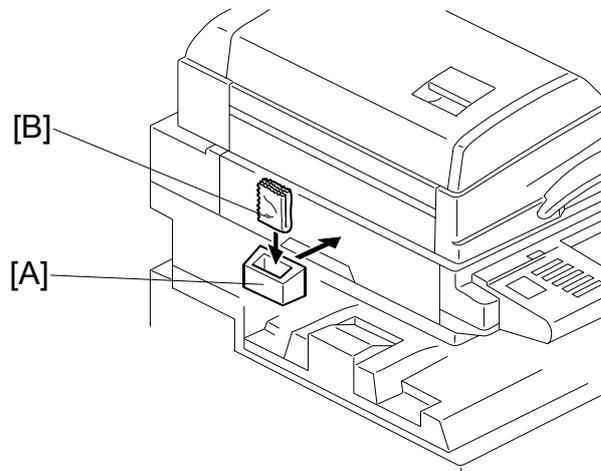
The electrical total counter no longer requires initialization. The new incrementing counter is set to "0" at the factory.

### ***HDD Caution Decal***

1. Attach the HDD Caution decal [A] to the front cover.



### Exposure Glass Cleaner



1. Attach the exposure glass cleaner holder [A] to the left side of the machine.
2. Place the exposure glass cleaner [B] inside the holder.  
**NOTE:** The exposure glass cleaner is used to clean the ARDF exposure glass, the glass strip to the left of the large exposure glass.

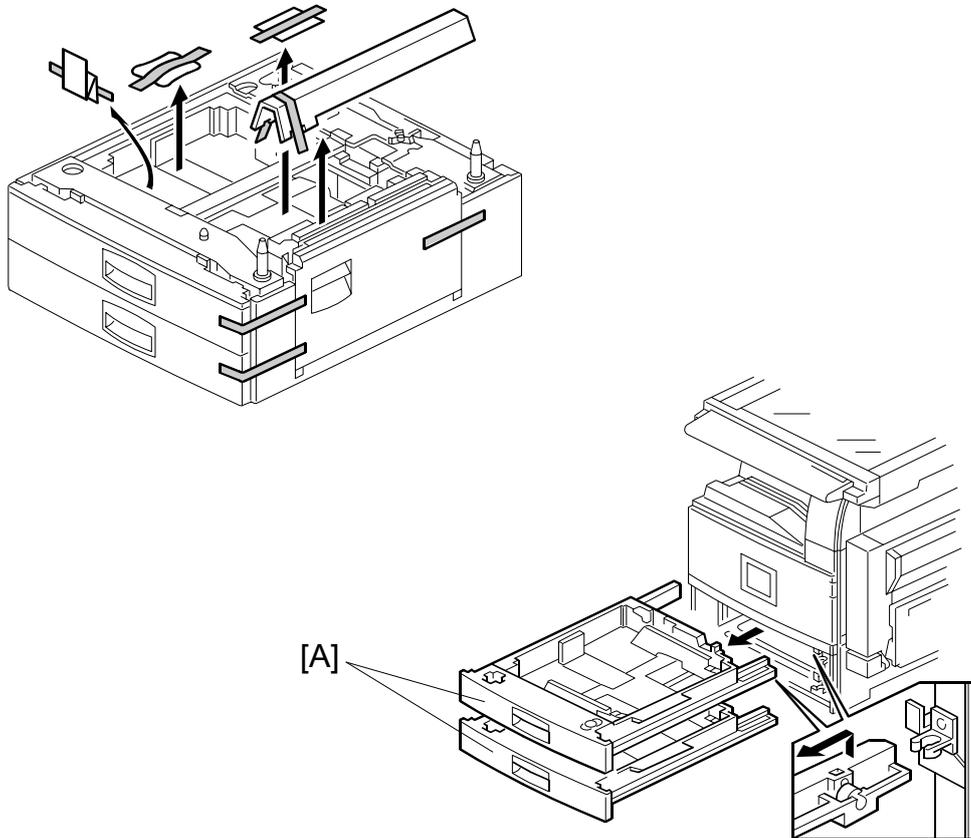
## 1.4 PAPER TRAY UNIT INSTALLATION (B542)

### 1.4.1 ACCESSORY CHECK

Check the quantity and condition of the accessories in the box against the following list:

<b>Description</b>	<b>Q'ty</b>
1. Knob Screw – M3 .....	1
2. Knob Screw – M4 .....	1
3. Joint Bracket .....	1
4. Front Stand .....	1
5. Rear Stand.....	1
6. Stand Bracket .....	1
7. Installation Procedure .....	1

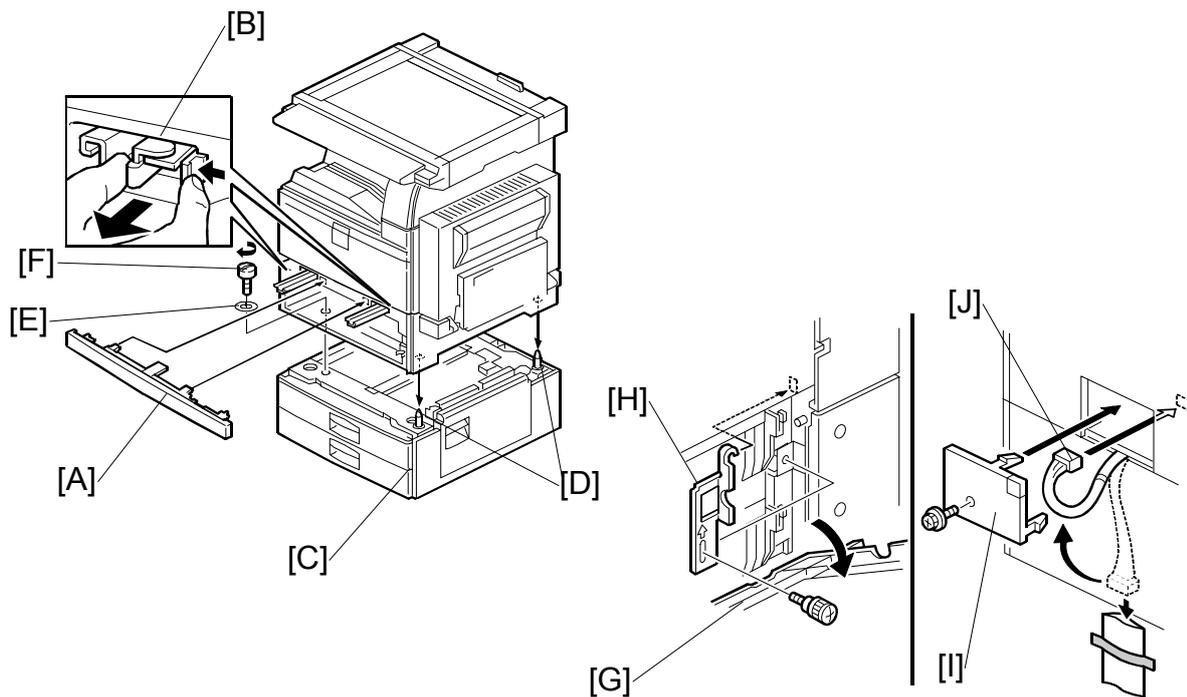
## 1.4.2 PAPER TRAY UNIT INSTALLATION PROCEDURE

**⚠ CAUTION**

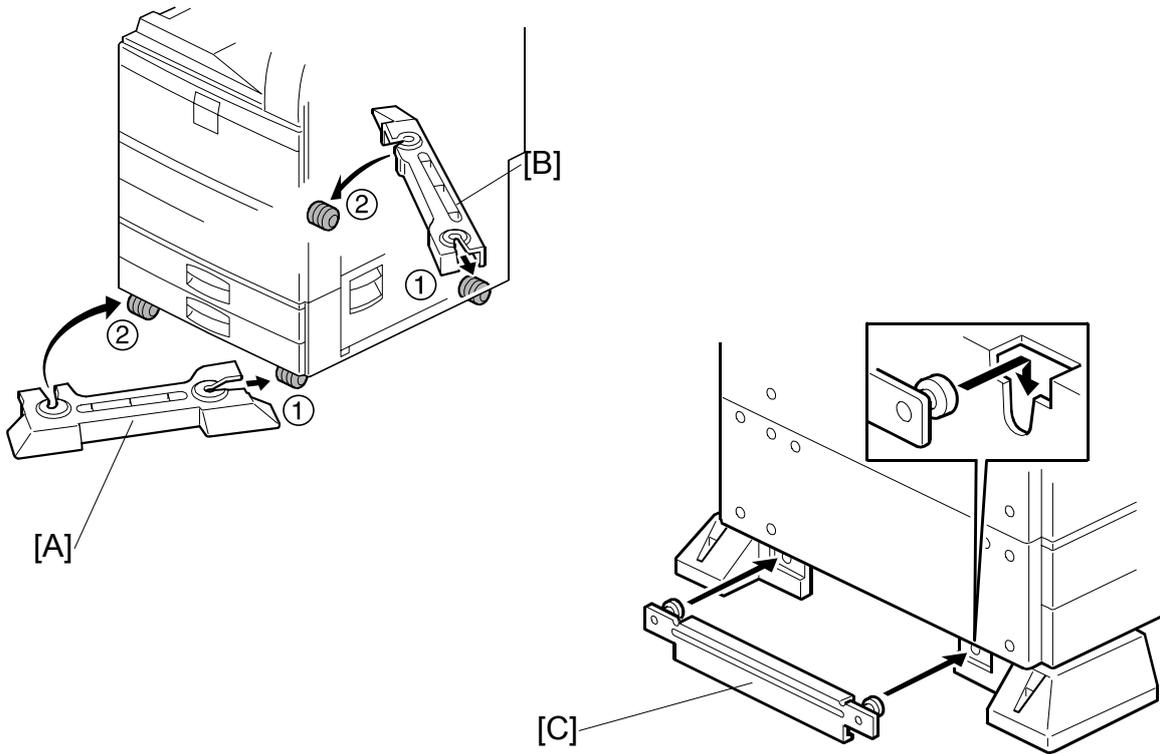
**Unplug the main machine power cord before starting the following procedure.**

1. Unpack the paper tray unit.
2. Remove all tape and shipping materials.
3. Remove the paper trays [A].

## PAPER TRAY UNIT INSTALLATION (B542)



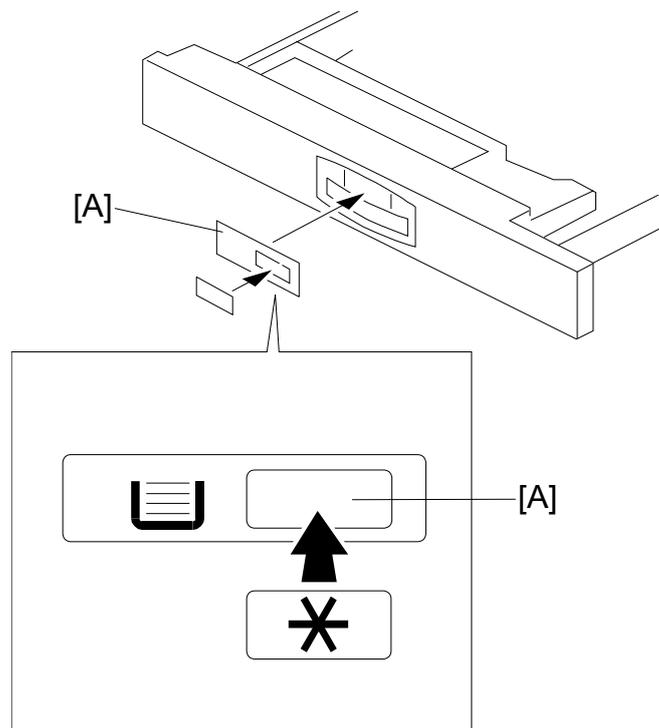
4. Remove the middle front cover [A] and pull out the front handles [B].
5. Using the front handles and rear handles, lift the machine and hold it over the paper tray unit [C].
6. Slowly lower the machine onto the paper tray unit with the pegs [D] aligned with the peg holes on the bottom of the machine.  
**NOTE:** Do not hold the scanner unit.
7. Re-install the middle front cover [A].
8. Attach the spring washer [E] to the short knob screw [F]. Then, secure the paper tray unit.
9. Open the right cover of the paper tray unit [G].
10. Secure the joint bracket [H] (1 long knob screw).
11. Remove the connector cover [I] of the main machine (🔩 x 1).
12. Connect the paper tray unit harness [J] to the main machine and reinstall the connector cover.



13. Install the front stand [A] and rear stand [B] as shown above.

14. Install the stand bracket [C].

## PAPER TRAY UNIT INSTALLATION (B542)



15. Load paper into the paper tray and install the paper trays.
16. Attach the appropriate tray decals [A] which are included in the accessory box for the main machine.
17. Turn on the ac switch.
18. Turn the paper size dial to the correct setting for the paper size.
19. Check the machine's operation and copy quality.

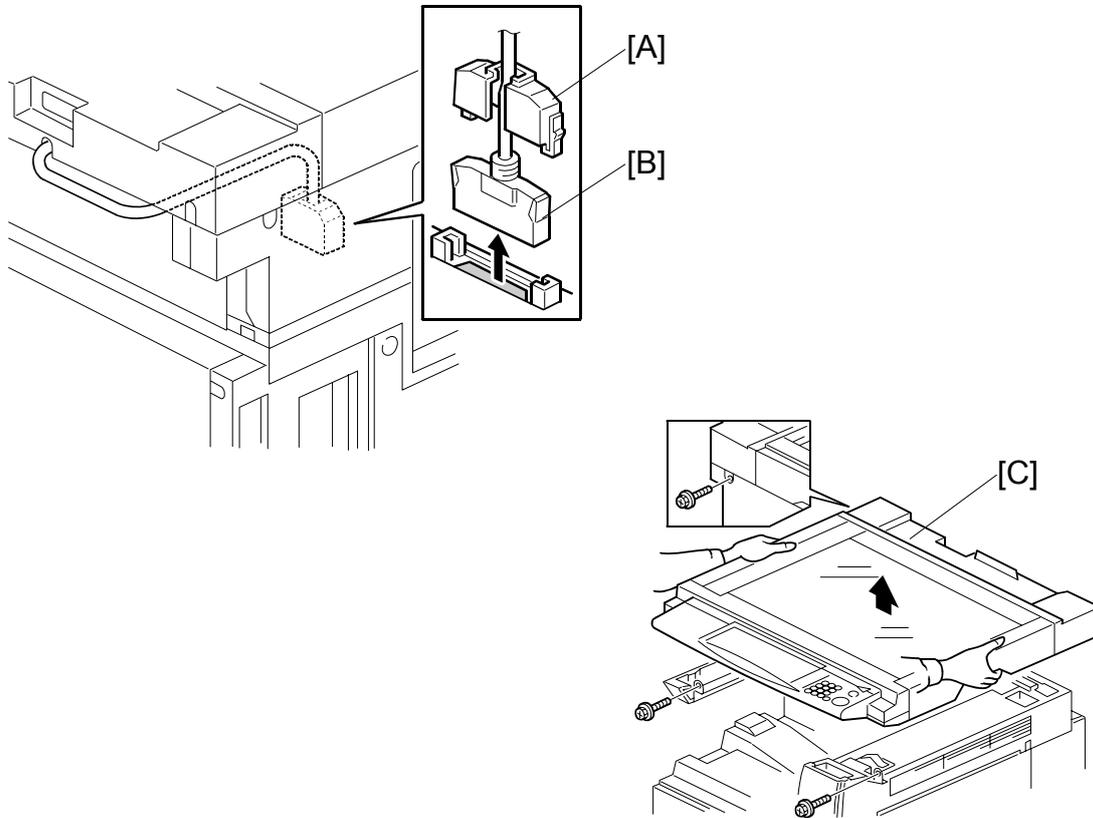
## 1.5 1-BIN TRAY UNIT INSTALLATION (B544)

### 1.5.1 ACCESSORY CHECK

Check the quantity and condition of the accessories in the box against the following list:

Description	Q'ty
1. Ground Bracket.....	1
2. Connector Cover.....	1
3. Base Cover.....	1
4. Arm Cover.....	1
5. Copy Tray.....	1
6. Mylar Strip.....	2
7. Stepped Screw – M3 x 8.....	5
8. Screw –M3 x 8.....	2
9. Screw – M4 x 7.....	1
10. Tapping Screw – M3 x 6.....	2
11. Tapping Screw – M3 x 14.....	1
12. Tapping Screw – M3 x 8.....	1
13. Installation Procedure.....	1

## 1.5.2 1-BIN TRAY INSTALLATION PROCEDURE



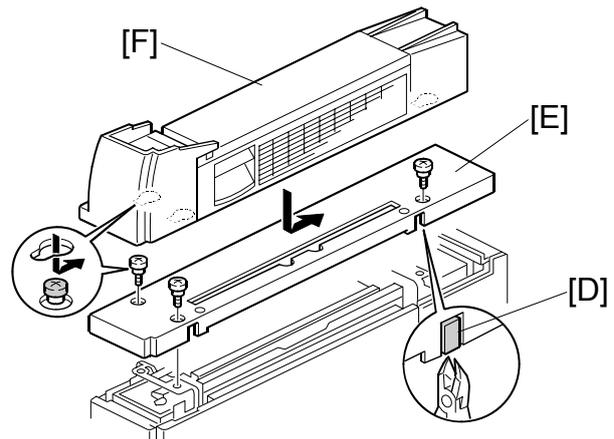
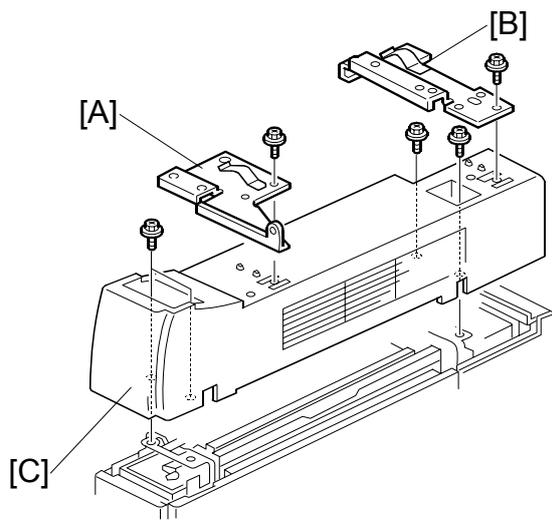
### **⚠ CAUTION**

**Unplug the main machine power cord before starting the following procedure.**

#### 1. Remove Scanner Unit

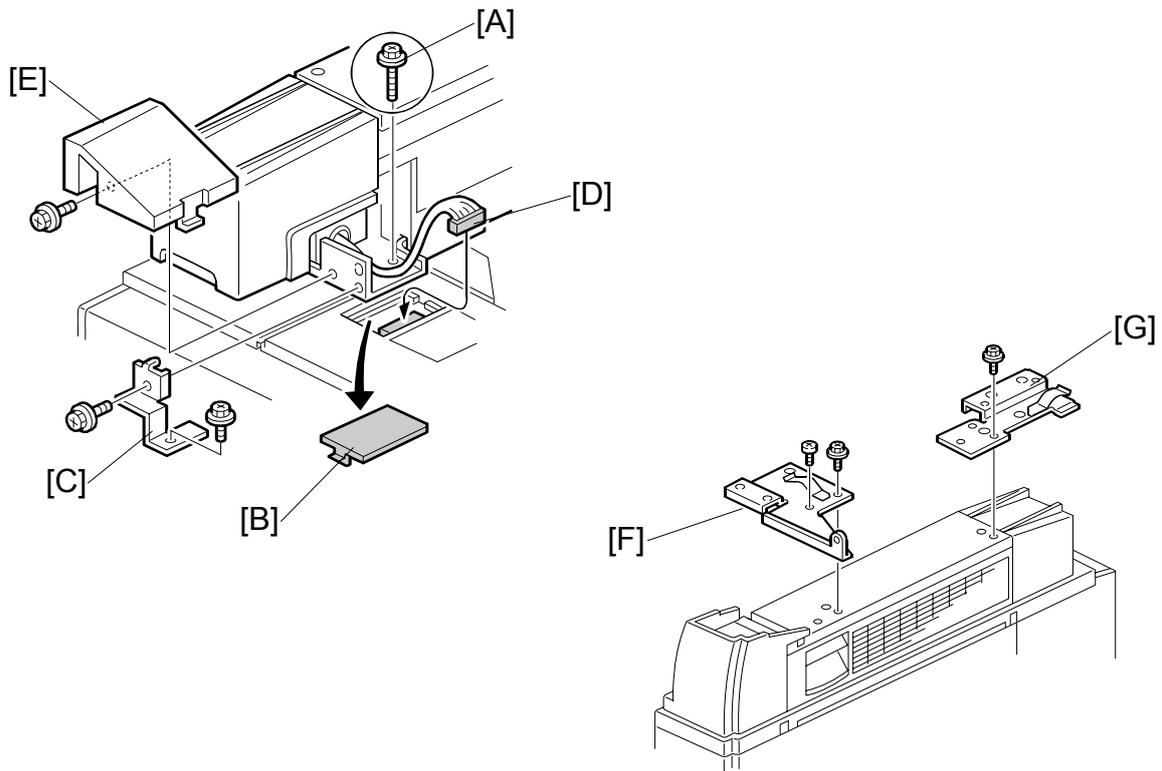
**NOTE:** If the ARDF is installed, remove the ARDF before removing the scanner unit.

- Remove the connector cover [A].
- Disconnect the scanner cable [B].
- Remove the scanner unit [C] (⚙ x 3).

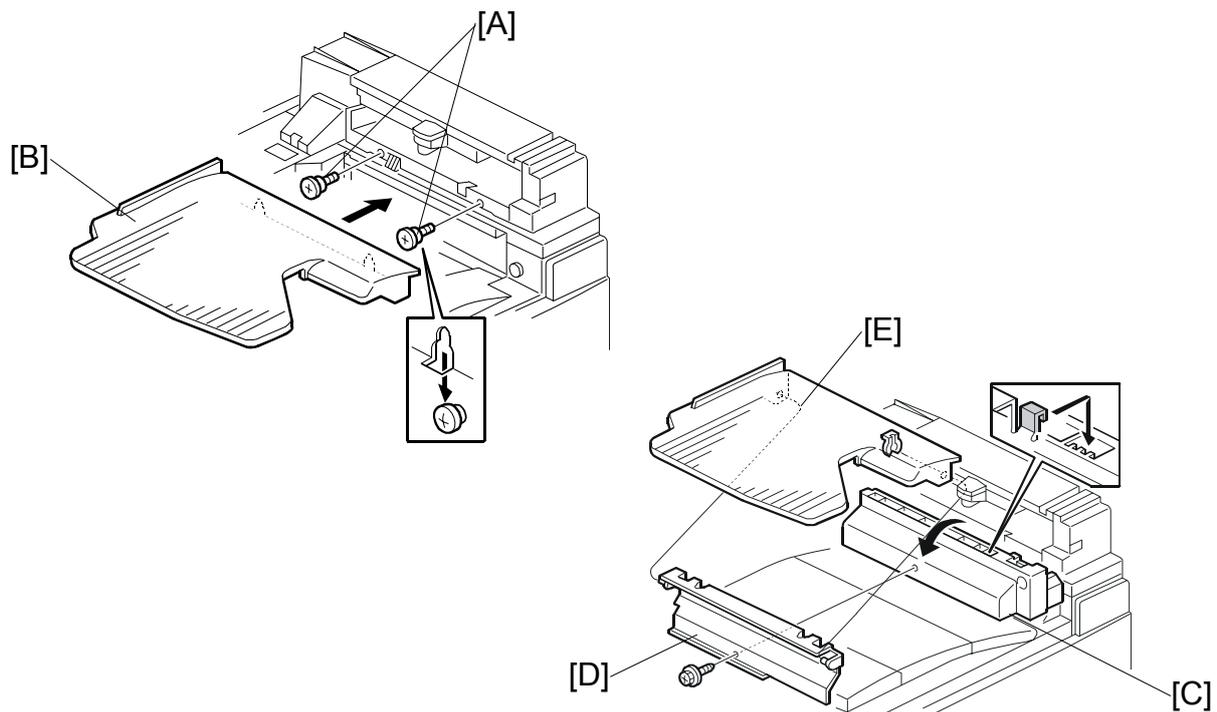


2. Unpack the 1-bin tray unit and remove the tapes.
3. Remove the front bracket [A] (⌀ x 1) and rear bracket [B] (⌀ x 1) from the top of the paper exit cover [C].
4. Remove the paper exit cover [C] (⌀ x 4).
5. Cut away two covers [D] from the base cover [E].
6. Trim the edges so they are smooth.
7. Install the base cover [E] (⌀ x 3: stepped screw).
8. Set the 1-bin tray unit [F] on the base cover and slide onto the heads of the stepped screws.

## 1-BIN TRAY UNIT INSTALLATION (B544)



9. Secure the 1-bin tray unit [A] (⚙ x 1 M3 x14).
10. Remove the cover [B].
11. Install the grounding bracket [C] (⚙ x 2 M3 x 6).
12. Connect the harness [D].
13. Install the connector cover [E] (⚙ x 1 M3 x 8)
14. Re-install the front bracket [F] (⚙ x 2 M4 x 7, M4 x 10) and the rear bracket [G] (⚙ x 1 M4 x 10).



15. Attach the copy tray [B]

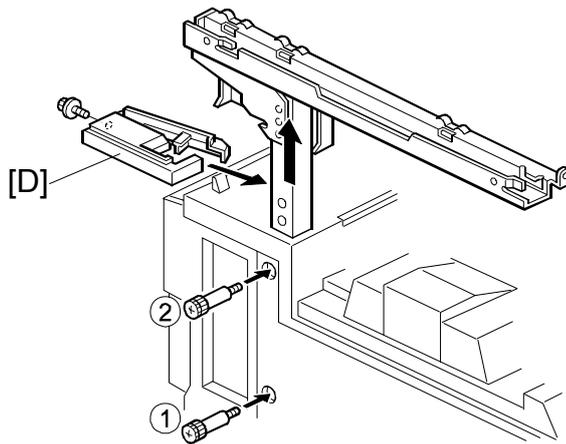
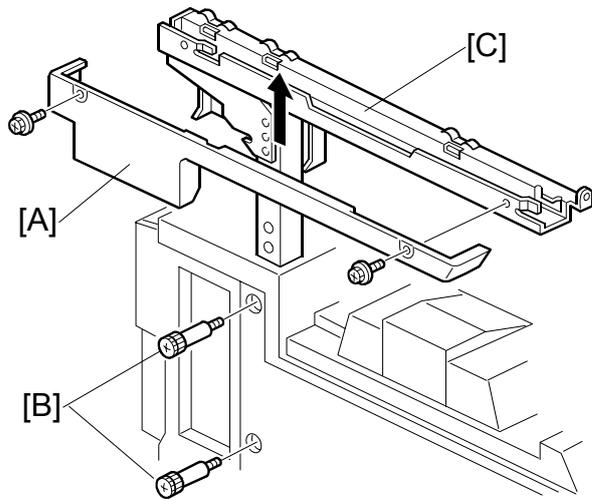
**Bridge Unit (B538) has not been installed:**

- 1) Secure [A] (stepped  x 2) into the side of the 1-bin tray housing.
- 2) Attach the copy tray [B] to the stepped screws.

**Bridge Unit (B538) has been installed**

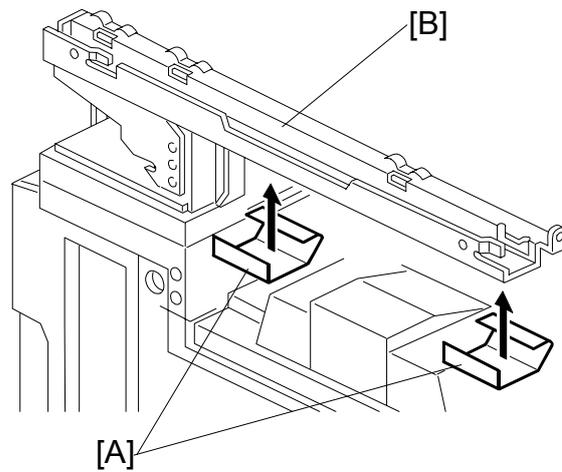
- 1) Open the cover of the bridge unit [C].
- 2) First, remove the copy tray bracket [D] ( x 1).
- 3) Install the copy tray bracket ( x 1: tapping screw).
- 4) Re-install the copy tray [E] ( x 1).

## 1-BIN TRAY UNIT INSTALLATION (B544)



16. Remove the scanner stand cover [A] (⚙ x 2).
17. To adjust the height of the scanner stand, first remove [B] (⚙ x 2) to release the scanner stand [C].
18. Raise the scanner stand until the next set of screw holes in the main frame can be seen through the screw holes in the scanner stand.
19. Secure the stand (⚙ x 2: ①, ②) and install the arm cover [D] (⚙ x 1).

## 1-BIN TRAY UNIT INSTALLATION (B544)



20. Attach two mylar strips [A] to the scanner stand [B].
21. Reinstall the scanner stand cover.
22. Reinstall the scanner unit.
23. Turn on the main switch and check the 1-bin tray unit operation.

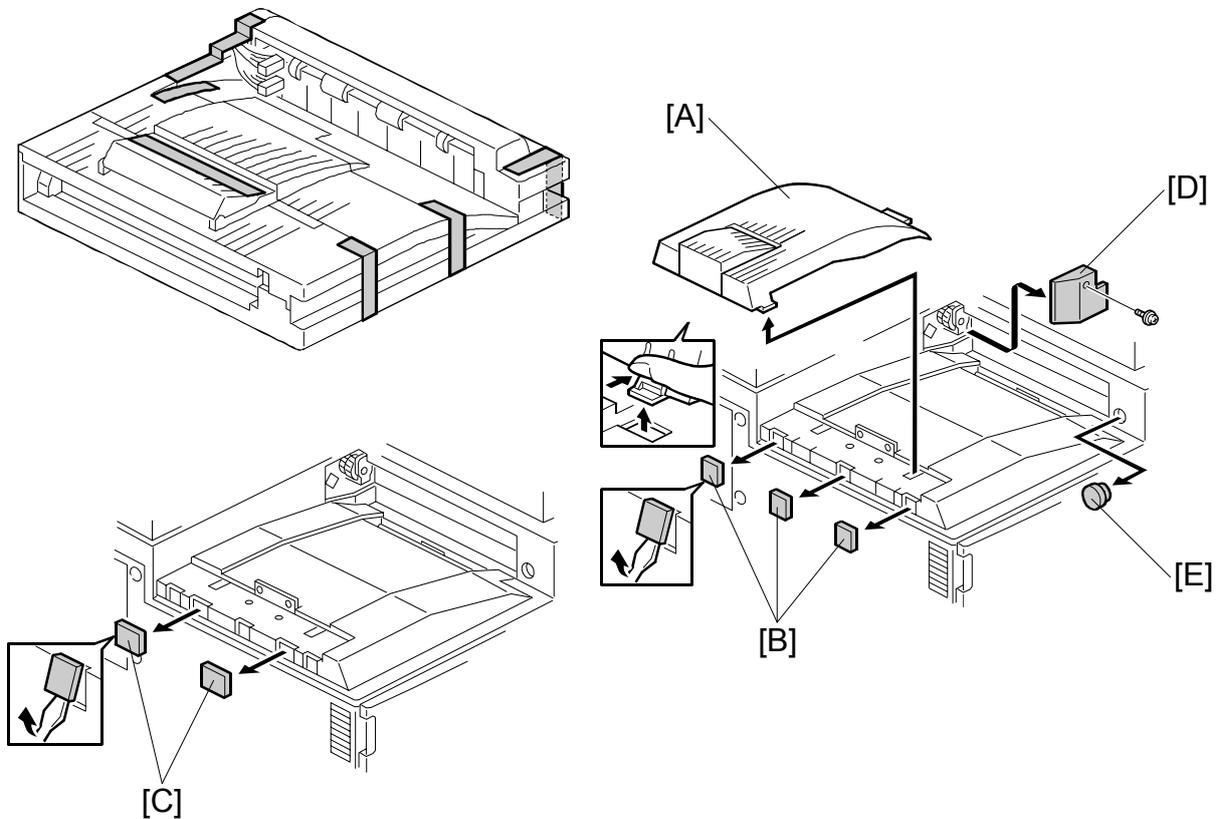
## 1.6 BRIDGE UNIT INSTALLATION (B538)

### 1.6.1 ACCESSORY CHECK

Check the quantity and condition of the accessories in the box against the following list:

Description	Q'ty
1. Stepped Screw .....	2
2. Connector Cover .....	1
3. Exit Mylar .....	2
4. Installation Procedure .....	1

## 1.6.2 BRIDGE UNIT INSTALLATION PROCEDURE



### **⚠ CAUTION**

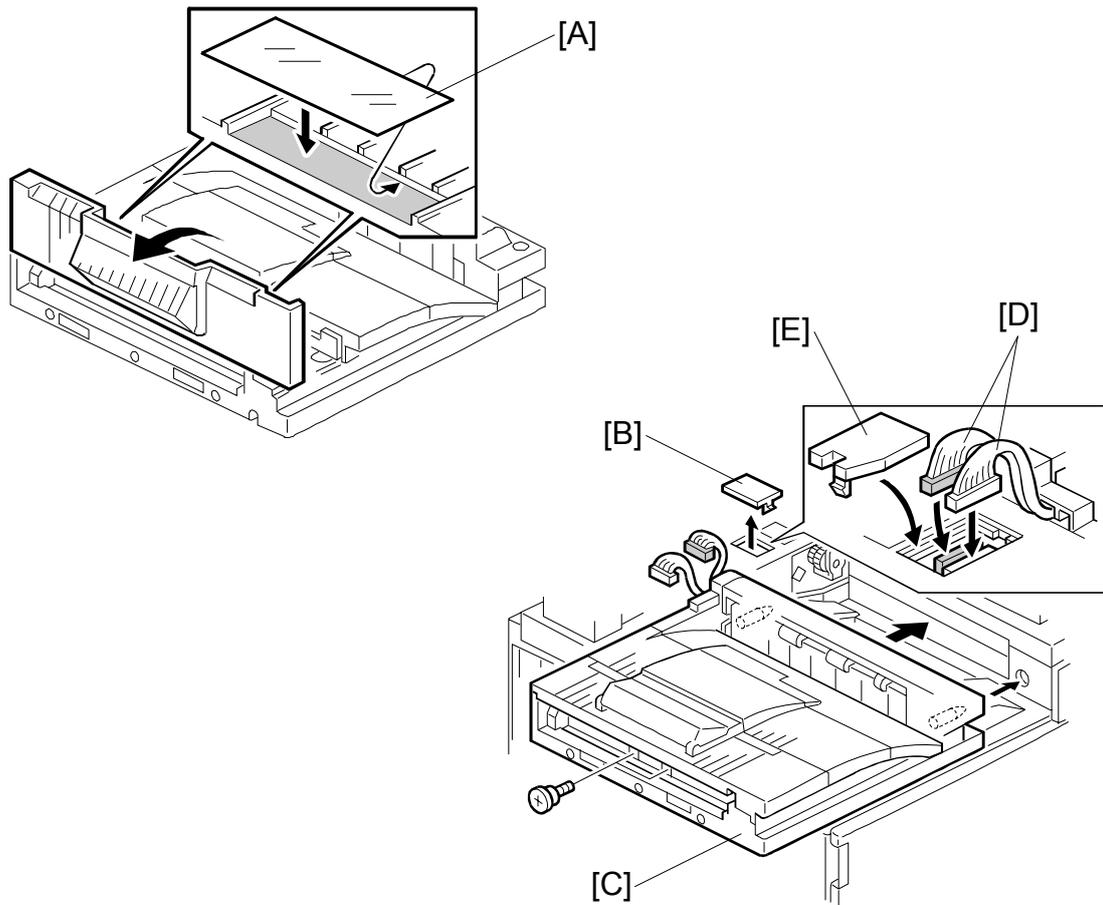
**Unplug the main machine power cord before starting the following procedure.**

1. Unpack the bridge unit and remove all tapes shipping retainers.
2. Remove the inner tray [A].
3. On the side of the machine, remove the three small covers [B].

**If the optional external output tray (A825) will be installed (instead of a finisher), do Step 4.**

4. Remove the two small covers [C].
5. Remove the cover [D] (⚙ x 1).
6. Remove the cap [E].

## BRIDGE UNIT INSTALLATION (B538)



7. If an optional finisher is to be installed, attach two mylars [A] to the bridge unit.
8. Remove the cover [B].
9. Install the bridge unit [C] (⚙️ x 2).
10. Connect the bridge unit I/F harnesses [D] (🔌 x 2).
11. Install the connector cover [E].
12. Turn on the main switch and check the bridge unit operation (make sure that there are no paper jams).

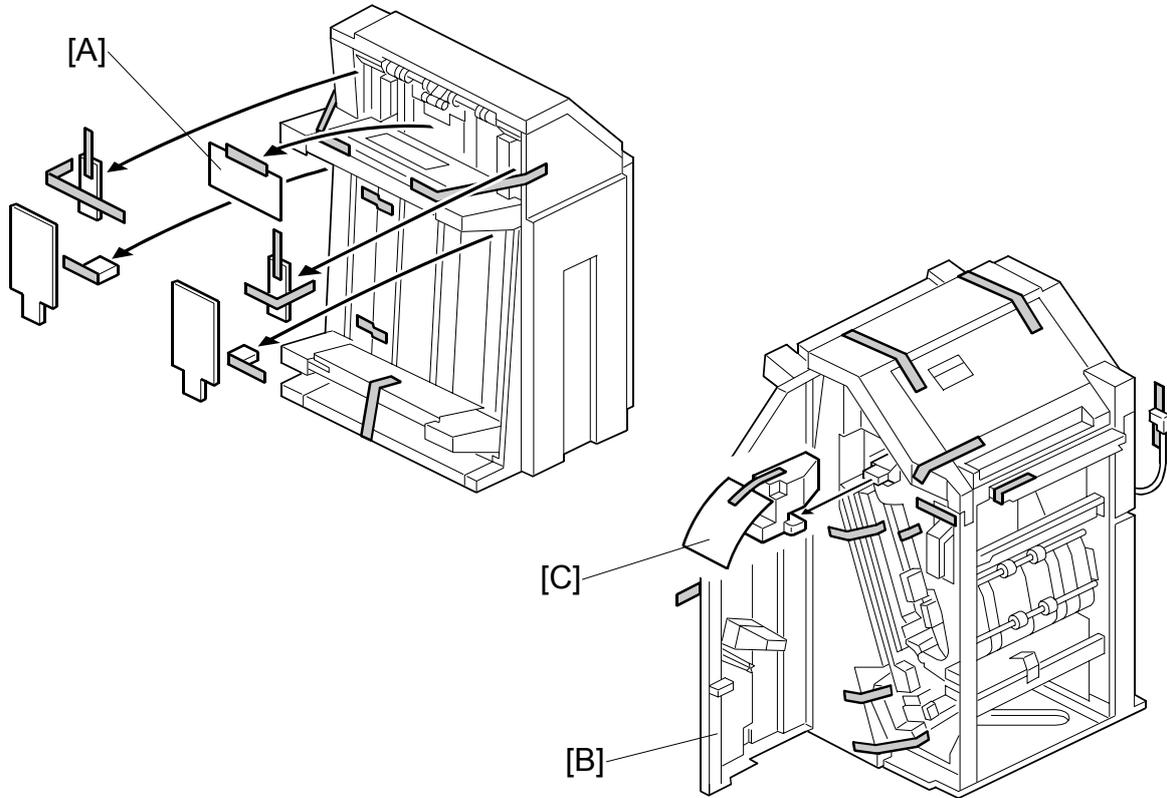
## 1.7 TWO-TRAY FINISHER INSTALLATION (B545)

### 1.7.1 ACCESSORY CHECK

Check the quantity and condition of the accessories in the box against the following list:

Description	Q'ty
1. Front Joint Bracket.....	1
2. Rear Joint Bracket .....	1
3. Shift Tray .....	2
4. Screw – M4 x 8 .....	2
5. Screw – M4 x 12 .....	5
6. Ground Plate.....	1
7. Installation Procedure .....	1

## 1.7.2 TWO-TRAY FINISHER INSTALLATION PROCEDURE



**⚠ CAUTION**

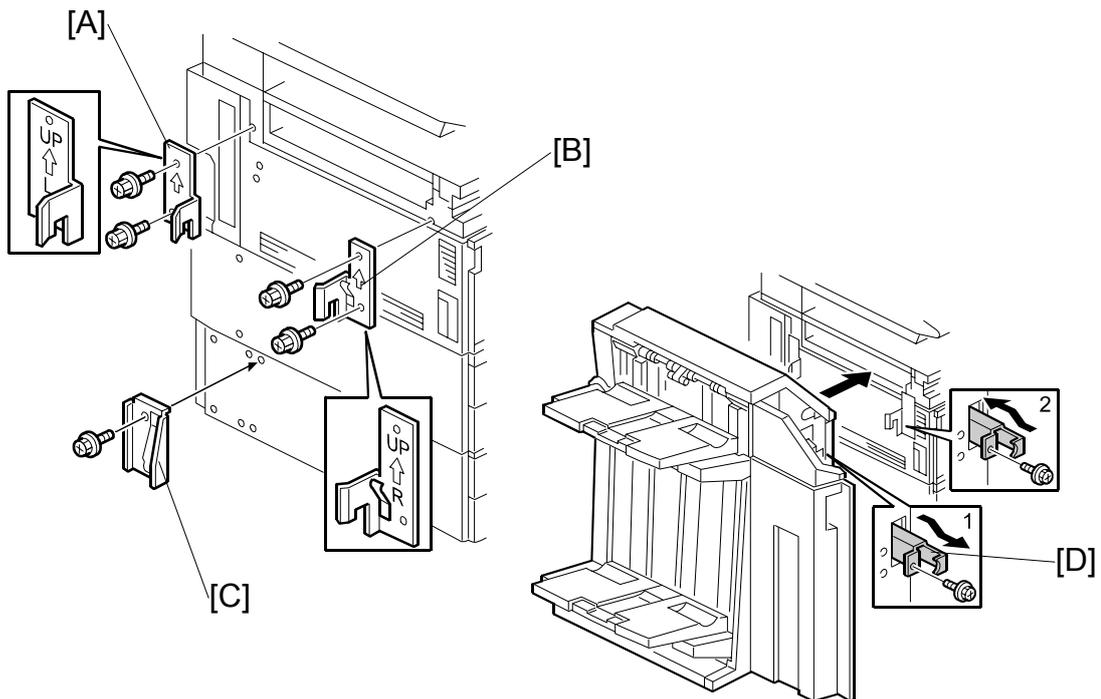
**Unplug the main machine power cord before starting the following procedure.**

**NOTE:** The bridge unit (B538) and paper tray unit (B542) must be installed before installing this finisher.

1. Unpack the finisher and remove all tapes and shipping retainers from outside the unit [A].
2. Open the front door [B] and remove all tapes and shipping materials from inside the finisher unit.
3. Save the retainer [C] and other shipping material.

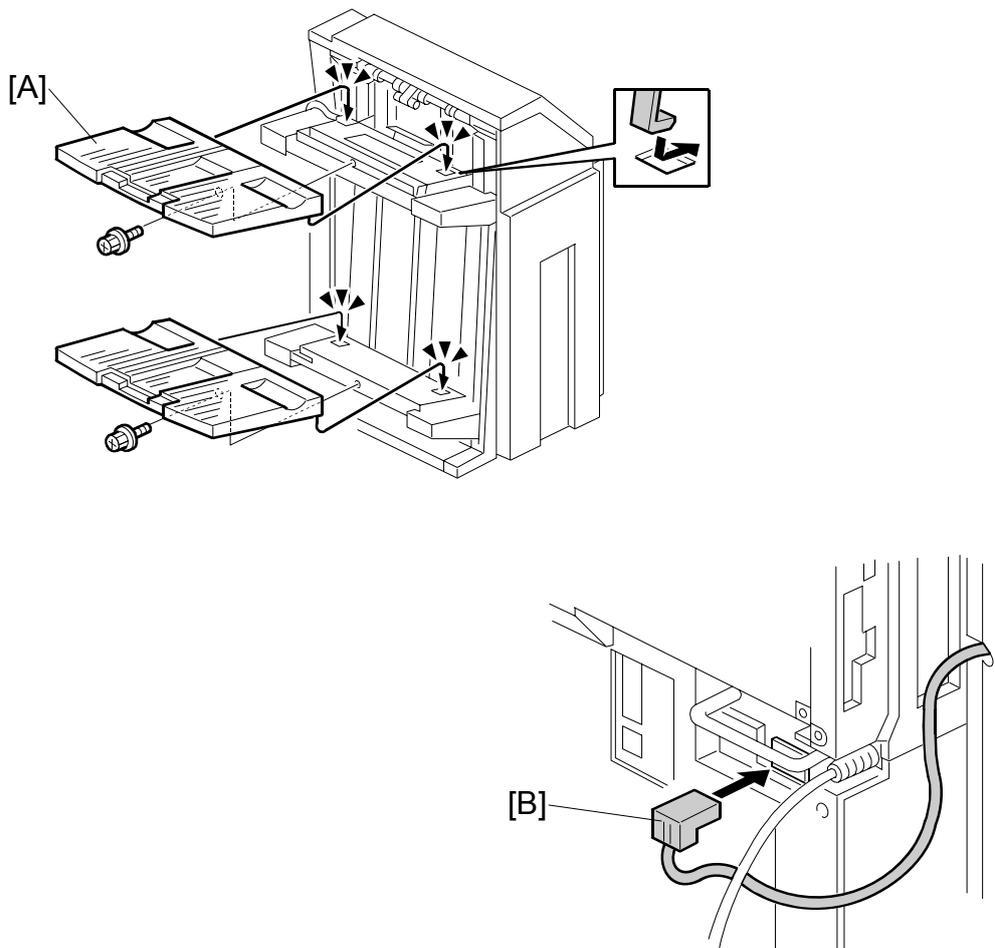
**NOTE:** The retainer [C] must be re-installed in the finisher before moving or shipping the finisher to another location.

## TWO-TRAY FINISHER INSTALLATION (B545)



4. Install the left joint bracket [A] (🔩 x 2 M4 x 12) and right joint bracket [B] (🔩 x 2 M4 x 12).
5. Attach the ground plate [C] (🔩 x 1 M4 x 12) to the center of the paper tray unit as shown.
6. Open the front door of the finisher, and pull out the locking lever [D] (🔩 x 1).
7. Push the finisher to the side of the machine with the holes in the finisher aligned with the joint brackets, and then dock the finisher against the machine.
8. Push in the locking lever and secure it (🔩 x 1), then close the front door.

## TWO-TRAY FINISHER INSTALLATION (B545)



9. Install two trays [A] (1 x 1 each).
10. Connect the finisher cable [B] to the main machine below the right, rear handle.
11. Turn on the main switch and check the finisher operation.

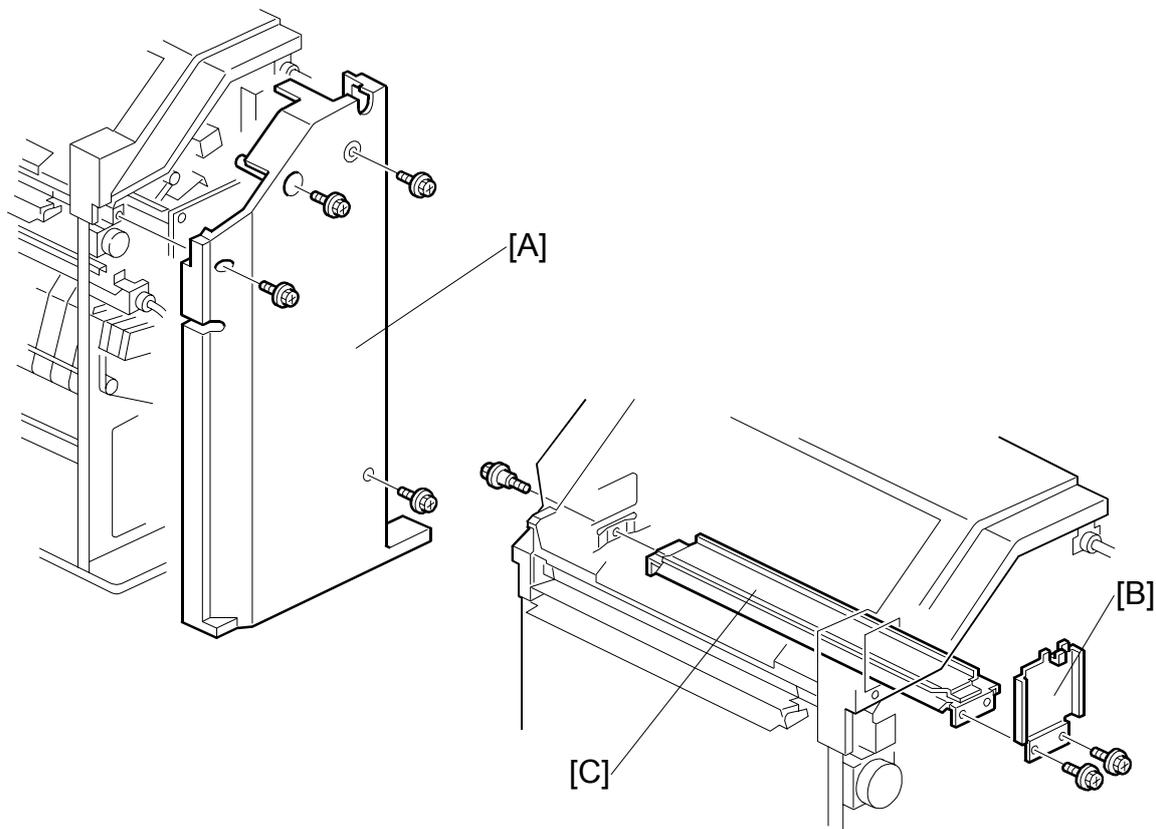
# 1.8 PUNCH UNIT INSTALLATION (B377)

## 1.8.1 ACCESSORY CHECK

Check the quantity and condition of the accessories in the box against the following list:

<b>Description</b>	<b>Q'ty</b>
1. Punch unit.....	1
2. Sensor arm .....	1
3. Hopper .....	1
4. Step screw .....	1
5. Spring .....	1
6. Spacer (2 mm).....	1
7. Spacer (1 mm).....	1
8. Tapping screw .....	1
9. Tapping screw .....	2

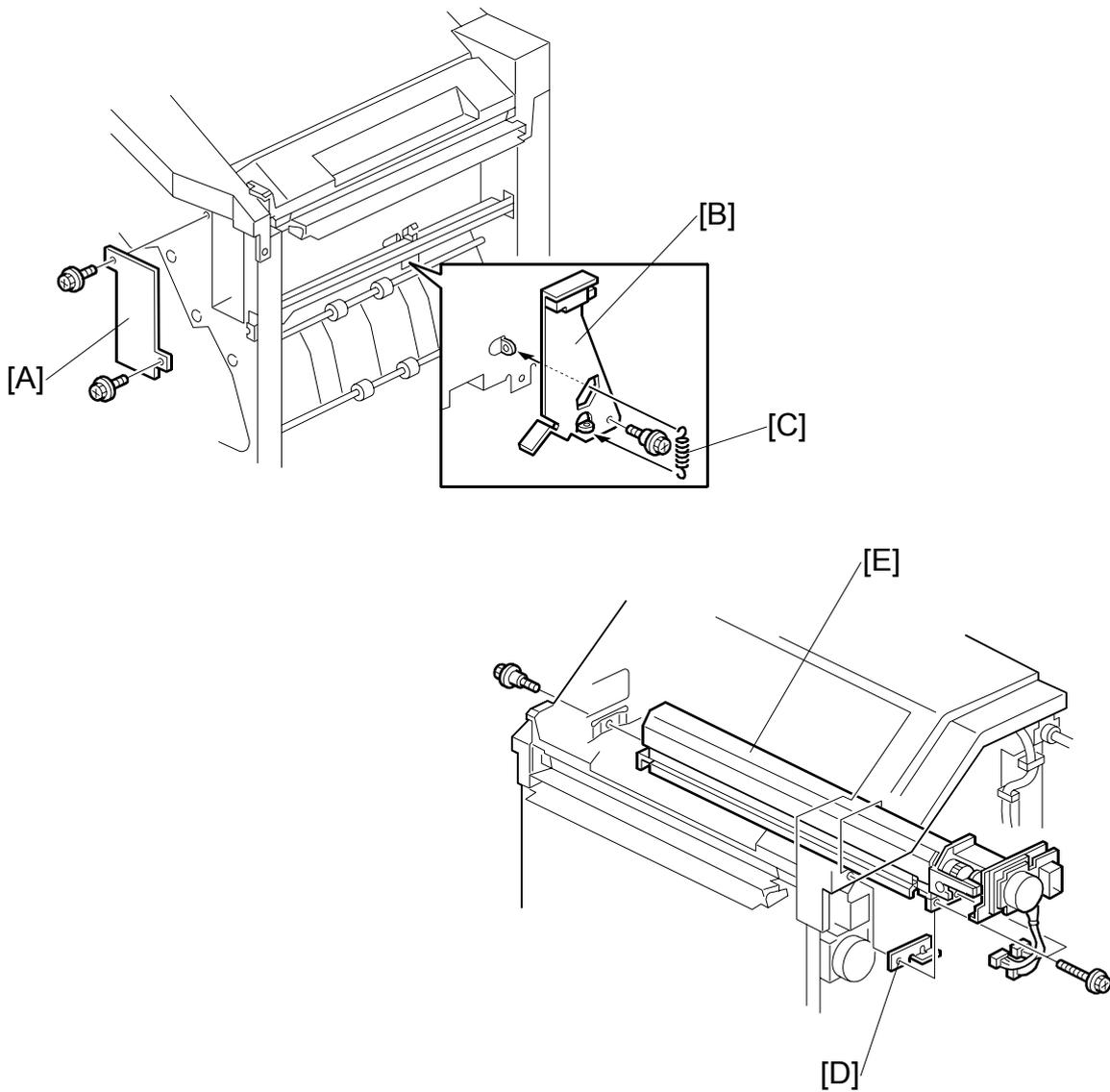
## 1.8.2 PUNCH UNIT INSTALLATION PROCEDURE



**⚠ CAUTION**

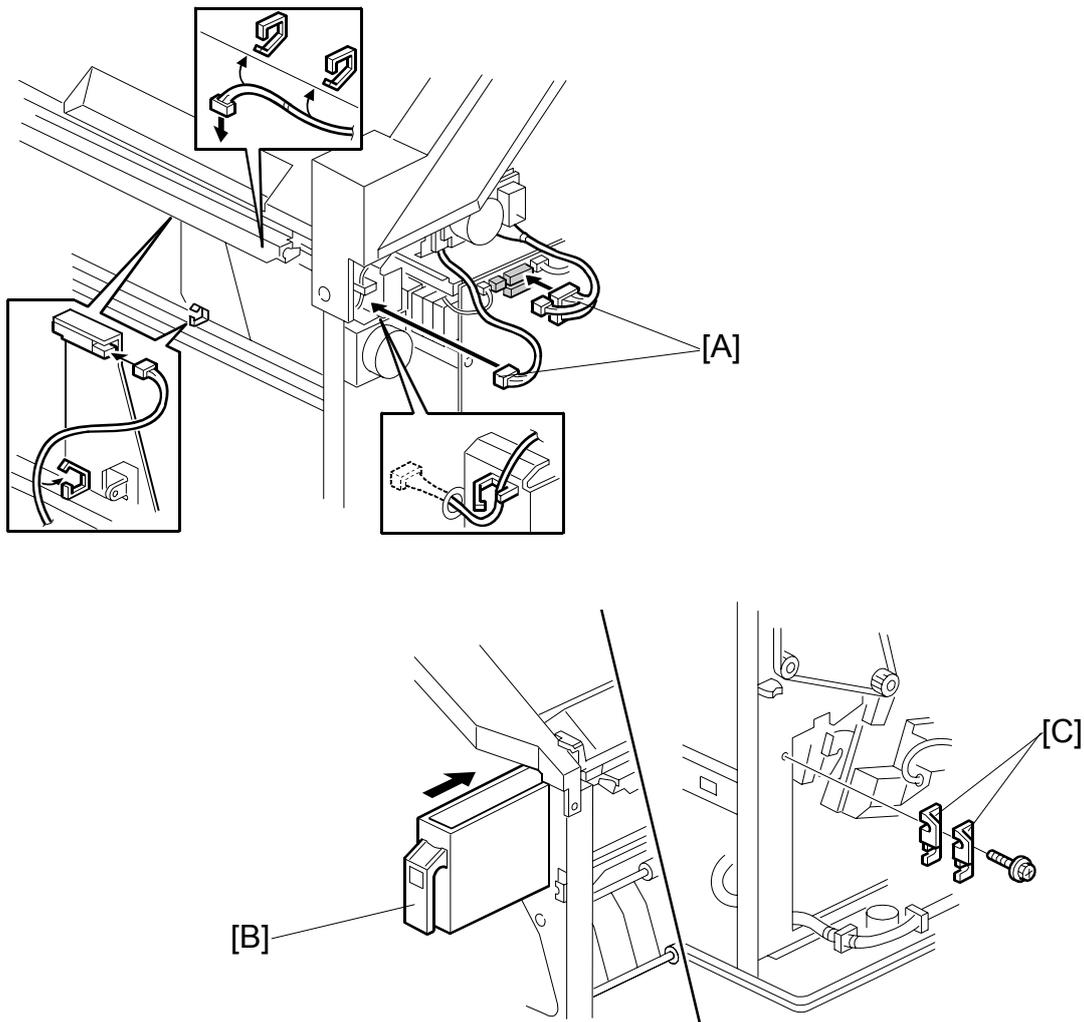
Switch off the main machine and unplug its power cord. If the Two-Tray Finisher is installed, disconnect it and pull it away from the machine.  
(☛1.7)

1. Unpack the punch unit and remove all tapes and shipping retainers.
2. Open the front door and remove the rear cover [A] (☛ x4).
3. Remove the bracket [B] (☛ x2) and paper guide [C] (☛ x 1).



4. Remove the hopper cover [A] (🔩 x 2).
5. Install the sensor bracket [B] (stepped 🔩 x 1).
6. Install the spring [C].
7. Install the 2 mm spacer [D].
8. Install the punch unit [E] (🔩 x 2, stepped 🔩 x 1)

## PUNCH UNIT INSTALLATION (B377)



9. Connect the harnesses [A] and clamp them as shown.

**NOTE:** No special DIP switch settings are required for this punch unit. The punch unit sends an identification signal to the machine board so it knows what type of punch unit has been installed.

10. Slide the hopper [B] into the machine.

11. Fasten the two 1 mm spacers [C] to the rear frame for future adjustment.

**NOTE:** The spacers are used to adjust the horizontal positioning of the holes.

12. Reassemble the finisher and check the punch operation.

## 1.9 ARDF INSTALLATION (B714)

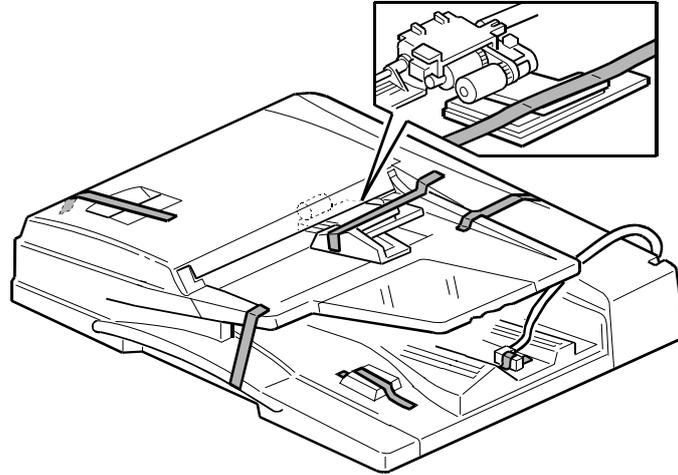
### 1.9.1 ACCESSORY CHECK

Check the quantity and condition of the accessories in the box against the following list:

Description	Q'ty
1. Stepped Screw .....	2
2. Screw – M4 x 10 .....	2
3. Attention Decal - Scanner .....	1
4. Attention Decal – Top Cover.....	1
5. Installation Procedure .....	1

**NOTE:** The gasket and ferrite core for the ARDF are provided with the accessories of the main machine. (☛1.3.1)

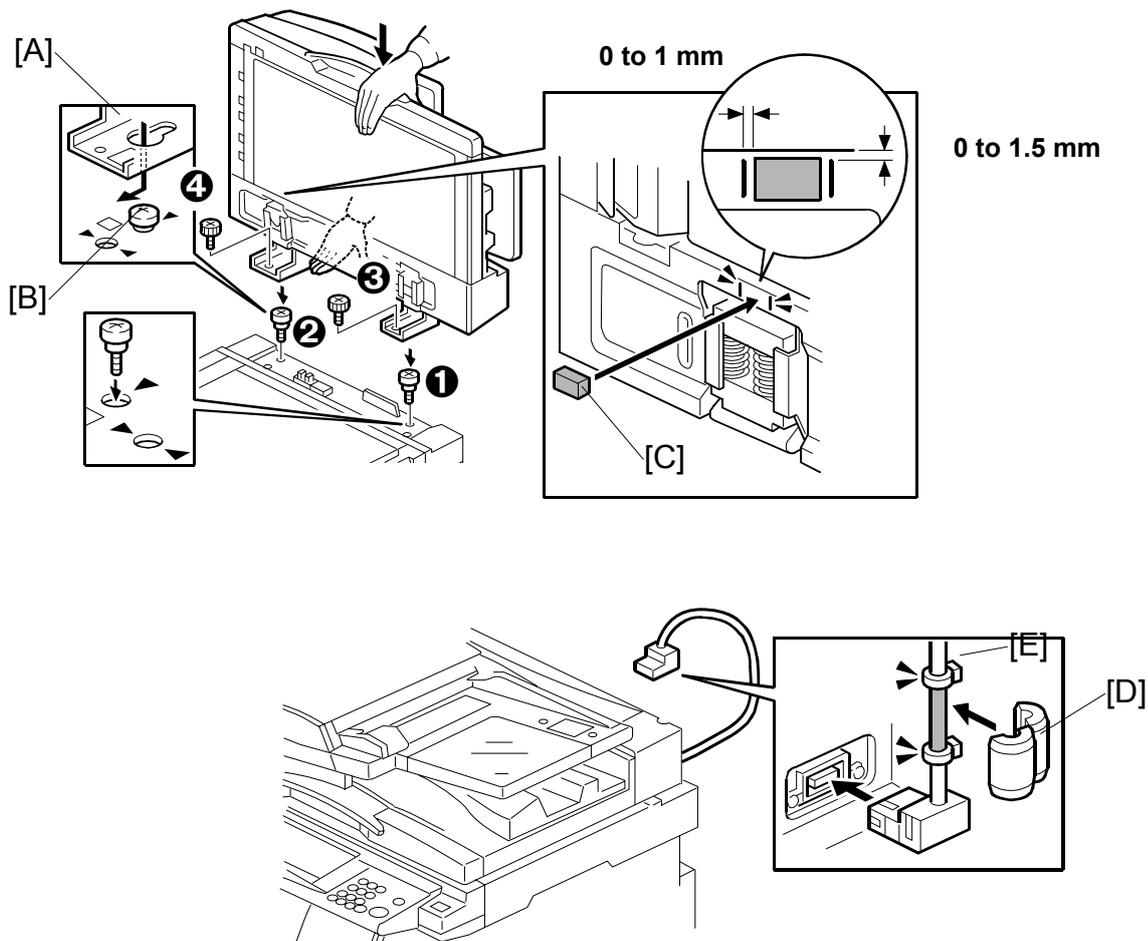
## 1.9.2 ARDF INSTALLATION PROCEDURE



**⚠ CAUTION**

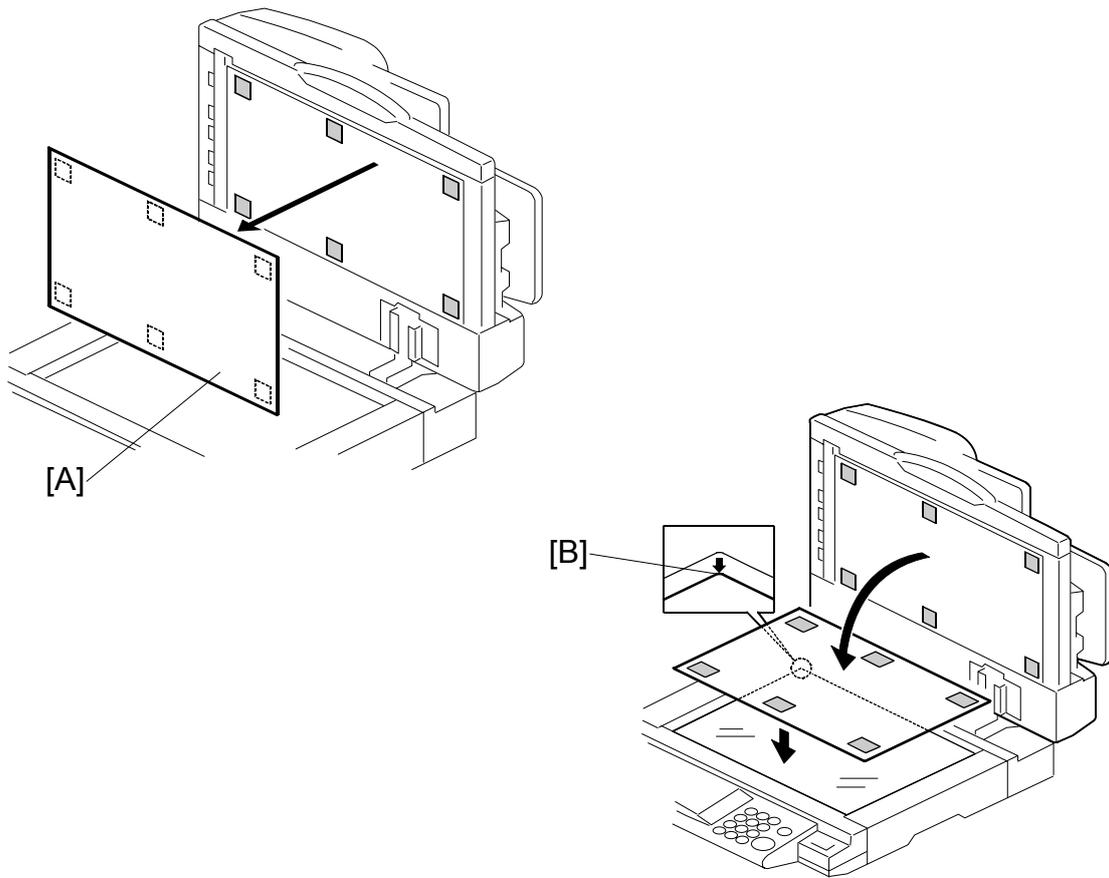
**Unplug the main machine power cord before starting the following procedure.**

1. Unpack the ARDF and remove all tapes and shipping retainers.

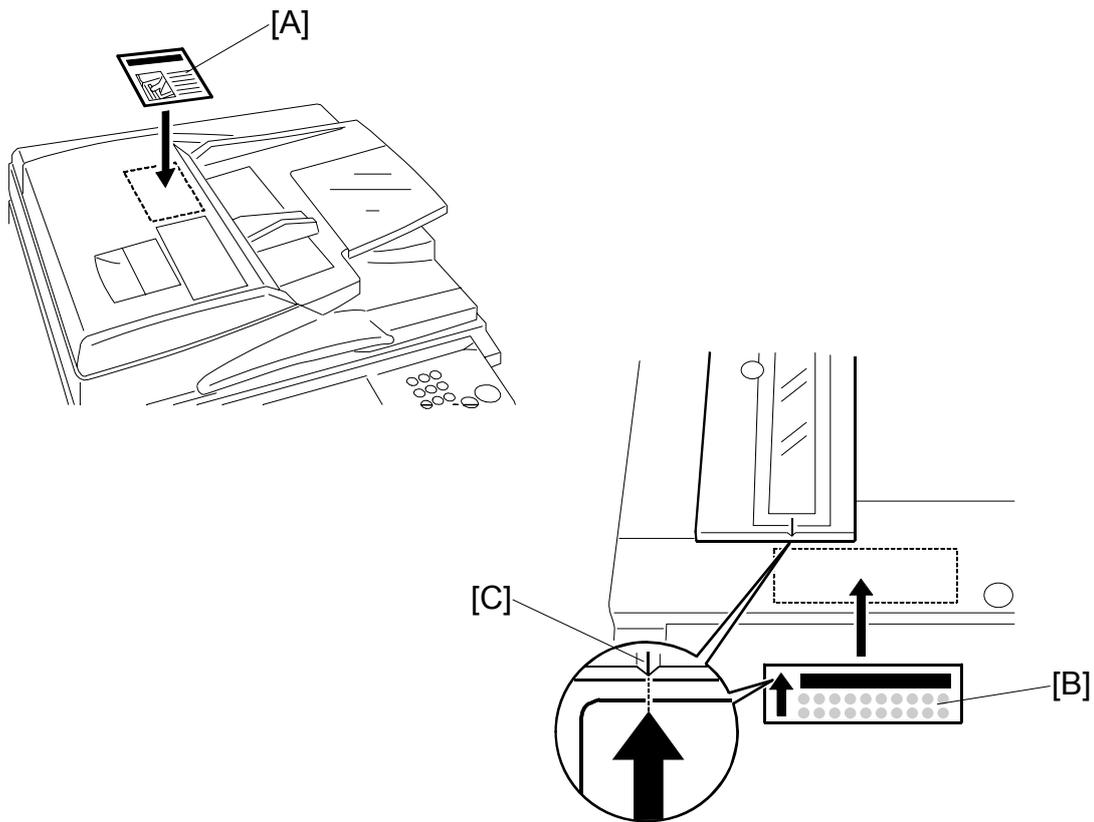


2. Attach and tighten stud screws ❶, ❷.
3. Mount the ARDF by aligning the screw keyholes [A] of the ARDF support plate over the stud screws [B], then slide the ARDF toward the front of the machine.  
**NOTE:** To avoid damaging the ARDF, hold it as shown.
4. Secure the ARDF with the screws ❸, ❹.
5. Attach the gasket [C].  
**NOTE:** The gasket is provided as an accessory with the mainframe.
6. Attach the ferrite core [D] to the I/F cable [E].  
**NOTE:** The ferrite core is provided as an accessory with the mainframe.
7. Connect the I/F cable the main machine.

## ARDF INSTALLATION (B714)

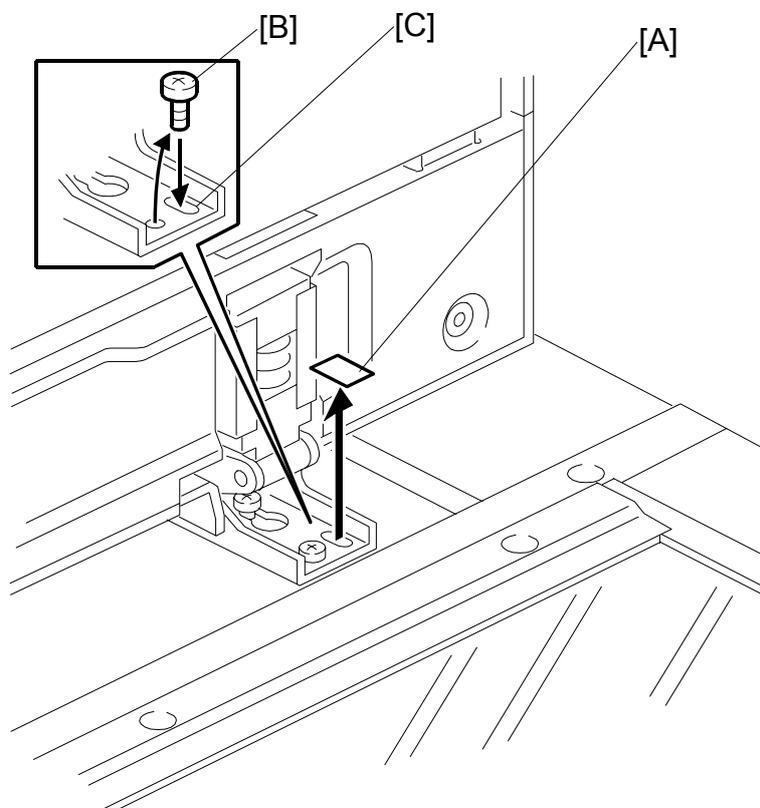


8. Peel off the platen sheet [A] and place it on the exposure glass.
9. Line up the rear left corner of the platen sheet flush against corner [B] on the exposure glass.
10. Close the ARDF.



11. Attach the decal [A] to the top cover as shown, choosing the language most suitable for the machine installed.
12. Attach the decal [B] to the cover so that the arrow on the decal lines up with the groove [C] of the left scale as shown. As with step 11, choose the language most suitable for the machine installed.
13. Turn on the main switch.
14. Check the ARDF operation and copy quality. Be sure to check and adjust the registration for the ARDF with the SP modes

### 1.9.3 ARDF SKEW ADJUSTMENT



1. Remove the tape [A] covering the elliptical hole.
2. Remove right screw [B] and install it into the elliptical hole [C].
3. Move the right side of the ARDF forward or back to adjust the position then tighten the screw.

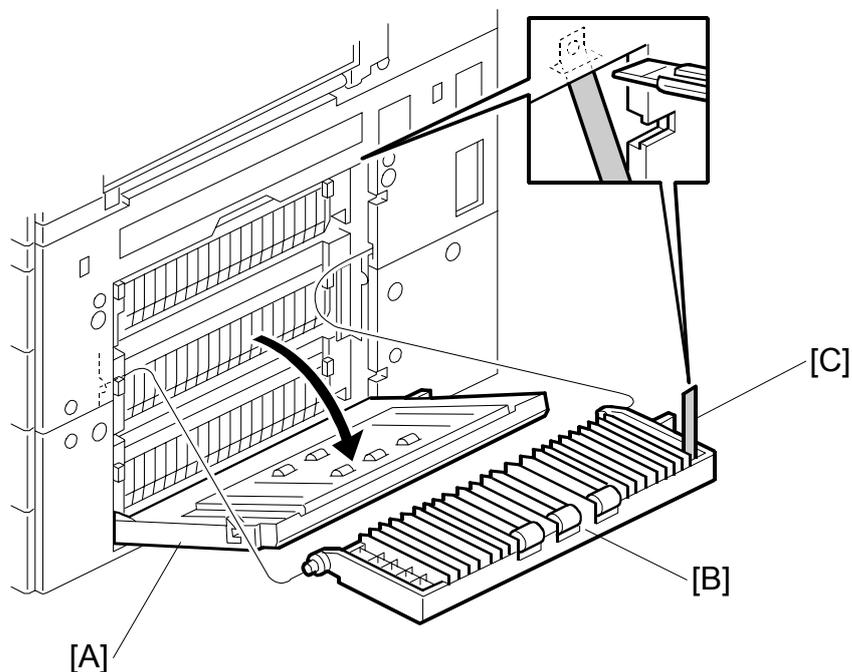
# 1.10 LCT INSTALLATION (B543)

## 1.10.1 ACCESSORY CHECK

Check the quantity and condition of the accessories in the box against the following list:

<b>Description</b>	<b>Q'ty</b>
1. Joint Pin .....	2
2. Stepped Screw M3 x 18.....	4
3. Installation Procedure .....	1

## 1.10.2 LCT INSTALLATION PROCEDURE

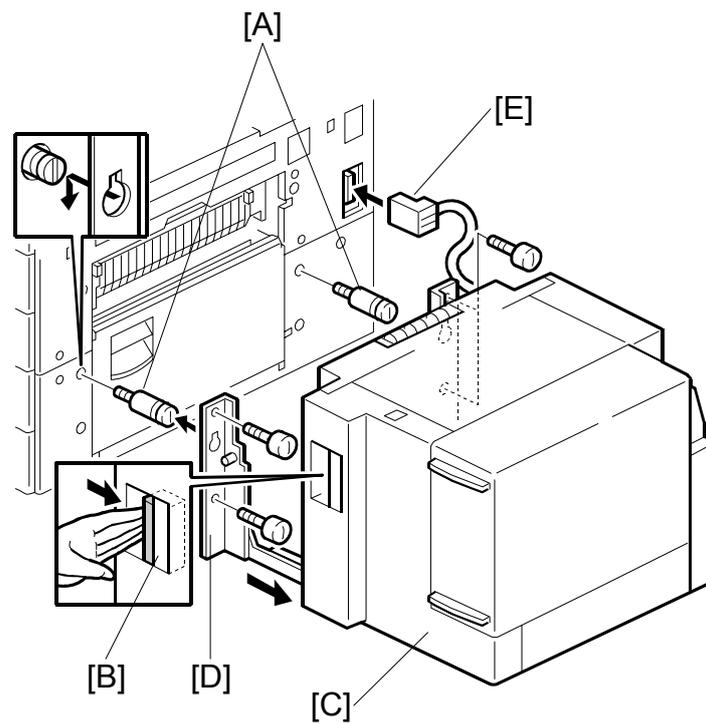


**⚠ CAUTION**

**Unplug the main machine power cord before starting the following procedure.**

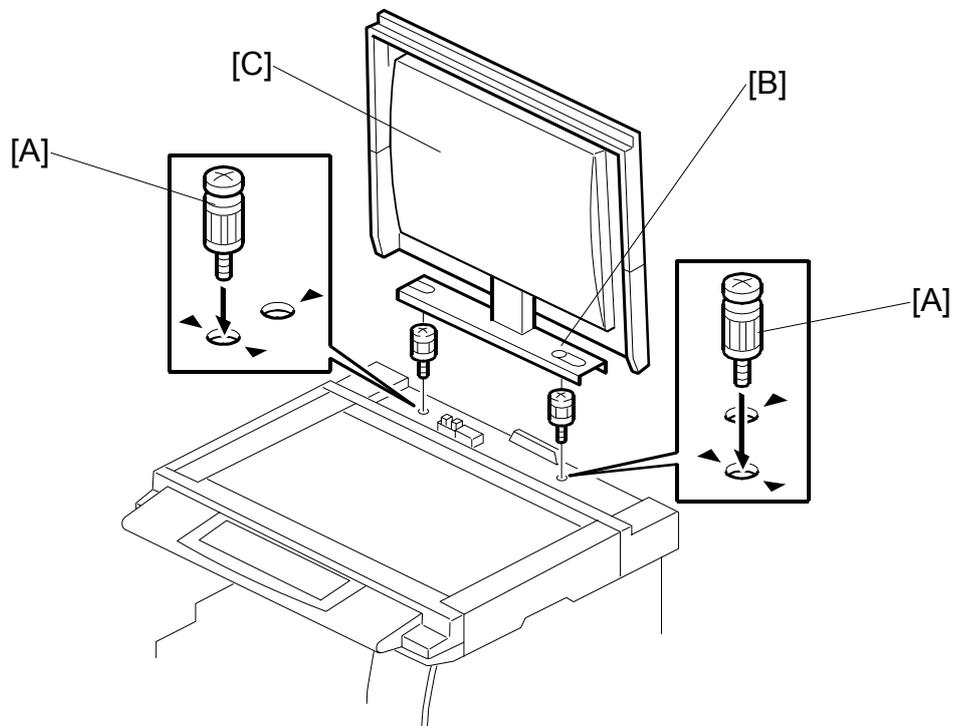
**NOTE:** The Paper Tray Unit (B542) or the cabinet (FAC25) must be installed before installing the LCT.

1. Unpack the LCT and remove the tapes.
2. Open the right cover of the paper tray unit [A].
3. Open the lower right cover [B] and cut the holding band [C].  
**NOTE:** When cutting the holding band, the upper part of the band should be cut as shown. Otherwise, paper jams may occur.
4. Remove the lower right cover.



5. Install the joint pins [A].
6. Push the release lever [B] and slide the LCT to the right (front view).
7. Hang the LCT [C] on the joint pins, then secure the brackets [D] (⌀ x 4).
8. Return the LCT to the previous position and connect the LCT cable [E].
9. Open the LCT cover and load the paper.
10. Turn on the ac switch and check the LCT operation.

## 1.11 PLATEN COVER INSTALLATION (G329)

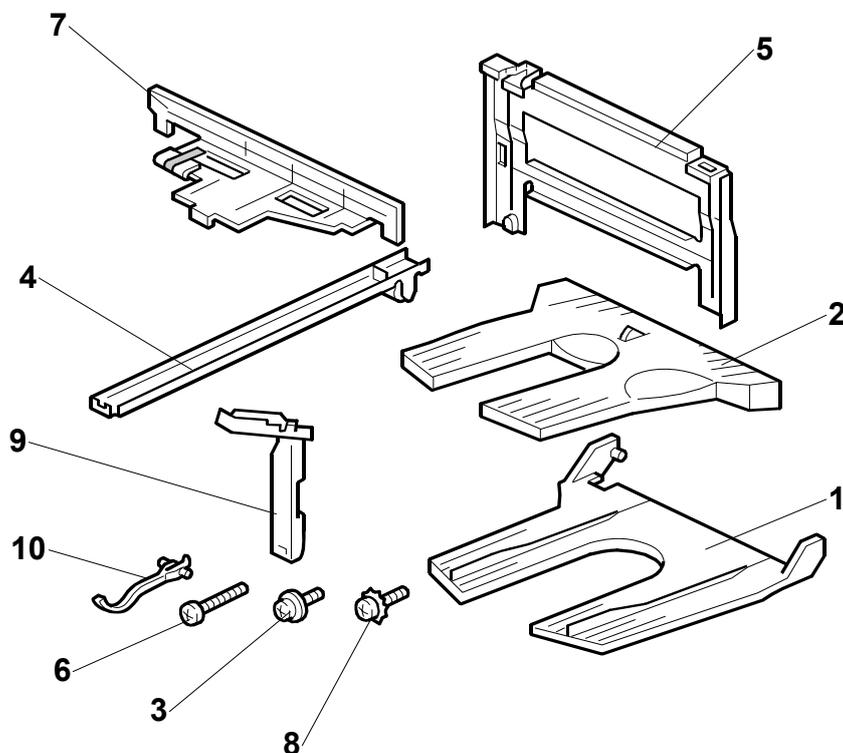


1. Install [A] (2 x) on the top cover as shown.
2. Position the platen cover bracket [B] on the heads of the stud screws and slide the platen cover [C] to the left.

## 1.12 BOOKLET FINISHER INSTALLATION (B546)

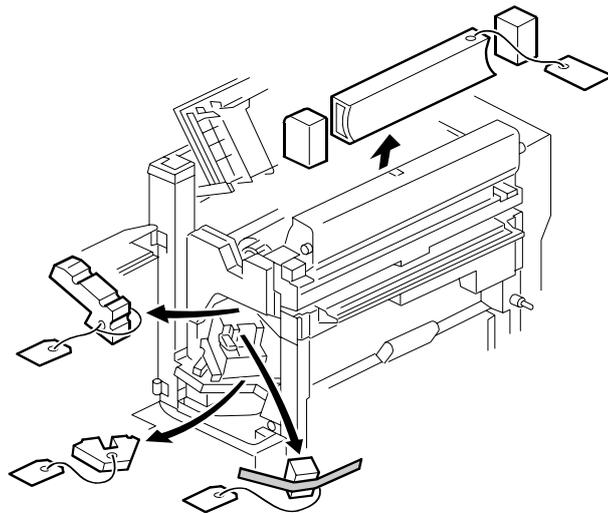
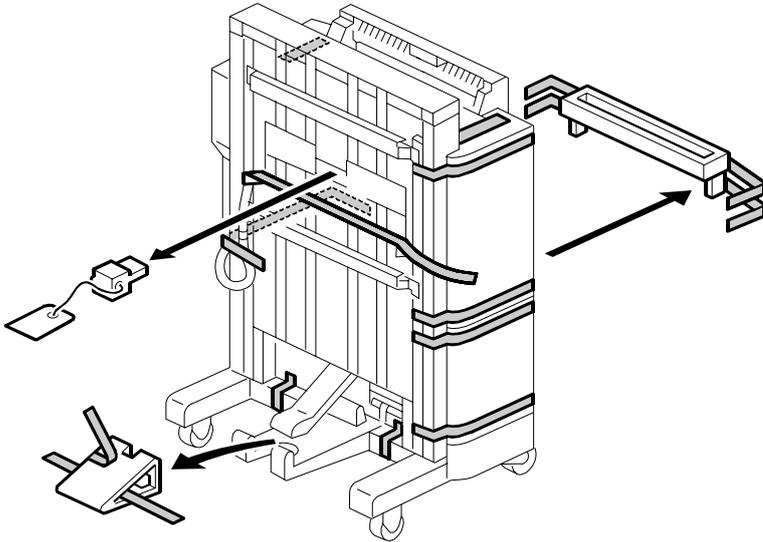
### 1.12.1 ACCESSORY CHECK

Check the quantity and condition of the accessories in the box against the following list.



Description	Q'ty
1. Upper Tray.....	1
2. Shift Tray .....	1
3. Tapping Screw - M4 x 6.....	2
4. Rail Ass'y .....	1
5. Joint Bracket.....	1
6. Tapping Screw - M4 x 16.....	8
7. Rail Bracket .....	1
8. Tapping Screw - M4 x 6.....	1
9. Harness Cover.....	1
10. Sensor Feeler .....	1

### 1.12.2 BOOKLET FINISHER INSTALLATION PROCEDURE

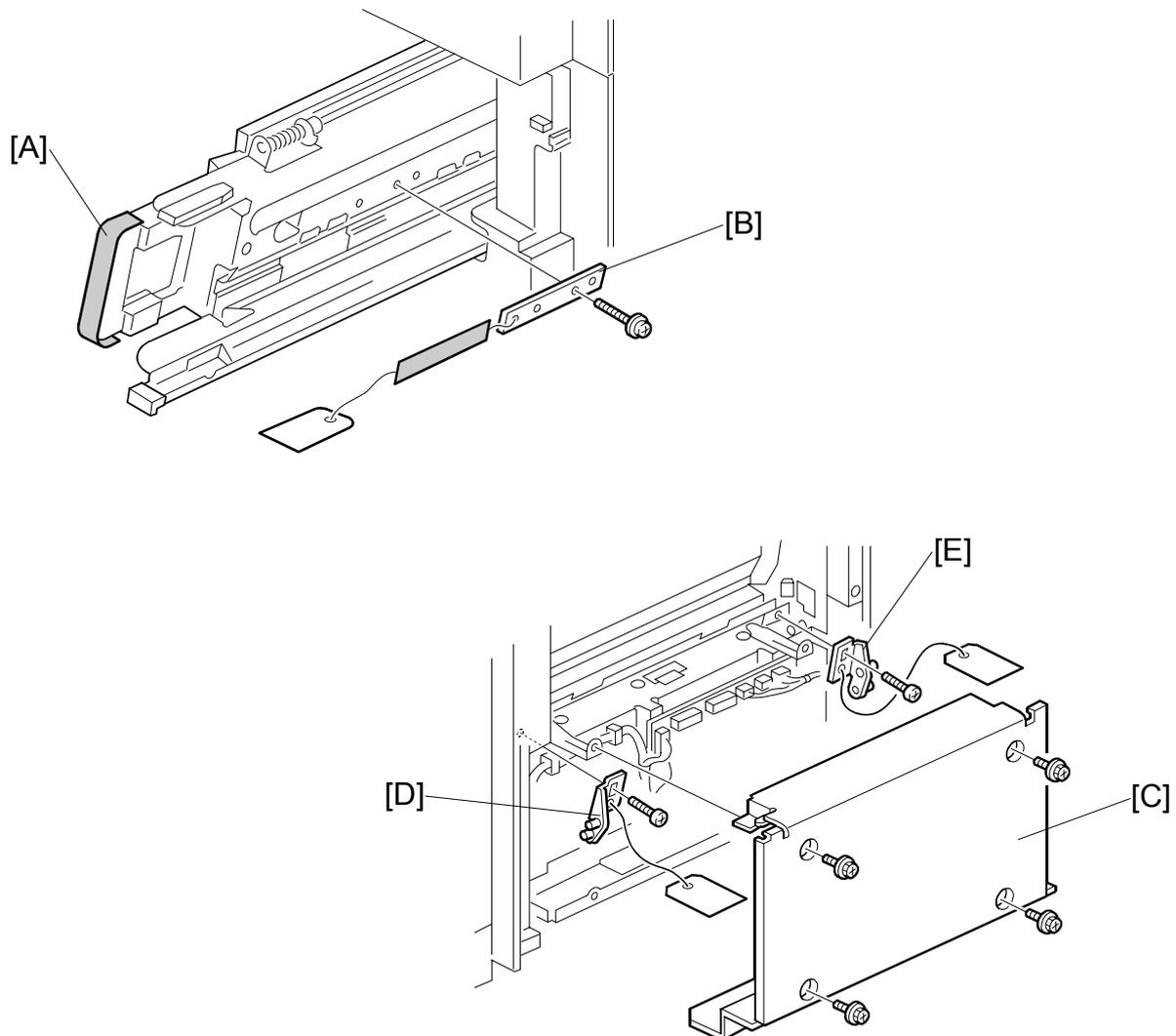


**NOTE:** The bridge unit (B538) and paper tray unit (B542) must be installed before installing this finisher.

**⚠ CAUTION**

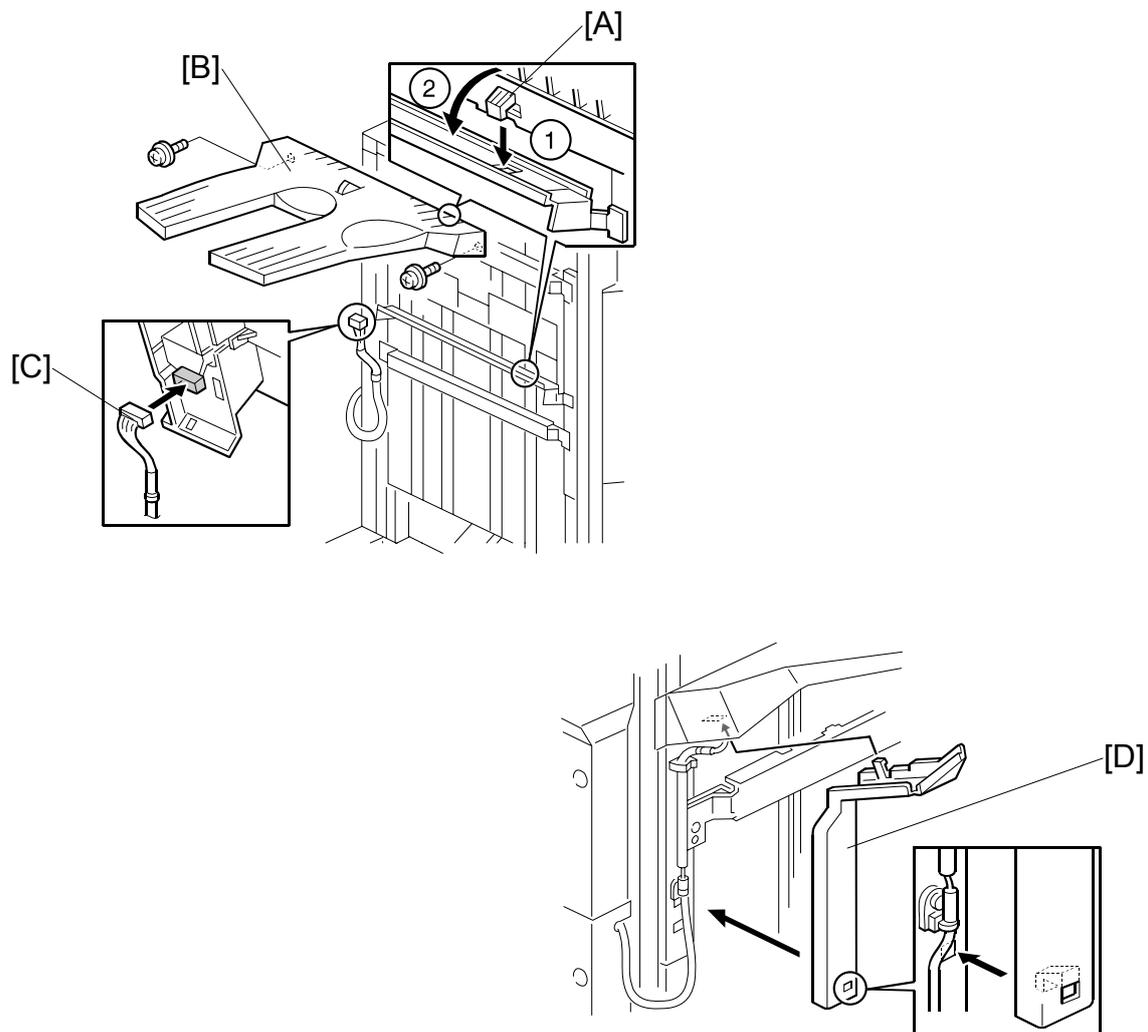
**Keep the power cord unplugged when starting the following procedure.**

1. Unpack the finisher and remove the tapes and shipping retainers.

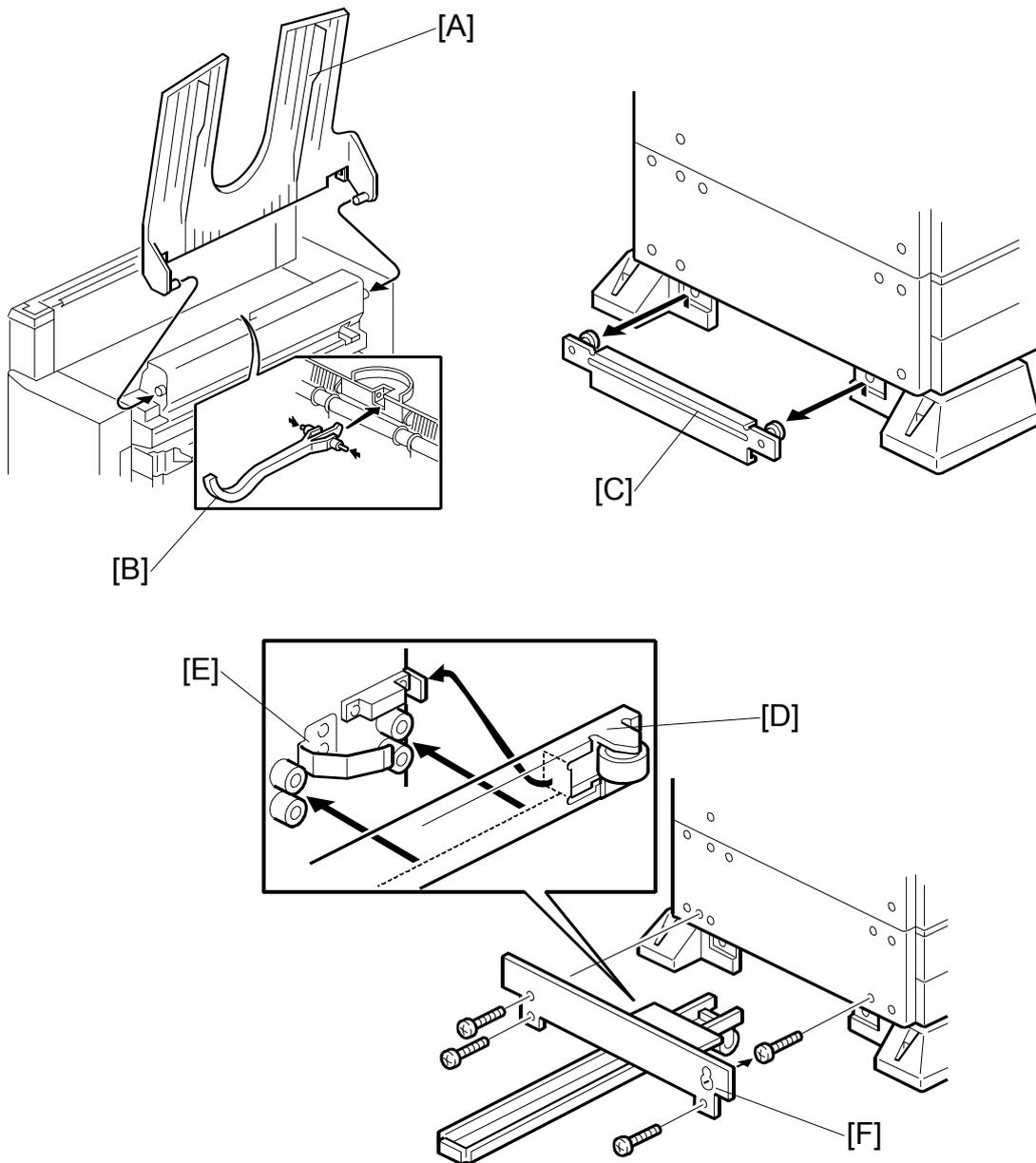


2. Open the front under door and pull out the stapler unit [A].
3. Remove the stapler unit lock plate [B] (⚙ x 1).
4. Push in the stapler unit and shut the front lower door.
5. Remove the right lower cover [C] (⚙ x 4).
6. Remove the front pressure release bracket [D] (⚙ x 1).
7. Remove the rear pressure release bracket [E] (⚙ x 1).
8. Reattach the cover [C].

## BOOKLET FINISHER INSTALLATION (B546)

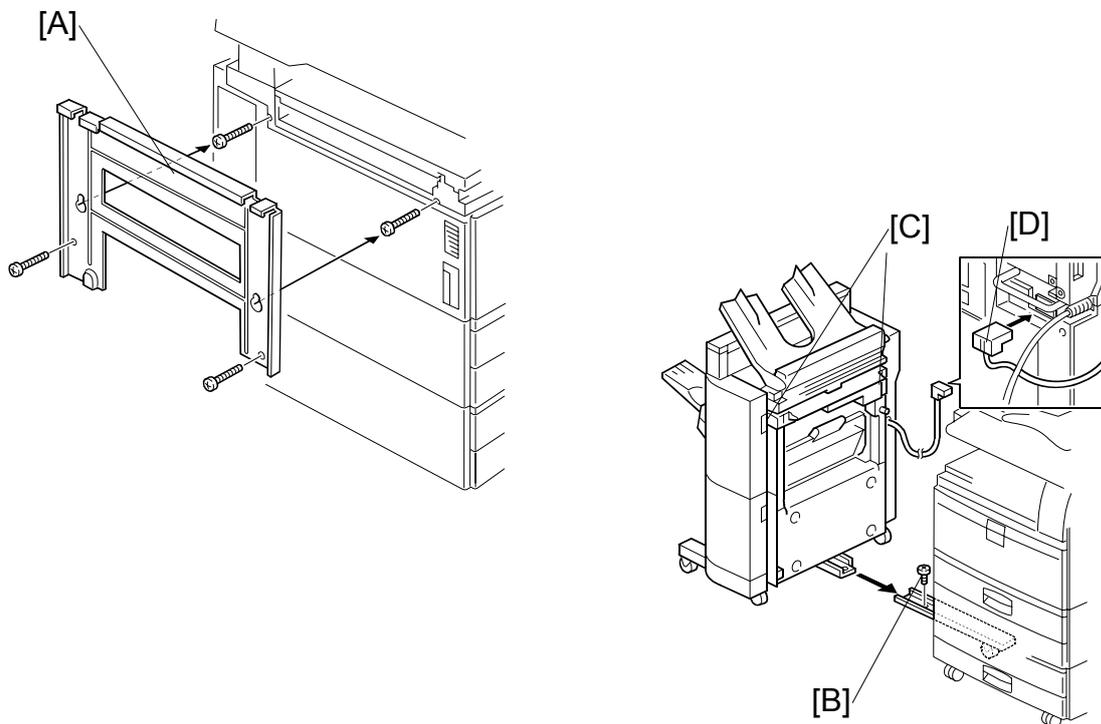


9. Set the hooks [A] of the shift tray [B] in the notches in the shift tray bracket, and secure the tray (⚙ x2 M4).
10. Connect the shift tray sensor harness [C].
11. Install the harness cover [D] (2 hooks).



12. Install the upper tray [A] (2 pins).
13. Attach the sensor feeler [B] (2 pins).
14. Remove the stand bracket [C].
15. Attach the rail [D] to the rail bracket [E] as shown.
16. Install the rail bracket [F] on the left lower cover of the copier (⌀ x 4).

## BOOKLET FINISHER INSTALLATION (B546)

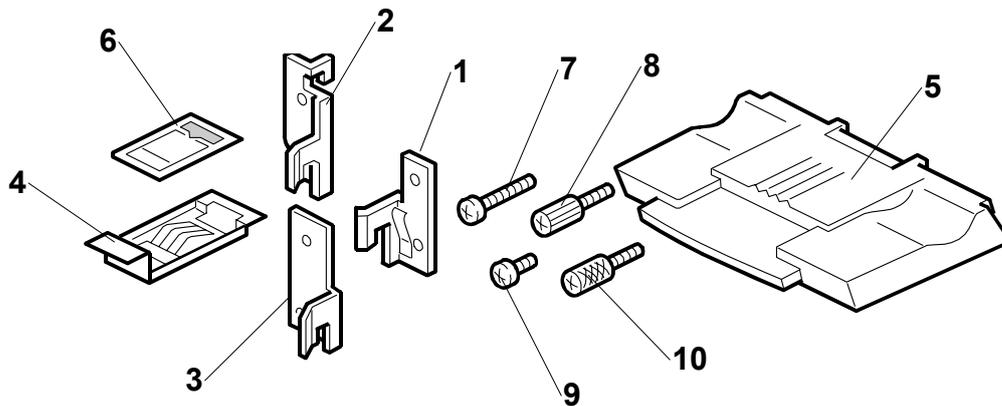


17. Install the joint bracket [A] on the left side of the copier (⚙ x 4).
18. Secure the rail [B] to the booklet finisher with 1 M4 screw.
19. Align the finisher on the joint bracket and lock the 2 hooks [C] of the finisher on the joint bracket.
20. Connect the finisher cable [D] to the copier.
21. Turn on the main switch and check the finisher operation.

## 1.13 1000 SHEET FINISHER (B408)

### 1.13.1 ACCESSORY CHECK

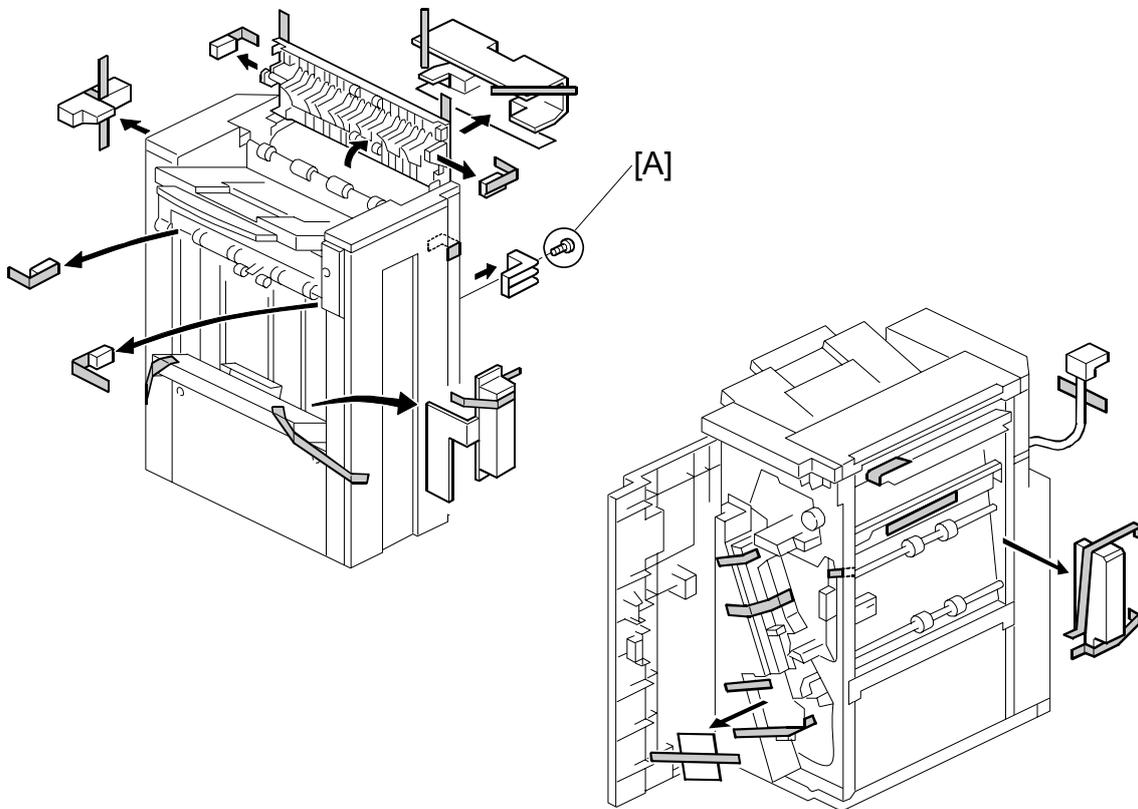
Check the quantity and condition of the accessories against the following list.



Description	Q'ty
1 Front Joint Bracket.....	1
2 Rear Joint Bracket <sup>*1</sup> .....	1
3 Rear Joint Bracket .....	1
4 Grounding Plate.....	1
5 Copy Tray .....	1
6 Staple Position Decal.....	1
7 Screw - M4 x 14.....	4
8 Knob Screw - M4 x 10 .....	1
9 Screw - M3 x 8.....	1
10 Knob Screw - M3 x 8 .....	1

<sup>\*1</sup>: Rear joint bracket is not required for these models.

### 1.13.2 1000 SHEET FINISHER INSTALLATION PROCEDURE

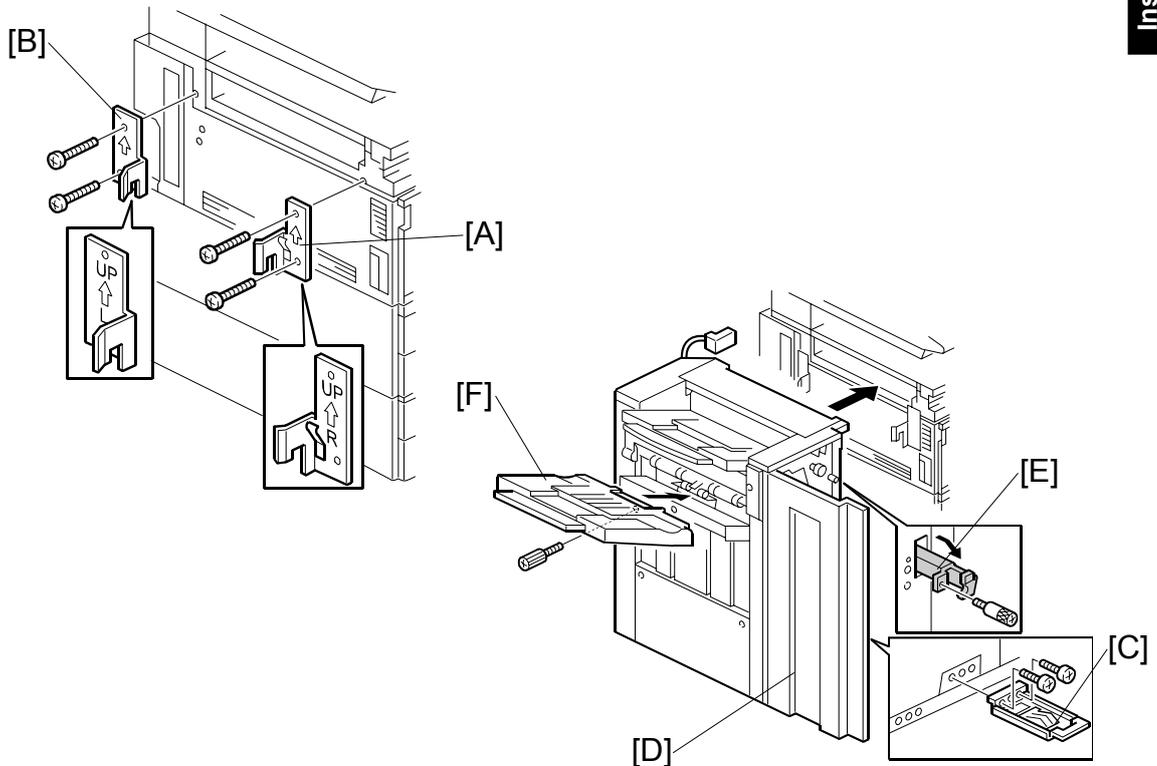


**⚠ CAUTION**

**Unplug the main machine power cord before starting the following procedure.**

1. The following options must be installed before installing this finisher.
  - Bridge Unit (B538)
  - Paper Tray Unit (B542)
2. Unpack the finisher and remove the tapes.

**NOTE:** Be sure to keep screw [A]. It will be needed to secure the grounding plate in Step 4.

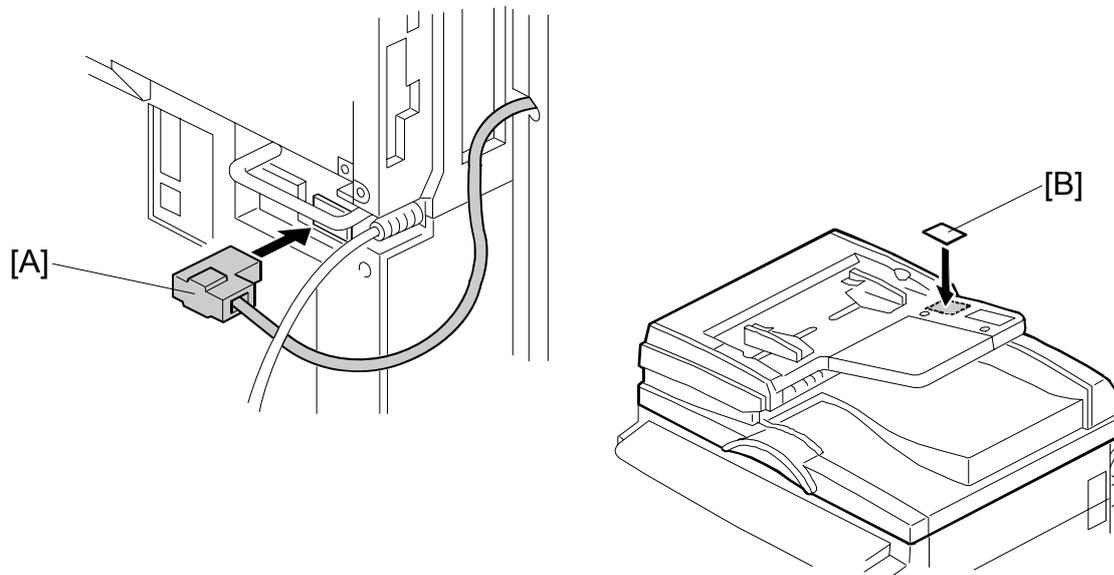


3. Install the front joint bracket [A] (2 screws - M4 x 14) and rear joint bracket [B] (2 x 2 M4 x 14).
4. Install the grounding plate [C] to the finisher (2 x 2 M3 x 8).

**NOTE:** Use the screw removed in step 2 and the screw from the accessory box.

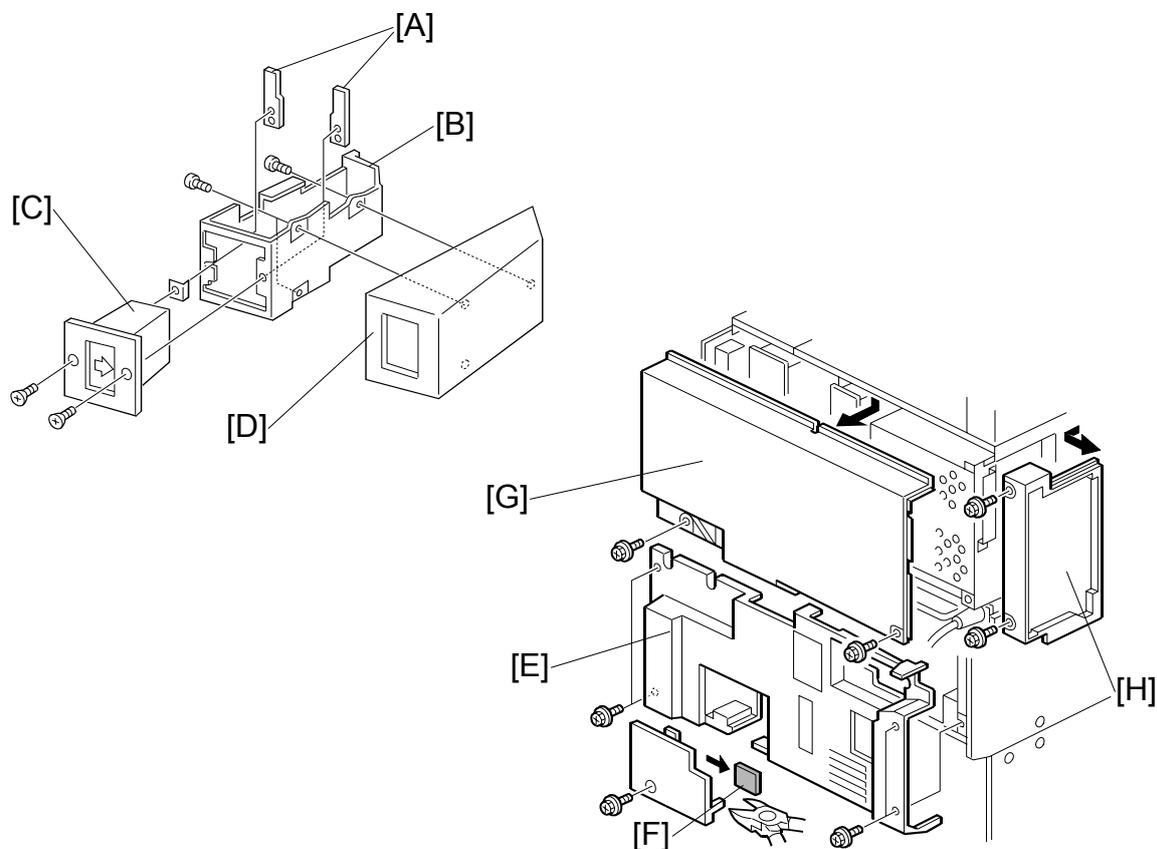
5. Open the front door [D] then pull the locking lever [E].
6. Align the finisher on the joint brackets, and lock it in place by pushing the locking lever.
7. Secure the locking lever (1 x 1 knob screw M3 x 8).
8. Close the front door.
9. Install the copy tray [F] (1 x 1 knob screw M4 x 10).

## 1000 SHEET FINISHER (B408)



10. Connect the finisher cable [A] to the main machine below the right rear handle.
11. Attach the staple position decal [B] to the ARDF as shown.
12. Turn on the main power switch and check the finisher operation.

## 1.14 KEY COUNTER INSTALLATION

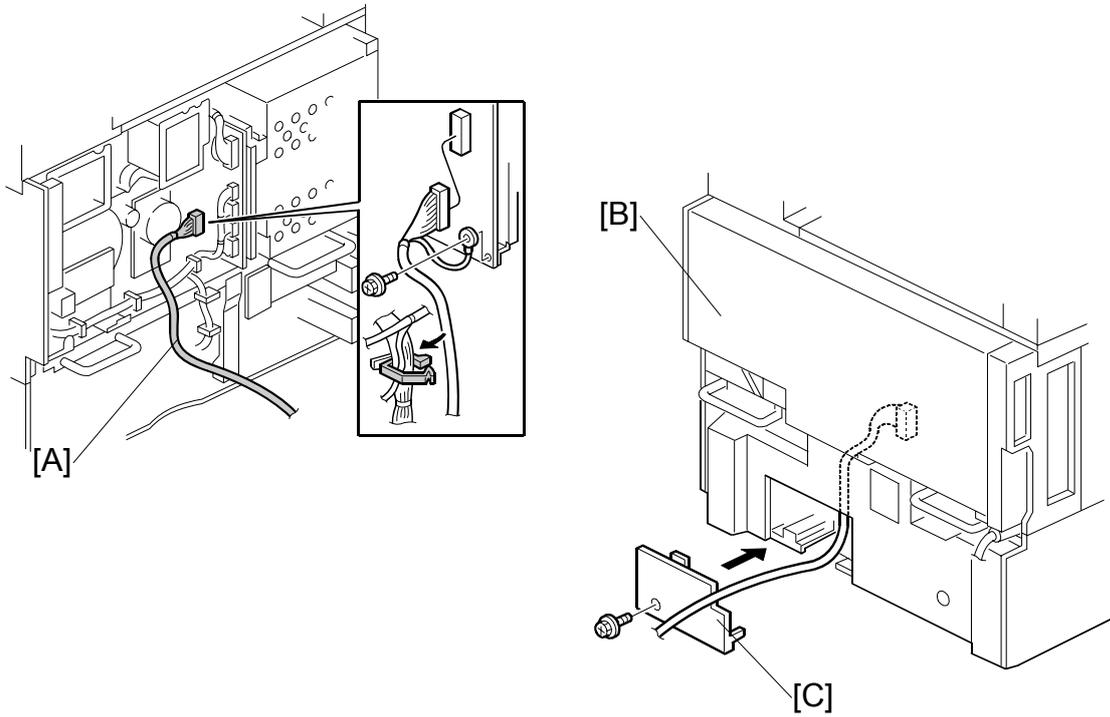


**⚠ CAUTION**

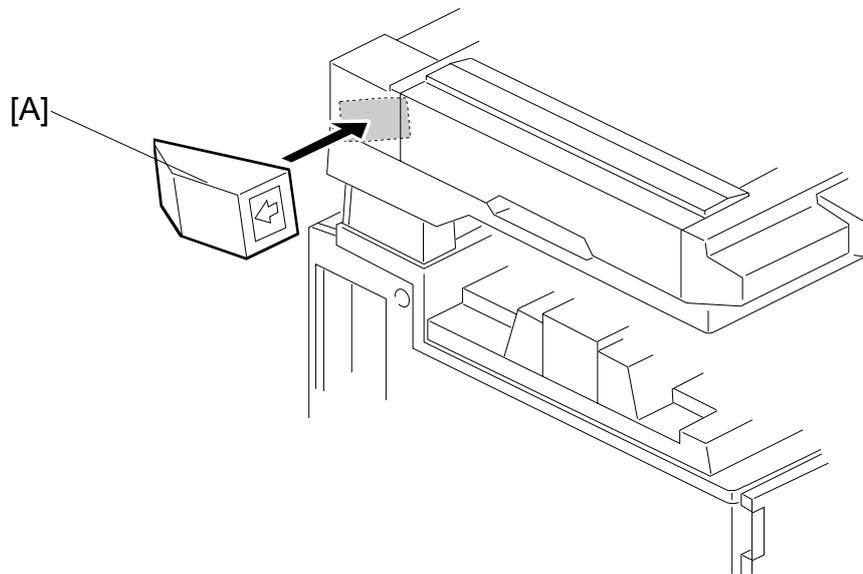
**Unplug the machine power cord before starting the following procedure.**

1. Hold the key counter plates [A] on the inside of the key counter bracket [B] and insert the key counter holder [C]
2. Secure the key counter holder to the bracket (⚙ x2).
3. Attach the key counter cover [D] (⚙ x2).
4. Remove the connector cover [E].
5. Remove the knockout [F] from the connector cover.
6. Remove the rear upper cover [G] (⚙ x4) and left corner cover [H] (⚙ x2).

## KEY COUNTER INSTALLATION



7. Connect the key counter connector [A] to CN211 on the I/O board.
8. Reinstall the covers [B] and [C].



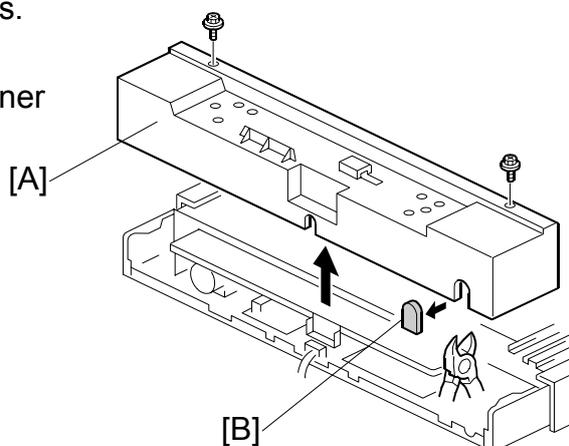
9. Attach the double-sided tape to the key counter bracket.
10. Peel off the backing of the double-sided tape then attach the key counter assembly [A] to the left side of the scanner unit.

**NOTE:** When attaching the key counter assembly, press the assembly hard against the scanner cover. Otherwise, the key counter assembly may come off easily.

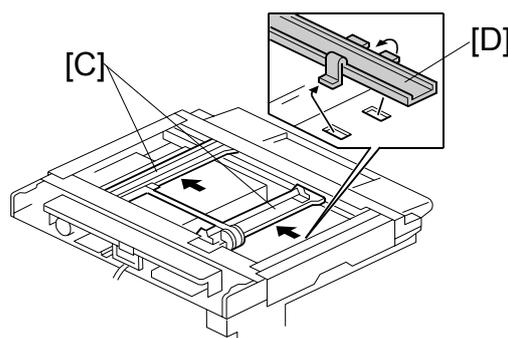
11. Push [User Tools]> "System Settings"> "Key Counter Management".
12. Set the following key counter functions to ON or OFF as necessary.
  - Copier
  - Document server
  - Facsimile
  - Scanner
  - Printer

## 1.15 ANTI-CONDENSATION HEATER

1. Remove the ARDF and exposure glass.  
(☛3.9.2)
2. Remove the rear cover [A] of the scanner unit (🔩 x2, 🗑️ x1)
3. Remove the knockout [B]



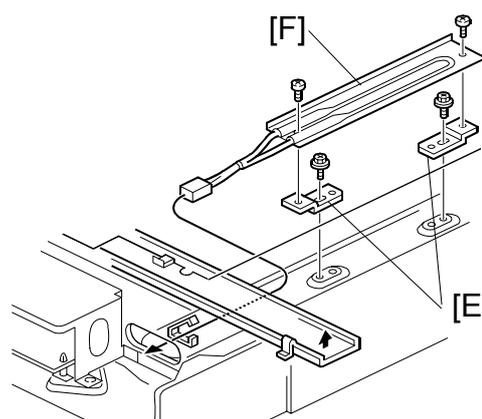
4. Push the 1st and 2nd scanners [C] to the right.
5. Lift the harness guide [D]



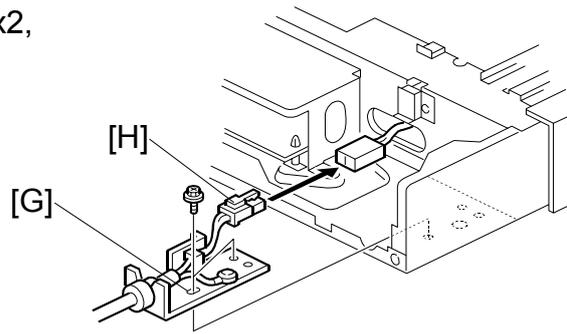
6. Install the heater brackets [E] (🔩 x2, M3x6).

**NOTE:** Use the screws already attached at the same position.

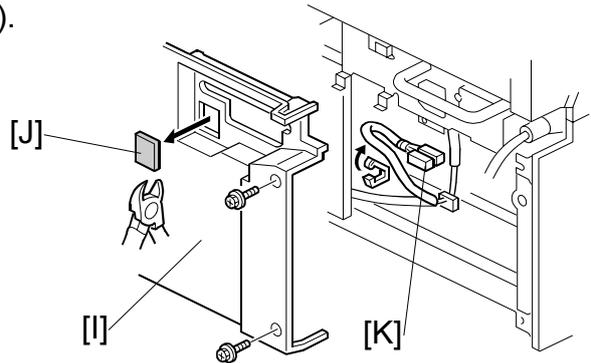
7. Install the heater [F] (🔩 x2, M4x6) and route the harness.



8. Install the ac harness assembly [G] (⚙️ x2, M4x6) and connect the connector [H].



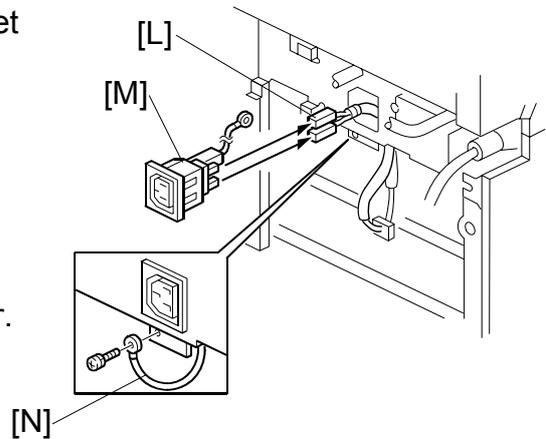
9. Remove the rear lower cover [I] (⚙️ x4).
10. Remove knockout [J].
11. Pull out ac harness [K].



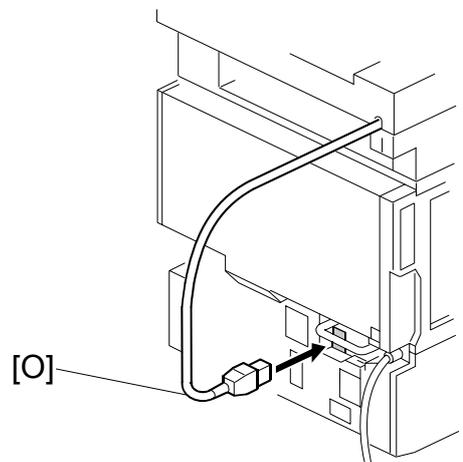
12. Connect the ac harness [L] to the ac outlet [M].

**NOTE:** Do not remove the ground wire from the ac outlet.

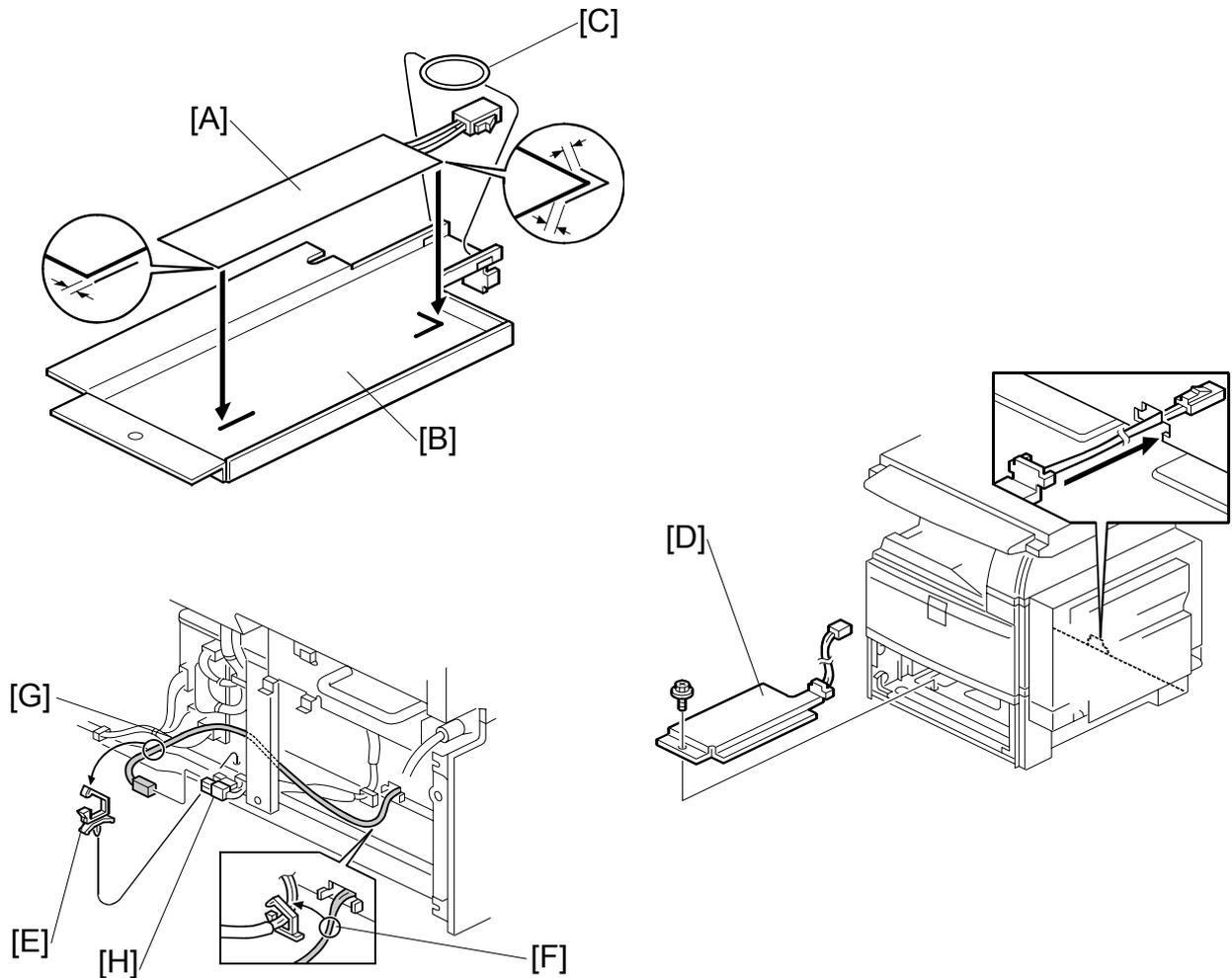
13. Install the ac outlet [M].
14. Install the ground wire [N] (⚙️ x1, M4x6).
15. Re-install the rear cover, rear lower cover.



16. Connect the harness [O].



## 1.16 TRAY HEATER

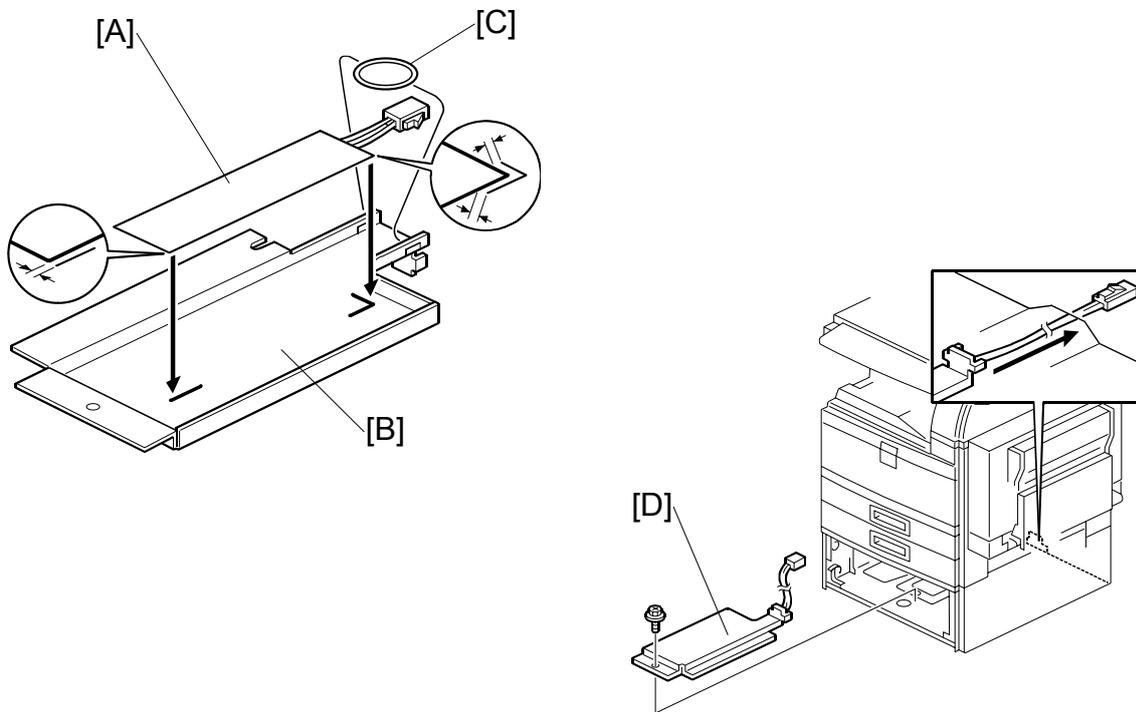


### **⚠ CAUTION**

**Unplug the machine power cord before starting the following procedure.**

1. Attach the tray heater [A] to the heater bracket [B].
2. Install the harness holder [C].
3. Remove the rear lower cover.
4. Remove the upper and lower paper trays from the main machine.
5. Install the heater assembly [D] (⚙ x1).
6. Install the harness clamp [E].
7. Fasten the harness [F] with the clamp.
8. Route the heater harness [G] and connect it to the ac harness [H].

## 1.17 TRAY HEATER (OPTIONAL PAPER TRAY UNIT)

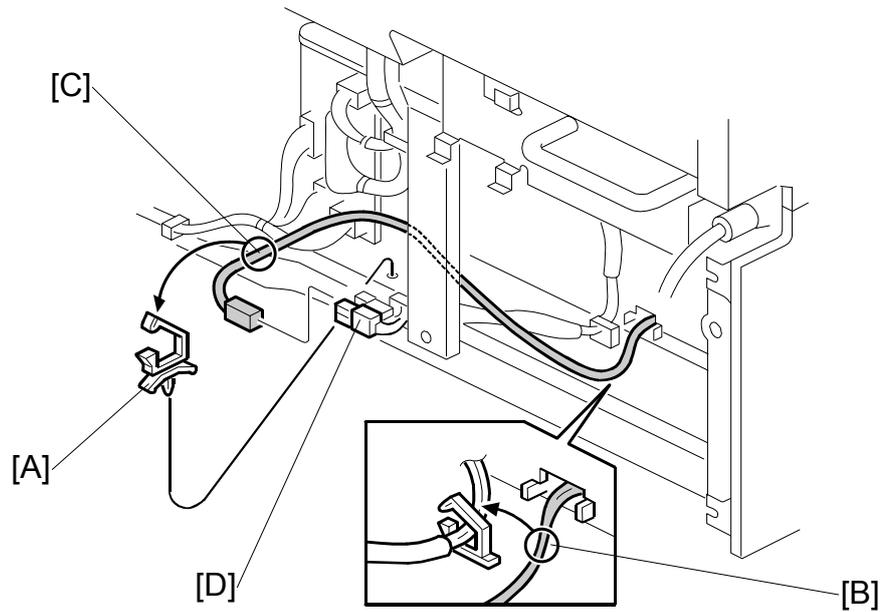


### **⚠ CAUTION**

**Unplug the machine power cord before starting the following procedure.**

1. Attach the optional tray heater [A] to the heater bracket [B].
2. Install the harness holder [C].
3. Remove the rear lower cover of the machine and the rear cover of the optional paper tray unit.
4. Remove the upper and lower paper trays of the optional paper tray unit.
5. Install the heater assembly [D] (⚙ x1).

## TRAY HEATER (OPTIONAL PAPER TRAY UNIT)



6. Install four harness clamps [A].
7. Route the harness [B] and connect it to the harness [C] and heater harness [D].

## 1.18 DATA OVERWRITE SECURITY UNIT (B735)

### *Before You Begin...*

1. Confirm that the Data Overwrite Security unit SD card is the correct type for the machine. The correct type for this machine is **Type "D"**.

**Important: Do THIS NOW. IF YOU INSTALL ANY VERSION OTHER THAN TYPE "D", YOU WILL HAVE TO REPLACE THE NVRAM AND DO THIS INSTALLATION PROCEDURE AGAIN.**

2. Make sure that the following settings are not at the factory default settings:
  - Supervisor login password
  - Administrator login name
  - Administrator login password

**Important:** These settings must be set up by the customer before the Data Overwrite Security unit can be installed.

3. Confirm that "Admin. Authentication" is on:  
[User Tools]> "System Settings"> "Administrator Tools"> "Administrator Authentication Management"> "Admin. Authentication"> "On"

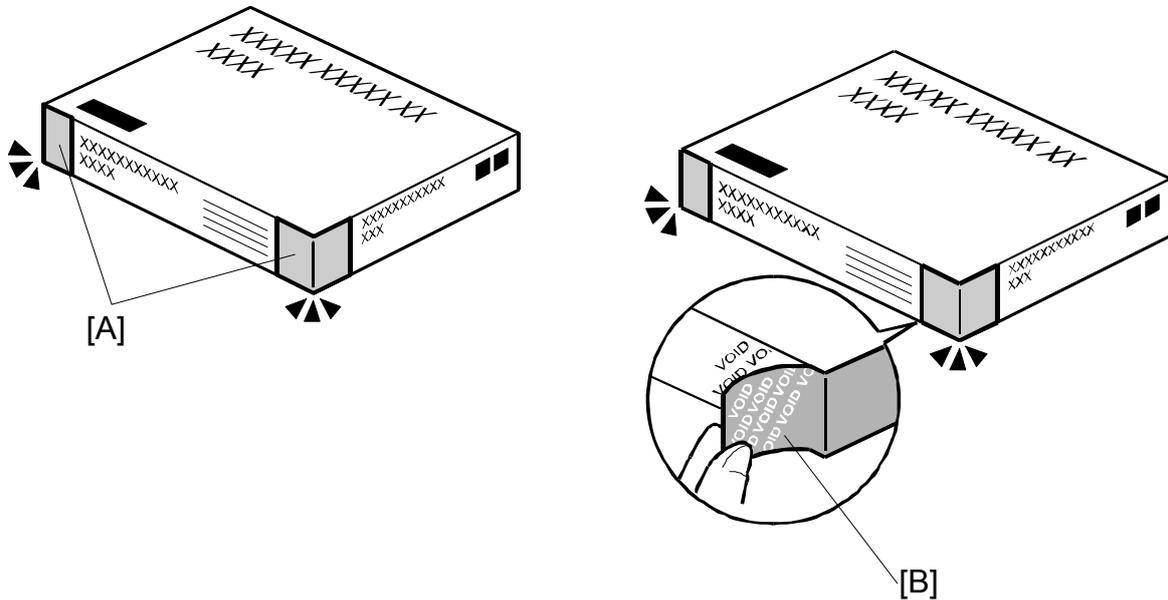
If this setting is "Off" tell the customer that this setting must be "On" before you can do the installation procedure.

4. Confirm that "Administrator Tools" is selected and enabled:  
[User Tools]> "System Settings"> "Administrator Tools"> "Administrator Authentication Management"> "Available Settings"

**NOTE:** "Available Settings" is not displayed until Step 2 is done.

If this setting is not selected tell the customer that this setting must be selected before you can do the installation procedure.

### Seal Check and Removal



#### **⚠ CAUTION**

**TURN OFF THE MAIN POWER SWITCH AND DISCONNECT THE POWER SUPPLY CORD.**

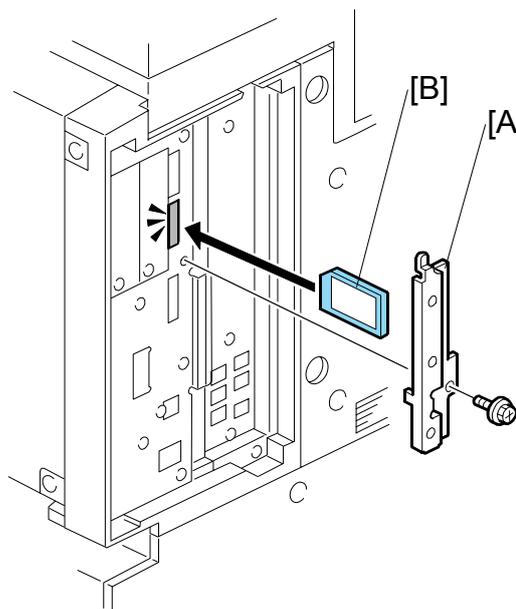
1. Check the box seals [A] on each corner of the box.
  - Make sure that a tape is attached to each corner.
  - The surfaces of the tapes must be blank. If you see “VOID” on the tapes, do not install the components in the box.
2. If the surfaces of the tapes do not show “VOID”, remove them from the corners of the box.
3. When you remove each seal, the “VOID” marks [B] can be seen. In this condition, they cannot be reattached to the box.

## 1.18.2 INSTALLATION

### Important

- The DOS SD card must always reside in SD card slot **C2** or it can be merged with the printer/scanner SD card in **C1**.
- The PostScript3 SD card must always reside in slot **C2**. If the DOS option is also required, then move the DOS application to the SD card in slot **C1** with **SP5873**. (The PS3 option cannot be merged onto any other SD card.)
- For more information about merging applications, refer to the Printer/Scanner Manual.

1. If the machine is on, turn off the main power switch.
2. Disconnect the network cable.
3. Turn the main power switch on.
4. Turn the operation switch and main power switch off.
5. Remove the SD card slot cover [A] (⚙️x1).
6. With the printed side of the SD card [B] facing the rear of the machine, install the SD card in SD card slot C2.
7. Reconnect the network cable, if the network is connected to the copier.
8. Turn the main power switch on.
9. Do SP5-878 and push [EXECUTE].
10. Go out of the SP mode, turn the operation switch off, then turn the main power switch off.



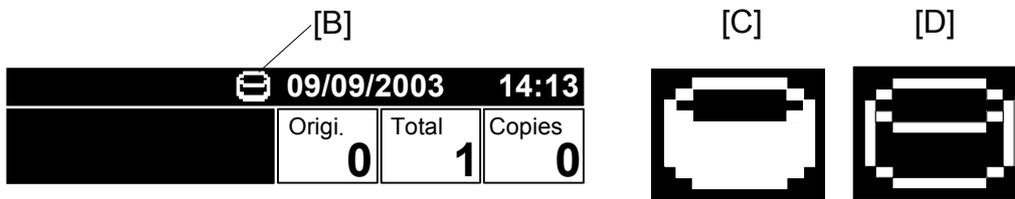
### Checking and Completing the Installation

Do this procedure to confirm that the data overwrite security feature is enabled and operating.

1. Turn the machine power on.
2. Do SP5990 005 (Diagnostic Report) to print the diagnostic report
3. Check the diagnostic report.
  - Under [ROM No./Firmware Version] you should see "B7355060/0.03" displayed for "HDD Format Option".
  - Under [Loading Program] you should see "GW1a\_zoffy: B7355060/0.03"

**Important**

- The numbers (B7355060/0.03, for example) in the diagnostic report must be the same. (The ROM number and firmware version number change after the firmware has been upgraded.)
- If the ROM numbers or version numbers do not match, this means that the DOS unit type was incorrect (not "Type D". If this occurs:
  1. Obtain the Type D DOS unit card or confirm that the DOS unit is Type D.
  2. Replace the NVRAM on the controller board.
  3. Insert the Type D DOS unit SD card in Slot 2.
  4. Do the DOS unit installation procedure again.
- 4. Push [User Tools] and select System Settings> Administrator Tools> Auto Erase Memory Settings> On.
- 5. Exit User Tools mode.



6. Check the display and make sure that the overwrite erase icon [A] is displayed.
7. Make a Sample Copy.
8. Check the overwrite erase icon.
  - The icon [B] changes to [C] when job data is stored in the hard disk.
  - The icon goes back to its usual shape [B] after this function has completed a data overwrite operation to the hard disk.

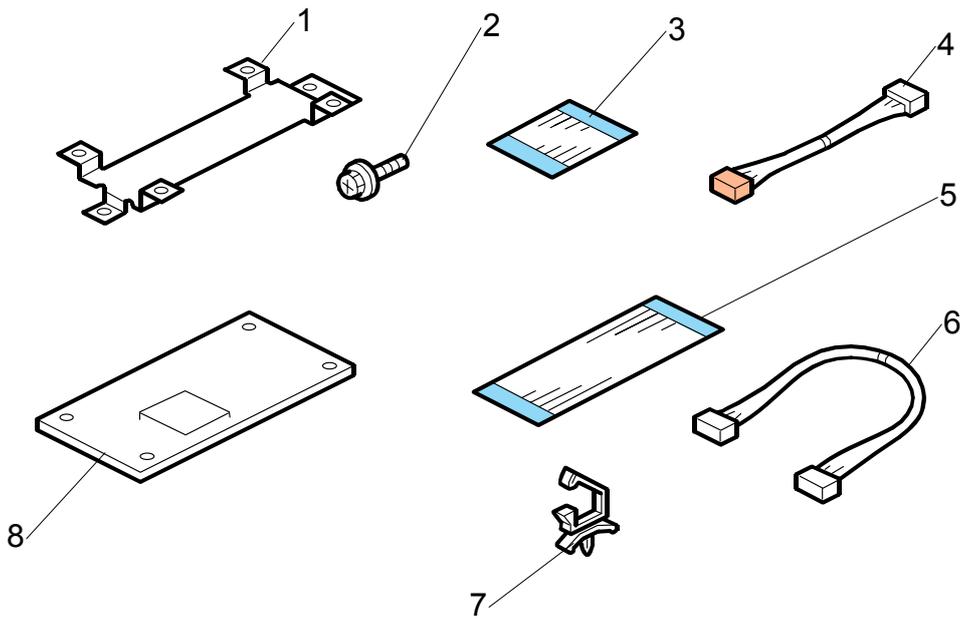


## 1.19 COPY DATA SECURITY UNIT (B770)

### 1.19.1 ACCESSORIES

Check the accessories and their quantities against the following list:

Description	Qty
1. Bracket .....	1
2. Screws .....	4
3. FFC (Short).....	1
4. Harness (Short) .....	1
5. FFC (Long: Not Used) .....	1
6. Harness (Long: Not Used) .....	1
7. Harness Clamp (Not Used).....	1
8. ICIB.....	1

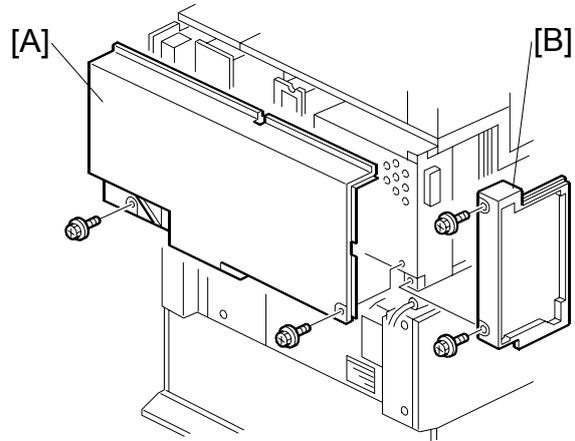


## 1.19.2 INSTALLATION

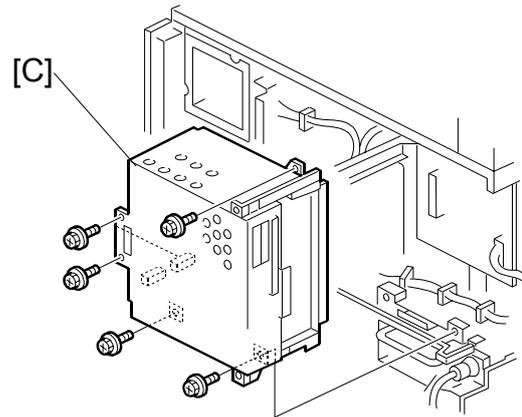
1. Remove:

[A]: Rear upper cover (🔩 x2)

[B]: Controller cover (🔩 x2)



2. Remove the controller box [C] (🔩 x5).



3. Attach the bracket [D] (🔩 x2).

4. Attach the ICIB [E] (🔩 x4)

5. Connect the short FFC [F].

6. Connect the short harness [G] (🔌 x2).

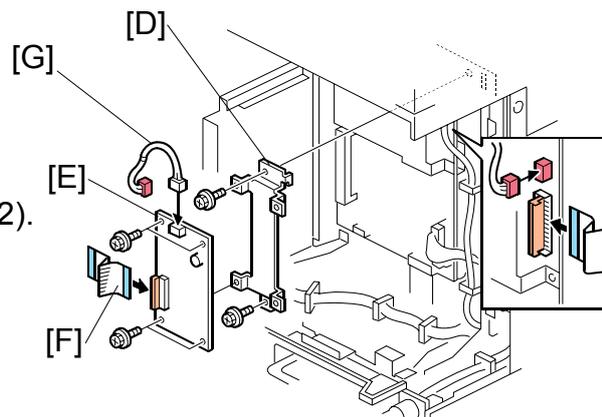
7. Reinstall the controller box.

8. Turn on the machine.

9. Enable the Copy Data Security Function:

[User Tools]> System Settings>

Administrator Tools> Copy Data Security Option

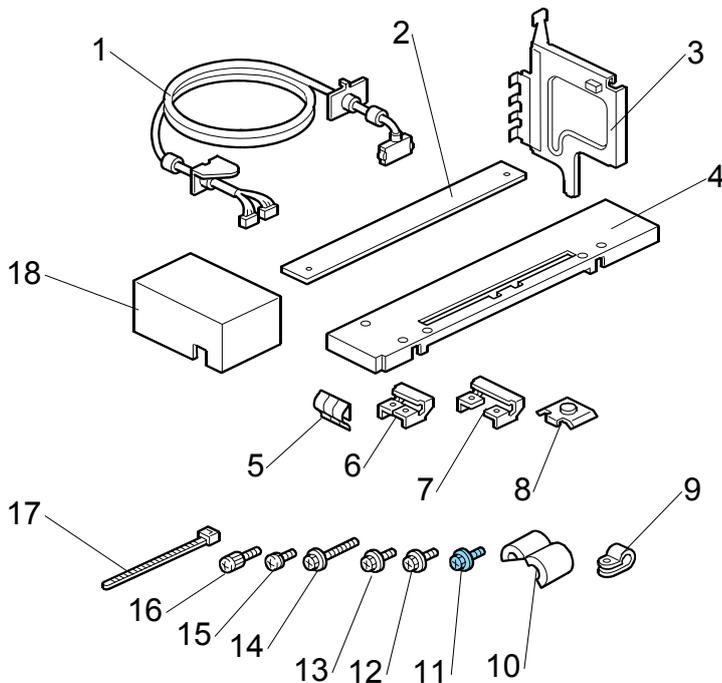


## 1.20 SCANNER ACCESSIBILITY OPTION (B815)

### 1.20.1 ACCESSORIES

Check the accessories and their quantities against the following list:

Description	Qty
1. Long I/F Cable .....	1
2. Paper Exit Cover.....	1
3. Rack Stack Ass'y .....	1
4. Upper Right Cover .....	1
5. Spring Plates – Operation Panel.....	2
6. Hinge Stopper – Right .....	1
7. Hinge Stopper – Left .....	1
8. Adjusting Pin Spacers.....	2
9. Clamp – NK-8N.....	1
10. Ferrite Core – RFC-8 .....	1
11. Tapping Screw M3x6 (Blue).....	1
12. Tapping Screws M3x6 .....	5
13. Tapping Screw M3x8 .....	1
14. Tapping Screws M3x14 .....	4
15. Screws with Spring Washer M4x6 .....	1
16. Knob Screws– M4 .....	4
17. Harness Bands .....	2
18. Cable Cover.....	1



## 1.20.2 INSTALLATION

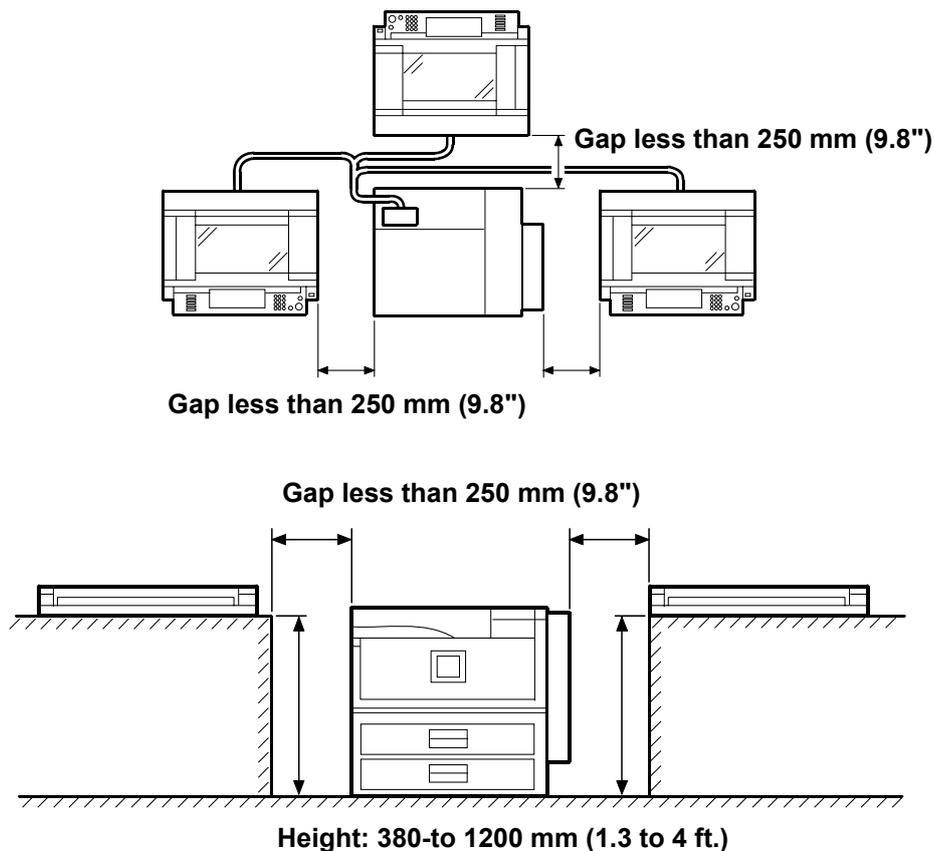
This option should be pre-installed at the service center or factory and the final installation should be done at the work site.

### General Requirements

- Install the scanner on a solid base.
- Do not install the scanner in an area where it can fall when the ARDF cover is opened.
- Install the scanner in an area that allows easy access for operation.
- Ask the customer about their requirements before you install the unit.

### Specific Requirements

- The scanner unit cable should not touch the floor.
- The cables should not hang free where they can become entangled with other equipment or furniture such as a wheelchair.
- The unit should be positioned within 380 to 1220 mm (1.3 to 4 ft.) above the floor.
- The gap between the scanner and the main unit on the left, right, or rear should not be more than 250 mm (9.8 in.)



**Pre-installation**

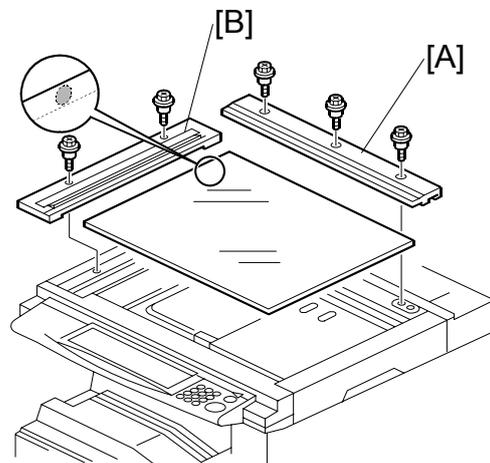
- Remove Short Scanner I/F Cable
- Connect the Long Scanner Cable to the Copier
- Install Anti-Static Springs on the Operation Panel
- Replace the Board Shield Plates

**On-Site Installation**

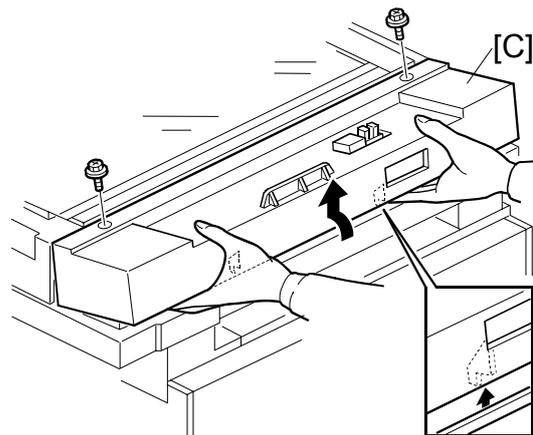
- Move the Scanner Unit to Its Accessible Location
- Remove the Horizontal Arm
- Connect the Long Scanner I/F Cable to the Copier
- Replace the Front Rubber Feet with the Adjustment Screws
- Connect the Scanner

**Pre-installation****Remove Short Scanner Cable**

1. If the ARDF is attached, remove it.
2. Remove:
  - [A]: Rear scale (⚙️ x3)
  - [B]: Left scale and exposure glass (⚙️ x2)



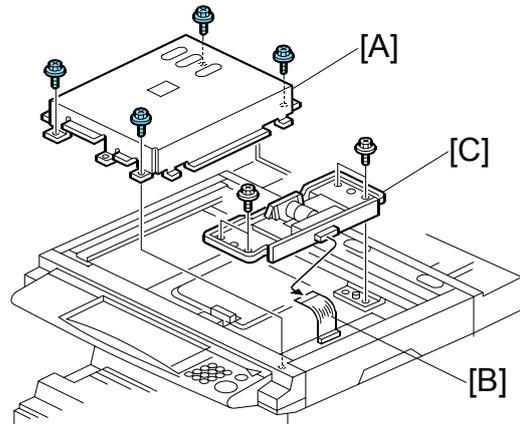
3. Remove scanner rear cover [C] (⚙️ x2).



## SCANNER ACCESSIBILITY OPTION (B815)

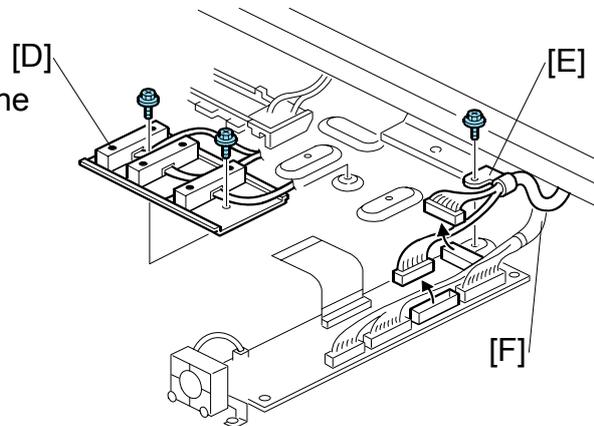
### 4. Remove:

- [A]: Lens block cover (⚙️ x4)
- [B]: Disconnect flat-film connector from the lens block.
- [C]: Lens block assembly (⚙️ x4)

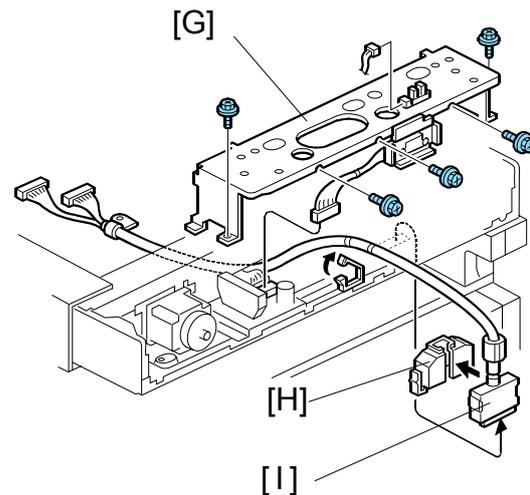


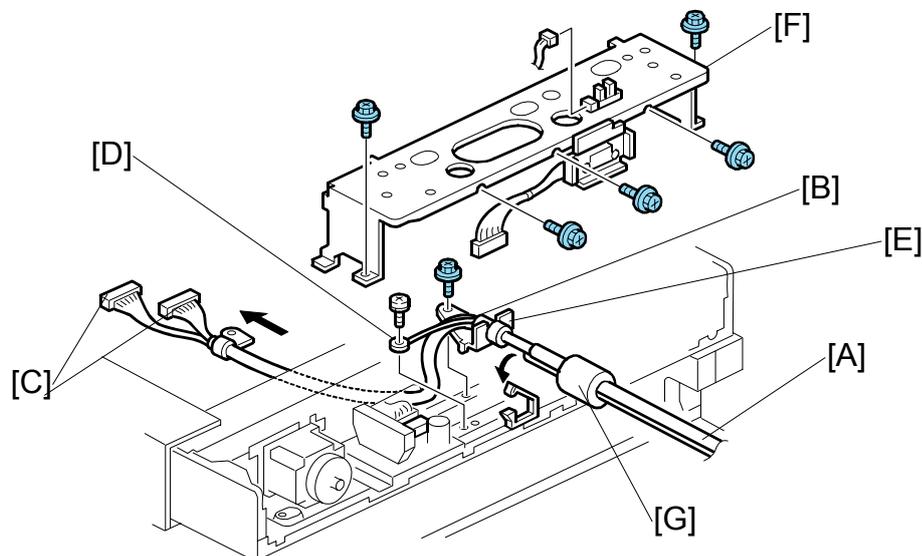
### 5. Disconnect:

- [D]: Original length sensor (⚙️ x1)
  - Push the sensor forward toward the front. It is not necessary to disconnect or remove the sensor.
- [E]: Ground wire [E] (⚙️ x1)
- [F]: Short scanner I/F cable (🔌 x2).



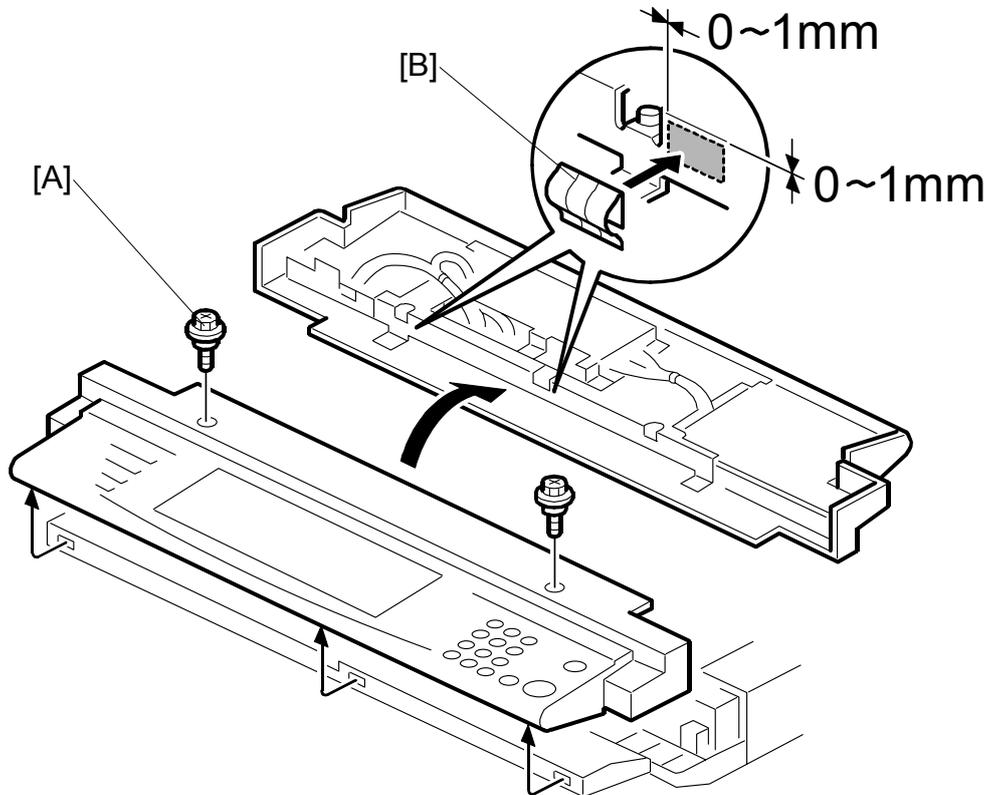
- 6. Remove the rear cover [G] (⚙️ x5, 🔌 x1)
- 7. Remove the connector cap [H] and disconnect the short scanner I/F cable [I] from the mainframe (🔌 x1, 🖱️ x1).
- 8. Pull the short scanner I/F cable out of the scanner unit.



*Connect the Long Scanner Cable to the Copier*

1. Position the cable [A] and ground wire [B] of the long scanner I/F cable as shown.
2. Reattach the long scanner I/F connectors [C] and ground wire [D] (⚙️x2)
  - Make sure the ground wire and cable loop behind the large boss.
3. Reattach (☛Pg. 1-80)
  - Original length sensor (⚙️ x1).
  - Lens block assembly (⚙️ x4).
  - Lens block cover (⚙️ x4)
4. Set the collar [E] of the long scanner I/F cable in the bracket and clamp the cable (⚙️x1)
5. Reinstall rear bracket [F] (⚙️ x5, 📏 x2).
6. Pull the ferrite core [G] slightly away from the back of the machine.
7. Reattach: (☛Pg. 1-79)
  - Scanner rear cover (⚙️ x2)
  - Rear scale (⚙️ x3)
  - Exposure glass and left scale (⚙️ x2)

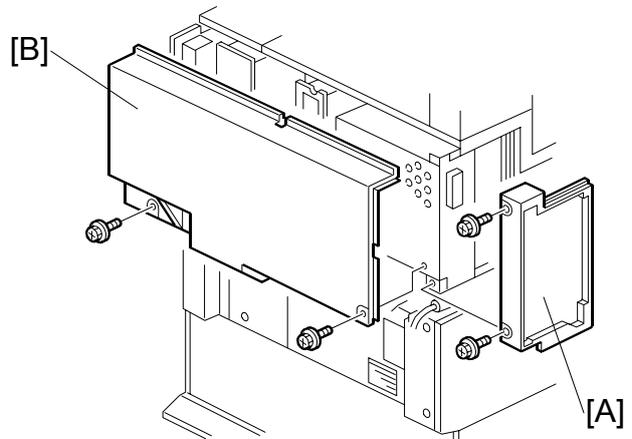
*Install Anti-Static Springs on Operation Panel*



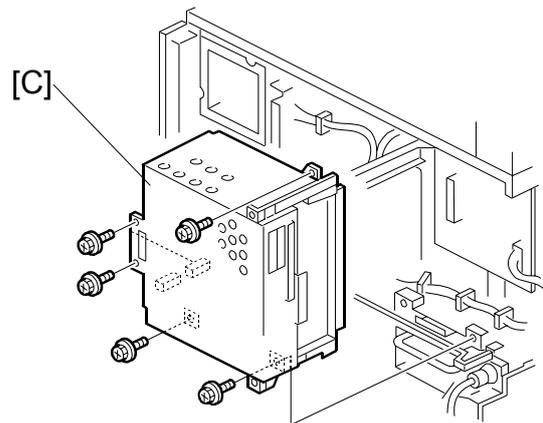
1. Disconnect the screws holding the operation panel [A] (  x2 )
2. Pull the operation panel away from the copier (do not disconnect or remove) and turn it over.
3. Peel the covers from the anti-static springs [B] and attach them as shown.
4. Press down gently on each spring to confirm that each spring is attached securely.
5. Reattach the operation panel to the machine (  x2).

***Replace the Board Shield Plates***

1. Remove:
  - Corner plate [A] (🔩 x2)
  - Rear upper cover [B] (🔩 x2)



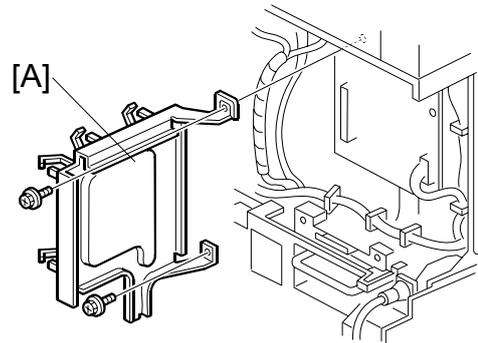
2. Remove controller box [C]  
(🔩 x5, 📏 x1)



## SCANNER ACCESSIBILITY OPTION (B815)

### 3. Remove:

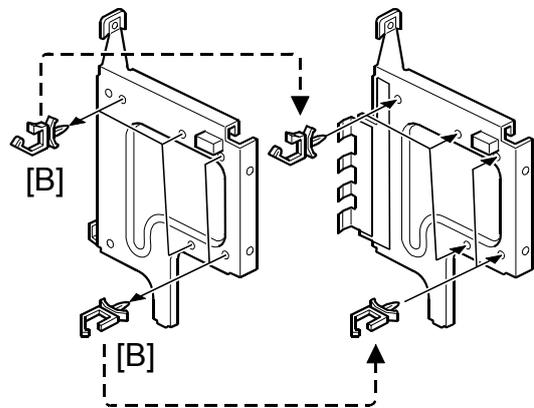
- IPU shield plate [A] (🔩 x2)



### 4. Remove the harness clamps [B] from the old IPU shield plate and attach them to the new plate (🔩x5).

### 5. Reattach:

- New IPU shield plate (🔩 x2)
- Controller box (🔩 x5, 📦 x1)
- Reattach rear lower cover (🔩 x4)
- Reattach the corner plate (🔩 x2)
- ARDF



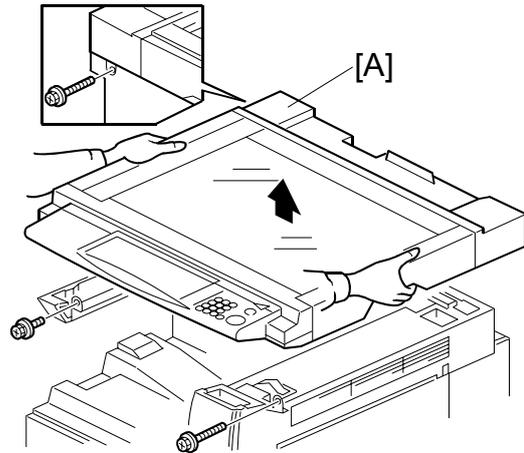
### Important:

- This completes the pre-installation procedure for this option.
- The mainframe can now be moved to the work site.

**On-Site Installation**

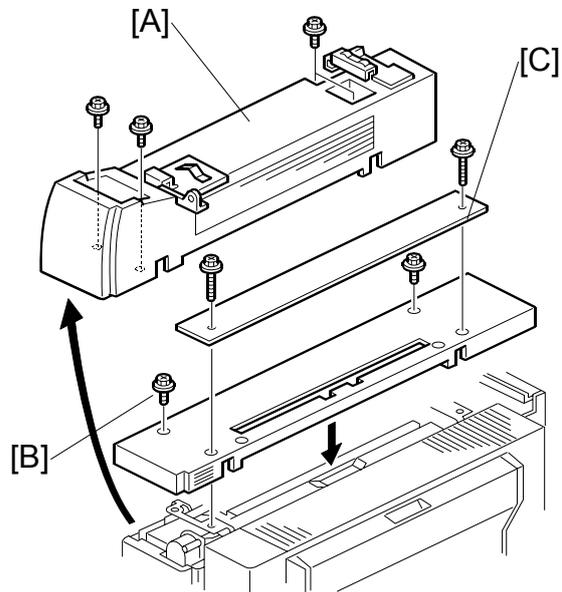
**Move the Scanner Unit to Its Accessible Location**

1. Disconnect the scanner unit from the machine (⚙️ x3)
2. Lift the scanner unit and set it at the accessible location.



**Replace the Cover**

1. Remove the paper exit cover [A] (⚙️ x4)
2. Remove the upper right cover and replace it with the cover [B] provided with the Scanner Accessibility Option (⚙️ x2 – M3 x14).
3. Attach the paper exit cover [C] (provided with the option) (⚙️ x2).

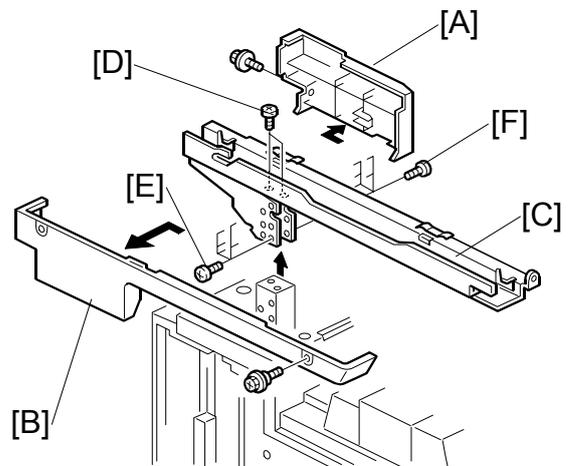


**Remove the Horizontal Arm**

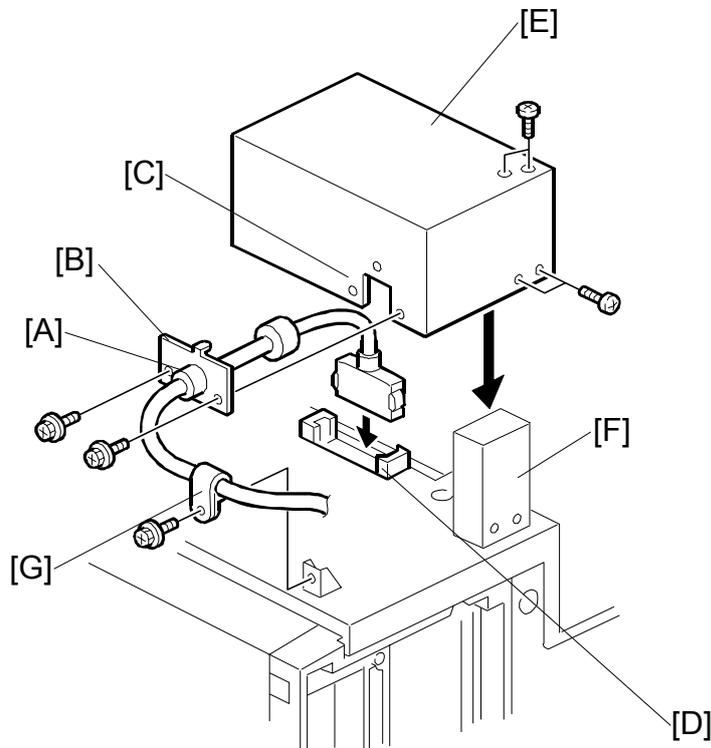
1. Remove:
  - Right cover [A] (⚙️ x1)
  - Left cover [B] (⚙️ x2)
2. To remove the horizontal arm [C] of the scanner stand, remove these screws:
  - Top [D] (⚙️ x2)
  - Right side [E] (⚙️ x6)

**NOTE:** Keep these screws. They are needed to fasten the cable cover in Step 4 (next page).

  - Left side [F] (⚙️ x6)



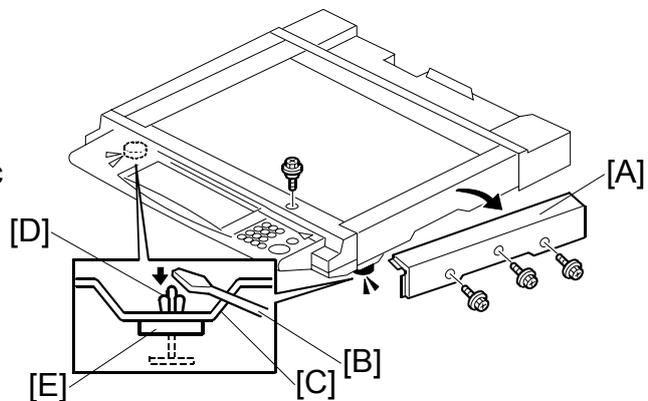
*Connect the Long Scanner I/F Cable to Copier*



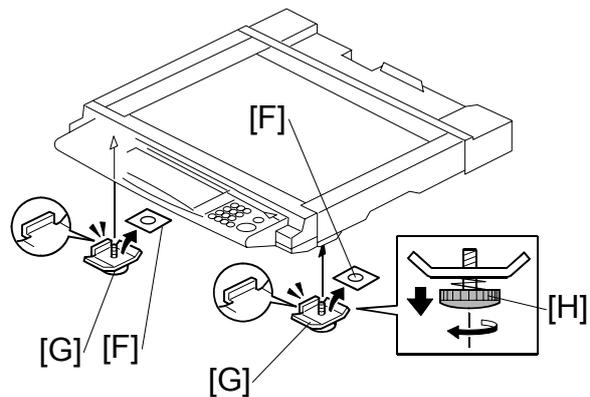
1. Fasten the collar [A] of the long scanner I/F cable to the bracket [B].
2. Fasten the bracket to the side of the housing [C] (⚙️ x2)
3. Connect the cable [D] to the cable connector (🔌 x1).
4. Use the screws removed in Step 2 on the previous page to fasten the cable cover [E] over the cable connection and the vertical post [F] of the scanner stand (⚙️ x4).
5. Fasten the cable clamp [G] as shown (⚙️ x1).

***Replace the Front Rubber Feet with the Adjustment Screws***

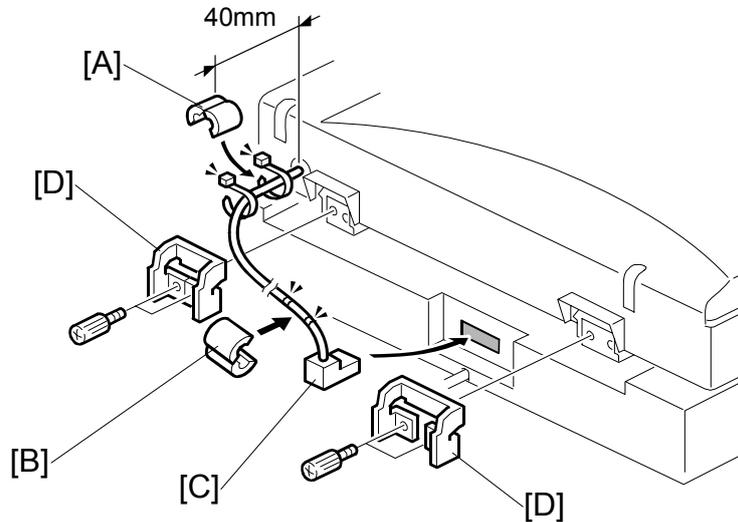
1. Remove the cover [A] (⚙️ x3).
2. Under the right front corner of the scanner unit, insert a flathead screwdriver [B] behind the metal bracket [C] and dislodge the plastic pin [D].
3. Pull out the plastic pin and remove the rubber foot [E].



4. Remove the seal [F] from the adjusting pin spacer [G], then attach the pin spacer to the scanner unit.
5. Turn the metal foot [H] until it stops.
6. Reinstall the cover [A] (⚙️ x3).
7. Repeat Steps 2 to 5 at the left front.



*Connect the Scanner*



1. Attach one ferrite core [A] to the cable 40 mm away from the scanner unit.
2. Attach one ferrite core [B] near the cable connector.

**NOTE:** The ferrite core is provided as an accessory with the mainframe.

3. Connect the cable [C] to the scanner.
4. Attach the safety blocks [D] behind each hinge (⚙ x 2 each).

**NOTE:** These blocks prevent the ARDF from falling over if it is opened too far.

# PREVENTIVE MAINTENANCE

PREVENTIVE MAINTENANCE REVISION HISTORY		
Page	Date	Added/Updated/New
		None



## 2. PREVENTIVE MAINTENANCE SCHEDULE

### 2.1 PM TABLE

**NOTE:** Amounts mentioned as the PM interval indicate the number of prints.

Symbol key: **C:** Clean, **R:** Replace, **L:** Lubricate, **I:** Inspect

B291/B295/B296/B297	EM	150K	300K	450K	NOTE
<b>SCANNER/OPTICS</b>					
Reflector		C	C	C	Optics cloth
1st Mirror		C	C	C	Optics cloth
2nd Mirror		C	C	C	Optics cloth
3rd Mirror		C	C	C	Optics cloth
Scanner Guide Rails		I	I	I	Do not use alcohol. Lubricate if necessary.
Platen Sheet Cover	C	I	I	I	Dry cloth or alcohol. Replace platen sheet if required.
Exposure Glass		C	C	C	Dry cloth or alcohol
Toner Shield Glass		C	C	C	Optics cloth
APS Sensor		C	C	C	Dry cloth or alcohol
Exposure Glass (Sheet through)		C	C	C	Dry cloth or alcohol
<b>DRUM (OPC) AREA</b>					
OPC Drum		R	R	R	
Charge Roller		R	R	R	
Charge Roller Cleaning Roller		R	R	R	
Drum Cleaning Blade 1		R	R	R	
Drum Cleaning Blade 2		R	R	R	
Quenching Lamp			C		Dry cloth
Pick-off Pawls		R	R	R	
Spurs		C	C	C	Dry cloth or alcohol
ID Sensor		C	C	C	Perform SP3-001-2 after blower brush cleaning.
Cleaning Entrance Seal		C	C	C	Blower brush. Replace if required.
Side Seal		I	I	I	

PM TABLE

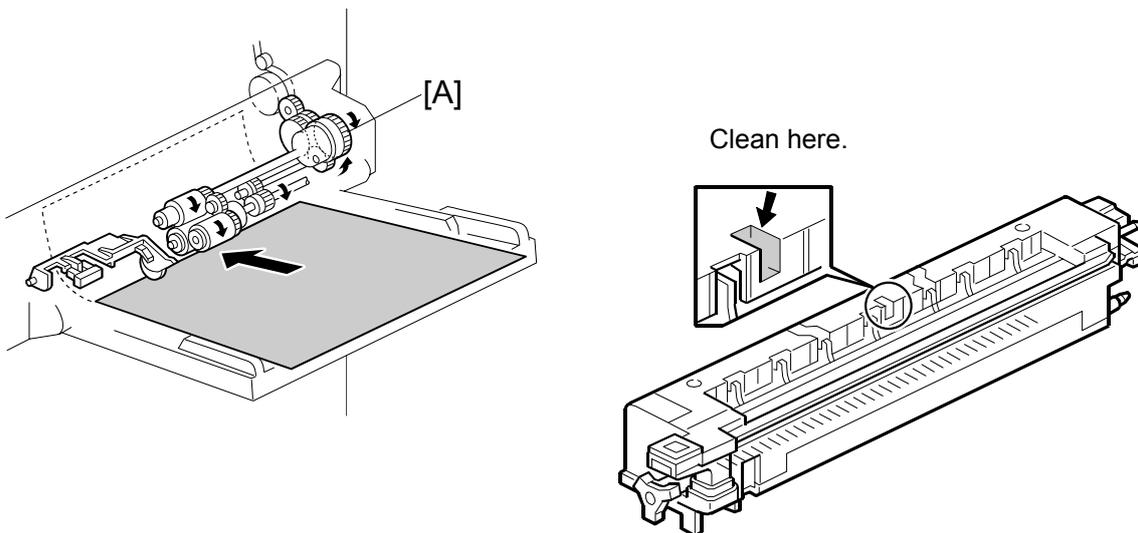
B291/B295/B296/B297	EM	150K	300K	450K	NOTE
<b>DEVELOPMENT UNIT</b>					
Development Drive Gears		I	I	I	
Development Filter		R	R	R	
Developer		I	R	I	
Entrance Seal		I	I	I	
Side Seal		I	I	I	
Development Roller		C	C	C	Dry cloth
<b>PAPER FEED</b>					
Registration Roller	C	C	C	C	Water or alcohol.
Idle Roller Dust Blade		C	C	C	Detach and tap gently on flat surface to empty. Blower brush.
Registration Roller Dust Blade		C	R	C	Blower brush.
Paper Feed Guides		C	C	C	Water or alcohol.
Relay Rollers		C	C	C	Water or alcohol.
Bottom Plate Pad		C	C	C	Water or alcohol.
Bottom Plate Pad (By-pass feed)		C	C	C	Water or alcohol.
Registration Sensor		C	C	C	Blower brush
Paper Feed Roller Gear		L	L	L	Silicone Grease G-501. See note below.* <sup>1</sup>
Upper Relay Sensor		C	C	C	Blower Brush
<b>DUPLEX UNIT</b>					
Upper Transport Roller		C	C	C	Water or alcohol.
Lower Transport Roller		C	C	C	Water or alcohol.
<b>TRANSFER BELT UNIT</b>					
Transfer Belt	C	R	R	R	Dry cloth.
Transfer Belt Cleaning Blade		R	R	R	To prevent damage to the cleaning blade, always replace these items together.
Transfer Belt Rollers		C	C	C	Dry cloth
Entrance Seal		C	C	C	Dry cloth
Transfer Entrance Guide	C	C	C	C	Dry cloth
Used Toner Tank	I	C	C	C	Empty the tank.

**Note:** Due to their durability and extended service life, the feed rollers, separation rollers, and pick-up rollers of the mainframe, optional paper trays, and LCT have been removed from the PM parts list.

B291/B295/B296/B297	EM	150K	300K	450K	NOTE
<b>FUSING UNIT AND PAPER EXIT</b>					
Fusing Entrance and Exit Guide Plates		C	C	C	Water or alcohol.
Hot Roller		R	R	R	
Pressure Roller		R	R	R	
Fusing Thermistors		R	R	R	
Cleaning Roller Bushings		L	L	L	Grease: Barrierta S552R
Hot Roller Strippers		C	R	C	Water or alcohol.
Paper Exit Guide Ribs		C	C	C	Water or alcohol. (See illustration below.)
Exit Sensor		C	C	C	Blower brush
<b>DRIVE</b>					
Drive Belts			I		Replace if necessary

Preventive Maintenance

\*1: Lubricate the paper feed clutch gear [A] with Silicone Grease G501 every P.M.



PM TABLE

<b>B714</b>	<b>EM</b>	<b>80K</b>	<b>160K</b>	<b>240K</b>	<b>NOTE</b>
<b>ARDF (for originals)</b>					
Pick-up Roller	C	R	R	R	Belt cleaner
Feed Belt	C	R	R	R	Belt cleaner
Separation Roller	C	R	R	R	Dry or damp cloth
Sensors		C	C	C	Blower brush
Drive Gears		L	L	L	Grease, G501

<b>B542</b>	<b>EM</b>	<b>150K</b>	<b>300K</b>	<b>450K</b>	<b>NOTE</b>
<b>PAPER TRAY UNIT</b>					
Relay Rollers		C	C	C	Dry or damp cloth
Bottom Plate Pad		C	C	C	Dry or damp cloth

<b>B543</b>	<b>EM</b>	<b>150K</b>	<b>300K</b>	<b>450K</b>	<b>NOTE</b>
<b>LCT</b>					
Bottom Plate Pad		C	C	C	Dry or damp cloth

<b>B408/B545</b>	<b>EM</b>	<b>150K</b>	<b>300K</b>	<b>450K</b>	<b>NOTE</b>
<b>1000-SHEET/TWO-TRAY FINISHER</b>					
Rollers	C				Water or alcohol.
Brush Roller (A681 only)	I	I	I	I	Replace if required.
Discharge Brush	C	C	C	C	Dry cloth
Sensors	C				Blower brush
Jogger Fences	I	I	I	I	Replace if required.
Punch Waste Hopper*	I	I	I	I	Empty hopper.

\*: Only for B545

<b>B546</b>	<b>EM</b>	<b>150K</b>	<b>300K</b>	<b>450K</b>	<b>NOTE</b>
<b>BOOKLET FINISHER</b>					
Transport Belt		C	C	C	
Stapler Paddles		C	C	C	

<b>B544</b>	<b>EM</b>	<b>150K</b>	<b>300K</b>	<b>450K</b>	<b>NOTE</b>
<b>1-BIN TRAY UNIT</b>					
Rollers	C				Dry or damp cloth
Copy Tray	C				Dry or damp cloth
Sensors	C				Blower brush

# REPLACEMENT AND ADJUSTMENT

REPLACEMENT AND ADJUSTMENT REVISION HISTORY		
Page	Date	Added/Updated/New
		None



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## 3. REPLACEMENT AND ADJUSTMENT

### 3.1 GENERAL CAUTIONS

**⚠ CAUTION**

To avoid damage to the transfer belt, drum, or development unit when it is removed or re-installed, never turn off either power switch while electrical components are active.

**⚠ CAUTION**

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

**Replacement  
Adjustment**

#### 3.1.1 LASER UNIT

1. Do not loosen the screws that secure the LD drive board to the laser diode casing. Doing so would throw the LD unit out of adjustment.
2. Do not adjust the variable resistors on the LD unit, as they are adjusted in the factory.
3. The polygon mirror and F-theta lenses are very sensitive to dust. Do not open the optical housing unit.
4. Do not touch the glass surface of the polygon mirror motor unit with bare hands.
5. After replacing the LD unit, do the laser beam pitch adjustment. Otherwise, an SC condition will be generated.

#### 3.1.2 USED TONER

1. Dispose of used toner in accordance with local regulations. Never throw toner into an open flame, for toner dust may ignite.

### 3.2 SPECIAL TOOLS AND LUBRICANTS

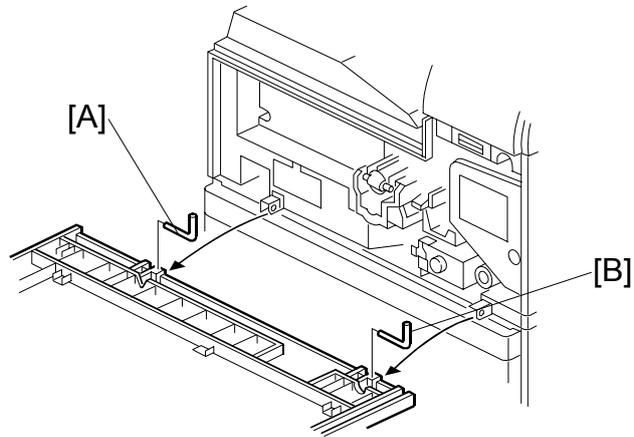
#### 3.2.1 SPECIAL TOOLS

Part Number	Description	Q'ty
A0069104	Scanner Positioning Pin (4 pc./set)	1
A2929500	Test Chart – S5S (10 pc./set)	1
VSSM9000	Digital Multimeter – FLUKE 187	1
A2309003	Adjustment Cam – Laser Unit	1
A2309004	Positioning Pin – Laser Unit	1
B6455010	SD Card	1
B6456800	USB Read/Writer	1
G0219350	Loop Back Connector	1

#### 3.2.2 LUBRICANTS

Part Number	Description	Q'ty
A2579300	Grease Barrierta S552R	1
52039502	Silicone Grease G-501	1

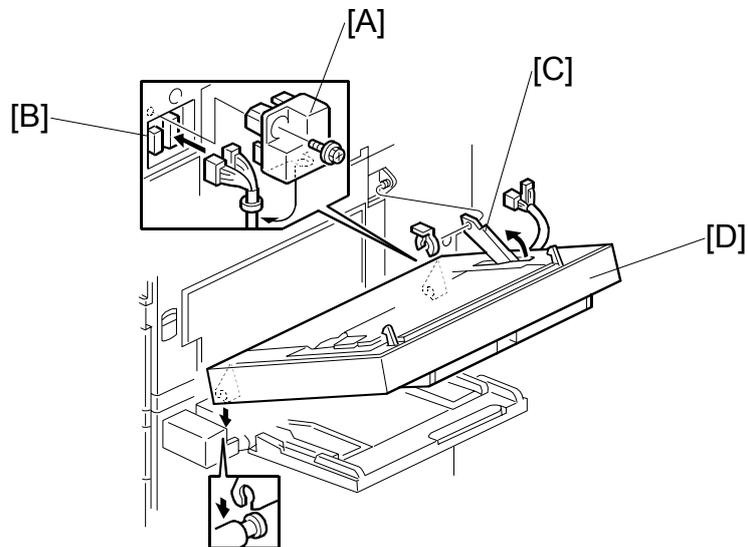
### 3.3 FRONT DOOR



Replacement  
Adjustment

1. Open front door.
2. To remove the front door, remove left pin [A], and right pin [B].

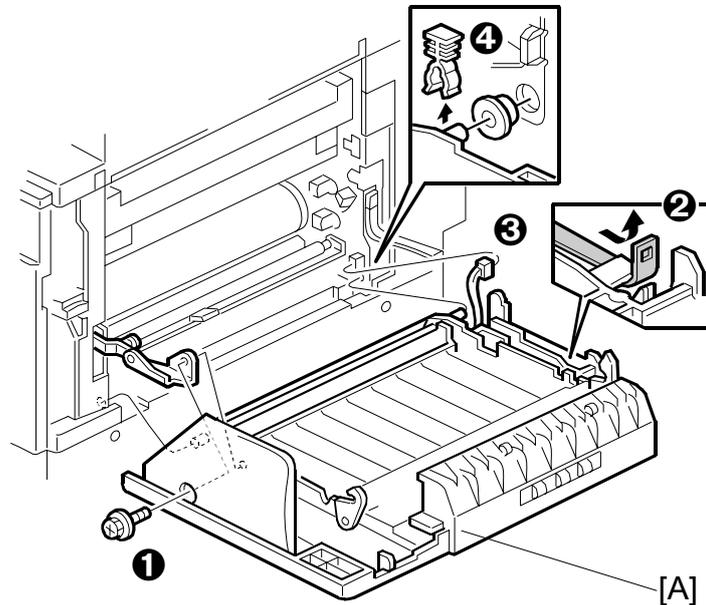
### 3.4 DUPLEX UNIT



1. Connector cover [A] (🔑 x1)
2. Duplex connectors [B] (🔌 x2)
3. Duplex support arm [C] (🔧 x1)
4. Duplex unit [D]

**NOTE:** Grip the duplex unit with both hands, slowly rotate it towards you and then lift up.

### 3.5 RIGHT UPPER COVER

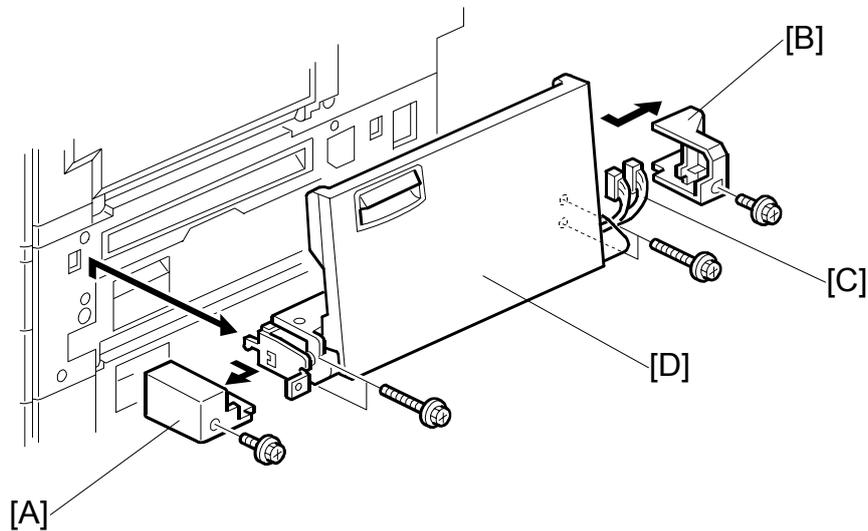


Replacement  
Adjustment

**NOTE:** Work carefully to avoid damaging the development roller.

- Duplex unit (☛ 3.4)
- Transfer belt unit (☛ 3.13.1)
- Remove the upper right cover [A]
  - ① (🔩 x1)
  - ② Loop fastener
  - ③ (🔗 x1)
  - ④ (🔩 x1, Bushing x1)

### 3.6 BY-PASS TRAY UNIT



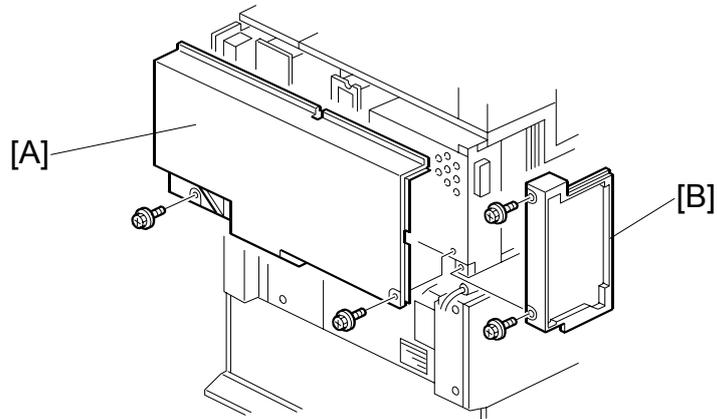
Use this procedure to remove the complete by-pass tray unit from the machine. If you wish to remove only the table, or some of the components of this unit, see 3.16.

1. Duplex unit (☞ 3.4)
2. Left cover [A] (🔩 x1)
3. Right cover [B] (🔩 x1)
4. Connectors [C] (🔌 x2)
5. By-pass unit [D] (🔩 x4)

**NOTE:** After removing the screws, lift to unhook the by-pass tray unit from the frame of the machine.

### 3.7 REAR COVERS

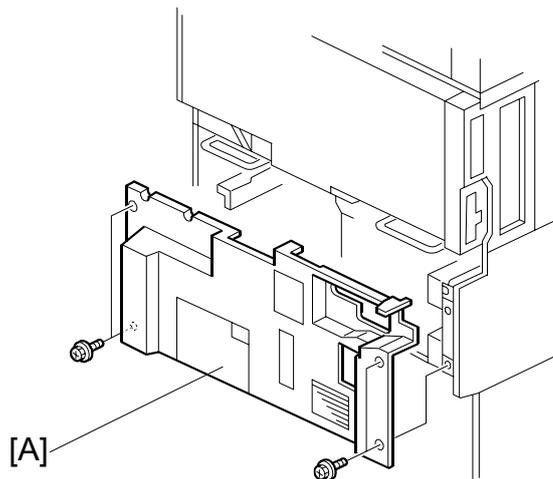
#### 3.7.1 REAR UPPER COVER



Replacement  
Adjustment

1. Rear upper cover [A] (🔩 x2)
2. Controller cover [B] (🔩 x2)

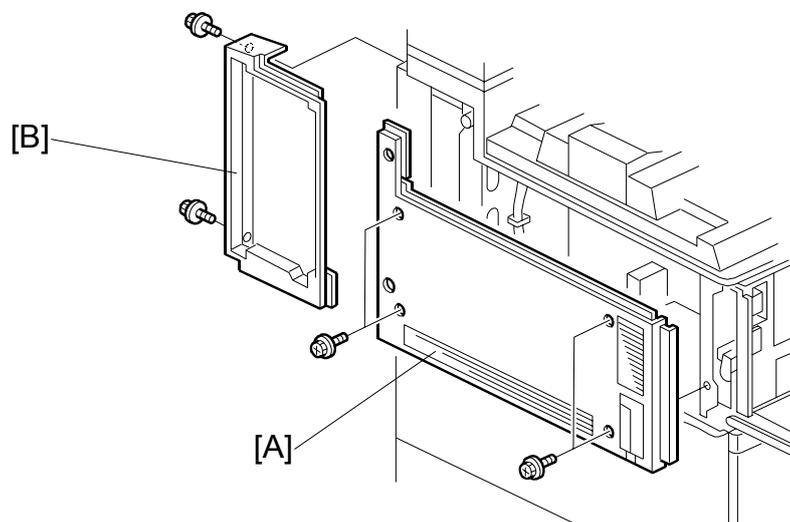
#### 3.7.2 REAR LOWER COVER



1. Rear lower cover [A] (🔩 x4)

## LEFT COVER

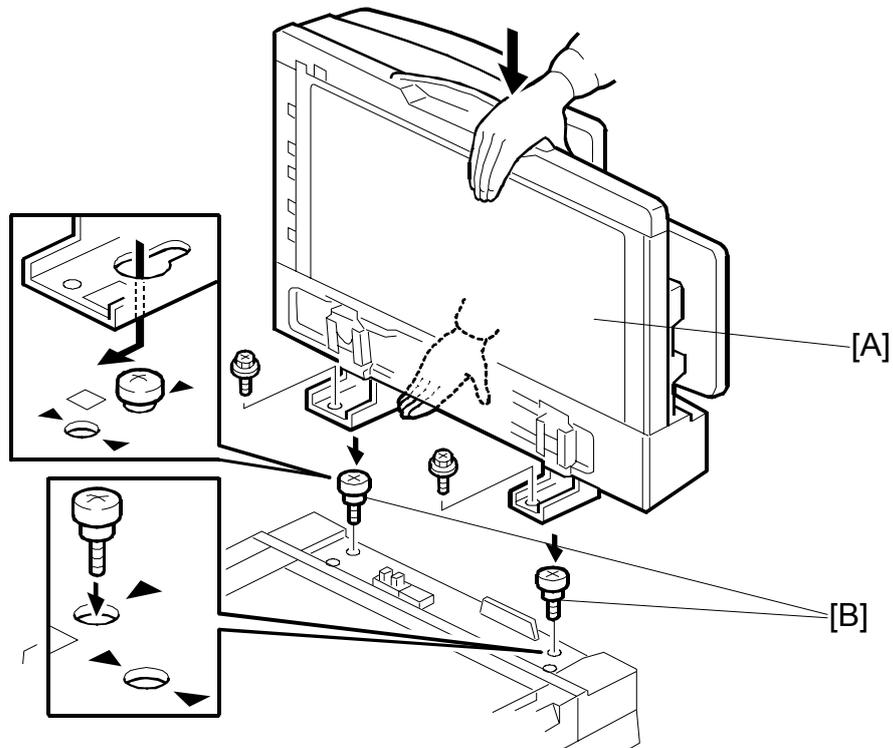
### 3.8 LEFT COVER



1. Left upper cover [A] (🔩 x4)
2. Controller cover [B] (🔩 x2)

## 3.9 SCANNER UNIT

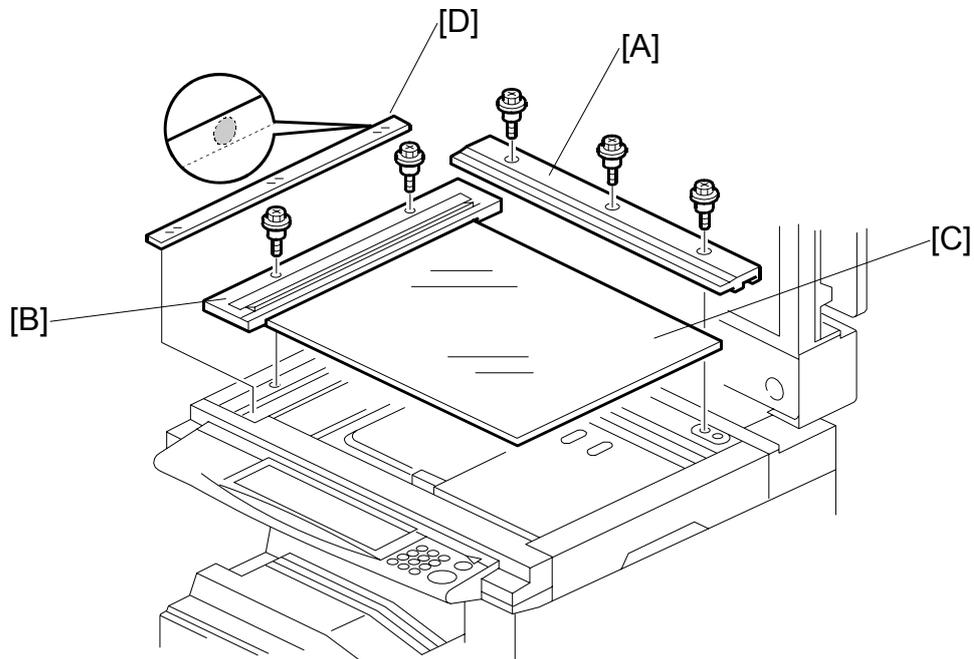
### 3.9.1 ARDF



Replacement  
Adjustment

1. Interface connector (not shown)
2. ARDF [A] (🔩 x2)
  - Push the ARDF towards the front of the machine to align the keyholes in the ARDF base with the heads of the stud screws [B] and lift.

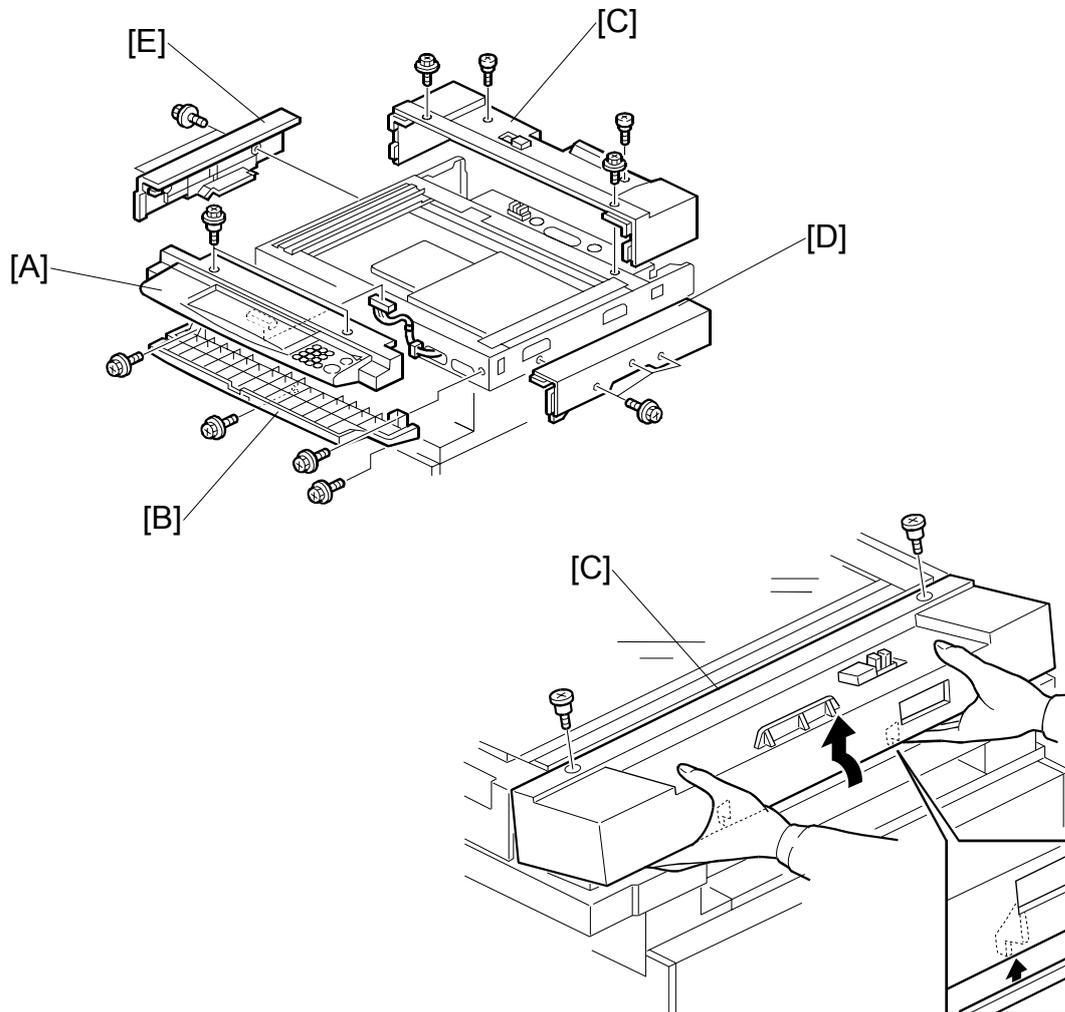
### 3.9.2 EXPOSURE GLASS



1. Open the ARDF or platen cover.
2. Rear scale [A] (⚙️ x3)
3. Left scale [B] (⚙️ x2)
4. Exposure glass [C]
5. DF exposure glass [D]

**NOTE:** When reinstalling the exposure glass, make sure that the white dot is positioned at the rear left corner.

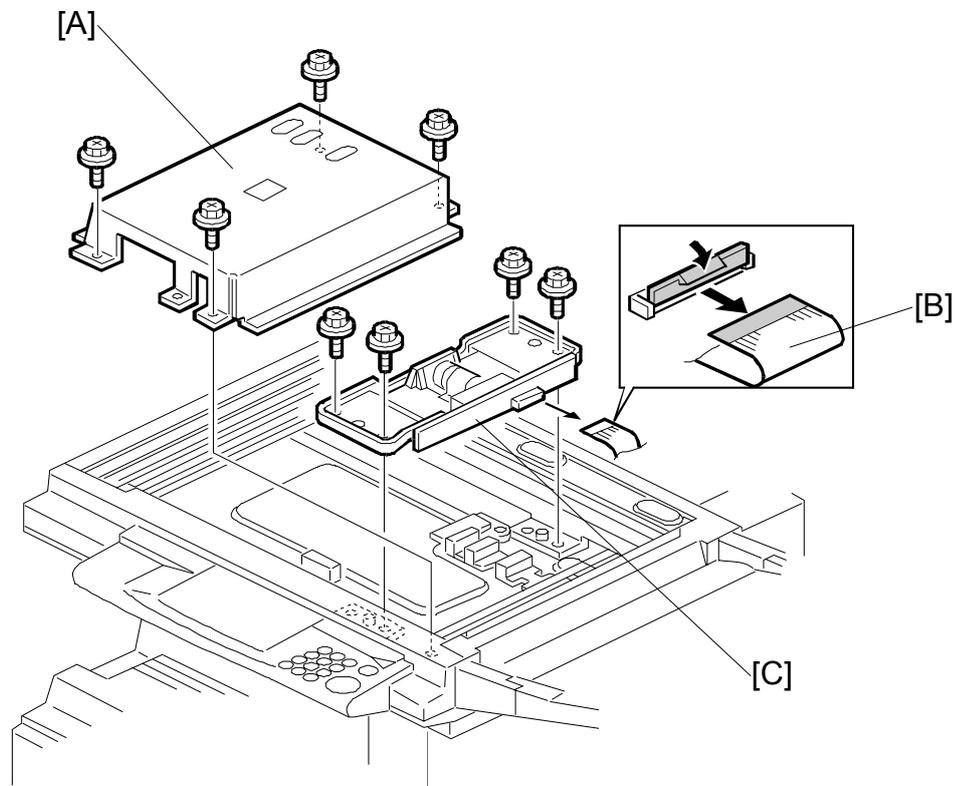
### 3.9.3 SCANNER EXTERIOR PANELS, OPERATION PANEL



Replacement  
Adjustment

1. ARDF (☛ 3.9.1)
2. Exposure glass and DF exposure glass (☛3.9.2)
3. Operation panel [A] (🔩 x2, 📏 x1)
4. Operation panel base [B] (🔩 x4)
5. Scanner rear cover [C] (🔩 x4). Carefully lift in the direction of the arrow to disconnect the tab.
6. Right cover [D] (🔩 x3 )
7. Left cover [E] (🔩 x2)

### 3.9.4 LENS BLOCK, SBU ASSEMBLY

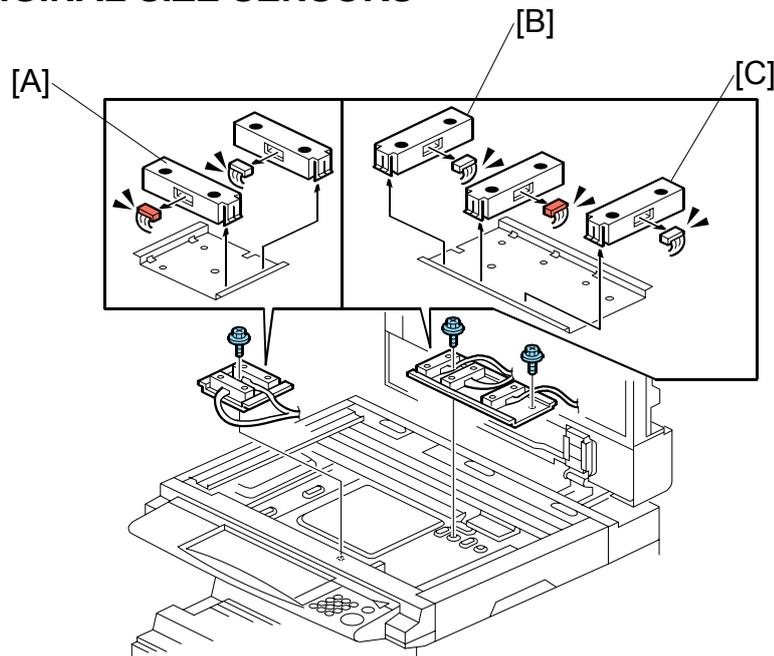


1. ARDF (☛ 3.9.1)
2. Exposure glass and DF exposure glass (☛ 3.9.2)
3. Lens cover [A] (🔩 x4)
4. Flexible cable [B] (🔌 x1)
5. Lens block assembly [C] (🔩 x4)

**NOTE:** The elements of the lens block assembly have been factory adjusted and paint locked at 8 points. Do not attempt to replace these items. Replace the unit.

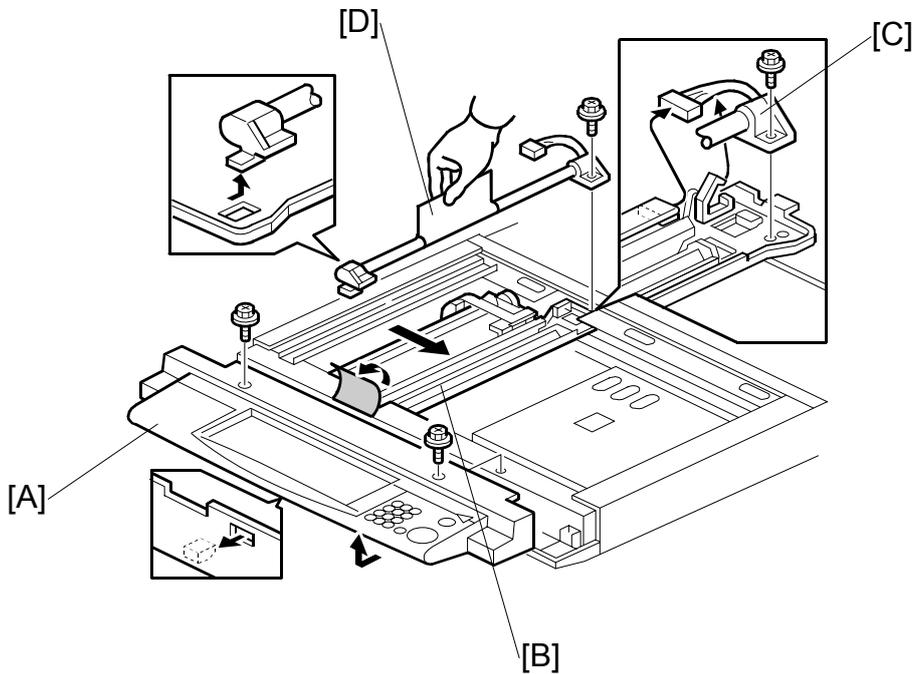
6. Perform scanner and printer copy adjustments (☛ 3.21)

### 3.9.5 ORIGINAL SIZE SENSORS



1. ARDF (☛ 3.9.1)
2. Exposure glass (☛ 3.9.2)
3. Lens block (☛ 3.9.4)
4. Original size sensors [A] (🔧 x1, 📏 x2)
5. Original size sensors [B] (🔧 x1, 📏 x2)
6. Original size sensor [C] (🔧 x1, 📏 x1)

### 3.9.6 EXPOSURE LAMP

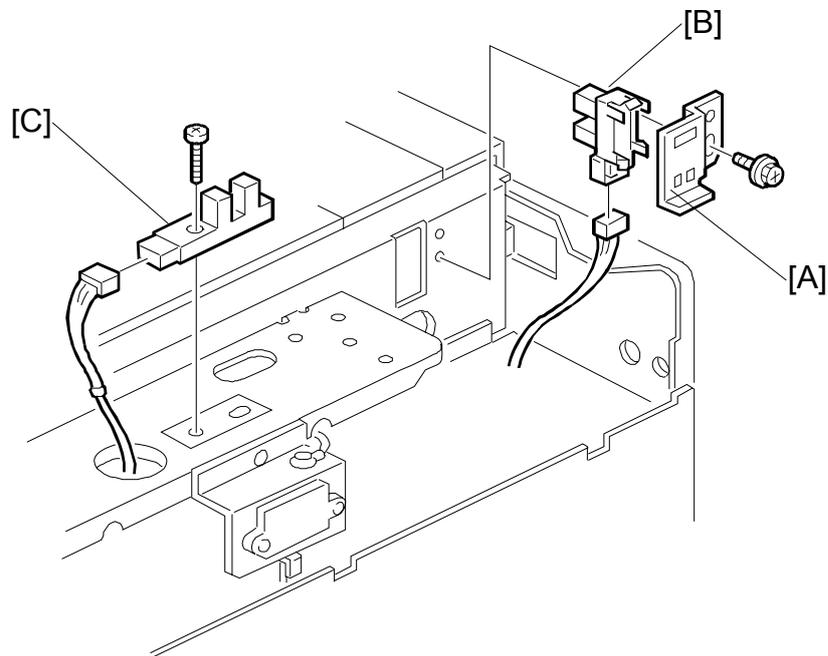


1. ARDF (☛ 3.9.1)
2. Exposure glass (☛ 3.9.2)
3. Operation panel [A] (🔧 x2, 📏 x1)
4. Slide 1st scanner [B] to the cutout to expose connector and screw.
5. Exposure lamp [C] (🔧 x1, 📏 x1)

**Important**

- Never touch the glass surface of the exposure lamp with bare hands.
- Slide the exposure lamp toward the rear to disengage the tab on its base from the hole below and then lift out.

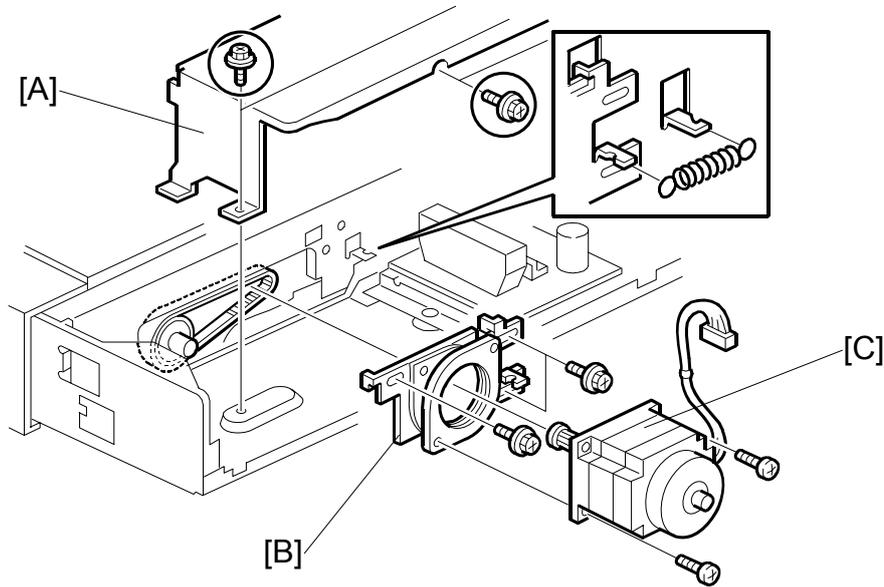
### 3.9.7 SCANNER HP SENSOR/PLATEN COVER SENSOR



Replacement  
Adjustment

1. ARDF (☛ 3.9.1)
2. Scanner rear cover (☛ 3.9.3)
3. Scanner HP sensor bracket [A] (🔩 x1)
4. Scanner HP sensor [B] (🔌 x1)
5. Platen cover sensor [C] (🔩 x1, 🔌 x1)

### 3.9.8 SCANNER MOTOR

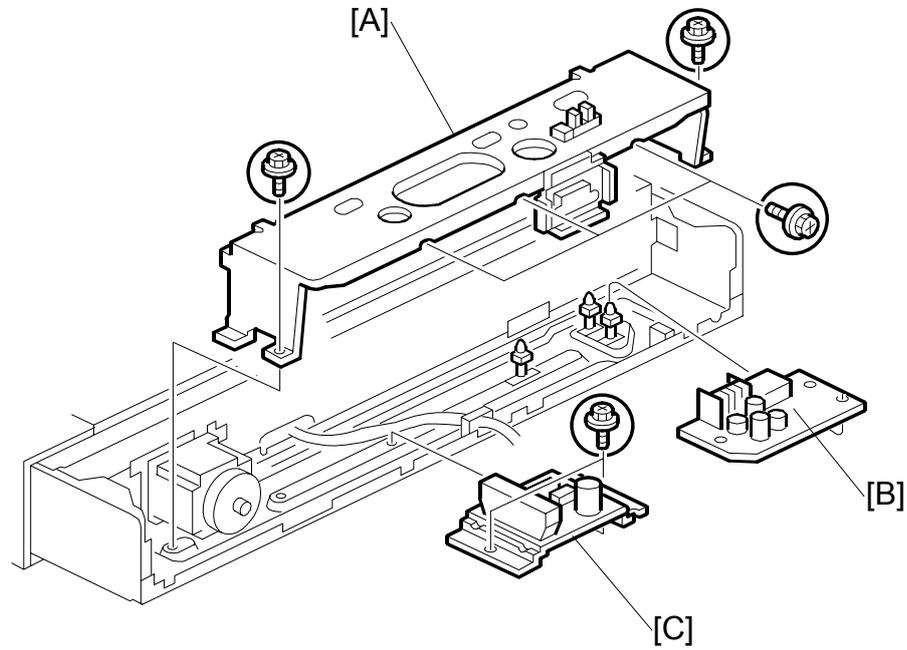


1. ARDF (☛ 3.9.1)
2. Scanner rear cover (☛ 3.9.3)
3. Rear bracket [A] (🔩 x5, 📏 x2)
4. Scanner motor bracket [B] (🔩 x3, 📏 x1, spring x1, timing belt x1)

**NOTE:** Loosen motor bracket [B] (🔩 x3) to release tension on belt (motor slides side to side).

5. Scanner motor [C] (🔩 x2, 📏 x1)
6. Perform scanner and printer copy adjustments (☛ 3.21)

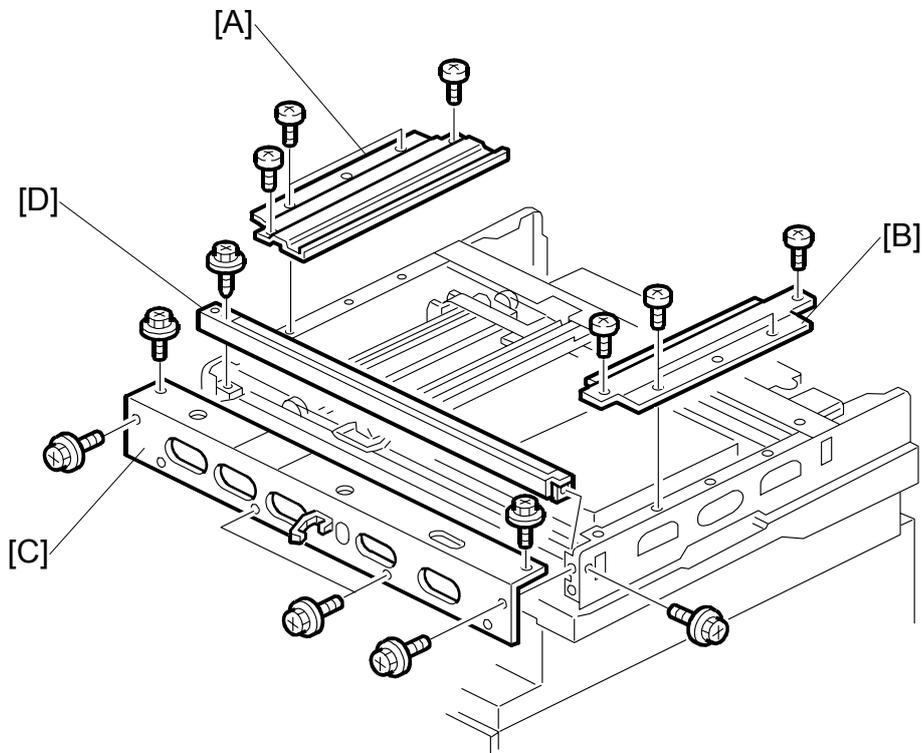
### 3.9.9 LAMP STABILIZER AND SCANNER MOTOR DRIVE BOARD



Replacement  
Adjustment

1. ARDF (☛ 3.9.1)
2. Scanner rear cover (☛ 3.9.3)
3. Rear bracket [A] (⚙️ x5, 🛠️ x2)
4. Lamp stabilizer [B] (🛠️ x2, Standoffs x3)
5. Scanner motor drive board [C] (🛠️ x2, ⚙️ x2)

### 3.9.10 SCANNER WIRE



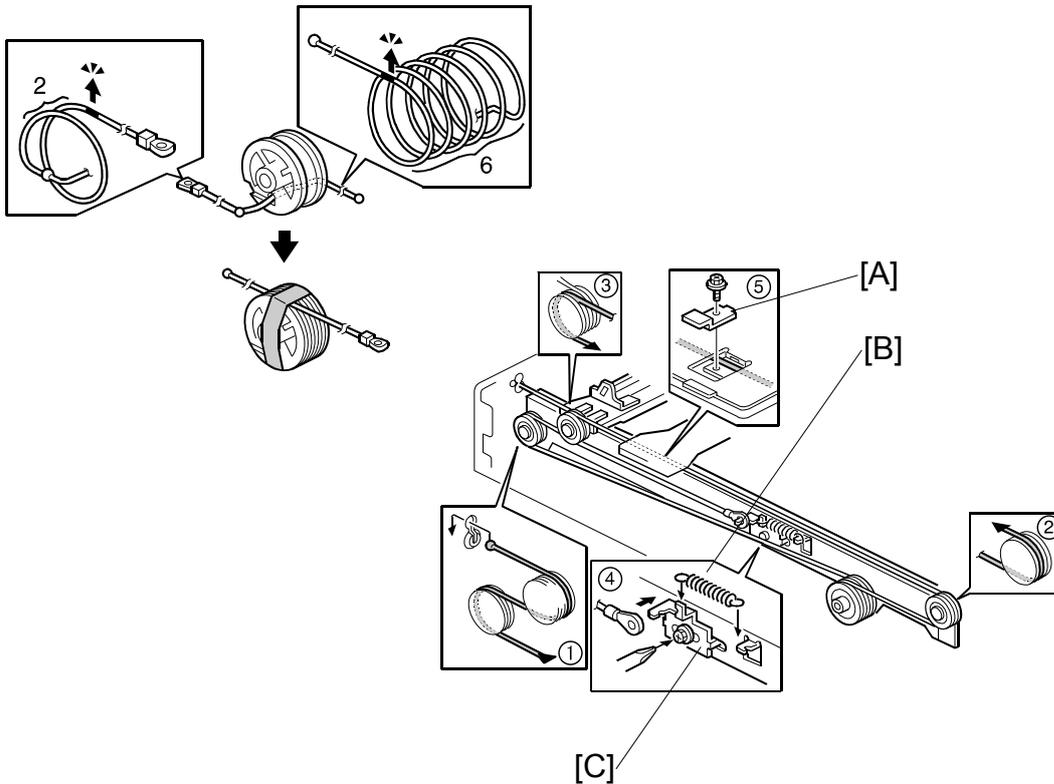
1. ARDF (☛ 3.9.1)
2. Exposure glass (☛ 3.9.2)
3. Scanner exterior panels and operation panel (☛ 3.9.3)

**Front wire:**

4. Left stay [A] (🔩 x5)
5. Right stay [B] (🔩 x5)
6. Front stay [C] (🔩 x6)
7. Front scanner rail [D] (🔩 x2)
8. To replace the scanner wire, see page 3-20.



## SCANNER UNIT

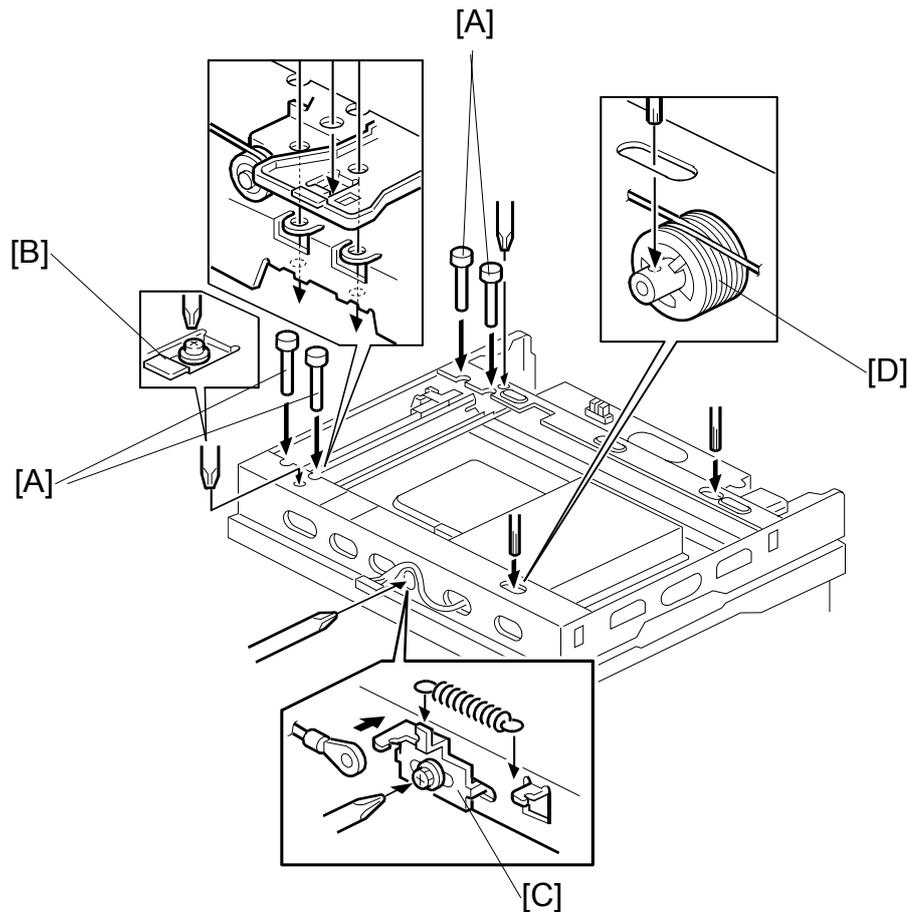


### To replace the scanner wire:

1. Front and rear scanner wire bracket [A] (🔩 x1 ea.)
2. Tension spring [B]
3. Tension bracket [C] (🔩 x1). Loosen and do not remove!
4. Remove wires, front and rear.
5. Attach the new wires.

**NOTE:** Illustration above shows the front wire.

6. Pass the wire through the pulleys as shown in the illustration, and then pass the bead-end of the wire through the slot in the pulley.
7. Turn the pulley until you see the red mark on the wire. 2 turns and 6 turns (see top illustration)
8. Without allowing the wire to loosen, tape the wire to the pulley.
9. Pass the wire through ①.
10. Complete threading the wire: ② → ③ → ④ → Tension spring → Screw
11. Scanner wire bracket ⑤ (🔩 x1)



### Completion:

1. Adjust the 1st scanner [A] position with the scanner positioning tools (P/N A0069104).
2. Secure the 1st scanner with the scanner wire brackets [B] (⚙️ x2)
3. Tighten tension bracket [C] (⚙️ x1)
4. Secure scanner wire pulley [D] (Allen screw x1)
  - 1) Remove the positioning tools. After sliding the scanner to the right and left several times, set the positioning tools to check the scanner wire bracket and tension bracket again.
  - 2) Reassemble the scanner and do the scanner and printer copy adjustments (👉 3.21)

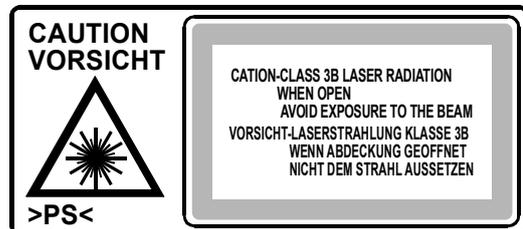
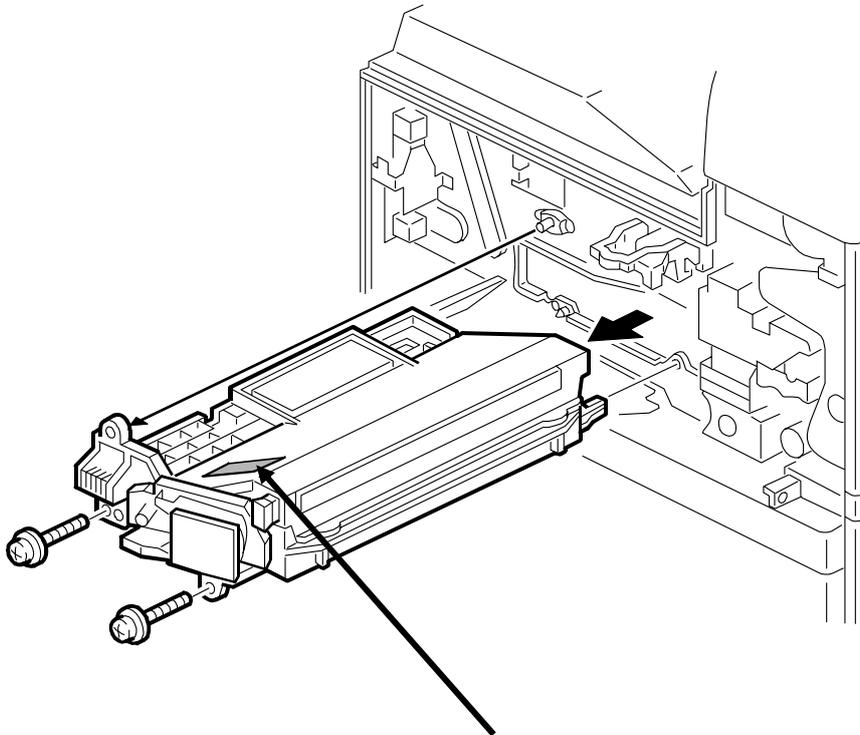
### 3.10 LASER UNIT

**⚠ WARNING**

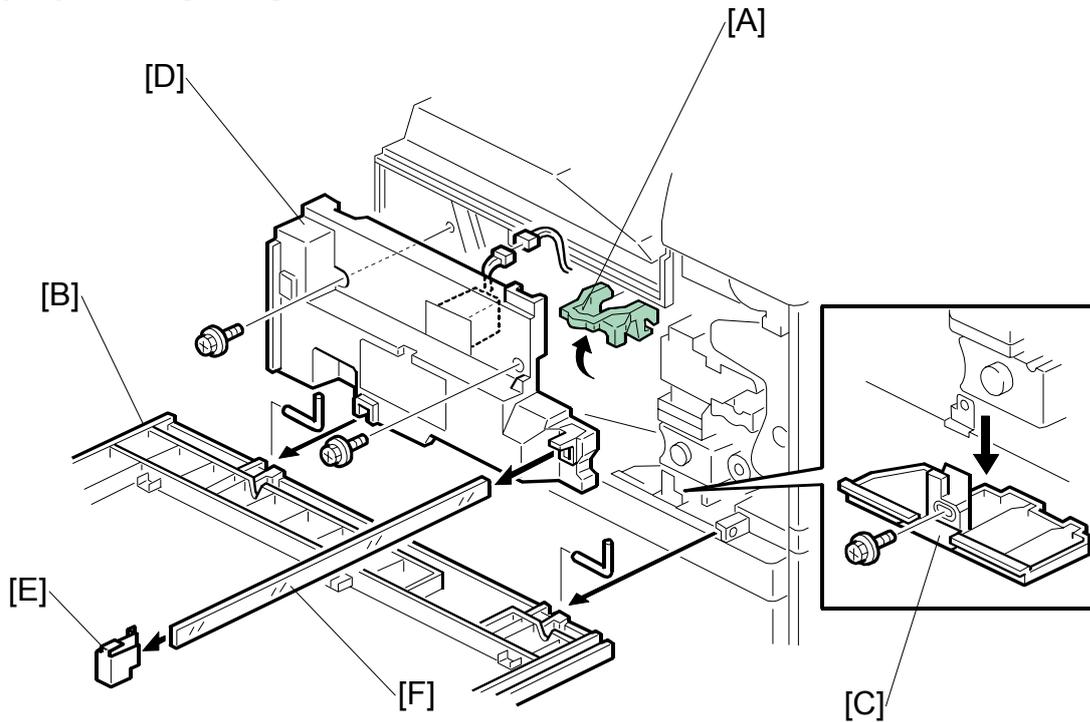
Turn off the main power switch and unplug the machine before attempting any of the procedures in this section. Laser beams can seriously damage your eyes.

#### 3.10.1 CAUTION DECAL LOCATIONS

Two caution decals are located in the laser section as shown below. (See the next page for removal instructions.)



## 3.10.2 LASER UNIT



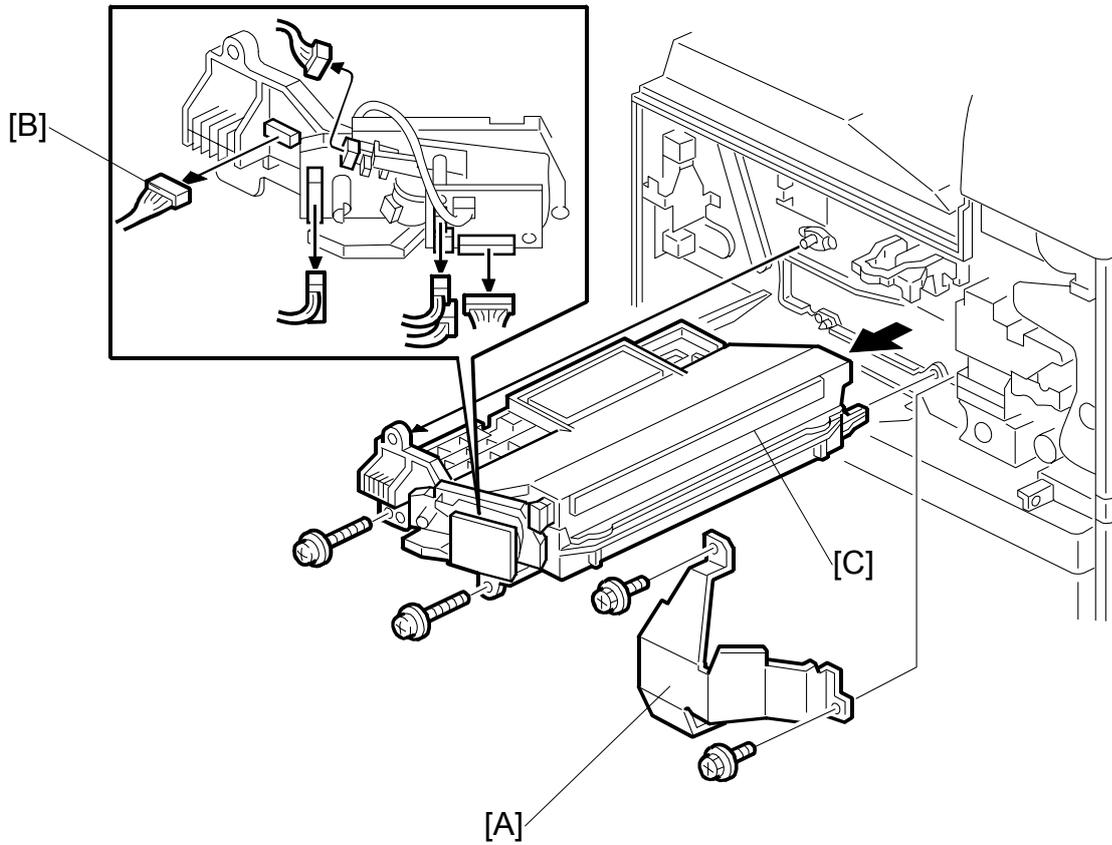
Replacement  
Adjustment

**⚠ WARNING**

**Turn off the main power switch and unplug the machine before attempting this procedure. Laser beams can seriously damage your eyes.**

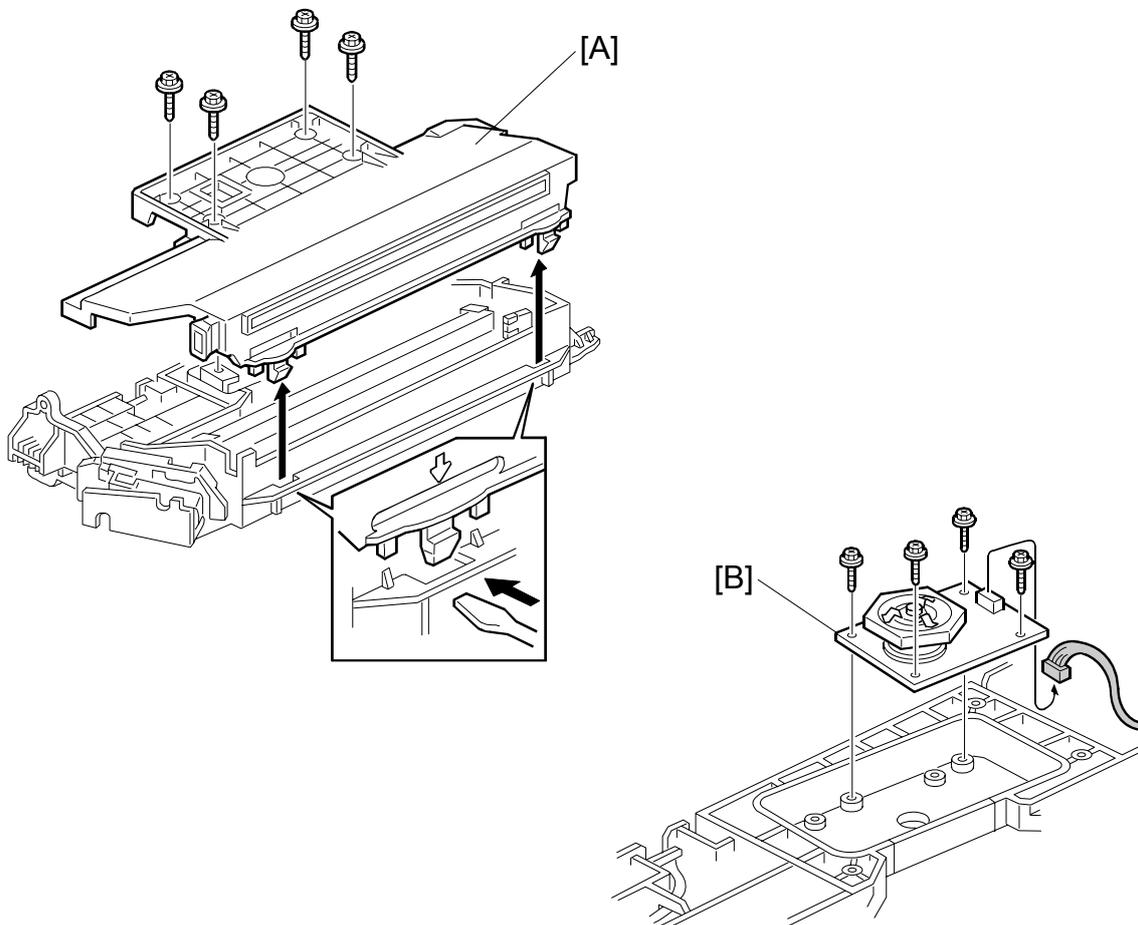
1. Open the front door.
2. Raise the toner bottle holder handle [A].
3. Remove front door [B] (Pins x2)
4. Remove toner collection plate [C] (⚙ x).
5. Remove inner cover [D] (⚙ x 2, 🛠 x 1)
6. While pressing in the top leaf on the left side, remove the shield glass cover [E].
  - The shield glass cover holds the shield glass firmly in place and prevents it from accidental removal.
  - When re-attaching the shield glass cover, the top leaf lies on top of the plastic form.
7. Shield glass [F]

## LASER UNIT



8. Shield plate [A] (🔩 x 2)
9. While holding the LD board securely, disconnect the laser unit connector [B] (🔌 x 6, Flat film cable x1)
10. Hold the laser unit [C] by its casing, slide it out of the machine (🔩 x 2)

### 3.10.3 POLYGON MIRROR MOTOR

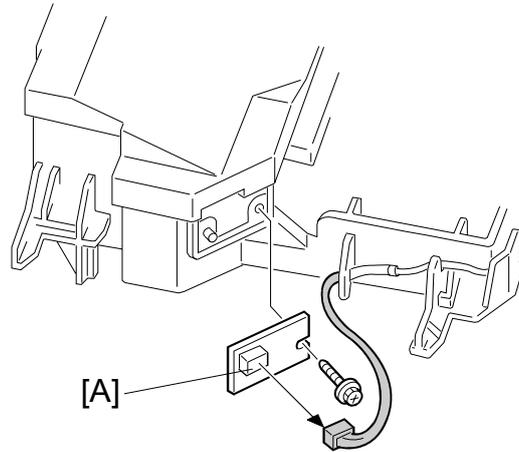


Replacement  
Adjustment

1. Laser unit (☞ 3.10.2)
2. Laser unit cover [A] (🔩 x4, 2 hooks)
3. Polygon mirror motor [B] (🔩 x4, 📡 x1)
4. After replacing the motor, do the image adjustment. (☞3.21)

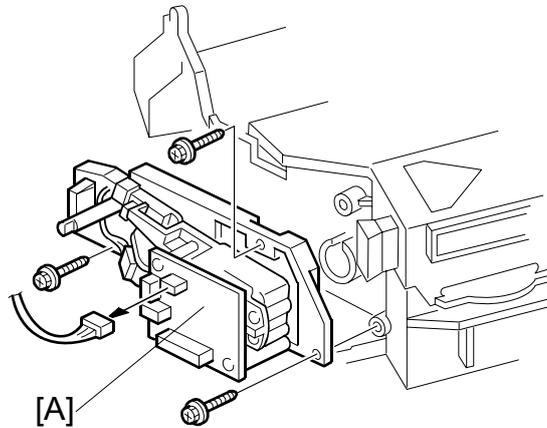
## LASER UNIT

### 3.10.4 LASER SYNCHRONIZATION DETECTOR



1. Laser unit (☛ 3.10.2)
2. Laser synchronization detector [A] (🔩 x1, 📡 x1).

### 3.10.5 LD UNIT



Replacement  
Adjustment

1. Laser unit (☛ 3.10.2)
2. LD unit [A] (🔩 x3, 📏 x1)  
**NOTE:** To avoid damaging the LD board, hold it securely when disconnecting the connectors. Hold the laser unit casing.
3. After replacing the LD board, perform SP 2-109 to adjust the laser beam pitch (described on the next page).

**Laser beam pitch adjustment**

After replacing the LD board, perform the laser beam pitch adjustment. There are two laser beam pitch adjustment procedures: one for 400 dpi, and one for 600 dpi. These adjustments use the following SP modes.

SP2-110	Test Mode Dpi (0: 400 dpi, 8: 600 dpi)
SP2-109-1:	LD Beam Pitch Adjustment – 400 dpi
SP2-109-2:	LD Beam Pitch Adjustment – 600 dpi
SP2-109-3:	LD Initial Setting – 400 dpi
SP2-109-4:	LD Initial Setting – 600 dpi

1. Set SP2-110 to 0 (for 400 dpi), or to 8 (for 600 dpi).
2. Do SP 2-109-8 to reset all the beam pitch data.
3. For SP2-109-1 input 144.

**NOTE:** The entry “144” is only a starting reference value that will allow the machine to operate. It is only a starting point for adjustment.

4. Do SP2-109-3.
5. Print the test pattern onto A3 (11" x 17") paper using SP2-902-3 No. 12.  
(☛ **5.2.4 Test Pattern Printing (SP2-902)**).
6. On the test pattern write 144, the value of SP2-109-1.
7. Change the value of SP2-109-1 and then print another test pattern, repeating steps 2 to 6. Print about 5 patterns with different values for SP2-109-1 (e.g. 48, 96, 192, 240).
8. Check these test patterns. If the laser beam pitch is not correct, the image looks like a black vertical stripe pattern.

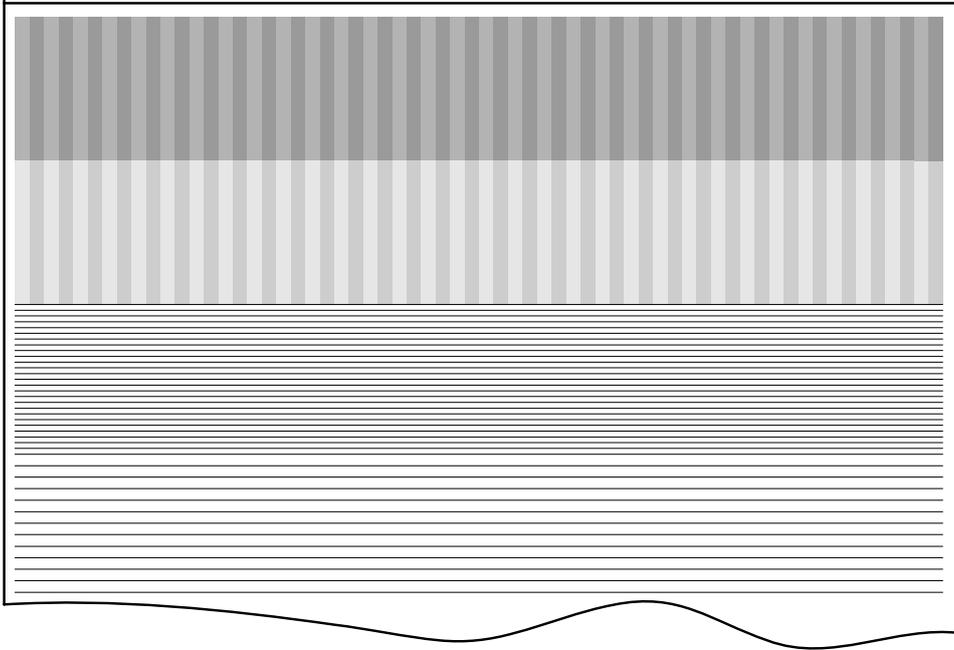
**NOTE:** For example, if the pattern made with the value 192 has fewer obvious stripes than the other printouts, the correct value is near 192.

9. Fine adjustment: Do steps 2 to 6 to adjust the laser beam pitch position until thin lines are of uniform thickness (no stripes should appear on the printout).

**NOTE:** In step 3, input a value estimated to be correct (e.g., if 192 was the closest, try 182), then do steps 4 and 5, then if necessary go back to step 2 and try another value.

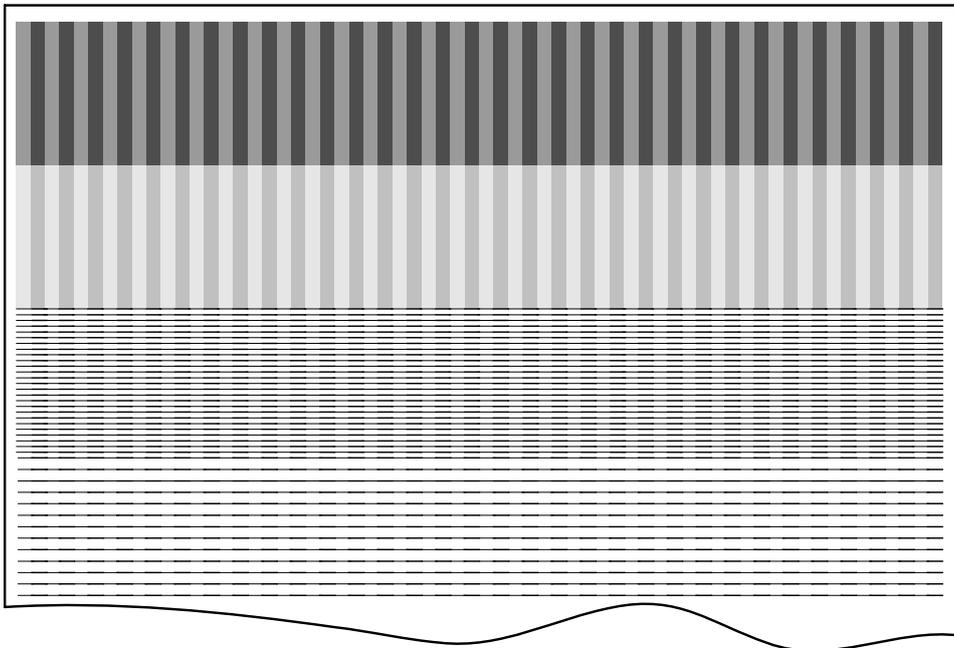
10. After adjusting the laser beam pitch for 400 dpi, adjust it for 600 dpi, using the same procedure as for 400 dpi (use the SP modes for 600 dpi). Laser beam pitch for 600 dpi should be 24~48 more than for 400 dpi.

**OK: Adjustment Complete**



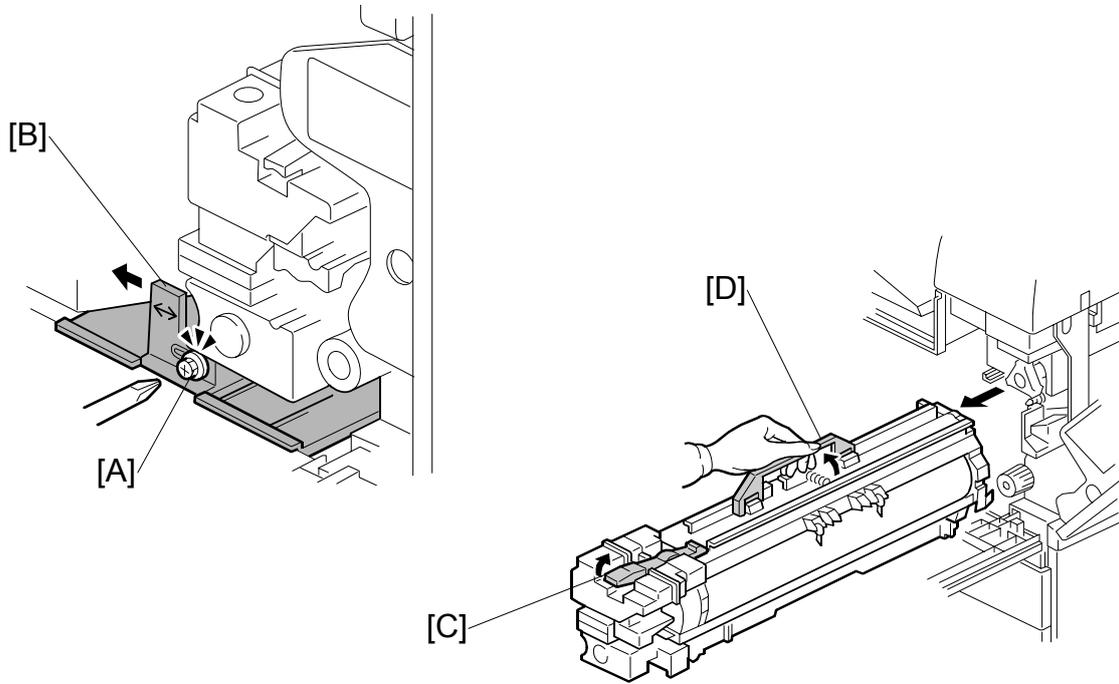
Replacement  
Adjustment

**NG: Adjustment Not Complete**



## 3.11 PHOTOCONDUCTOR UNIT (PCU)

### 3.11.1 PCU

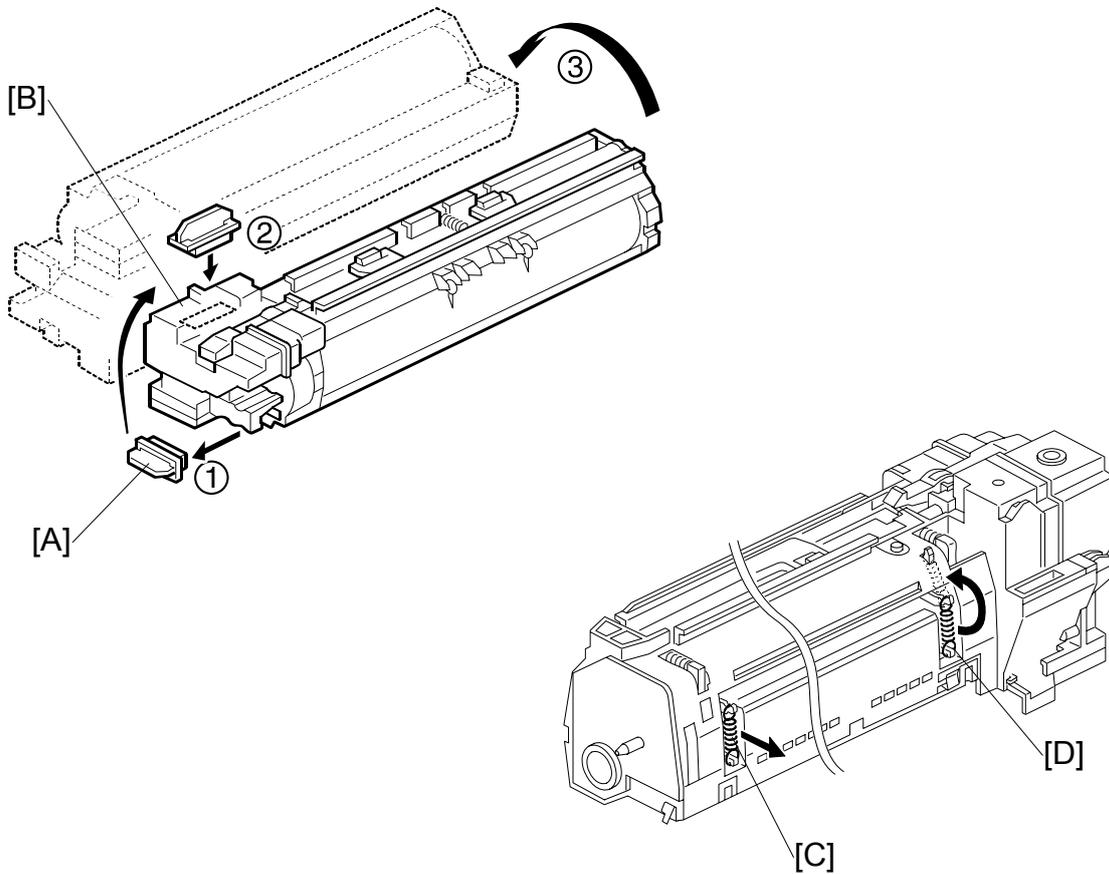


1. Open the front door.
2. Lower the by-pass tray, open the duplex unit, and open the transfer unit right cover.
3. Spread a sheet of A4/ LTR paper on top of the open front door to catch loose toner.
4. Loosen [A] (⌀ x 1).
5. Push [B] slightly to the left.
6. Raise the release lever [C].
7. Hold the PCU at [D] and pull it out of the machine.
8. Cover the OPC with a sheet of paper to protect it from light.

#### Reinstallation

- Open the right cover before you install the PCU in the machine.
- Make sure that the PCU brackets are engaged with the rails before you slowly push the PCU into the machine.

### 3.11.2 DRUM

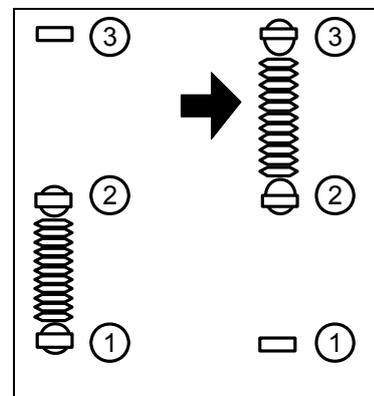


Replacement  
Adjustment

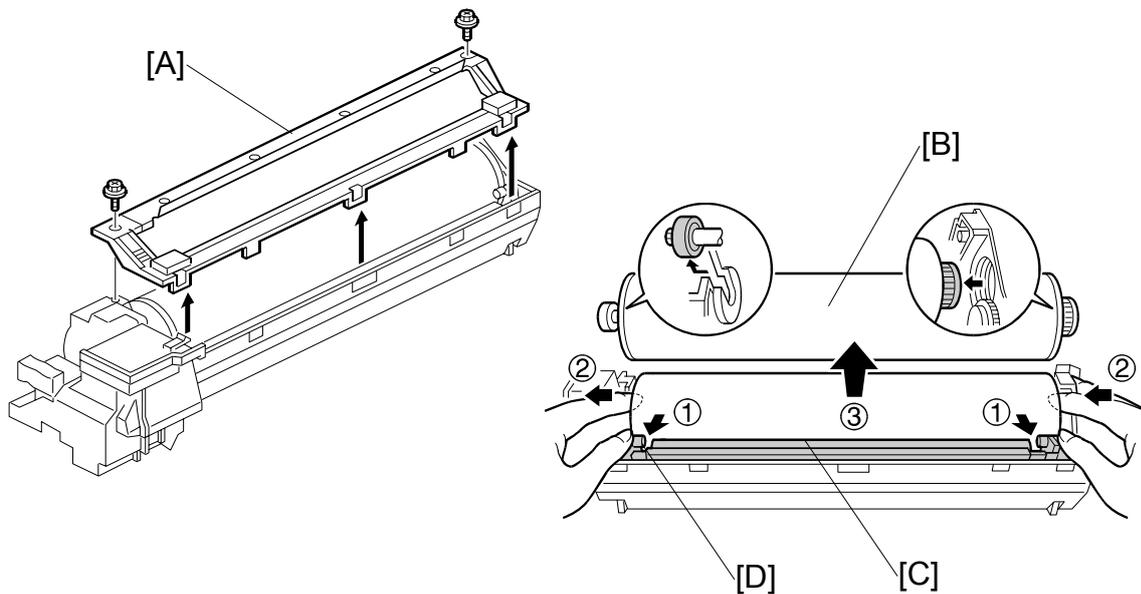
1. Remove the PCU (☛3.11.1)
2. Toner cap [A]
3. Insert cap [A] into the toner entrance hole [B].

**NOTE:** Make sure that the cap is inserted completely into the hole.

4. On the left side of the PCU, disconnect the spring [C].
  - To prevent breaking the weaker hook ①, use a pair of needle-nose pliers to disconnect the spring at ②, then re-attach to ② and ③.
  - Moving this spring retracts the movable drum cleaning blade so it does not touch the surface of the drum when the drum is re-installed.



## PHOTOCONDUCTOR UNIT (PCU)



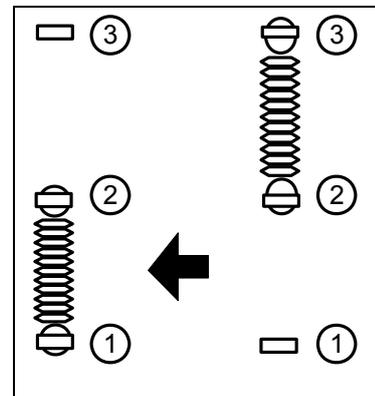
6. Turn the PCU upside-down, and remove lower PCU cover [A] (⚙ x 2, 3 pawls).
7. Pull the drum [B] towards the front ② (the left side in the illustration) while releasing the charge roller [C] using the release lever ① [D], and then remove the drum ③.

**CAUTION:** Never touch the drum surface with bare hands.

8. Replace the drum and re-attach the lower PCU cover.
9. Detach the spring from ②, ③ and re-attach to ①, ②.

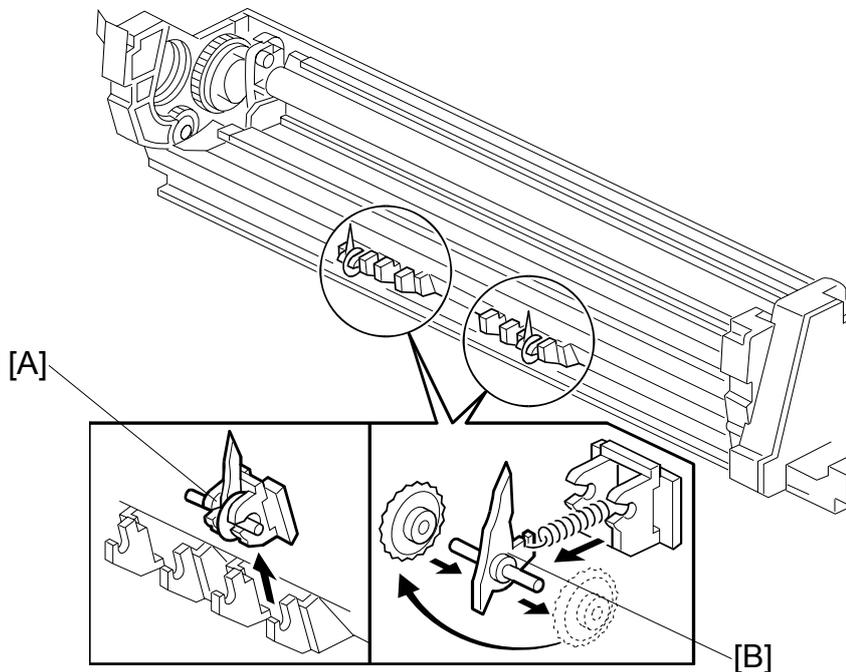
**CAUTION:** You must return re-attach the spring to ①, ② in order for the cleaning blade to operate correctly.

If you fail to re-attach the spring to ①, ② the movable cleaning blade will not contact the drum for cleaning, but the machine will operate without generating an error. However, copies will gradually become dirty due to toner collecting on the drum.



10. Re-attach the spring on the left side of the PCU.
11. After replacing the drum, perform the ID sensor initial setting using SP3001 002.

### 3.11.3 PICK-OFF PAWLS



1. Remove the drum. (☛ 3.11.2)
2. Pawl assembly [A]
3. Pick-off pawl [B] (spring x 1, spur x 1)

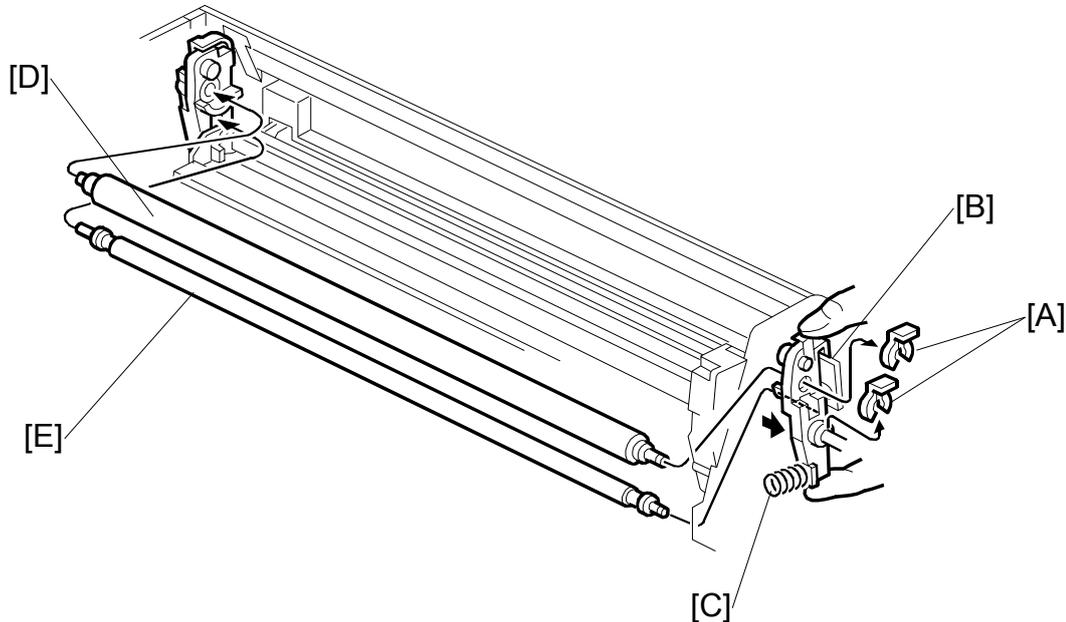
#### ***Pick-off pawl position adjustment***

If the pick-off pawl has marked the drum with a line, the pick-off pawl position can be adjusted using either method:

- Changing the spur position.
- Changing the pick-off pawl assembly position

**CAUTION:** After re-assembly make sure that the front spring of the movable cleaning blade is re-attached to the ①, ② position. (☛ 3.11.2)

### 3.11.4 CHARGE ROLLER AND CLEANING ROLLER



1. Remove the drum. (☛ 3.11.2)
2. Two snap rings [A] (🔗 x 2).
3. Push charge roller holder [B] toward the front of the PCU and remove the spring [C].
4. Charge roller [D].

**NOTE:** Disengage the charge roller on the right side to remove. Try to avoid touching the charge roller.

5. Cleaning roller [E].

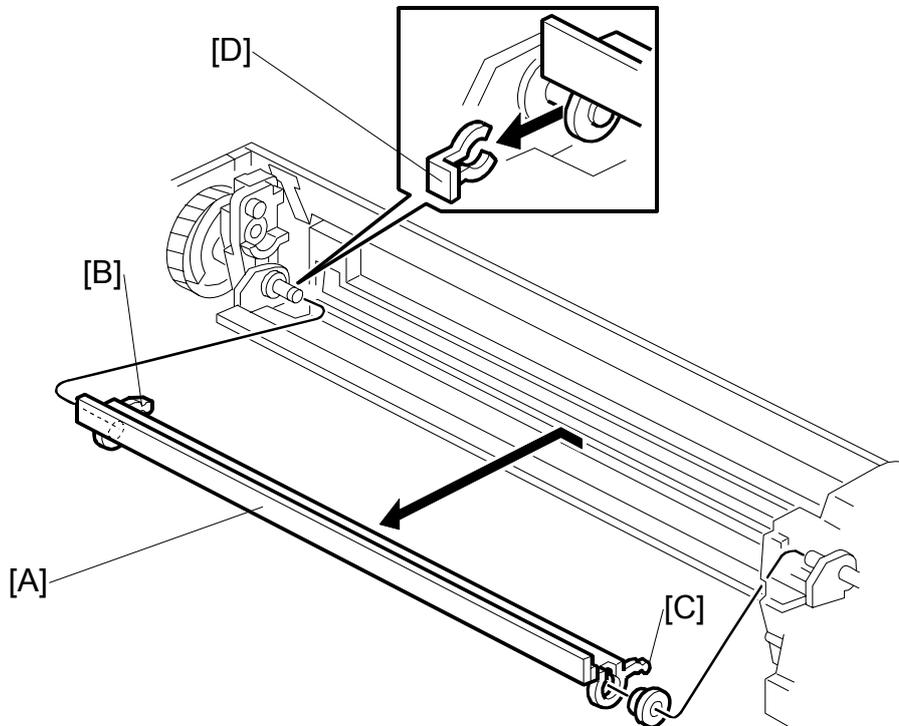
**NOTE:** Disengage the cleaning roller on the left to remove.

6. After replacing the charge roller and cleaning roller, check the value of SP2001 001. If it is not at the standard value (1500 V), set SP2001 001 to -1500 V.

**NOTE:** If this is not done, the carrier will be attracted to the drum because the charge roller voltage will be too high.

**CAUTION:** After re-assembly make sure that the front spring of the movable cleaning blade is re-attached to the ①, ② position. (☛3.11.2)

### 3.11.5 DRUM CLEANING BLADE 2



Replacement  
Adjustment

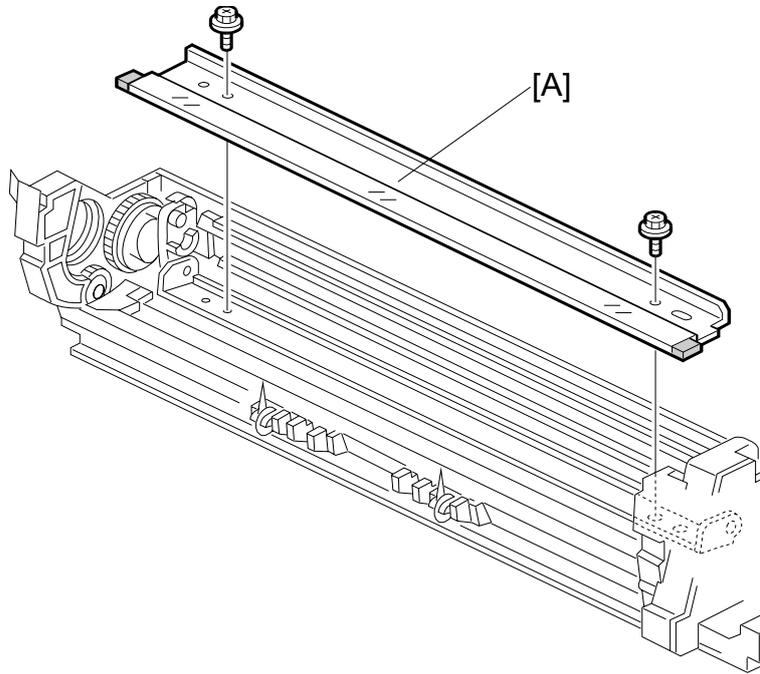
1. Remove the OPC drum. (☛ 3.11.2)
2. Remove the charge roller and cleaning roller. (☛ 3.11.4)
3. Remove the movable cleaning blade [A]. (☞ x 1)

#### Re-installation

- Engage the left end of the cleaning blade first, then make sure that both arms [B] and [C] are through the holes on the left and right side.
- When you re-attach the snap-ring, make sure that the head of the snap-ring [D] is below the blade.

**CAUTION:** After re-assembly make sure that the front spring of the movable cleaning blade is re-attached to the ①, ② position. (☛ 3.11.2)

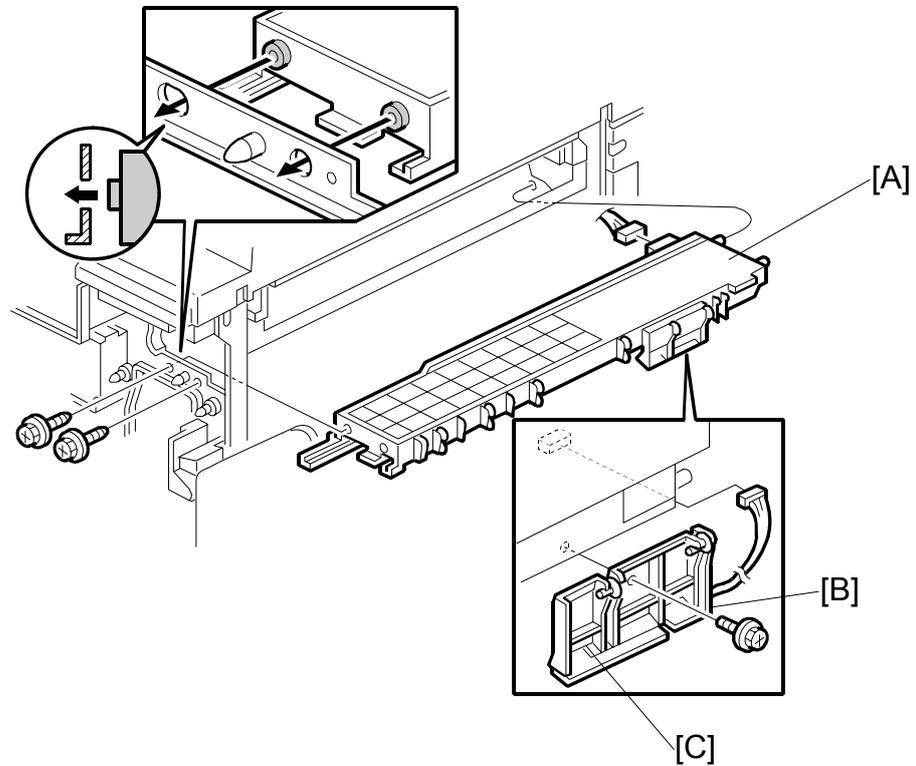
### 3.11.6 DRUM CLEANING BLADE 1



1. Remove the drum. (☛ 3.11.2)
2. Remove the charge roller and cleaning roller. (☛ 3.11.4)
3. Remove the movable cleaning blade. (☛ 3.11.5)
4. Remove the stationary drum cleaning blade [A] (🔩 x 2)

**CAUTION:** After re-assembly make sure that the front spring of the movable cleaning blade is re-attached to the ①, ② position. (☛ 3.11.2)

## 3.11.7 ID SENSOR



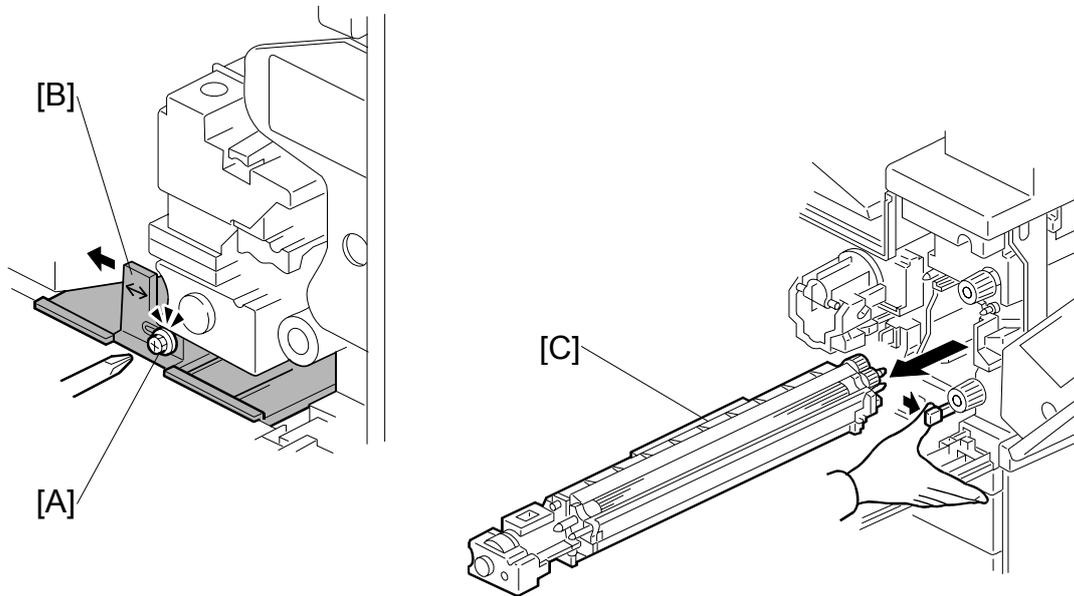
Replacement  
Adjustment

## Remove:

- Remove the PCU (☛ 3.11.1)
  - Fusing unit (☛ 3.15)
  - Development unit (☛ 3.12.1)
1. Remove the PCU rail [A] (⚙️ x2, 🛠️ x1)
  2. Remove the ID sensor bracket [B] (⚙️ x1, 🛠️ x1)
  3. Remove the ID sensor [C] (⚙️ x1)
  4. Do SP3-001-2 to initialize the ID sensor.

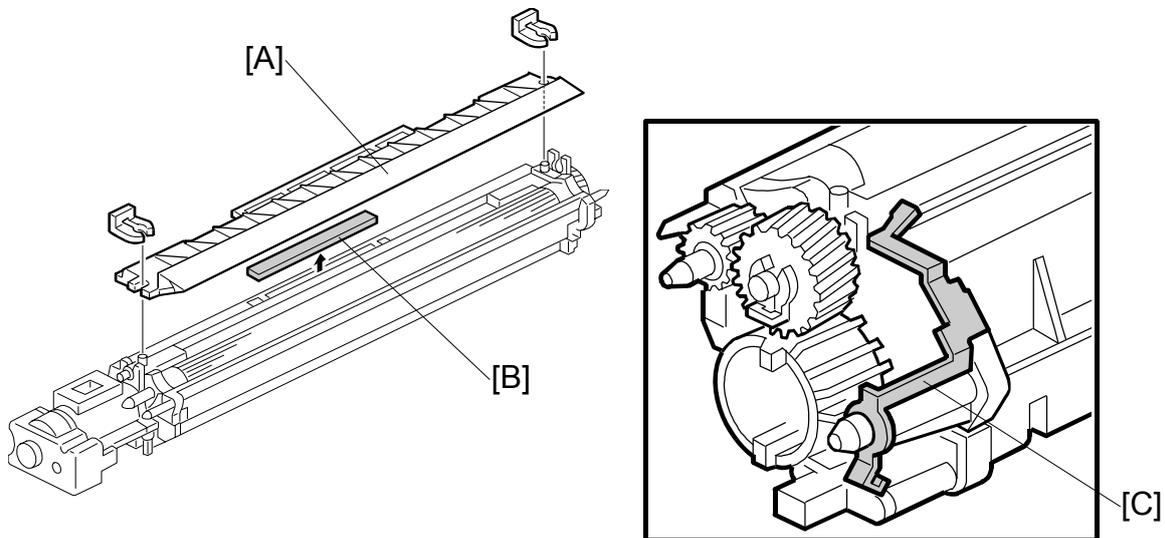
## 3.12 DEVELOPMENT

### 3.12.1 DEVELOPMENT UNIT



- Open the right upper cover and front cover.
  - PCU. (☛ 3.11.1)
1. Spread paper on a clean flat surface that is free of pins, paper clips, staples, screws or any other metal objects.
  2. Loosen [A] (☛ x 1).
  3. Push [B] slightly to the left.
  4. Development unit [C]  
**NOTE:** Pull slowly to avoid scratching or nicking the development roller.
  5. Set the development unit on the spread paper.
  6. If you are temporarily installing a used development unit for test purposes, perform SP2-802-1 after installation. For more, see Section "5. Service Tables".

### 3.12.2 DEVELOPMENT FILTER



Replacement  
Adjustment

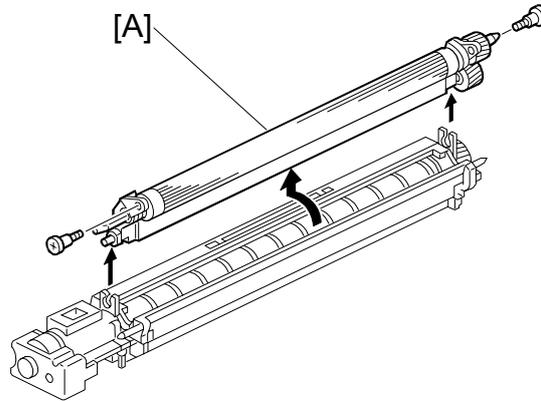
1. Development unit (☛ 3.12.1)
2. Upper development cover [A] (☞ x2)
3. Development filter [B]

**NOTE:** Make sure that the surface with the red mark is facing up.

4. Make sure that the ground plate [C] is positioned correctly.

## DEVELOPMENT

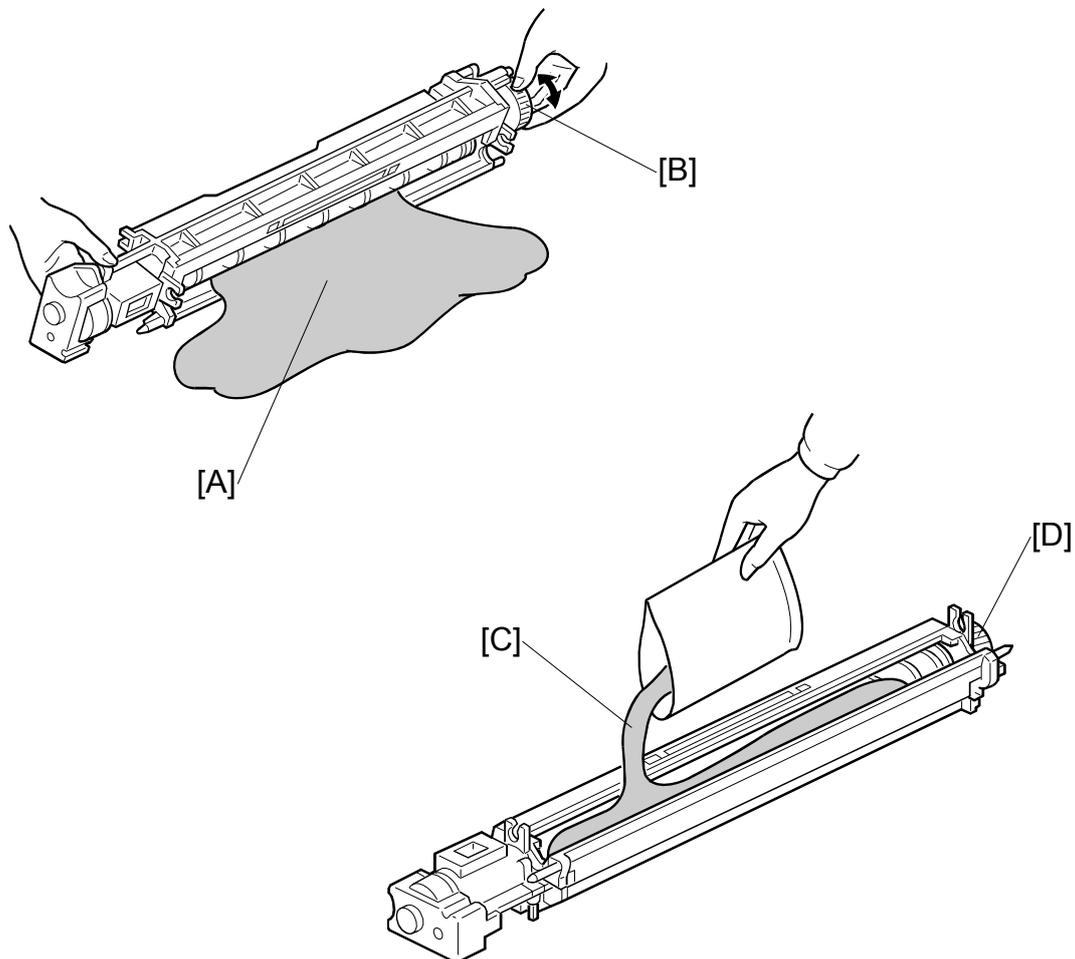
### 3.12.3 DEVELOPMENT ROLLER



1. Development unit (☛ 3.12.1)
2. Upper development cover (☛ 3.12.2)
3. Development roller [A] (🔩 x2)

**NOTE:** Work carefully to avoid scratching or nicking the development roller.

### 3.12.4 DEVELOPER



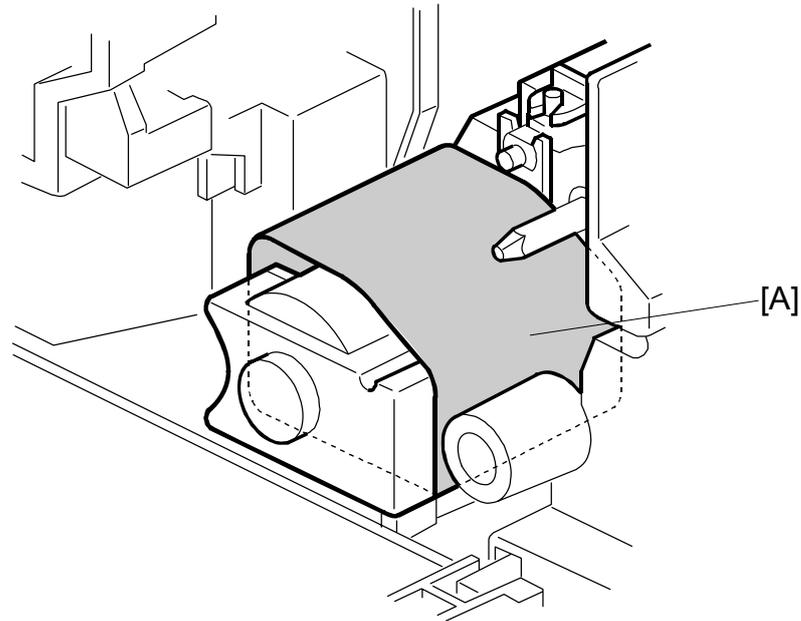
Replacement  
Adjustment

1. Development unit (☛ 3.12.1)
2. Remove the development roller (☛ 3.12.3)
3. Tip out the old developer [A].
4. Turn drive gear [B] to ensure that no developer remains in the unit or on the developer roller.

**NOTE:** Dispose of the used developer in accordance with local regulations.  
Work carefully to avoid scratching or nicking the development roller.

5. Pour approximately 1/3 of the developer [C] evenly along the length of the development unit.
6. Rotate the drive gear [D] to work the developer into the unit. Repeat [C] and [D] until all toner is in the unit and level with the edges.

## DEVELOPMENT

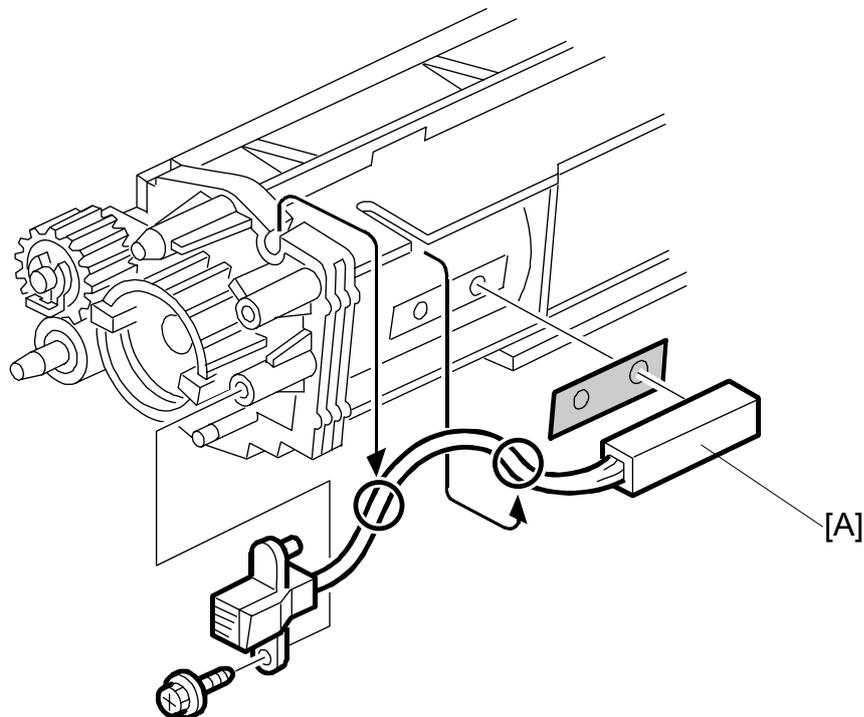


7. Reassemble the development unit
8. Cover the toner entrance hole [A] with a piece of paper.
9. Install the development unit in the machine.
10. Turn on the main power switch, and wait for the machine to warm-up.
11. Do SP2801 to initialize the TD sensor and enter the developer lot number.

**NOTE:** When performing this setting, cover the toner entrance hole with a piece of paper. This prevents used toner falling from the PCU into the development unit during the TD sensor initial setting and interfering with the Vref setting (toner density reference voltage).

12. After performing the TD sensor initial setting, remove the sheet [A] from the development unit.

### 3.12.5 TD SENSOR



Replacement  
Adjustment

1. Remove the development unit. (☛3.12.1)
2. Empty all developer from the development unit
3. TD sensor [A] (🔧 x1)

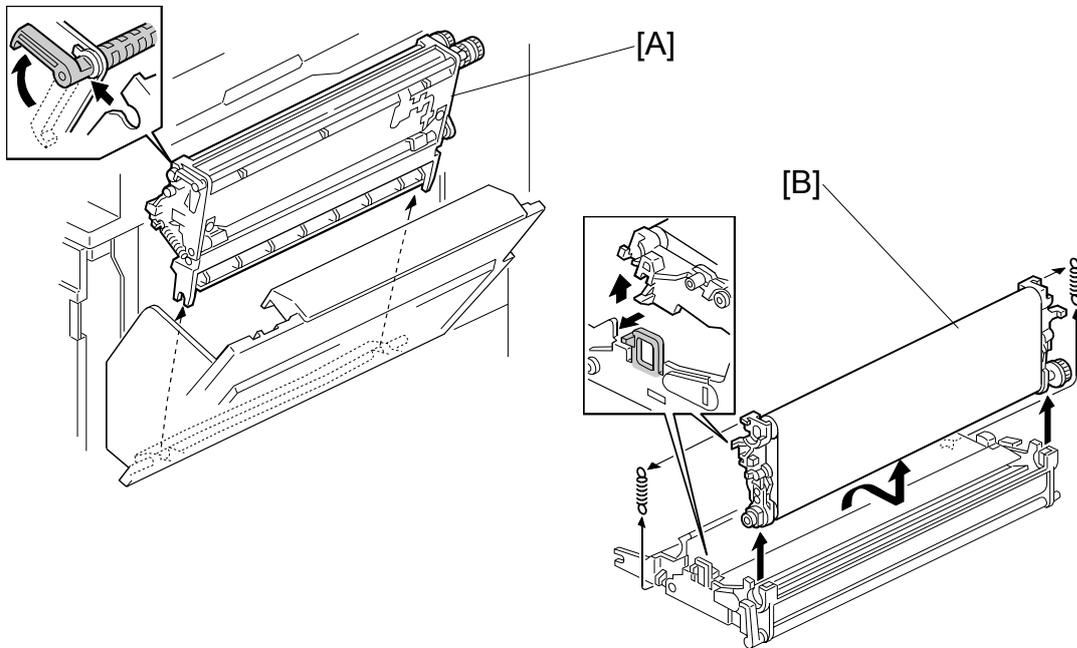
**NOTE:** The TD sensor is attached to the casing with double-sided tape. Pry it off with the flat head of a screwdriver. Use fresh double-sided tape to re-attach the sensor.

4. Pour new developer into the development unit and perform the TD sensor initial setting using SP2-801.

**NOTE:** When performing the TD sensor initial setting, cover the toner entrance hole with a piece of paper.

### 3.13 TRANSFER UNIT

#### 3.13.1 TRANSFER BELT UNIT

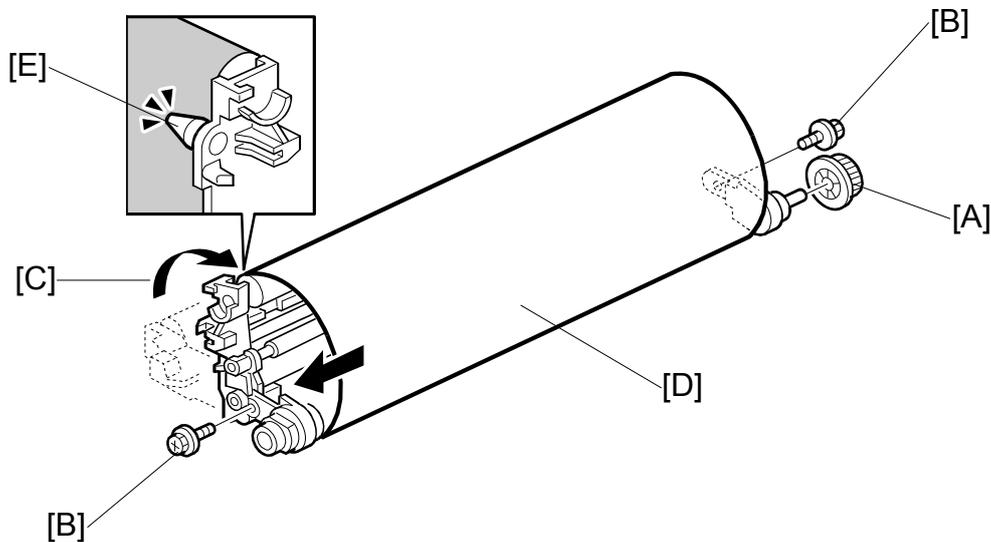


**NOTE:** To avoid exposing the PCU drum to strong light, cover it with paper if the right cover will be open for a long period.

1. Lower the by-pass tray, open the duplex unit, and open the right cover.
2. Transfer unit [A] (Hook x1)
3. Transfer belt [B] (springs x2, Hook x1)

**NOTE:** Avoid touching the transfer belt surface.

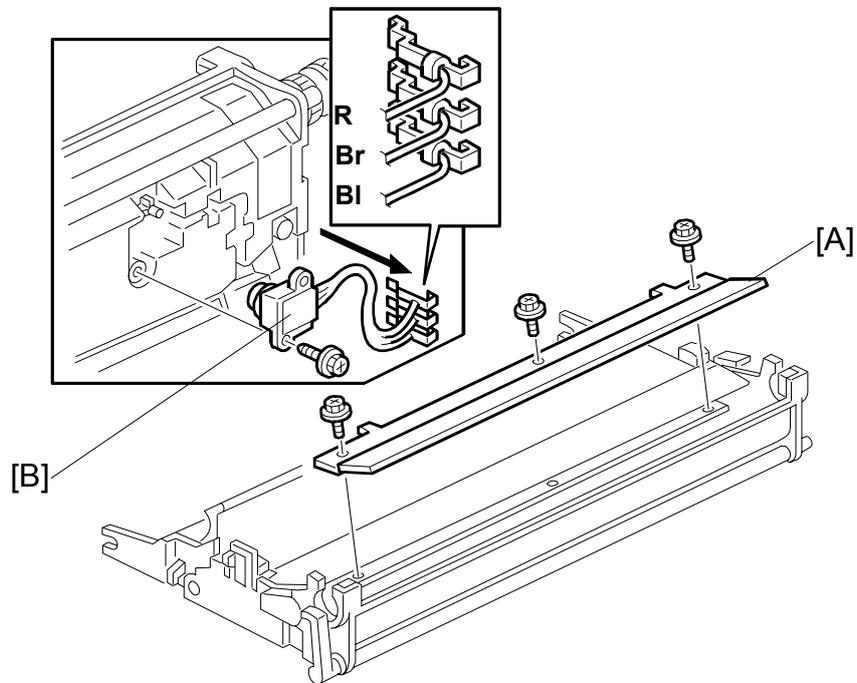
## 3.13.2 TRANSFER BELT



1. Remove the transfer belt unit. (☛ 3.13.1)
2. Belt drive gear [A]
3. Set screws [B] (⚙ x2)
4. Lay on a flat, clean surface and fold the unit to release the tension on the belt [C].
5. Transfer belt [D]

- NOTE:**
- 1) Avoid touching the transfer belt surface.
  - 2) Before installing the new transfer belt, clean all the rollers and shafts with alcohol to prevent the belt from slipping.
  - 3) When reinstalling the transfer belt, make sure that the belt is under the pin [E].
  - 4) To avoid damaging the transfer belt during installation, manually turn the rollers, and make sure that the new transfer belt is not running over the edges of any of the rollers.

### 3.13.3 TRANSFER BELT CLEANING BLADE AND TONER OVERFLOW SENSOR



#### Transfer Belt Cleaning Blade

1. Transfer belt unit. (☛ 3.13.1)
2. Transfer belt. (☛ 3.13.2)
3. Transfer belt cleaning blade [A] (🔩 x3)

**NOTE:** Avoid touching the edge of the new blade. Check the new blade for dust or damage.

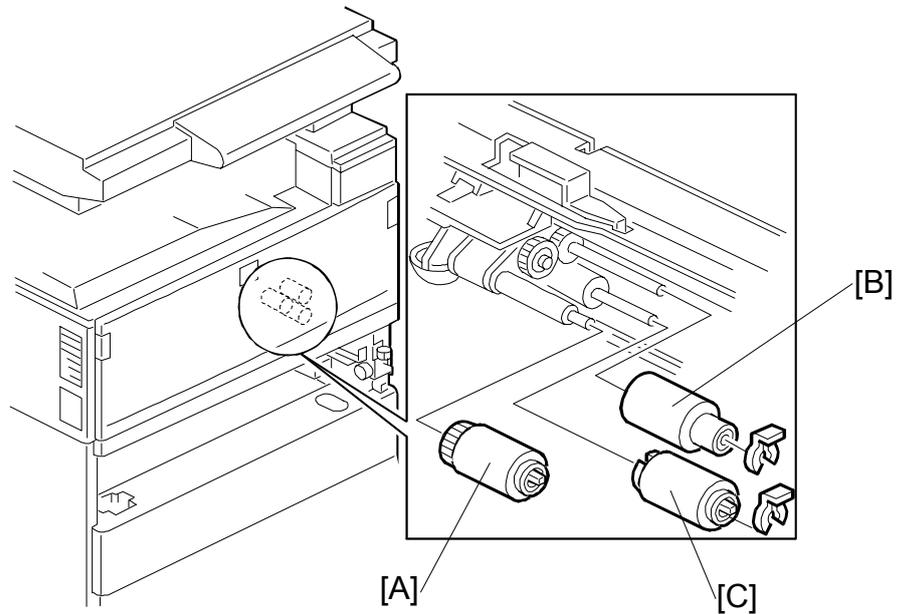
#### Toner Overflow Sensor

1. Transfer belt unit. (☛ 3.13.1)
2. Transfer belt. (☛ 3.13.2)
3. Transfer belt cleaning blade [A] (🔩 x3)
4. Turn over the transfer unit and empty the used toner in the transfer unit.
5. Toner overflow sensor [B] (🔩 x1, 📎 x3)

**NOTE:** Re-install the color-coded wires in the correct order.  
R: Red, Br: Brown, Bl: Blue

## 3.14 PAPER FEED

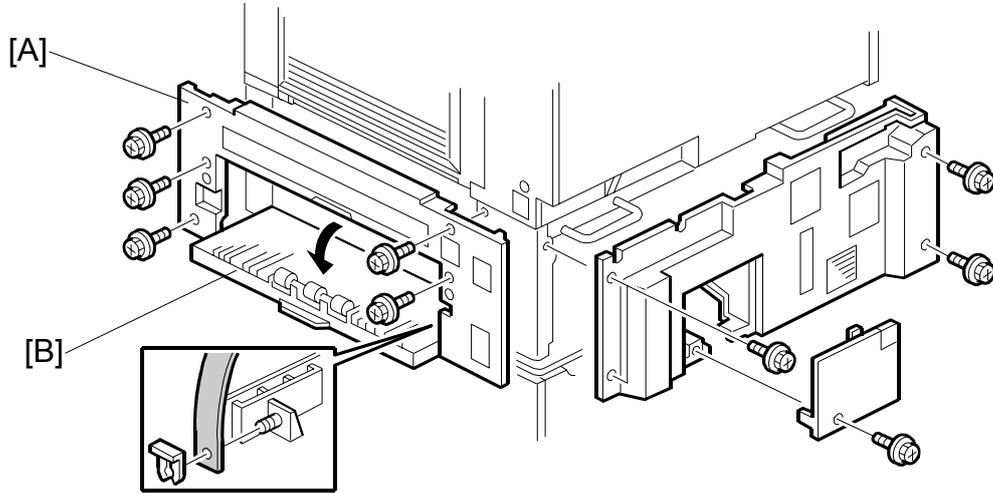
### 3.14.1 PICK-UP, SEPARATION, AND FEED ROLLERS



Replacement  
Adjustment

1. Paper tray
2. Pick-up roller [A]
3. Feed roller [B] (⌀ x 1)
4. Separation roller [C] (⌀ x 1)

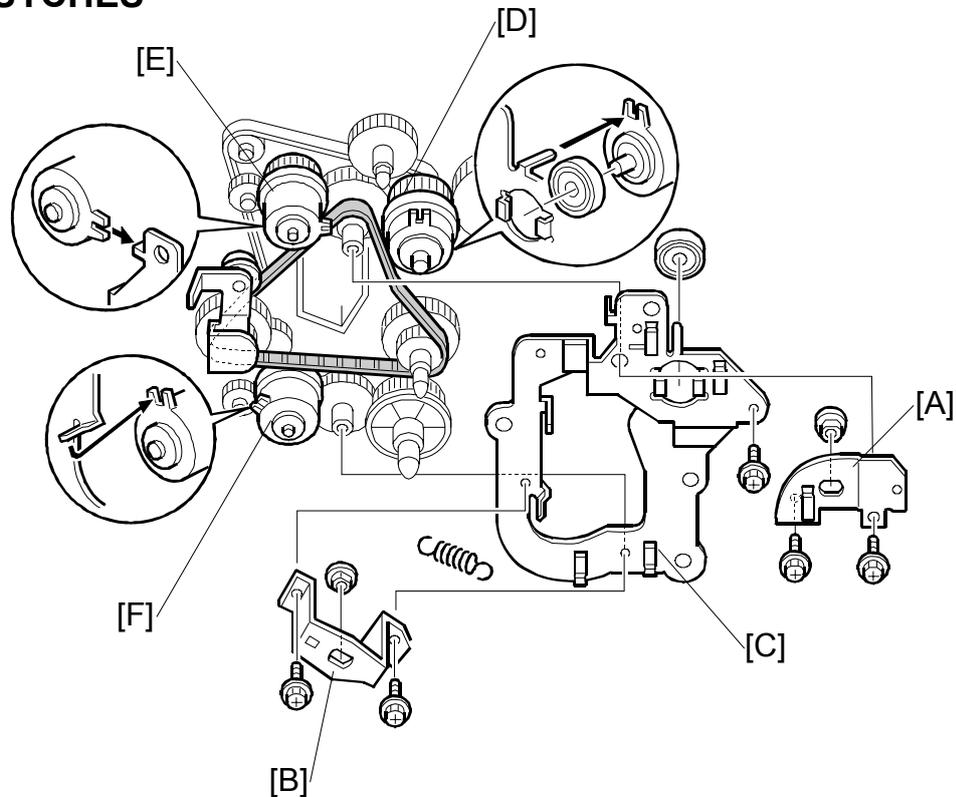
### 3.14.2 LOWER RIGHT COVER



1. Duplex unit (☛ 3.4)
2. By-pass tray (☛ 3.6)
3. LCT (if installed)
4. Lower right cover [A] (🔩 x5)
5. Vertical transport cover [B]

**NOTE:** Push the cover completely to the left and then press in on the right tab to release the peg from the hole.

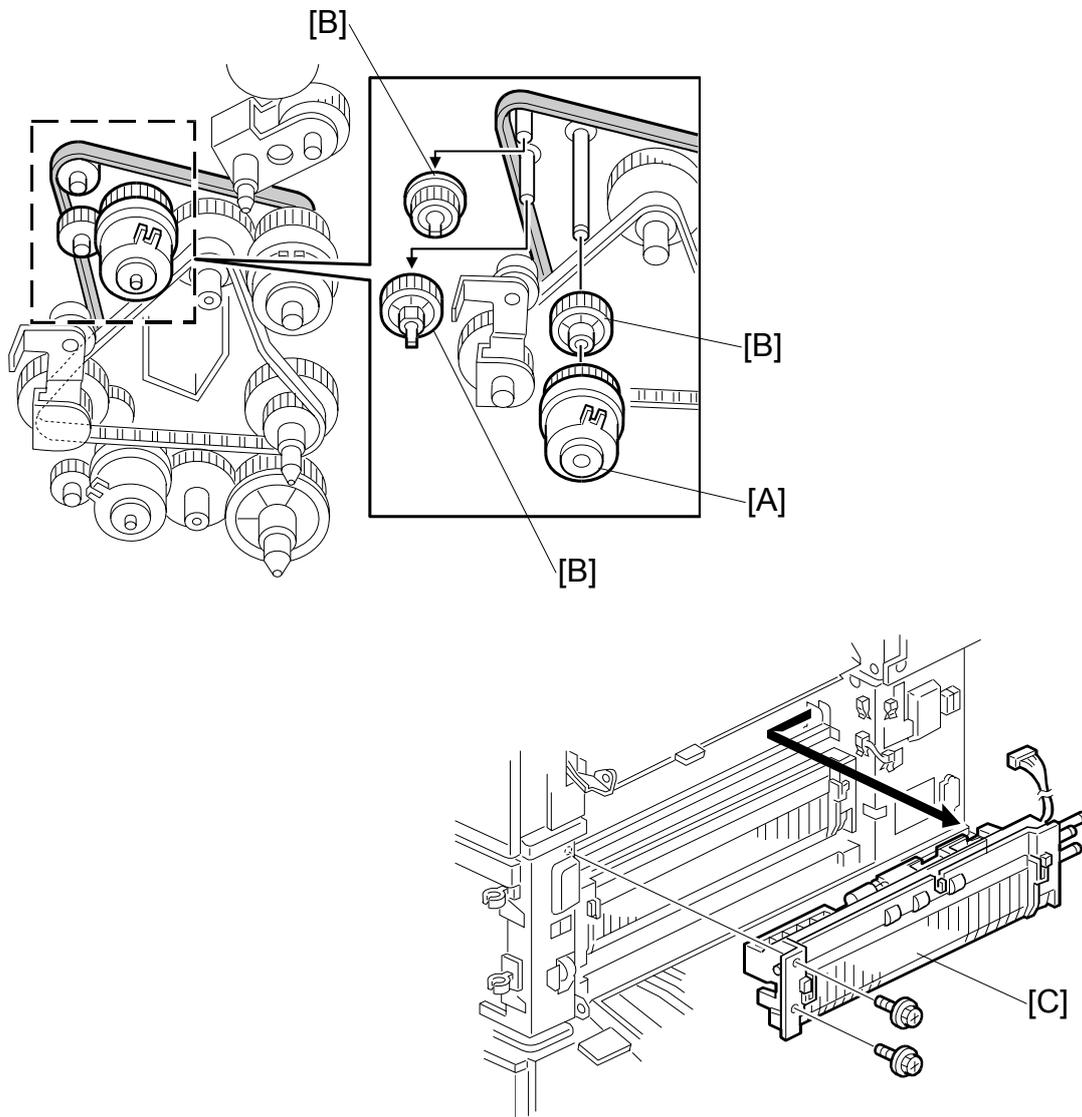
### 3.14.3 RELAY/UPPER PAPER FEED AND LOWER PAPER FEED CLUTCHES



Replacement  
Adjustment

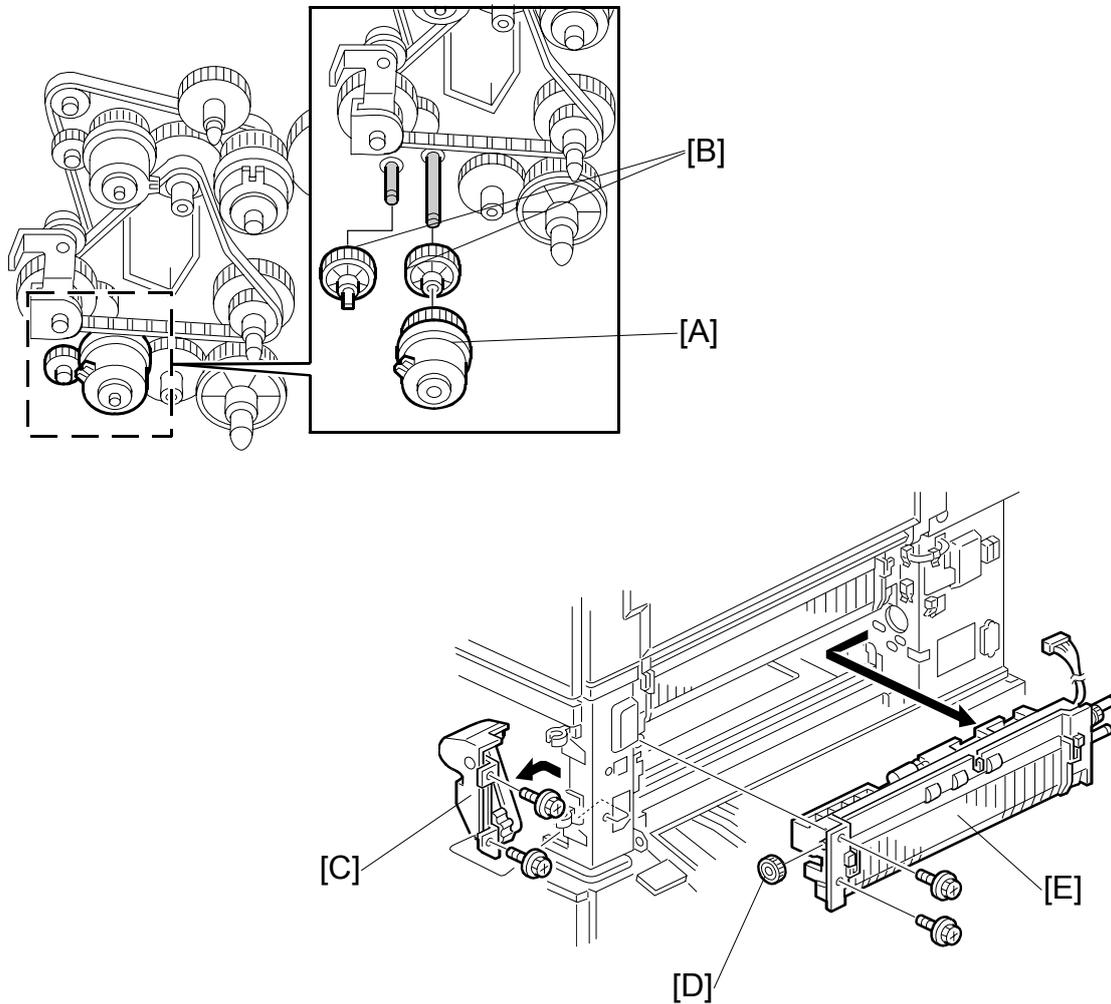
1. Rear lower cover (☛ 3.7.2)
2. Remove the IOB. (☛ 3.19.3)
3. First paper feed clutch bracket [A] (⚙ x2, bushing x1)
4. Second paper feed clutch bracket [B] (⚙ x2, bushing x1)
5. Drive bracket [C] (⚙ x1, spring x1, bearing x1)
6. Relay clutch [D] (⚙ x1)
7. Upper paper feed clutch [E] (⚙ x1)
8. Lower paper feed clutch [F] (⚙ x1)

### 3.14.4 UPPER PAPER FEED UNIT FOR TRAY 1



1. Upper paper tray
2. Right lower cover. (☛3.14.2)
3. Right upper cover (☛ 3.5)
4. Upper paper feed clutch [A] (☛3.14.3 )
5. 3 relay gears [B]
6. Upper paper feed unit [C] (🔩 x2, 📦 x1)

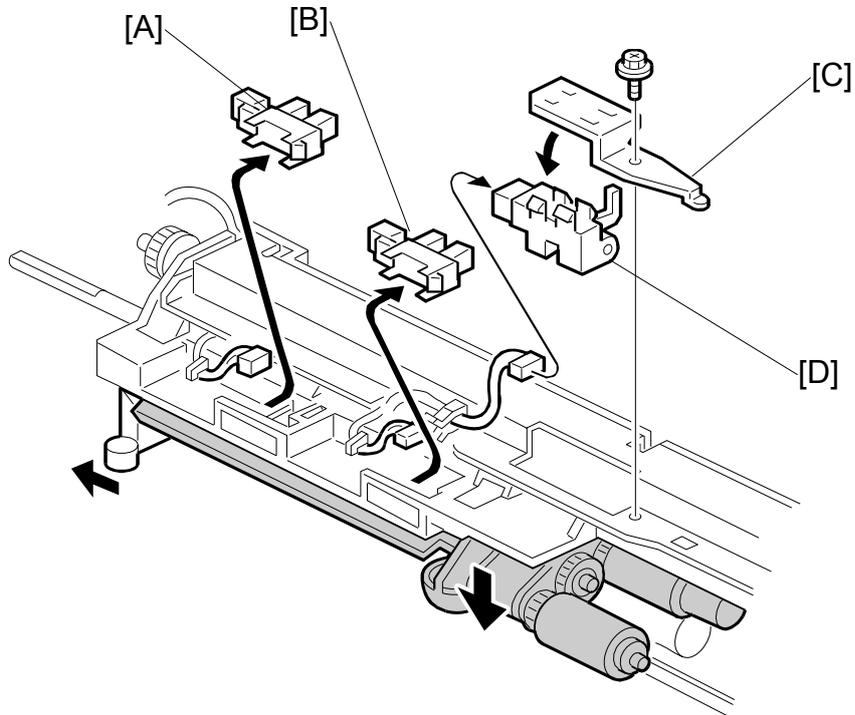
### 3.14.5 LOWER PAPER FEED UNIT FOR TRAY 2



Replacement  
Adjustment

1. Lower the paper trays
2. Right lower cover (☛3.14.2)
3. Remove the lower paper feed clutch [A] (☛3.14.3)
4. Relay gears [B] (x2)
5. Cover [C] (🔩 x2)
6. Gear [D] (x1)
7. Lower paper feed unit [E] (🔩 x2, 📦 x1)

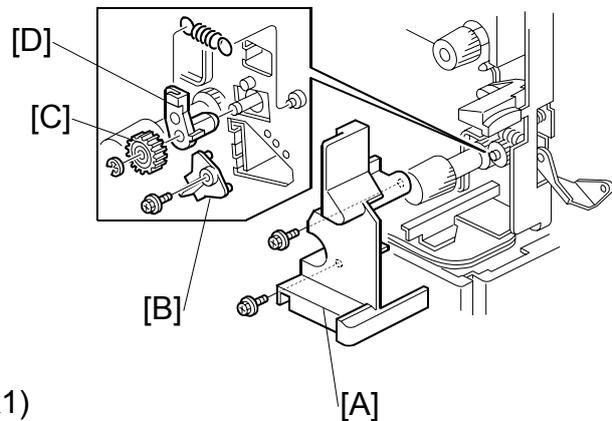
### 3.14.6 PAPER END/PAPER HEIGHT/RELAY SENSORS



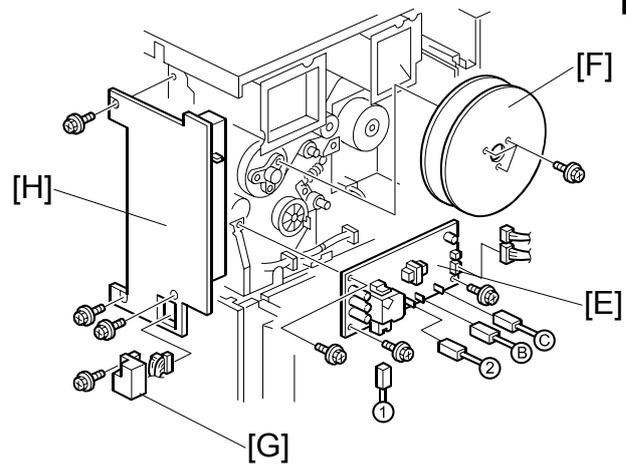
1. Remove the appropriate paper feed unit. (●3.14.4, 3.14.5)
2. Paper height sensor [A] (☞ x1)
3. Paper end sensor [B] (☞ x1).
4. Relay sensor bracket [C] (☞ x1, ☞ x1)
5. Relay sensor [D] (☞ x1)

### 3.14.7 REGISTRATION SENSOR

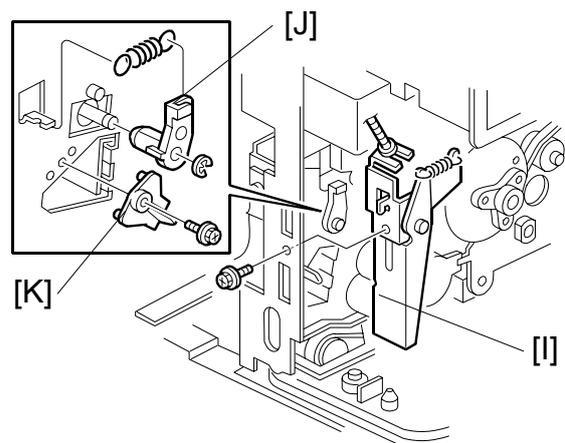
1. Remove
  - Front door (☞ 3.3)
  - Rear upper cover (☞ 3.7.1)
  - Right upper cover (☞ 3.5)
  - Transfer belt unit (☞ 3.13.1)
  - PCU (☞ 3.11.1)
2. Development unit (☞ 3.12.1)
3. Inner cover [A] (🔩 x2)
4. Front registration holder [B] (🔩 x1)
5. Front registration roller gear [C] (⊕ x1)
6. Registration roller bushing [D] (spring x 1)



7. High voltage power supply board [E] (🔩 x3, 📡 x6)
8. Flywheel [F] (🔩 x3)
9. Cover [G] (🔩 x1, 📡 x2)
10. Right rear cover [H] (🔩 x3)

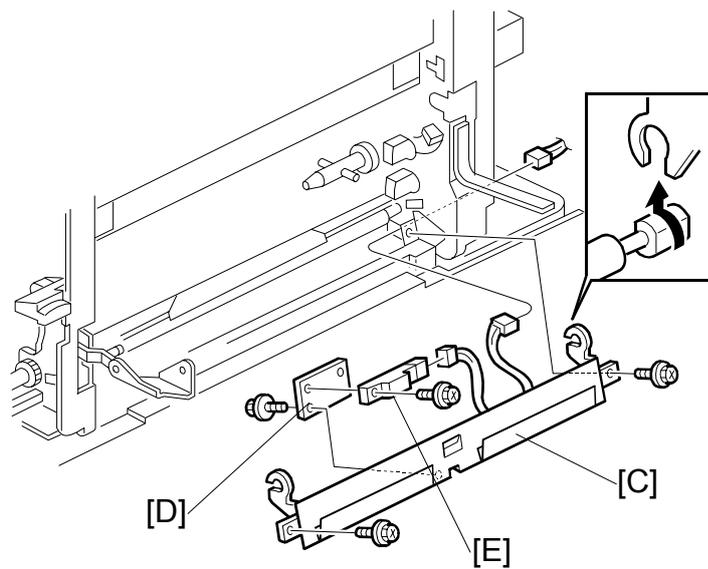
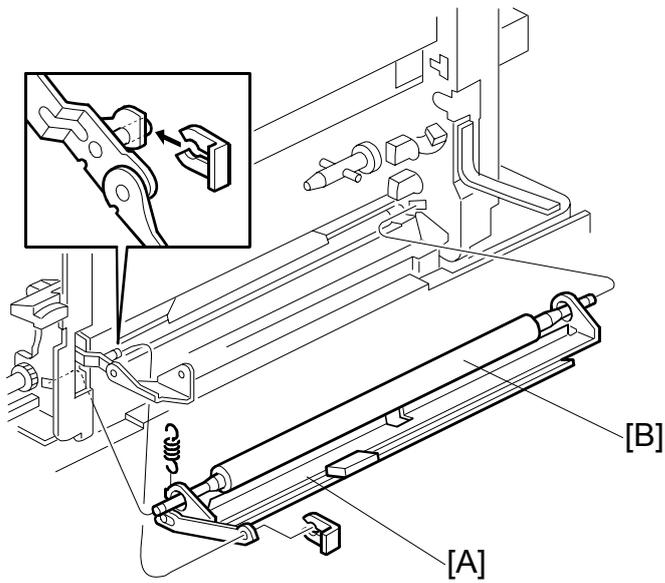


11. Right cover switch bracket [I] (🔩 x1)
12. Rear registration holder [J] (🔩 x1)
13. Registration roller bushing [K] (⊕ x1, spring x1)



Replacement  
Adjustment

## PAPER FEED



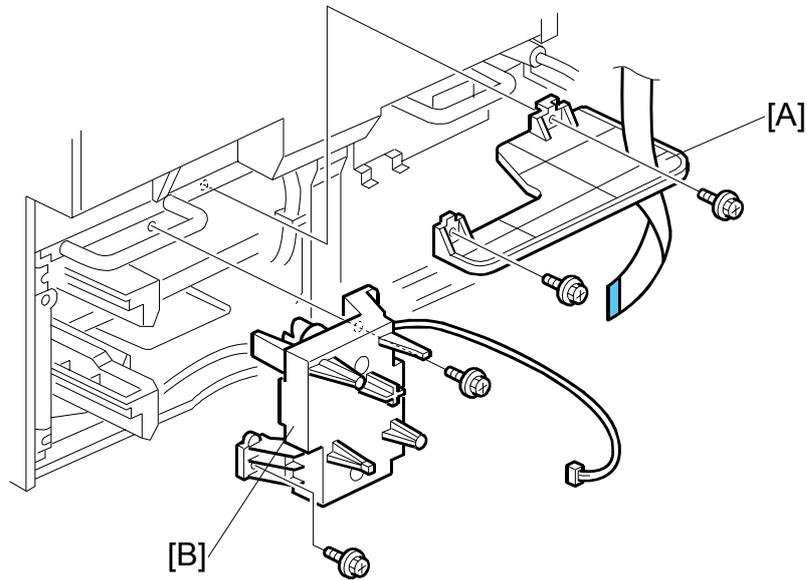
14. Guide plate [A] and registration roller [B] (spring x1,  x 1)

15. Registration guide plate [C] ( x2,  x1)

16. Sensor bracket [D] ( x1)

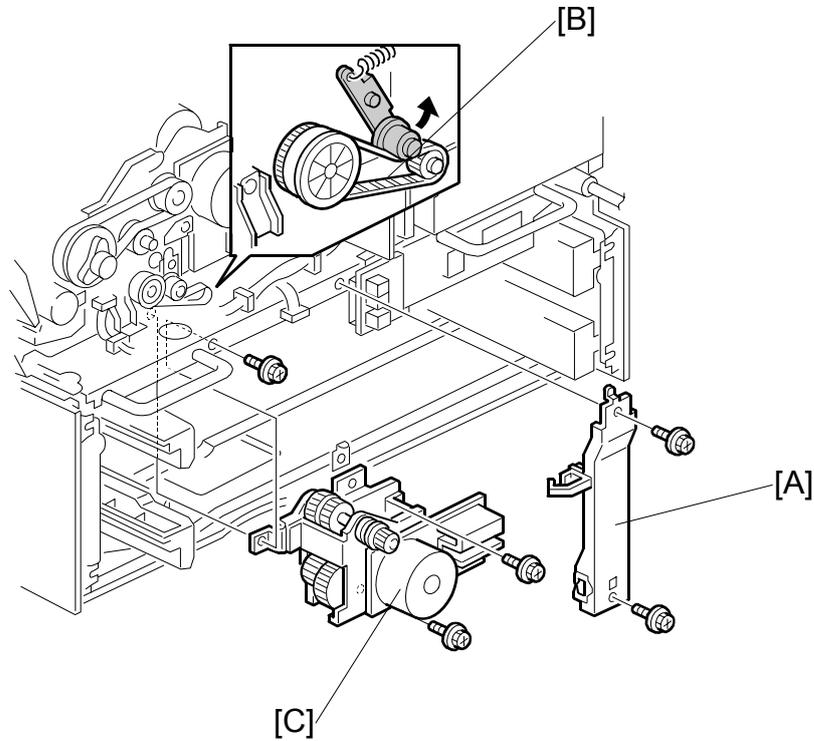
17. Registration sensor [E] ( x1,  x1)

### 3.14.8 TRAY LIFT MOTOR



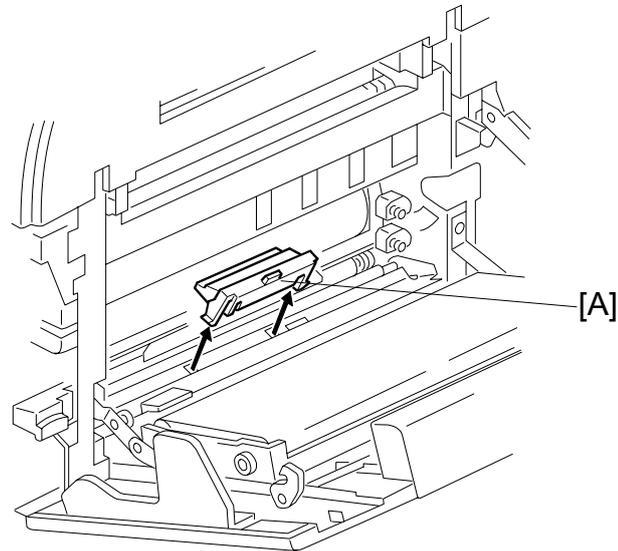
1. Rear lower cover (☛ 3.7.2)
2. Remove the IOB (☛ 3.19.3)
3. Bracket [A] (🔩 x2, 🏠 x1)
4. Tray lift motor [B] (🔩 x2)

### 3.14.9 FEED/DEVELOPMENT MOTOR



1. Rear lower cover (⚙️ x4) (➡️ 3.7.2)
2. Rear upper cover (⚙️ x4) (➡️ 3.7.1)
3. Tray lift motor (➡️ 3.14.8)
4. Support [A] (⚙️ x2, harnesses x2)
5. Timing belt [B] (Raise arm to release tension on belt.)
6. Feed/development motor [C] (⚙️ x3, 📡 x2)

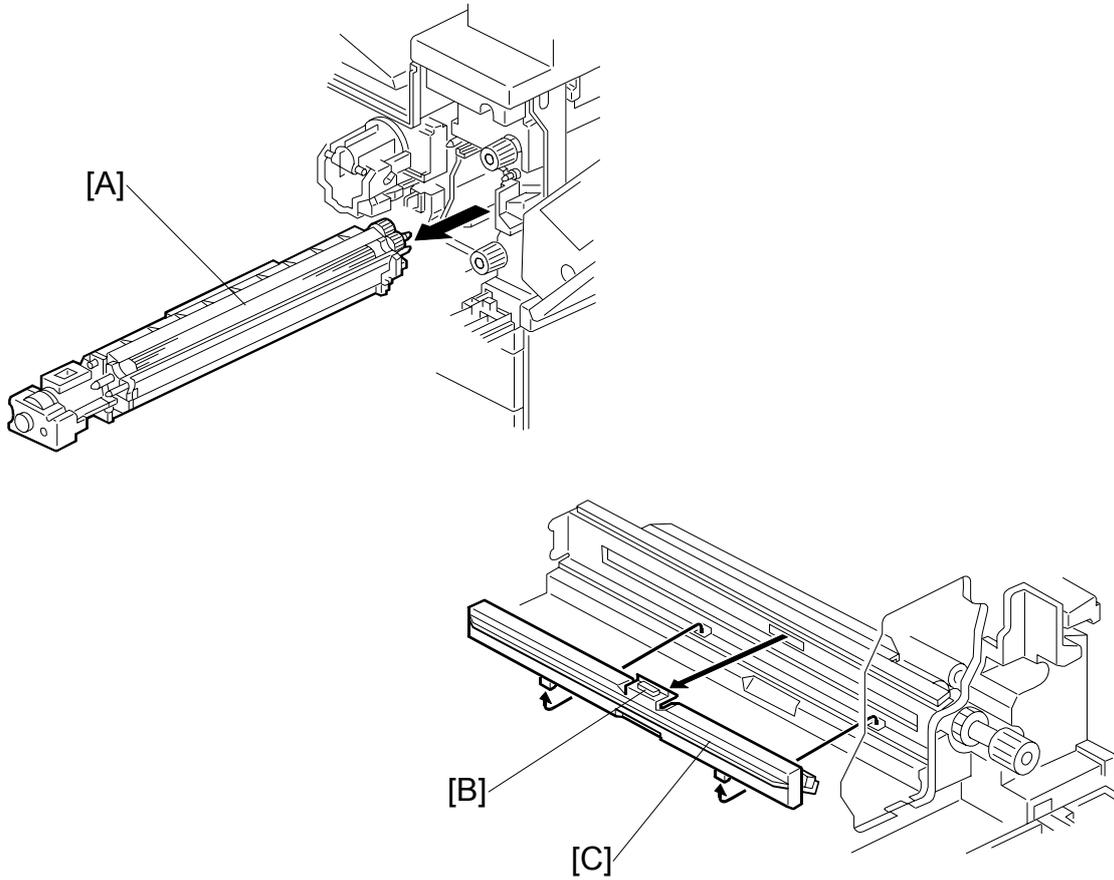
### 3.14.10 IDLE ROLLER DUST BLADE



Replacement  
Adjustment

1. Open the duplex unit and right door.
2. Detach the dust blade [A].
3. Spread some paper on a flat surface and tap the dust blade gently to remove paper dust collected in its dust box.

### 3.14.11 REGISTRATION ROLLER DUST BLADE



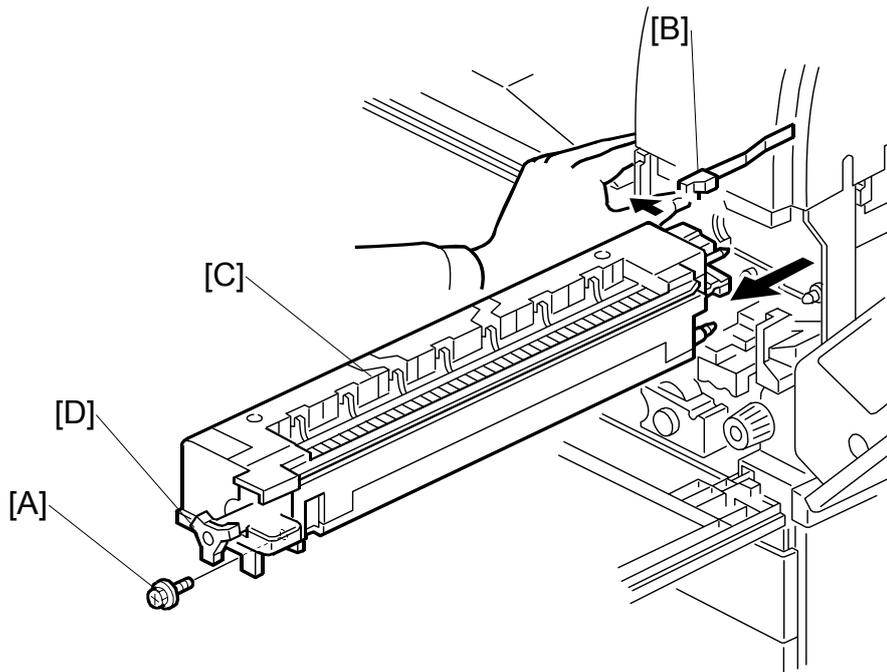
1. Open the duplex unit and open the right door.
2. Remove the PCU (☛3.11.1)
3. Remove the development unit [A].
4. Press the top of the blade [B] to unlock it and open it to the left.
5. Remove the dust blade [C] from the machine.

### 3.15 FUSING UNIT

#### ⚠ CAUTION

Allow time for the unit to cool before doing the following procedure.

#### 3.15.1 FUSING UNIT REMOVAL

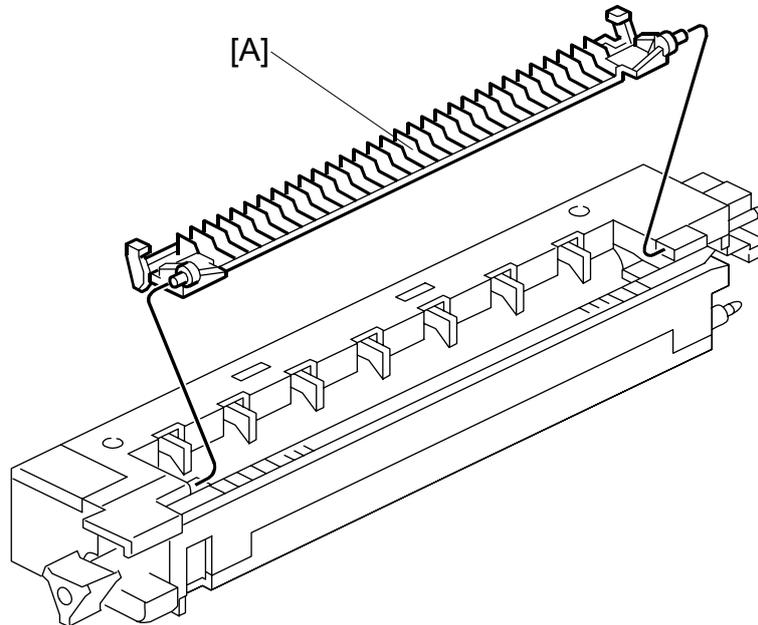


1. Open the front door, duplex unit, and right door.
2. Set screw [A] (⌀ x 1)
3. Fusing unit release lever [B]
4. Slide out the fusing unit [C]

**NOTE:** The larger knob [D] is provided to make turning the hot roller easier to free jams.

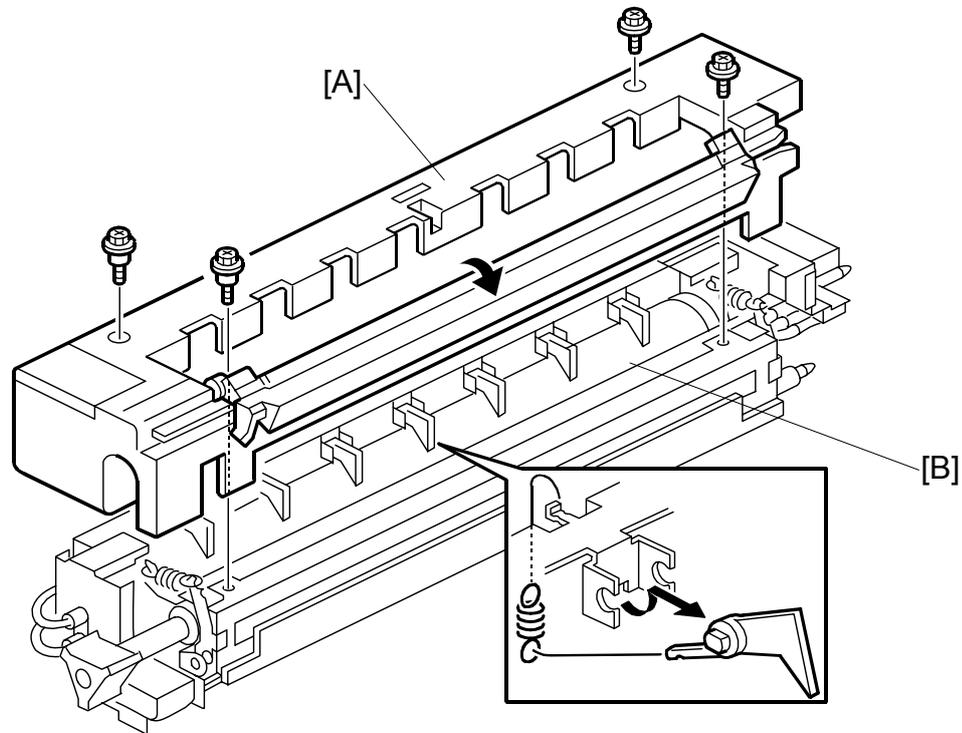
## FUSING UNIT

### 3.15.2 FUSING UNIT EXIT GUIDE



1. Fusing unit (☛ 3.15)
2. Exit guide [A]. Press the guide to the left and then press on the right end to release the peg from the hole.

### 3.15.3 HOT ROLLER STRIPPERS



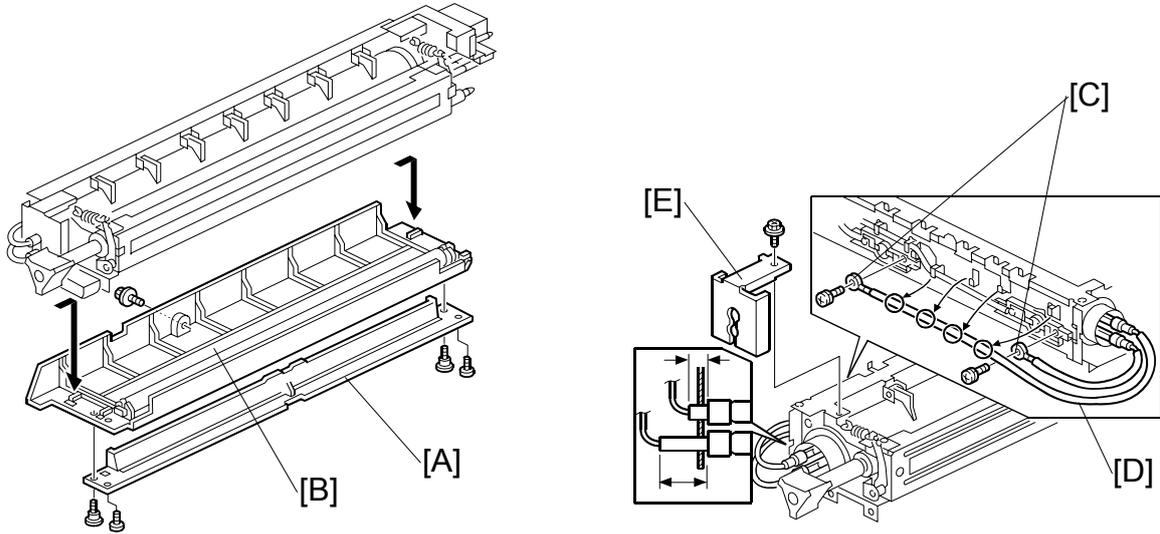
1. Fusing unit (☛ 3.15)
2. Fusing unit cover [A] (🔩 x4)

**NOTE:** Note the positioning of the step screws x2 and the set screws x2.

3. Hot roller strippers [B] x7 and springs x7

## FUSING UNIT

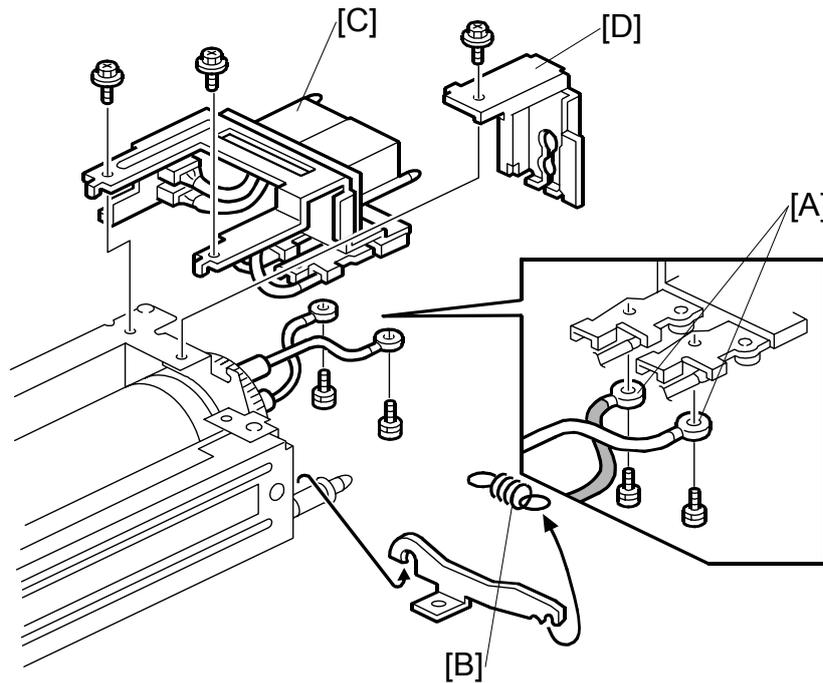
### 3.15.4 FUSING LAMPS



1. Fusing unit (☛ 3.15)
2. Fusing unit cover (☛ 3.15.3)
3. Fusing entrance guide [A] (🔩 x4)
4. Lower cover [B] (🔩 x1)

#### Left side

5. Two terminals [C] (🔩 x2)
6. Center fusing lamp lead [D] (Clamps x4)
7. Bracket [E] (🔩 x1)



### Right side

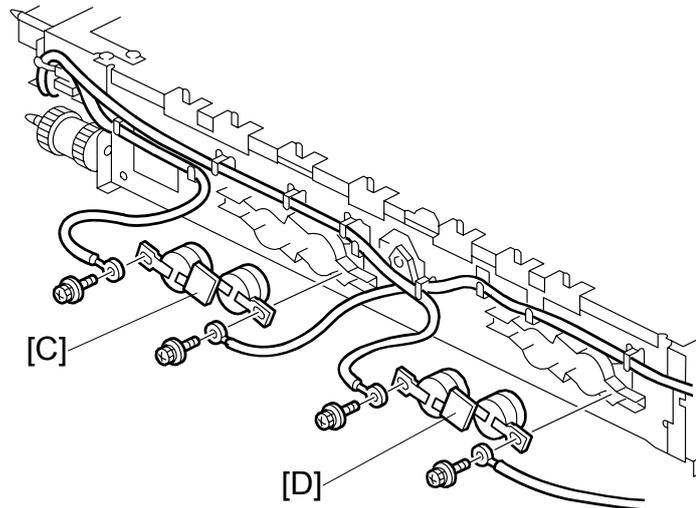
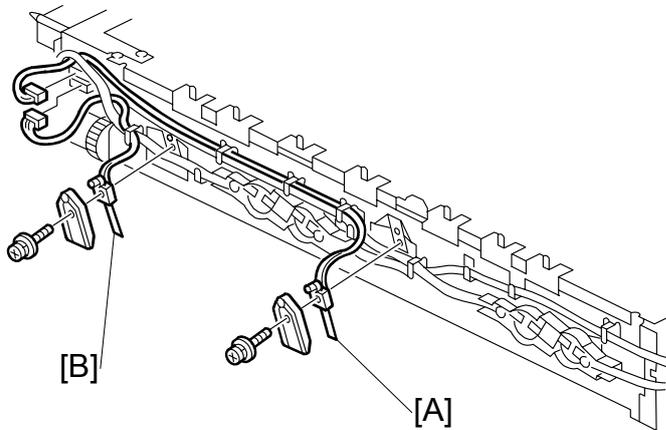
1. Two terminals [A] (⚙️ x2)
2. Spring [B]
3. Connector bracket [C] (⚙️ x2)
4. Bracket [D] (⚙️ x2)

### Important

- To avoid breaking the fusing lamps, handle them with care.
  - Avoid touching the lamps with bare hands.
  - Note the top/bottom positioning of the fusing lamps as you remove them. The sizes of the holes in the holder match the sizes of the ends of the 650 W lamp (red) and 650 W lamp (brown).
5. Remove both fusing lamps.

## FUSING UNIT

### 3.15.5 THERMISTORS AND THERMOSTATS

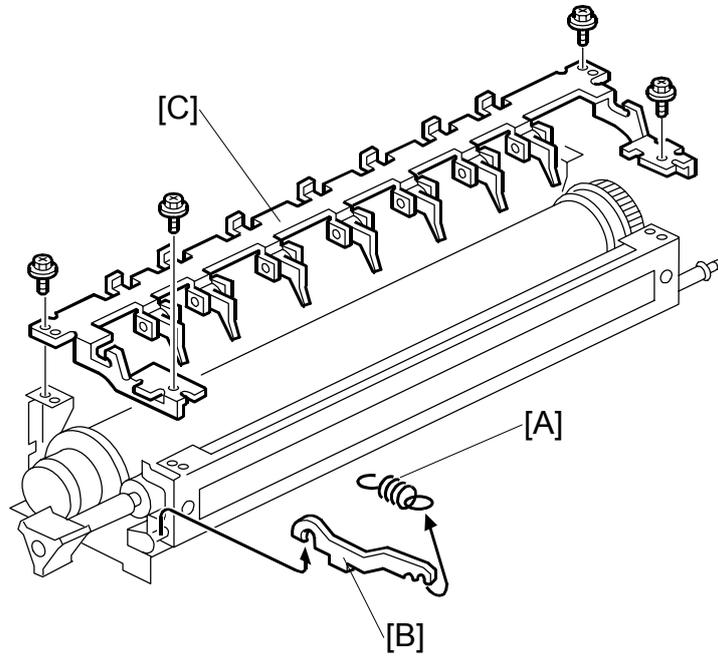


1. Fusing unit (☛ 3.15)
2. Fusing upper and lower cover. (☛ 3.15.3)
3. Center thermistor [A] (⚙ x1, 📏 x1, holder x1)
4. End thermistor [B] (⚙ x1, 📏 x1, holder x1)

**CAUTION:** The thermistors are thinly coated and extremely fragile. Handle with care to avoid damaging them. They should be replaced every 150K.

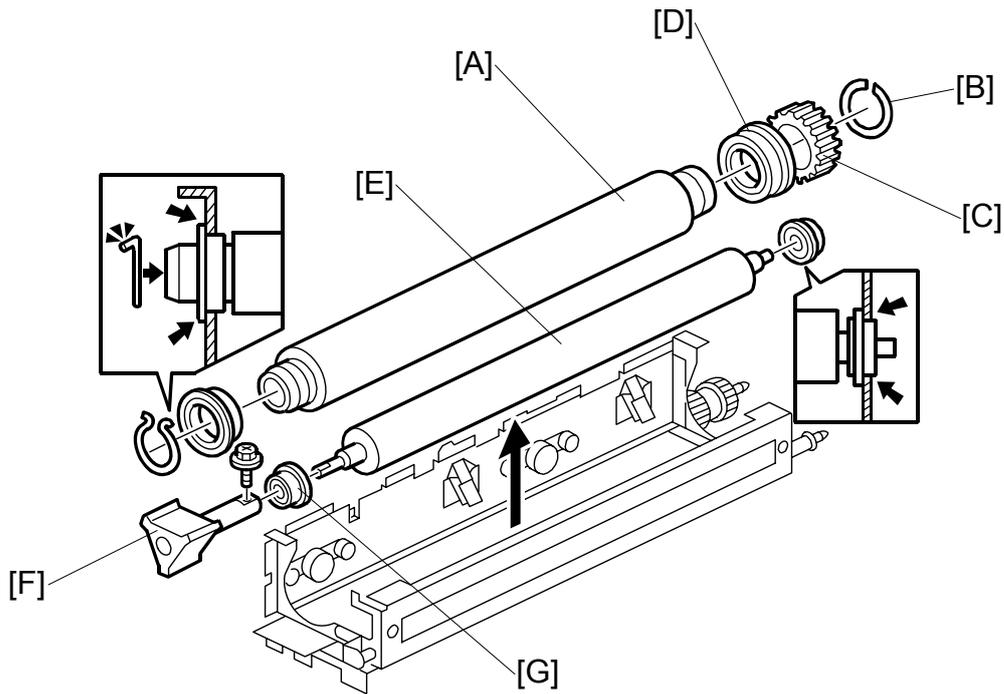
5. Center thermostat [C] (⚙ x2)
6. End thermostat [D] (⚙ x2)

### 3.15.6 HOT ROLLER/PRESSURE ROLLER



1. Fusing unit (☛ 3.15)
2. Fusing upper and lower cover. (☛ 3.15.3)
3. Fusing lamps. (☛ 3.15.4)
4. Springs x2 [A] (both sides)
5. Arms x2 [B] (both sides)
6. Pawl bracket [C] (☛ x4)

## FUSING UNIT



7. Hot roller [A]

**CAUTION:** The hot roller is easily damaged. Always handle it carefully.

8. C-rings x2 [B] (both ends)

9. Drive gear [C]

10. Bushings x2 [D] (both ends)

11. Pressure roller [E]

12. Fusing knob [F] (⌀ x1)

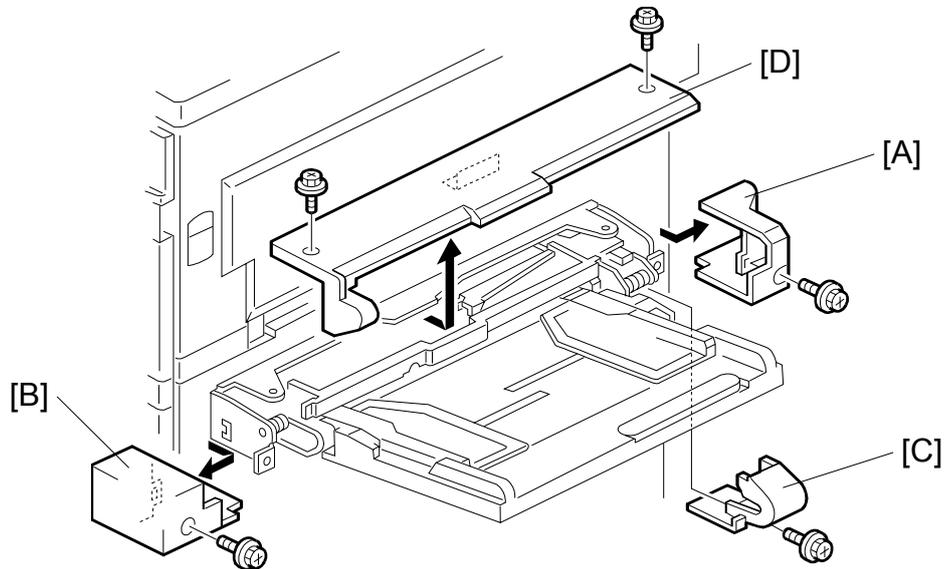
13. Bushings x2 [G] (both ends)

**NOTE:**

- 1) Before installing the new hot roller, peel off 3 cm (1 inch) from both ends of the protective sheet on the new roller.
- 2) Never touch the surface of the rollers.
- 3) Work carefully to avoid damaging the surface of the hot roller.
- 4) The standard pressure roller spring position is the upper position.
- 5) When reinstalling the hot roller assembly and pressure roller assembly, make sure that the flange position of the bushings is as shown.

## 3.16 BY-PASS TRAY

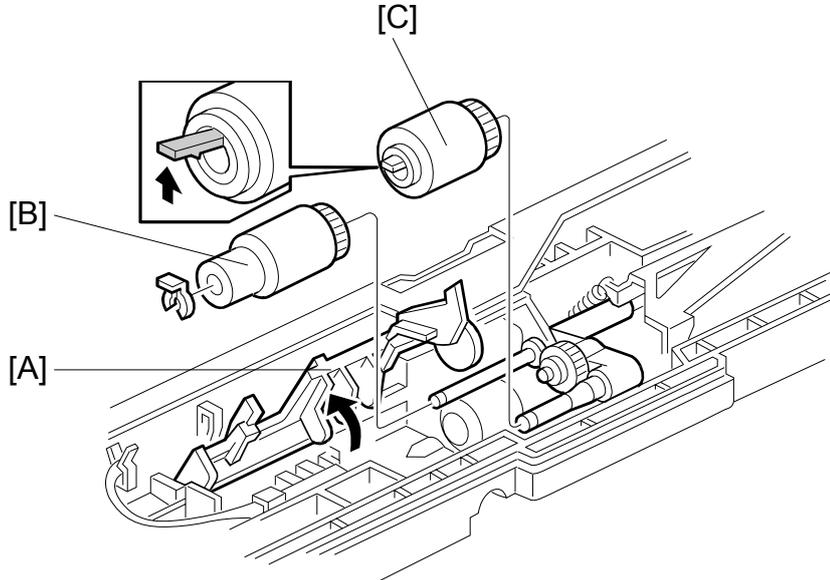
### 3.16.1 COVER REPLACEMENT



Replacement  
Adjustment

1. Rear cover [A] (⚙️ x1)
2. Front cover [B] (⚙️ x1)
3. Hinge cover [C] (⚙️ x1)
4. Upper cover [D] (⚙️ x2)
5. Close the duplex unit and pull out the upper cover.

### 3.16.2 BY-PASS PAPER FEED AND PICK-UP ROLLER REPLACEMENT

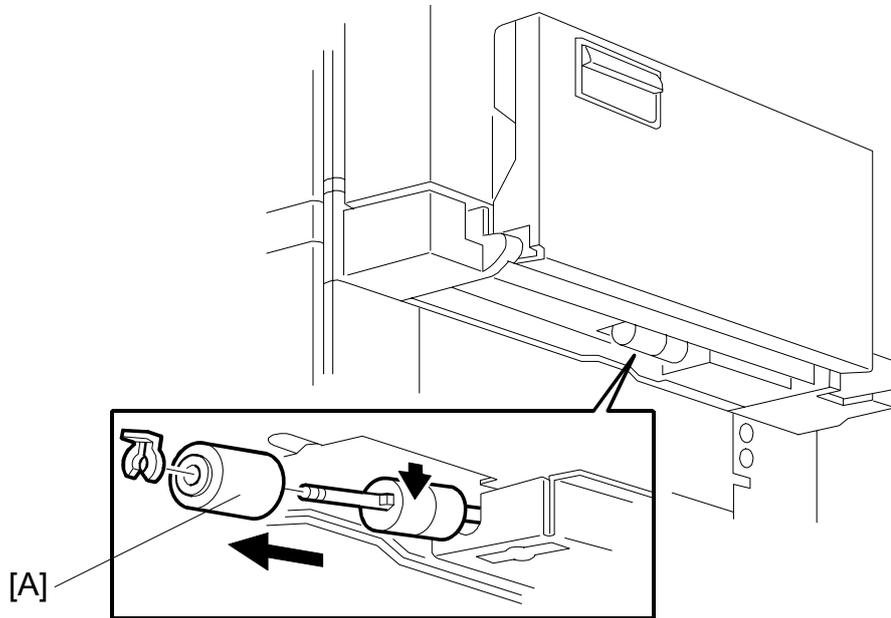


1. Upper cover (☛ 3.16.1)
2. Lift up paper end feeler [A] to lock feeler in position.

**NOTE:** Before reinstalling the upper cover, return the paper end feeler to its original position.

3. Replace the paper feed roller [B] (☞ x1)
4. Replace the pick-up roller [C].

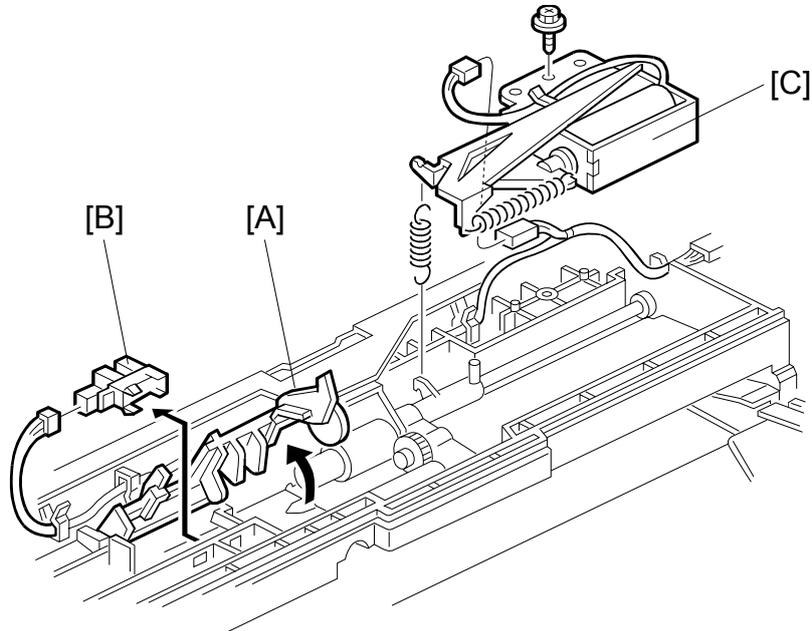
### 3.16.3 BY-PASS SEPARATION ROLLER



Replacement  
Adjustment

1. Close the by-pass table.
2. Remove the separation roller [A] from the bottom (🔧 x1)

### 3.16.4 PAPER END SENSOR, PICK-UP SOLENOID

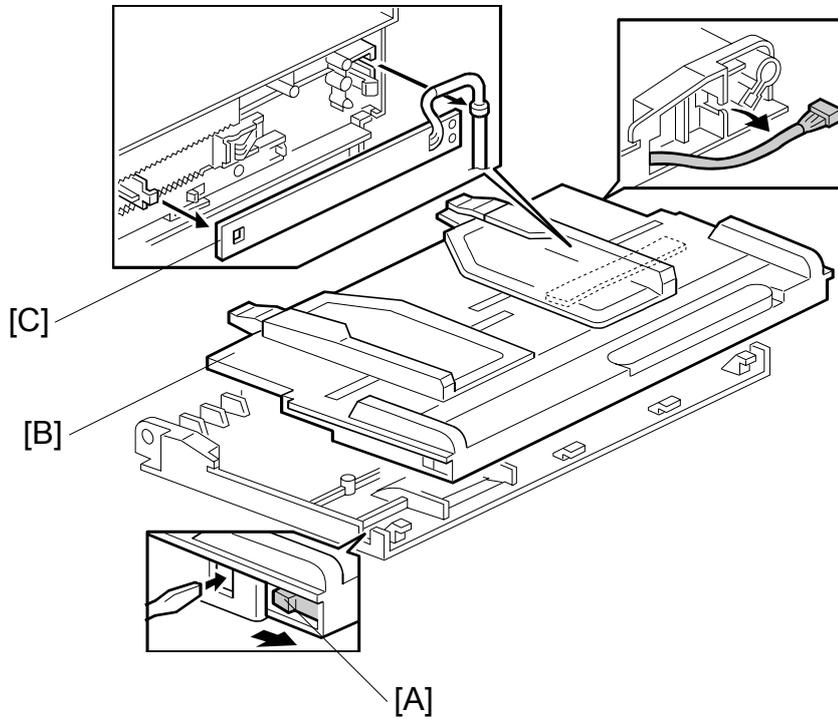


1. Upper cover (☛ 3.16.1)
2. Lift paper end feeler [A].

**NOTE:** Before reinstalling the upper cover, return the paper end feeler to its original position.

3. Replace the paper end sensor [B] (☛ x1).
4. Pick-up solenoid [C] (☛ x1, ☛ x1, spring x1)

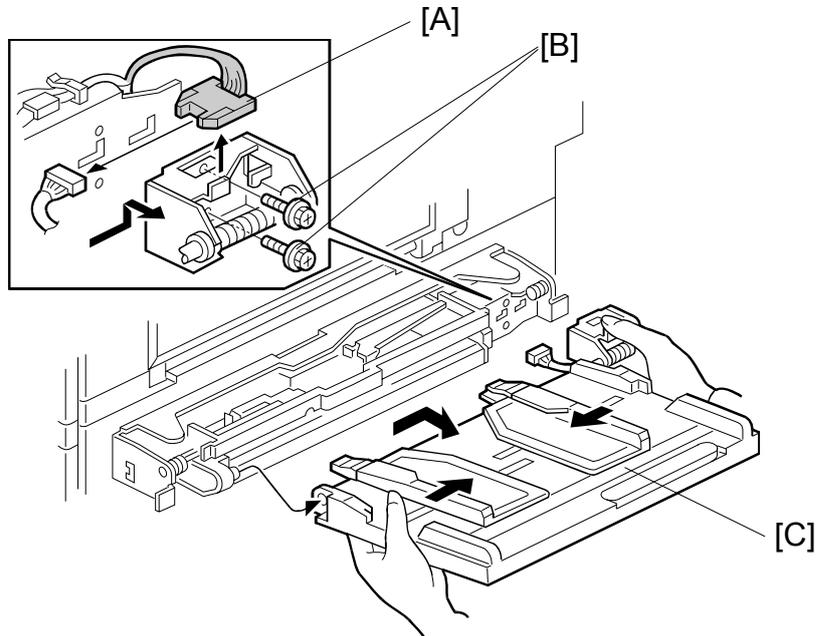
### 3.16.5 PAPER SIZE SENSOR BOARD REPLACEMENT



1. Hook [A]
2. Paper tray [B] (☞ x1).
3. Size sensor board [C].

**NOTE:** To avoid breaking the hook of the paper size sensor board, handle it carefully during removal.

### 3.16.6 BY-PASS TABLE REMOVAL

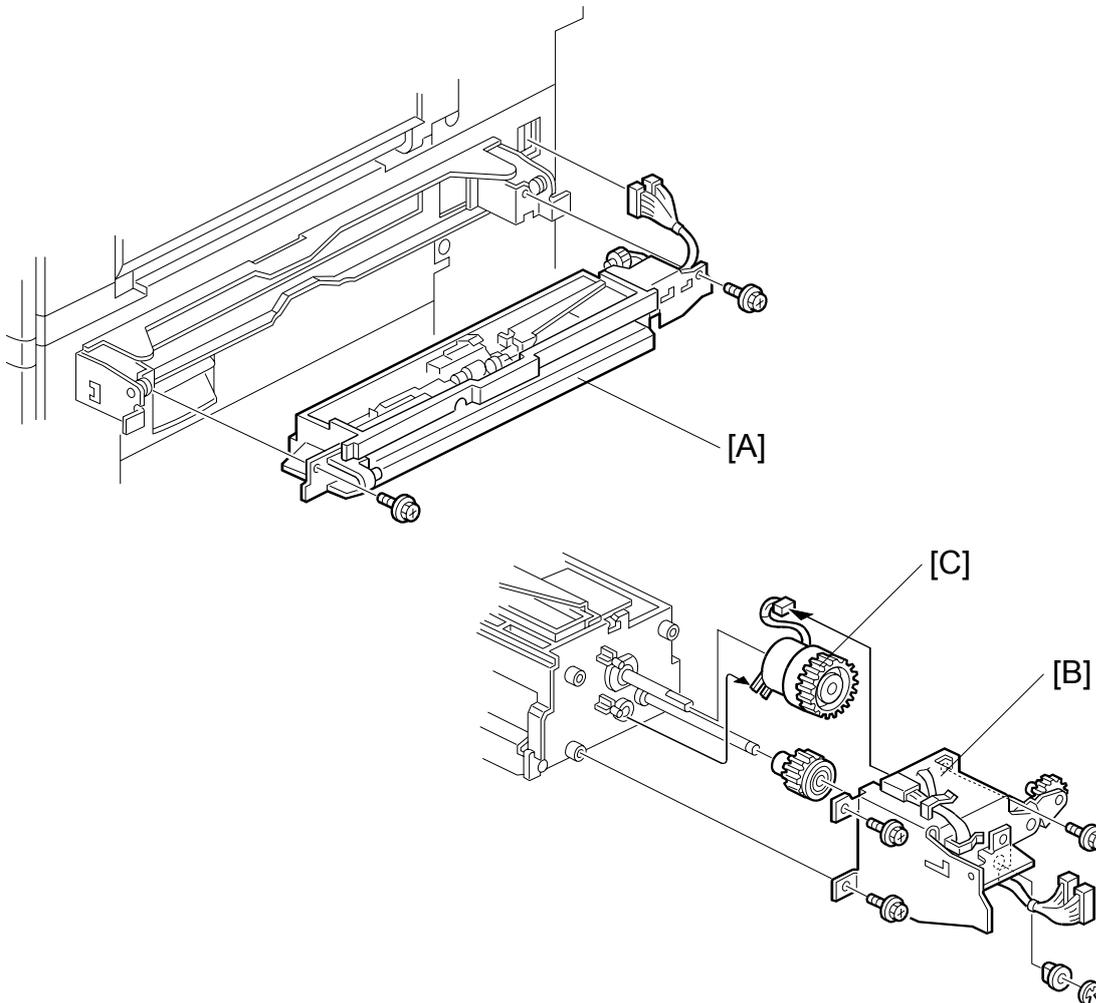


**Note:** The entire by-pass tray unit can be removed, not just the table. (☛3.6)

1. Hinge cover (☛ 3.16.1)
2. Harness [A] (☛ x1).
3. Screws [B] (☛ x2)
4. By-pass table [C].

**CAUTION:** To relieve pressure on the spring during removal, depress it as shown in the illustration.

### 3.16.7 PAPER FEED CLUTCH REPLACEMENT



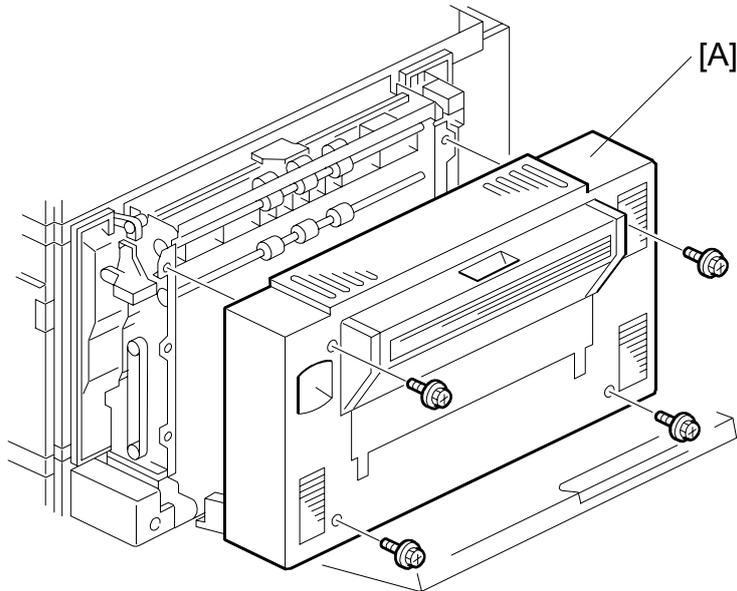
Replacement  
Adjustment

1. By-pass tray. (☞ 3.16.1)
2. Paper feed unit [A] (⚙️ x2, 📄 x2)
3. Rear bracket [B] (⚙️ x4, 📄 x1, bushing x1)
4. Paper feed clutch [C] (📄 x1)

## DUPLEX UNIT

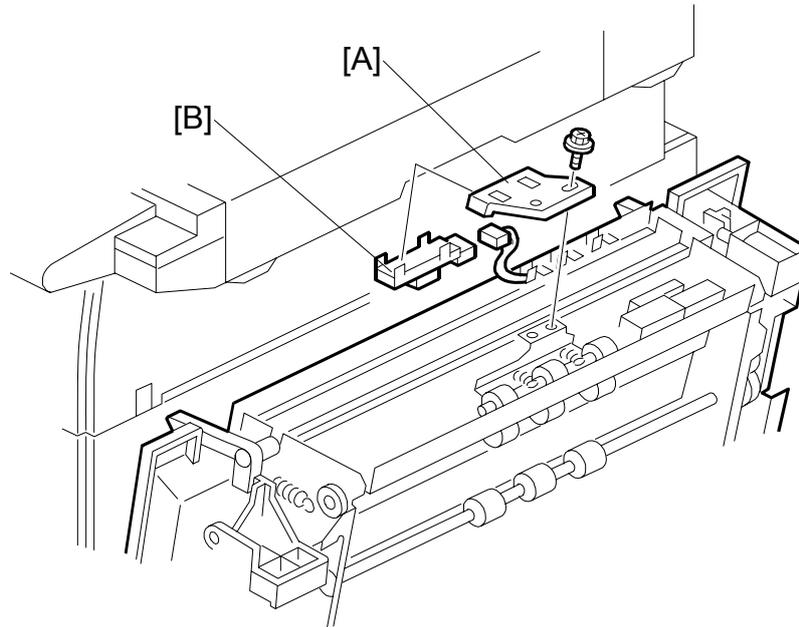
### 3.17 DUPLEX UNIT

#### 3.17.1 DUPLEX COVER REMOVAL



1. Duplex unit cover [A] (🔩 x4)

### 3.17.2 DUPLEX ENTRANCE SENSOR REPLACEMENT

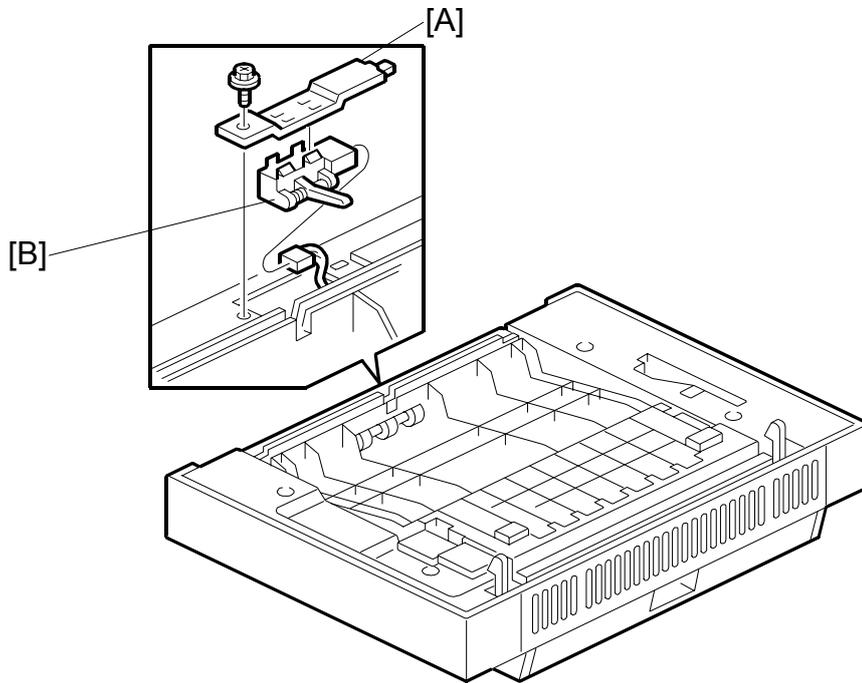


Replacement  
Adjustment

1. Duplex unit cover (☛ 3.17.1)
2. Sensor holder [A] (🔩 x1)
3. Entrance sensor [B] (📏 x1)

## DUPLEX UNIT

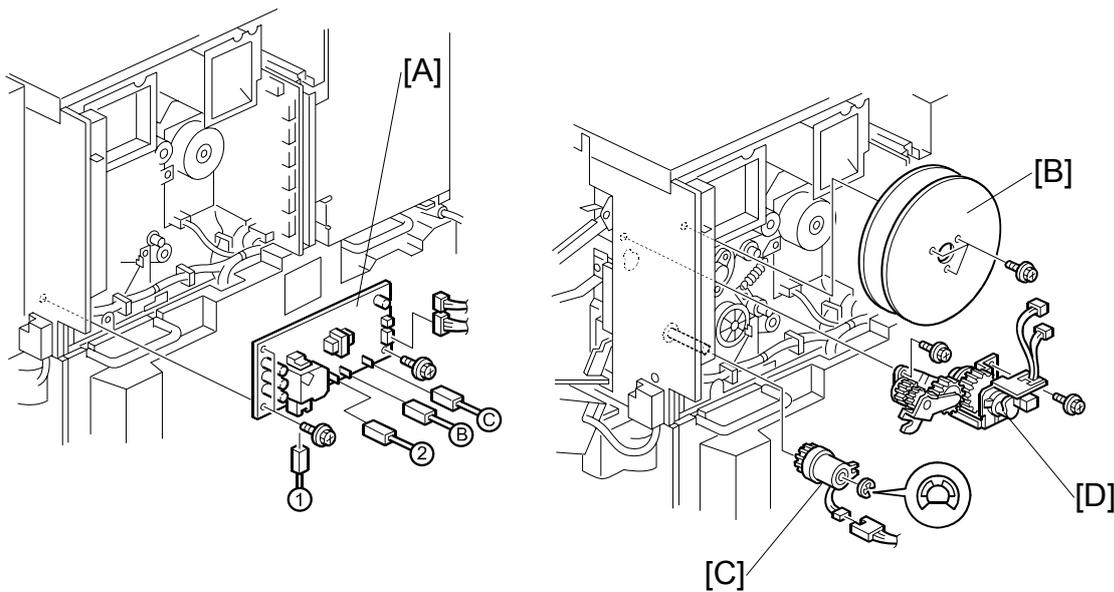
### 3.17.3 DUPLEX EXIT SENSOR REPLACEMENT



1. Duplex unit (☛3.4)
2. Sensor bracket [A] (🔩 x1)
3. Exit sensor [B] (🔌 x1)

## 3.18 DRIVE AREA

### 3.18.1 REGISTRATION CLUTCH, TRANSFER BELT CONTACT CLUTCH



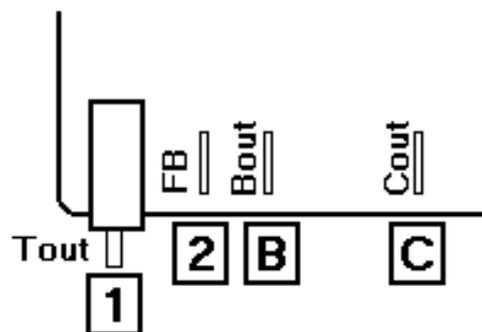
Replacement  
Adjustment

1. Rear upper cover (⚙️ x2) (➡️ 3.7.1)
2. High voltage supply board [A] (🔌 x6, ⚙️ x3)

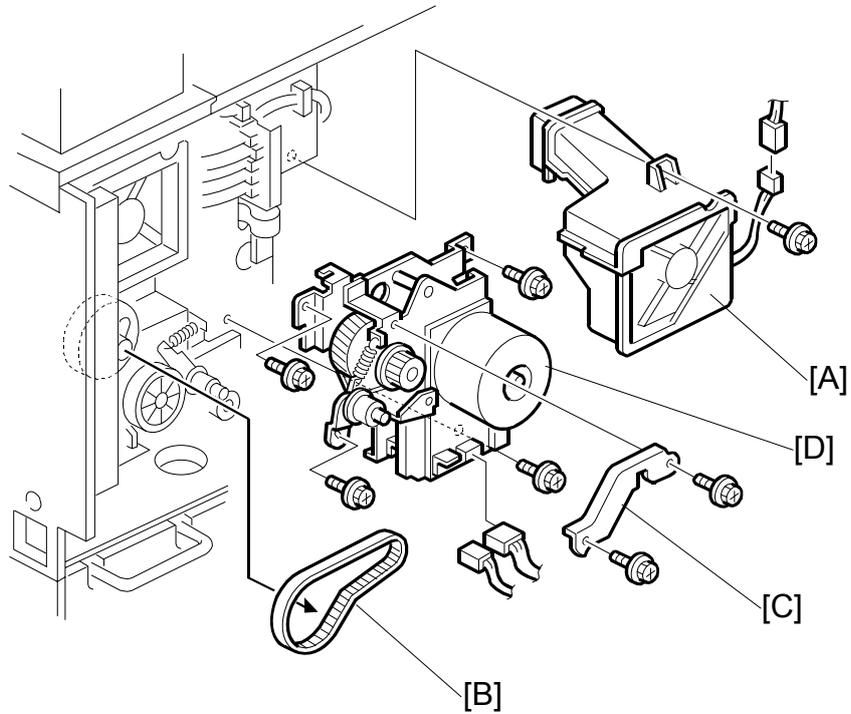
**NOTE:** Make sure that you re-connect the wires in the correct order. They are labeled:

1 → 2 → B → C

3. Flywheels [B] (⚙️ x3)
4. Registration clutch [C] (Ⓢ x1, 🔌 x1)
5. Transfer belt contact clutch [D] (🔌 x2, ⚙️ x2)



### 3.18.2 MAIN MOTOR



Remove:

- Rear upper cover (☛3.7.1)
  - High voltage power supply, flywheel (☛3.18.1)
1. Remove the main cooling fan [A] (☛ x2)
  2. Timing belt [B] x1
  3. Bracket [C] (☛ x3)
  4. Main motor [D] (☛ x2, ☛ x3)

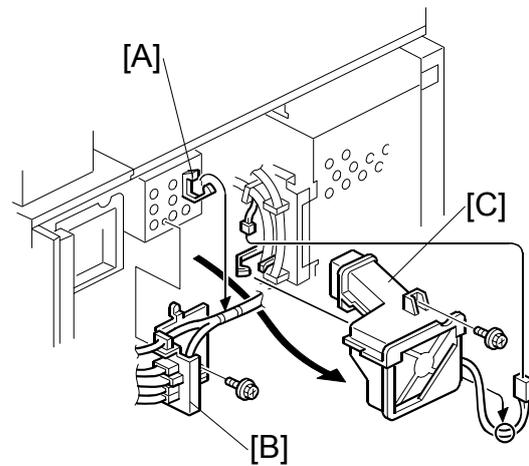
### 3.18.3 FUSING/EXIT MOTOR

- Rear upper cover (☛3.7.1)
- Fusing unit cover (☛3.15.3) (Do not disconnect.)
- Paper output tray

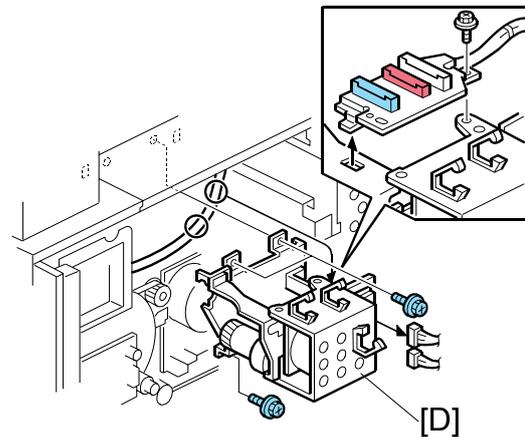
[A]: Harness clamps (☛x3)

[B]: Connector bracket (☛ x1, ☛ x1)

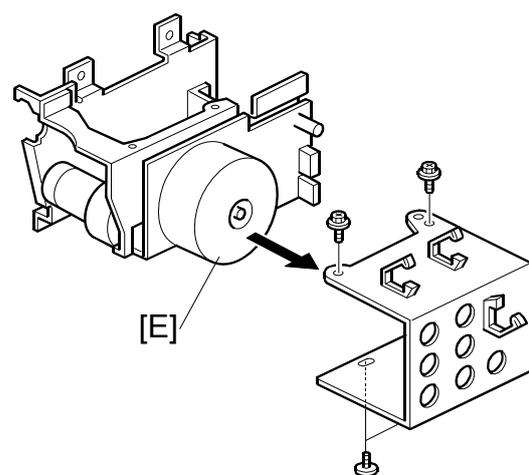
[C]: Main fan (☛ x1, ☛x1)



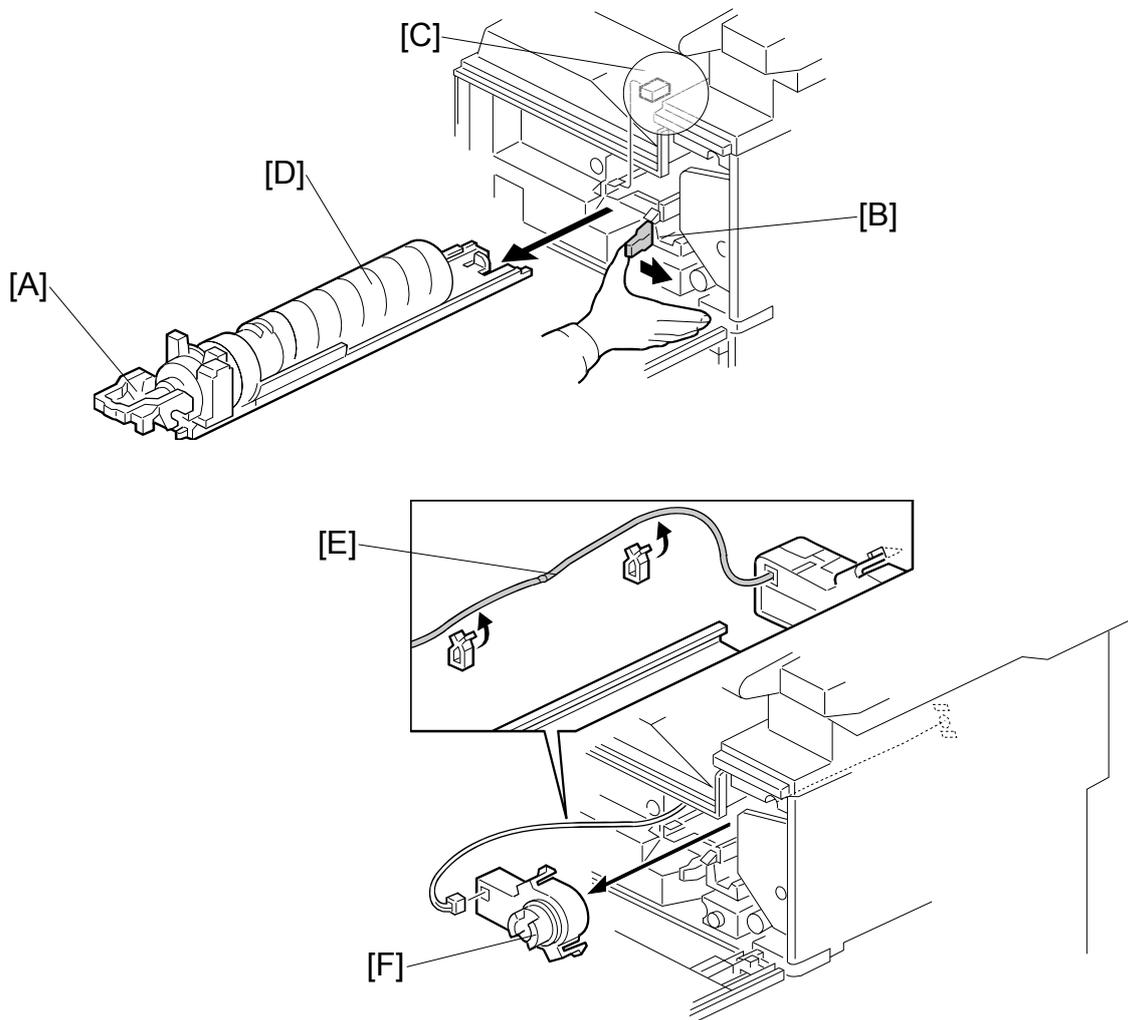
[D]: Motor bracket (☛ x4, ☛ x2)



[E]: Fusing exit motor (☛ x4)



### 3.18.4 TONER SUPPLY MOTOR



1. Open the front door
2. Raise holder handle [A]
3. Push the holder lever [B] to the right
4. Stopper [C]
5. Toner bottle holder and bottle [D]
6. Motor harness [E] (clamps x 2)
7. Toner supply motor [F] (hooks x2,  x1)

**NOTE:** Press both sides of the motor to release it.

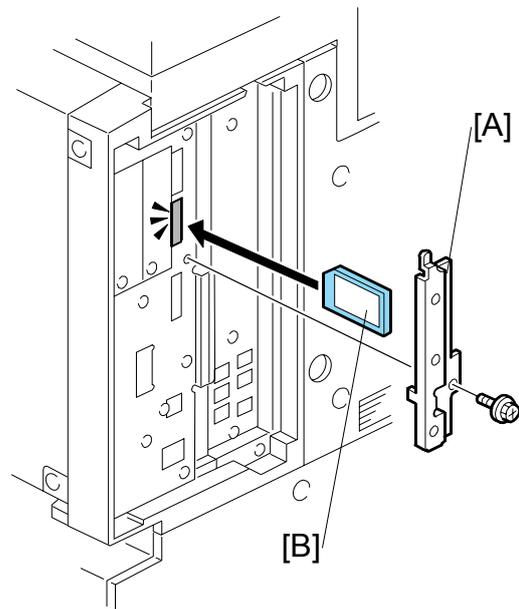
## 3.19 PRINTED CIRCUIT BOARDS

### 3.19.1 NVRAM

**Important:**

- Do not remove the NVRAM until you have uploaded its contents.
- Always touch a metal surface to discharge any static on your hands before you touch the controller board.
- Work carefully when removing the NVRAM to avoid damaging other components on the controller board or short circuiting the pins of other chips.

1. Do **SP5990 001** to print the SMC report.
2. Turn off the main switch.
3. Remove the controller cover (🔧 x2) (➡3.7.1)
4. Remove the SD card slot cover [A] (🔧 x1).
5. Insert the SD card [B] into SD card slot **C3**.
6. Turn on the main switch.
7. Do SP5824.
8. Touch “Execute” to start uploading the NVRAM data.
9. Turn off the main switch and remove the SD card.
10. Remove the controller box (🔧 x1)



Replacement  
Adjustment

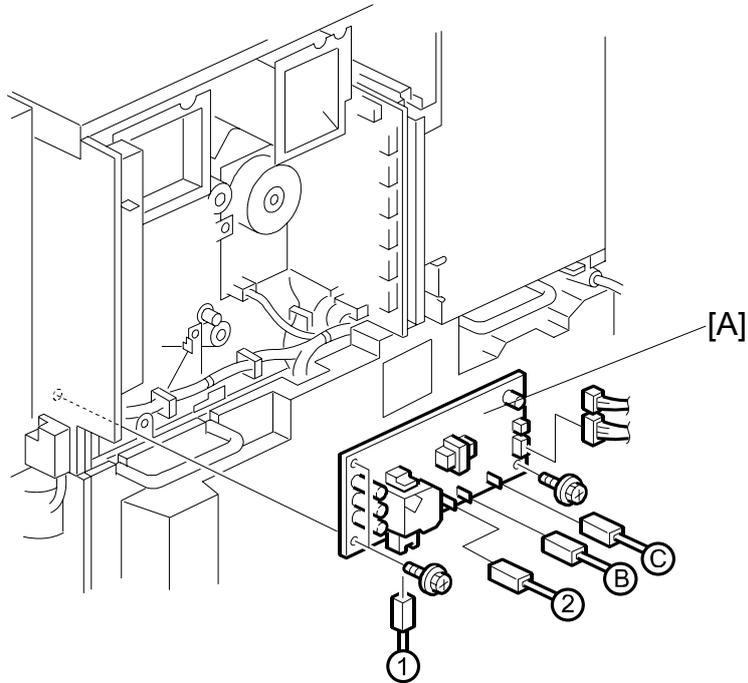
## PRINTED CIRCUIT BOARDS

11. Remove the NVRAM (x2) from the controller board and replace them with the new chips.

**NOTE:** Both NVRAM chips must be replaced.

12. Reinstall the controller box.
13. Insert the SD card with the NVRAM data in SD card slot **C3**.
14. Turn on the machine.
15. Do SP5825.
16. Touch "Execute" to start downloading the NVRAM data.
17. Turn off the main switch and remove the SD card.
18. Turn on the machine.
19. Do SP5990 001 to print another SMC report.
20. Compare this new SMC report with the report you printed in Step 1. If any of the SP settings are different, enter the SP settings of the first report.
21. Execute SP5907 and enter the brand and model name of the machine for Windows Plug & Play capability.

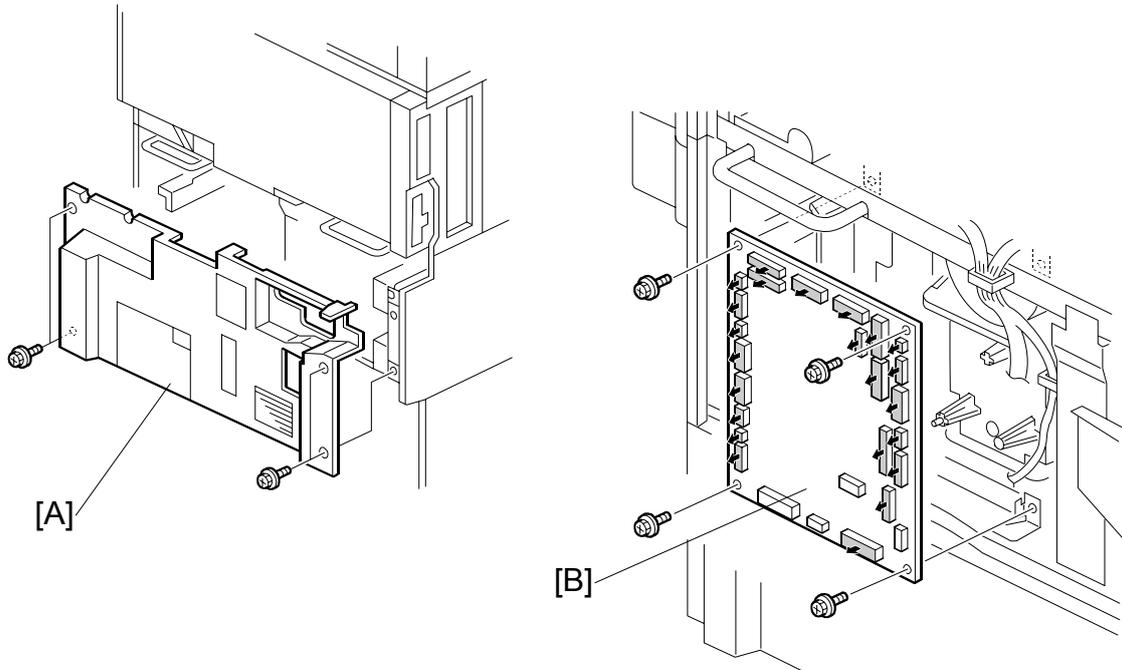
### 3.19.2 HIGH VOLTAGE POWER SUPPLY



Replacement  
Adjustment

1. Rear upper cover (☛ 3.7.1)
2. High voltage power supply [A] (⚙️ x3, 📏 x6)

### 3.19.3 IOB



1. Remove the rear lower cover [A] (⚙️ x 4).
2. Remove the IOB [B] (🔌 All, ⚙️ x 4, Ribbon cable x 1).
3. The IOB is identical for the B291/B295/B296/B297. However, the DIP switches are set differently for each machine. Check the DIP switches then adjust settings as required. (See next page.)

**IOB DIP Switch Settings (SW101)**

1. The position of SW 1 determines the engine speed. This switch should be UP (ON) for the B291/B296 (35 cpm) or DOWN (OFF) for the B295/B297 (45 cpm)  
**NOTE:** Move a switch UP to ON or DOWN to OFF.

2. SW 2, 3, 4, and 5 should all be DOWN (OFF). Do not change these settings. This information is only for reference:

SW	If set to ON
2	Switches off jam detection.
3	Engine program recovery.
4	Print output for debugging.
5	Switches off SC detection.

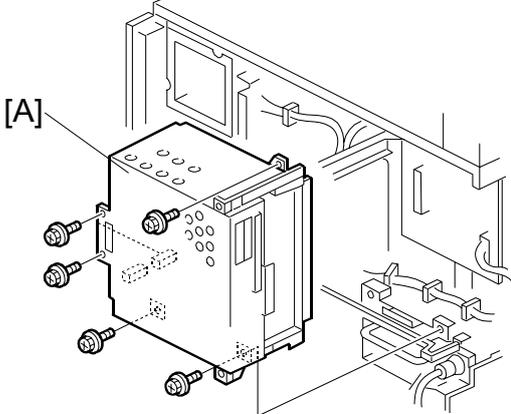
3. SW 6, 7, 8 should be set for the area where the machine is used and serviced.

6	7	8	Location
OFF	OFF	OFF	Japan
ON	OFF	OFF	North America
OFF	ON	OFF	Europe
ON	OFF	ON	Taiwan
ON	ON	OFF	Asia
OFF	ON	ON	Korea
ON	ON	ON	Not used

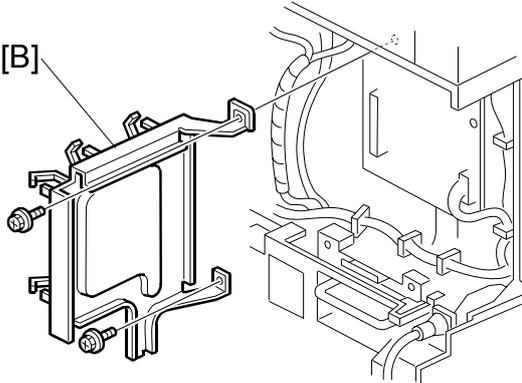
ON: Up  
OFF: Down

**3.19.4 BICU BOARD**

1. Controller box [A] (⚙️ x5)

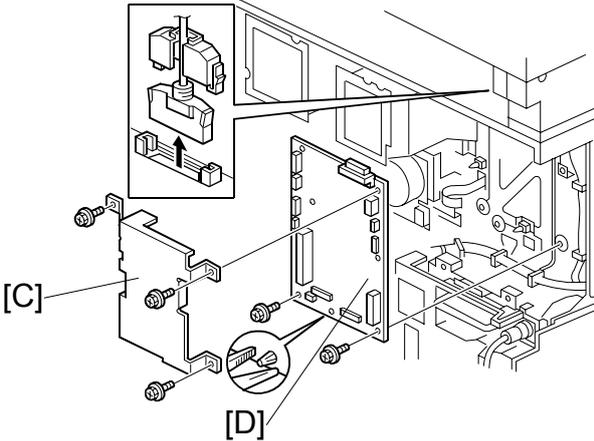


2. IPU shield plate [B] (⚙️ x2)

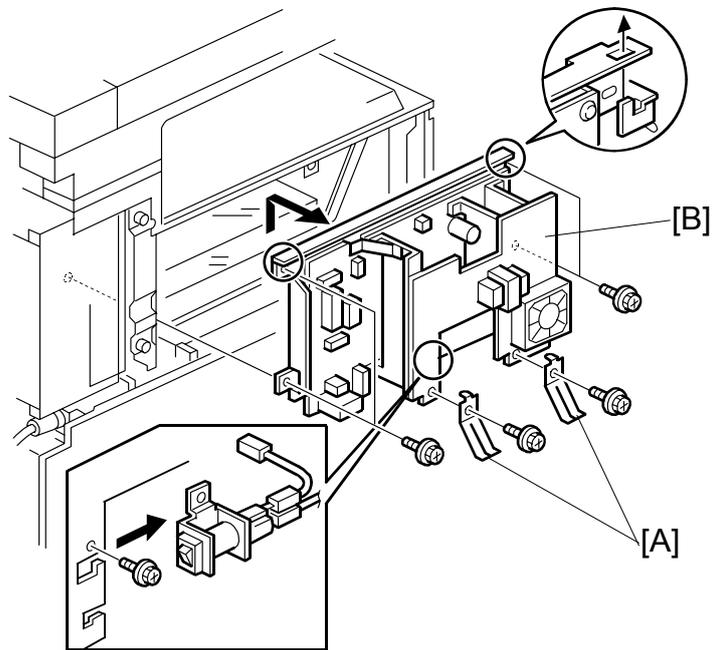


3. BICU cover [C] (⚙️ x3)

4. BICU [D] (⚙️ x2)



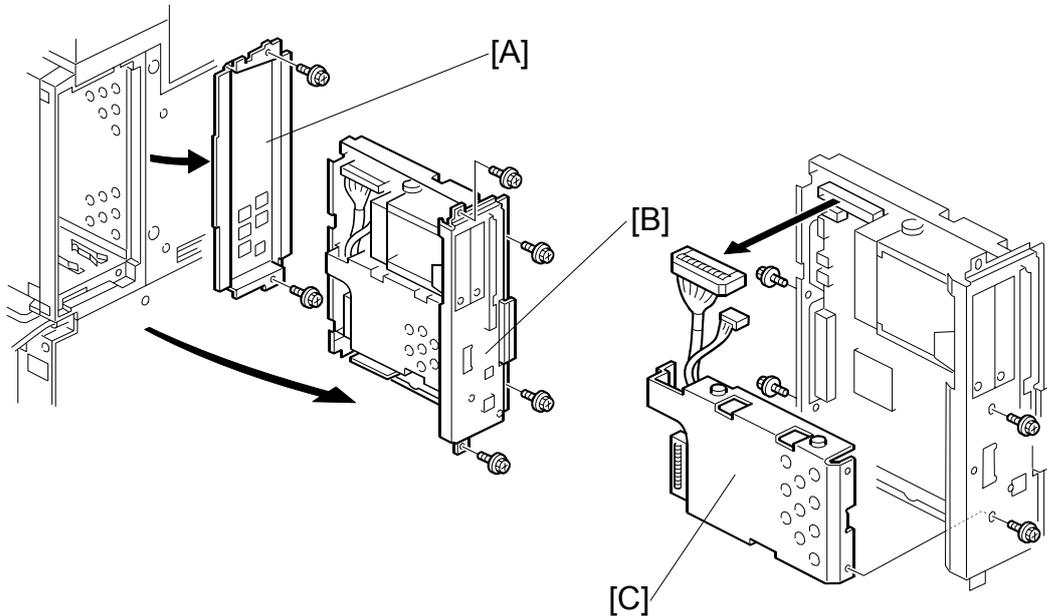
### 3.19.5 PSU



Replacement  
Adjustment

1. Left cover (☛ 3.8)
2. Ground (earth) plates [A] (☛ x2)
3. PSU [B] (☛ x4, ☛ x all)

### 3.20 HDD, CONTROLLER BOARD



#### Important!

The controller boards are machine specific and are not interchangeable:

- The controller board for the B291/B296 (35 cpm) must be installed in a B291/B296 copier.
- The controller board for the B295/B297 (45 cpm) must be installed in a B295/B297 copier.

1. Remove the controller cover (🔧 x 2). (➡ 3.7.1)
2. Controller board faceplate [A] (🔧 x 2).
3. Controller board [B] (🔧 x 4)
4. HDD unit bracket [C] (🔧 x 3, 📏 x 2)
5. After replacing the HDD, execute SP 5853 to copy the stamp data from the firmware ROM to the new disk.

### 3.21 COPY ADJUSTMENTS: PRINTING/SCANNING

Perform these adjustments after replacing any of the following:

- Scanner Wire
- Lens Block/SBU Assembly
- Scanner Drive Motor
- Polygon Mirror Motor
- Paper Side Fence
- Memory All Clear

#### 3.21.1 PRINTING

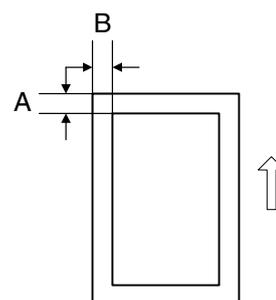
1. Make sure paper is installed correctly in each paper tray before you start these adjustments.
2. Use the Trimming Area Pattern (SP2-902-3, No. 10) to print the test pattern for the following procedures.
3. After completing these printing adjustments, be sure to set SP 2-902-3 to 0 again.

Replacement Adjustment

#### **Registration - Leading Edge/Side-to-Side**

1. Check the leading edge registration, and adjust it using SP1-001.  
Specification:  $3 \pm 2$ mm.
2. Check side-to-side registration for each paper feed station, and adjust with the following SP modes.

	SP mode	Specification
1st paper feed	SP1-002-1	$2 \pm 1.5$ mm
2nd paper feed	SP1-002-2	
3rd paper feed (Optional PFU tray 1)	SP1-002-3	
4th paper feed (Optional PTU tray 2)	SP1-002-4	
From the duplex tray	SP1-002-5	
By-pass feed	SP1-002-6	
LCT	SP1-002-7	



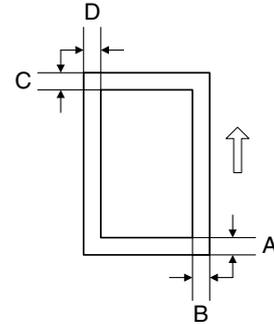
A: Leading Edge Registration  
B: Side-to-side Registration

**Blank Margin**

**NOTE:** If the leading edge/side-to-side registration cannot be adjusted within specifications, adjust the leading/left side edge blank margin.

1. Check the trailing edge and right edge blank margins, and adjust them with the following SP modes.

	<b>SP mode</b>	<b>Specification</b>
Trailing edge	SP2-101-2	$3 \pm 2$ mm
Right edge	SP2-101-4	$2 +2.5/-1.5$ mm
Leading edge	SP2-101-1	$3 \pm 2$ mm
Left edge	SP2-101-3	$2 \pm 1.5$ mm
Trailing edge (duplex copy, 2 <sup>nd</sup> side)	SP2-101-5	$1.2 \pm 2$ mm
Right edge (duplex copy, 2 <sup>nd</sup> side)	SP2-101-6	$0.3 \pm 1.5$ mm
Left edge (duplex copy, 2 <sup>nd</sup> side)	SP2-101-7	$0.3+2.5/-1.5$ mm



A: Trailing edge blank margin  
 B: Right edge blank margin  
 C: Leading edge blank margin  
 D: Left edge blank margin

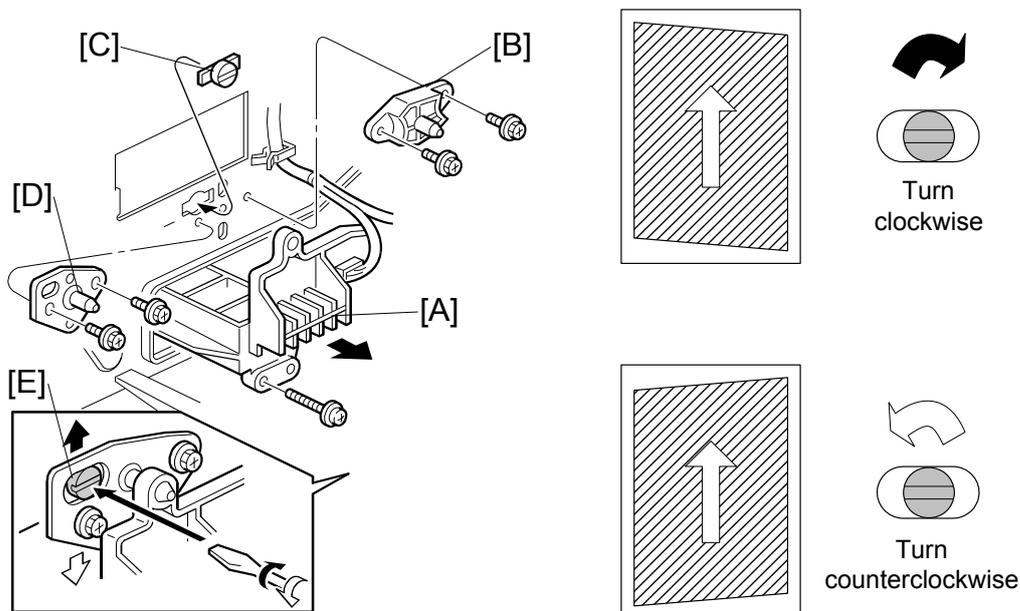
**Main Scan Magnification**

1. Use SP2-902-3, 5(Grid Pattern) to print a single dot pattern.
2. Check magnification, and then SP2-909-1 (Main Scan Magnification: Copy) to adjust magnification if required. Specification:  $\pm 2\%$ .

**Parallelogram Image Adjustment**

Do the following procedure if a parallelogram prints while adjusting the printing registration or printing margin using a trimming area pattern.

The following procedure should be done after adjusting the side-to-side registration for each paper tray station.



Use SP2-902-3 No. 10 (Trimming Area) to determine whether a parallelogram image appears. If the parallelogram pattern appears, perform the following procedure.

1. Laser unit [A]
2. Bracket [B] (⚙️ x2)
3. Install adjustment cam [C] (P/N: A2309003)
4. Secure positioning pin [D] (P/N A2309004) with the two screws removed with the bracket [B]. Do not tighten the screws at this time.
5. To adjust the position of the laser unit [E].
  - 1) Adjust the laser unit position by turning the adjustment cam. (See the illustration above.)
  - 2) Tighten the adjustment bracket.
  - 3) Print the trimming area pattern to check the image. If the results are not satisfactory, repeat step 5.

### 3.21.2 SCANNING

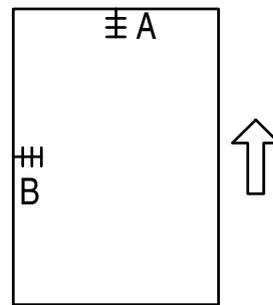
Before doing the following scanner adjustments, perform or check the printing registration/side-to-side adjustment and the blank margin adjustment.

**NOTE:** Use an OS-A3 test chart to perform the following adjustments.

#### ***Registration: Platen Mode***

1. Place the test chart on the exposure glass and make a copy from one of the feed stations.
2. Check the leading edge and side-to-side registration, and adjust them with the following SP modes if necessary.

	<b>SP mode</b>
Leading Edge	SP4-010
Side-to-side	SP4-011



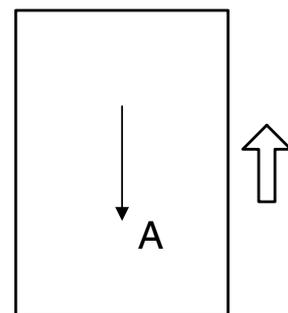
A: Leading Edge Registration  
B: Side-to-side Registration

#### ***Magnification***

Use an OS-A3 test chart to perform the following adjustment.

#### ***Sub Scan Magnification***

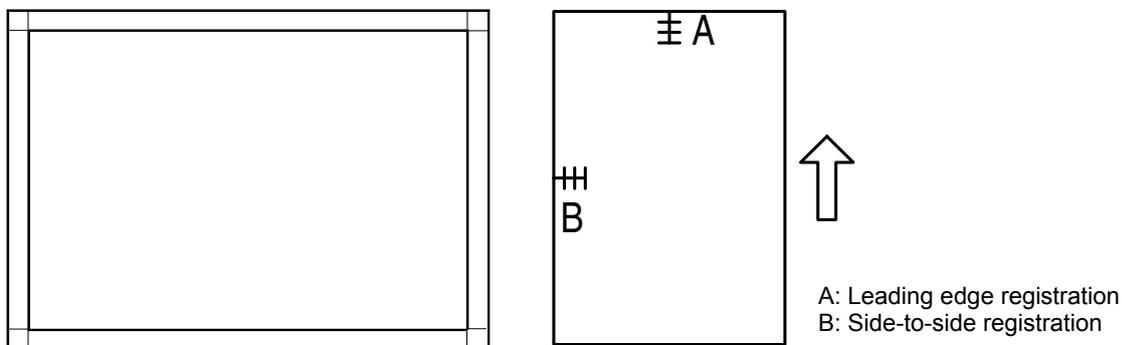
1. Place the test chart on the exposure glass and make a copy from one of the feed stations.
2. Check the magnification ratio. Use SP4-008 (Scanner Sub Scan Magnification) to adjust if necessary. Specification:  $\pm 0.9\%$ .



A: Main scan magnification

### 3.21.3 ADF IMAGE ADJUSTMENT

#### Registration



Replacement  
Adjustment

1. Make a temporary test chart as shown above using A3/DLT paper.
2. Place the temporary test chart on the ADF and make a copy from one of the feed stations.
3. Check the registration, and adjust using the following SP modes if necessary.

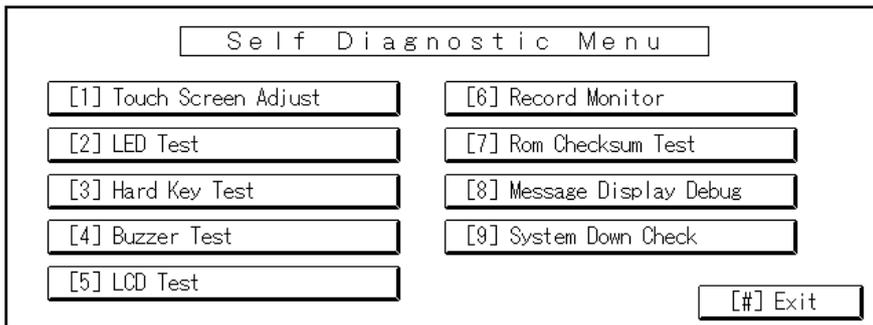
SP Code	What It Does	Adjustment Range
SP6-006-1	Side-to-Side Registration	±3.0 mm
SP6-006-2	Leading Edge Registration (Simplex)	±3.0 mm
SP6-006-3	Leading Edge Registration (Duplex: Front)	±4.2 mm
SP6-006-4	Leading Edge Registration (Duplex: Back)	±4.2 mm
SP6-006-5	Rear Edge Erase	±2.0 mm

### 3.21.4 TOUCH SCREEN CALIBRATION

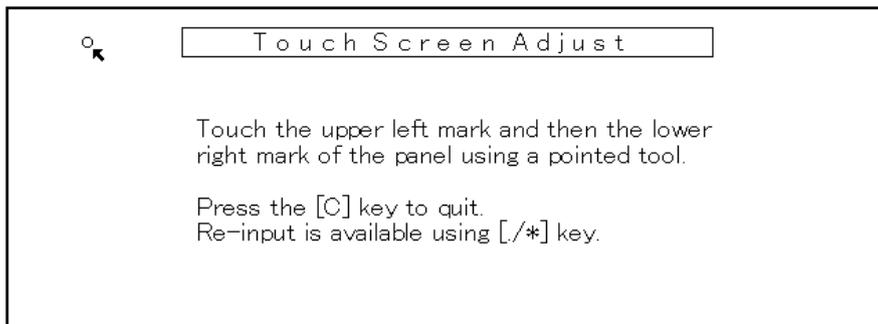
After clearing the memory, or if the touch panel detection function is not working correctly, follow this procedure to calibrate the touch screen.

**NOTE:** Do not attempt to use items [2] to [9] on the Self-Diagnostic Menu. These items are for design use only.

1. Press , press **1****9****9****3**, and then press **C** 5 times to open the Self-Diagnostics menu.



2. On the touch screen press “Touch Screen Adjust” (or press **1**).



3. Use a pointed (not sharp!) tool to press the upper left mark .
4. Press the lower right mark  after it appears.
5. Touch a few spots on the touch panel to confirm that the marker (+) appears exactly where the screen is touched.  
If the + mark does not appear where the screen is touched, press Cancel and repeat from Step 2.
6. When you are finished, press [#] OK on the screen (or press **#**).
7. Touch [#] Exit on the screen to close the Self-Diagnostic menu and save the calibration settings.

# TROUBLESHOOTING

TROUBLESHOOTING REVISION HISTORY		
Page	Date	Added/Updated/New
		None



## 4. TROUBLESHOOTING

### 4.1 SERVICE CALL CONDITIONS

#### 4.1.1 SUMMARY

There are 4 levels of service call conditions.

Level	Definition	Reset Procedure
A	To prevent damage to the machine, the main machine cannot be operated until the SC has been reset by a service representative (see the note below).	Enter SP mode, and then turn the main power switch off and on.
B	SCs that disable only the features that use the defective item. Although these SCs are not shown to the user under normal conditions, they are displayed on the operation panel only when the defective feature is selected.	Turn the operation switch or main switch off and on.
C	The SC history is updated. The machine can be operated as usual.	The SC will not be displayed. Only the SC history is updated.
D	Turning the main switch off then on resets SCs displayed on the operation panel. These are re-displayed if the error occurs again.	Turn the operation switch off and on.

#### When a Level “D” SC code occurs

When a Level D SC occurs, a screen opens on the operation panel to tell the operator:

- An error occurred
- The job in progress will be erased
- The machine will reboot automatically after approximately 30 seconds.

The operator can wait until the machine reboots automatically or touch “Reset” on the screen to reset the machine immediately and go back to the copy screen.

#### If the operator does not touch “Reset”

The next message tells the operator that the machine will reset automatically and that the previous job was lost and must be started again. After reading the message, the operator touches “Confirm” on the screen. The next screen shows the number and title of the SC code, and stops until the operator turns the machine off and on.

#### If the operator touches “Reset”

If the operator touches "Reset" to bypass the 30-second interval for the machine to reboot, the machine reboots immediately and the operation panel displays the copy screen.

#### Important

- Do not try to use the operation panel during an automatic reboot.
- If the Remote Service System is in use, the SC code is sent immediately to the Service Center

## 4.1.2 SC CODE DESCRIPTIONS

### Important

- If a problem concerns a circuit board, disconnect and reconnect the connectors and then test the machine. Often a loose or disconnected harness is the cause of the problem. Always do this before you decide to replace the PCB.
- If a motor lock error occurs, check the mechanical load before you decide to replace the motor or sensors.
- When a Level “A” or “B” SC occurs while in an SP mode, the machine cannot display the SC number. If this occurs, check the SC number after leaving the SP mode.
- The machine reboots automatically when the machine issues a Level “D” SC code. This is done for Level “D” SC codes only.

### CAUTION

**Never turn off the main power switch when the power LED is lit or flashing. To avoid damaging the hard disk or memory, press the operation switch to switch the power off, wait for the power LED to go off, and then switch the main power switch off.**

**NOTE:** The main power LED () lights or flashes while the platen cover or ARDF is open, while the main machine is communicating with a facsimile or the network server, or while the machine is accessing the hard disk or memory for reading or writing data.

## SERVICE CALL CONDITIONS

101	D	Exposure lamp error	<ul style="list-style-type: none"> <li>• Exposure lamp defective</li> <li>• Lamp stabilizer defective</li> <li>• Exposure lamp connector defective</li> <li>• Standard white plate dirty</li> <li>• Scanner mirror or scanner lens out of position or dirty</li> <li>• SBU defective</li> </ul>
		The standard white level was not detected properly when scanning the white plate.	
120	D	Scanner home position error 1	<ul style="list-style-type: none"> <li>• SIB or scanner drive motor defective</li> <li>• Scanner motor defective</li> <li>• Harness between SIB and scanner drive motor disconnected</li> <li>• Harness between SIB and scanner drive motor power source disconnected</li> <li>• Scanner HP sensor defective</li> <li>• Harness between SIB and HP sensor disconnected</li> <li>• Scanner wire, timing belt, pulley, or carriage defective</li> </ul>
		The scanner home position sensor does not detect the on condition during initialization or copying.	
121	D	Scanner home position error 2	<ul style="list-style-type: none"> <li>• SIB or scanner motor drive board defective</li> <li>• Scanner motor defective</li> <li>• Harness between SIB and scanner drive motor disconnected</li> <li>• Harness between SIB and scanner drive motor power source disconnected</li> <li>• Scanner HP sensor defective</li> <li>• Harness between SIB and scanner HP sensor disconnected</li> <li>• Scanner wire, timing belt, pulley, or carriage defective</li> </ul>
		The scanner home position sensor does not detect the off condition during initialization or copying.	
143	C	SBU auto adjust error	<ul style="list-style-type: none"> <li>• Exposure lamp defective</li> <li>• Lamp stabilizer defective</li> <li>• Lamp stabilizer connection loose, disconnected or damaged</li> <li>• White plate mounting is incorrect or defective</li> <li>• Scanner mirror or scanner lens out of position or dirty</li> <li>• SBU defective</li> <li>• BICU (Ri10) defective</li> <li>• SIB defective</li> <li>• Harness connections between SIB and SBU loose, disconnected, or damaged.</li> </ul>
		One of the following occurred: When the machine was powered on, automatic adjustment of the SBU failed. Automatic white density adjustment failed when reading standard white plate.	

Trouble-shooting

## SERVICE CALL CONDITIONS

144	B	SBU communication error	<ul style="list-style-type: none"> <li>Flat film or harness connectors between the SBU and SIB are loose, disconnected, or damaged</li> <li>Replace SBU</li> <li>Replace BICU</li> </ul>
		Immediately after power on, the operation check done by the SIB for the SBU failed because the SBU was not operating normally.	
165	B	Copy Data Security Unit error	<ul style="list-style-type: none"> <li>The Copy Data Security Unit card not installed</li> <li>The Copy Data Security Unit card is installed, but it is not the correct type for the machine.</li> </ul>
		An error occurred when the machine attempted to set the Copy Data Security Unit SD card.	

302	D	Charge roller current leak	<ul style="list-style-type: none"> <li>Charge roller damaged</li> <li>High voltage supply board defective</li> <li>PCU harness defective or disconnected</li> </ul>
		A charge roller current leak signal was detected.	
304	D	Charge roller current correction error	<ul style="list-style-type: none"> <li>ID sensor defective</li> </ul>
		The charge roller bias correction is performed twice even if the maximum charge roller bias (-2000V) is applied to the roller.	
321	D	F-Gate error: No laser writing signal	<ul style="list-style-type: none"> <li>BICU board defective</li> <li>PCI harness between the controller board and the BICU defective or disconnected</li> </ul>
		The laser writing signal (F-GATE) does not go to LOW for more than 30 seconds after the copy paper reaches the registration sensor.	
322	D	Synchronization error	<ul style="list-style-type: none"> <li>Laser synchronization board connectors loose, disconnected, or damaged</li> <li>Laser synchronization board defective</li> <li>LD drive board defective</li> </ul>
		The synchronization signal was not issued within 500 ms after the LD fired while the polygon motor was turning at the prescribed number of revolutions.	
323	D	LD drive current too high	<ul style="list-style-type: none"> <li>LD unit defective (not enough power, due to aging)</li> <li>Poor connection between the LD unit and the BICU board</li> <li>BICU defective</li> </ul>
		The LD drive board applies more than 100 mA to the LD.	
327	D	LD unit home position error 1	<ul style="list-style-type: none"> <li>HP sensor/harness defective</li> <li>LD unit home position sensor defective</li> <li>LD positioning motor harness defective</li> <li>LD unit movement blocked because of incorrect connector routing</li> </ul>
		The LD unit home position sensor does not detect an on condition when the LD unit moves to its home position.	
328	D	LD unit home position error 2	<ul style="list-style-type: none"> <li>HP sensor/harness defective</li> <li>LD positioning/harness motor defective</li> <li>LD unit movement blocked because of incorrect connector routing</li> </ul>
		The LD unit home position sensor does not detect an off condition when the LD unit moves from its home position.	

SERVICE CALL CONDITIONS

329	D	LD unit beam pitch adjusted incorrectly	<ul style="list-style-type: none"> <li>• After initialization of the SP modes, SP2-109-3 or SP2-109-4 was not executed.</li> <li>• The harness is blocking the LD drive (PCB), preventing adjustment of the pitch.</li> </ul>
		The LD unit HP sensor does not detect the ON condition while changing the LD unit position for correcting the LD position or changing the dpi.	
335	D	Polygon motor error 1: On timeout	<ul style="list-style-type: none"> <li>• Polygon motor drive board I/F harness loose, disconnected, or damaged</li> <li>• Polygon motor drive board defective</li> <li>• Polygon motor defective</li> </ul>
		The XSCRDY signal did not go LOW (Active) within 10 sec. after the polygon motor was turned on.	
336	D	Polygon motor error 2: Off timeout	<ul style="list-style-type: none"> <li>• Polygon motor drive board I/F harness loose, disconnected, or damaged</li> <li>• Polygon motor drive board defective</li> <li>• Polygon motor defective</li> </ul>
		The XSCRDY signal did not go HIGH (Inactive) within 3 sec. after the polygon motor was turned off.	
337	D	Polygon motor error 3: XSCRDY signal error	<ul style="list-style-type: none"> <li>• Polygon motor drive board I/F harness loose, disconnected, or damaged</li> <li>• Polygon motor drive board defective</li> <li>• Polygon motor defective</li> </ul>
		The XSCRDY signal did not go HIGH (Inactive) after the polygon motor had been rotating normally for 200 ms.	
338	D	Polygonal Mirror Motor Error 4: Unstable Timeout	<ul style="list-style-type: none"> <li>• I/F harness of the polygonal mirror motor disconnected or defective.</li> <li>• Polygonal mirror motor or polygonal mirror motor driver defective.</li> <li>• Polygonal mirror motor drive pulse is not output incorrectly.</li> </ul>
		The XSCRDY signal is detected LOW (Active) after the polygonal mirror motor switches on, but the signal is not detected LOW after 1 s has elapsed, and not detected after another 500 ms has elapsed.	
350	D	ID sensor pattern test error	<ul style="list-style-type: none"> <li>• ID sensor defective</li> <li>• ID sensor connector defective</li> <li>• Poor ID sensor connector connection</li> <li>• I/O board (IOB) defective</li> <li>• Poor writing of ID sensor pattern on the drum</li> <li>• High voltage supply board defective</li> <li>• ID sensor dirty</li> </ul>
		One of the following readings occurred 10 times in the ID sensor output when the ID sensor pattern was checked: 1) $V_{sp} \geq 2.5V$ 2) $V_{sg} \leq 2.5V$ 3) $V_{sp} = 0V$ 4) $V_{sg} = 0V$	
351	D	ID sensor Vsg test error	<ul style="list-style-type: none"> <li>• ID sensor defective</li> <li>• ID sensor connector defective</li> <li>• Poor ID sensor connection</li> <li>• I/O board (IOB) defective</li> <li>• Scanning system defective</li> <li>• High voltage supply board defective</li> <li>• ID sensor dirty</li> <li>• Defect at the ID sensor pattern writing area of the drum</li> </ul>
		When the ID sensor was checked, the ID sensor output voltage was 5.0V while the PWM signal input to the ID sensor was 0.	

Trouble-shooting

## SERVICE CALL CONDITIONS

352	D	ID sensor, pattern edge detect error	<ul style="list-style-type: none"> <li>• ID sensor defective</li> <li>• ID sensor connector defective</li> <li>• Poor ID sensor connector connection</li> <li>• I/O board (IOB) defective</li> <li>• High voltage supply board defective</li> <li>• Dirty ID sensor</li> <li>• Defect at the ID sensor pattern writing area of the drum</li> </ul>
		The ID sensor pattern edge voltage is detected to be not 2.5V twice consecutively during an 800 ms interval.	
353	D	ID sensor, LED current abnormal at initialization	<ul style="list-style-type: none"> <li>• ID sensor defective</li> <li>• ID sensor harness defective</li> <li>• ID sensor connector defective</li> <li>• Poor ID sensor connection</li> <li>• I/O board (IOB) defective</li> <li>• Exposure system defective</li> <li>• High voltage supply board defective</li> <li>• Dirty ID sensor</li> </ul>
		<p>One of the following ID sensor output voltages is detected at ID sensor initialization.</p> <p>1) <math>V_{sg} &lt; 4.0V</math> when the maximum PWM input (255) is applied to the ID sensor.</p> <p>2) <math>V_{sg} \geq 4.0V</math> when the minimum PWM input (0) is applied to the ID sensor.</p>	
354	D	ID sensor timeout abnormal at adjustment	<ul style="list-style-type: none"> <li>• ID sensor defective</li> <li>• ID sensor harness defective</li> <li>• ID sensor connector defective</li> <li>• I/O board (IOB) defective</li> <li>• Exposure system defective</li> <li>• Poor ID sensor connector connection</li> <li>• High voltage supply board defective</li> <li>• Dirty ID sensor</li> </ul>
		$V_{sg}$ falls out of the adjustment target ( $4.0 \pm 0.2V$ ) at the start of $V_{sg}$ checking after 20 seconds	
390	D	TD sensor error: Test value abnormal	<ul style="list-style-type: none"> <li>• TD sensor defective</li> <li>• TD sensor not connected or connector damaged</li> <li>• Poor connection between the TD sensor and the I/O board (IOB)</li> <li>• I/O board (IOB) defective</li> <li>• Toner supply defective</li> </ul>
		The TD sensor output voltage is less than 0.5V or more than 5.0V after 10 consecutive times during copying.	
391	D	TD sensor error: Auto adjust error	<ul style="list-style-type: none"> <li>• TD sensor abnormal</li> <li>• TD sensor disconnected</li> <li>• Poor TD sensor connection</li> <li>• I/O board (IOB) defective</li> <li>• Toner supply defective</li> </ul>
		During automatic adjustment of the TD sensor, output voltage is less than 1.8V or more than 4.8V during TD sensor initial setting.	
395	D	Development output abnormal	<ul style="list-style-type: none"> <li>• High voltage supply board defective</li> <li>• Poor connection at the development bias terminal</li> <li>• Poor connection at the high voltage supply board</li> </ul>
		A development bias leak signal is detected. High voltage output to the development unit exceeded the upper limit (65%) for 60 ms.	

## SERVICE CALL CONDITIONS

401	D	Transfer roller leak detected	<ul style="list-style-type: none"> <li>• High voltage supply board defective</li> <li>• Poor cable connection or defective cable</li> <li>• Transfer connector defective</li> </ul>
		A transfer roller current leak signal is detected.	
402	D	Transfer roller open error	<ul style="list-style-type: none"> <li>• High voltage supply board defective</li> <li>• Transfer connector cable defective</li> <li>• Transfer connector defective</li> <li>• Poor PCU connection</li> </ul>
		The transfer roller current feedback signal is not detected.	
403	D	Transfer belt position sensor error	<ul style="list-style-type: none"> <li>• Main motor/drive malfunction</li> <li>• Transfer belt contact clutch defective</li> <li>• Transfer belt position sensor defective</li> <li>• Harness disconnected</li> </ul>
		The transfer belt position sensor does not activate even if the transfer belt contact clutch has been switched on twice and rotated once.	
405	D	Transfer belt error	<ul style="list-style-type: none"> <li>• Main motor/drive malfunction</li> <li>• Transfer belt position sensor defective</li> <li>• Poor transfer belt position sensor connection</li> <li>• Transfer belt contact clutch defective</li> </ul>
		The transfer belt does not move away from the drum during ID sensor pattern checking.	
440	D	Main motor lock	<ul style="list-style-type: none"> <li>• Physical overload on drive mechanism</li> <li>• Main motor drive board (PCB) defective</li> </ul>
		The PLL lock signal remained HIGH while the main motor was off, and when the motor was turned on, the signal remained LOW for 2 sec.	
450	D	Feed Development Motor Error	<ul style="list-style-type: none"> <li>• Motor lock caused by physical overload.</li> <li>• Motor drive board (PCB) defective.</li> </ul>
		The PLL lock signal remained HIGH while the feed development motor was off, and when the motor was turned on, the signal remained LOW for 2 sec.	
490	D	Exhaust fan motor lock	<ul style="list-style-type: none"> <li>• Too much load on the drive mechanism</li> <li>• Exhaust fan motor defective or a loose object is interfering with the fan</li> <li>• Poor fan motor connector connection</li> </ul>
		An exhaust fan motor lock signal is not detected within 5 seconds after the exhaust fan motor turns on.	
492	D	Cooling fan motor lock	<ul style="list-style-type: none"> <li>• Too much load on the drive mechanism</li> <li>• Cooling fan motor defective or a loose object is interfering with the fan</li> <li>• Poor fan motor connector connection</li> </ul>
		A cooling fan motor lock signal is not detected within 5 seconds after the cooling fan motor turns on.	

**Trouble-shooting**

SERVICE CALL CONDITIONS

501	B	1st tray lift malfunction	<ul style="list-style-type: none"> <li>• Lift motor malfunction or disconnected</li> <li>• Height sensor abnormal, or connector loose</li> <li>• Loose paper or object between the tray and motor</li> <li>• Pick-up arm malfunction</li> </ul>
		<p>The paper height sensor is not activated after the tray lift motor has been on for 10 seconds. If the main power switch is turned on when the paper is already at the feed height, the paper height position is detected again. At this time, the paper height sensor should de-activate within 5 seconds after the paper bottom plate starts to drop. If it does not deactivate within 5 s four times consecutively, a message will prompt the user to reset Tray 1. After two attempts to release the error by re-setting the paper tray, if this does not solve the problem then this SC is displayed.</p>	
502	B	2nd tray lift malfunction	<ul style="list-style-type: none"> <li>• Lift motor abnormal or disconnected</li> <li>• Height sensor defective or disconnected</li> <li>• Loose paper or object between the tray and motor</li> <li>• Pick-up arm malfunction</li> </ul>
		<p>The paper height sensor is not activated after the tray lift motor has been on for 10 seconds. If the main power switch is turned on when the paper is already at the feed height, the paper height position is detected again. At this time, the paper height sensor should de-activate within 5 seconds after the paper bottom plate starts to drop. If it does not deactivate within 5 s four times consecutively, a message will prompt the user to reset Tray 2. After two attempts to re-set the paper tray, if this does not solve the problem then this SC is displayed.</p>	
503	B	3rd tray lift malfunction (optional paper tray unit)	<ul style="list-style-type: none"> <li>• Tray lift motor defective or disconnected</li> <li>• Height sensor defective or disconnected</li> </ul>
		<p>The paper height sensor is not activated after the tray lift motor has been on for 13 seconds. If the main power switch is turned on when the paper is already at the feed height, the paper height position is detected again. At this time, the paper height sensor should de-activate within 5 seconds after the paper bottom plate starts to drop. If it does not deactivate within 5 s four times consecutively, the tray lift motor halts. After two attempts to re-set the paper tray, if this does not solve the problem, then this SC is displayed and tray control halts.</p>	
504	B	4th tray lift malfunction (optional paper tray unit)	<ul style="list-style-type: none"> <li>• Tray lift motor defective or disconnected</li> <li>• Height sensor defective or disconnected</li> </ul>
		<p>The paper height sensor is not activated after the tray lift motor has been on for 13 seconds. If the main power switch is turned on when the paper is already at the feed height, the paper height position is detected again. At this time, the paper height sensor should de-activate within 5 seconds after the paper bottom plate starts to drop. If it does not deactivate within 5 s four times consecutively, the tray lift motor halts. After two attempts to re-set the paper tray, if this does not solve the problem, then this SC is displayed and tray control halts.</p>	
506	B	Paper tray unit main motor lock (optional paper tray)	<ul style="list-style-type: none"> <li>• Paper tray unit main motor defective</li> <li>• Paper tray unit main motor connection loose</li> <li>• Too much load on the drive mechanism</li> </ul>
		<p>A main motor lock signal is detected for more than 50 ms during rotation.</p>	

SERVICE CALL CONDITIONS

507	B	LCT main motor lock	<ul style="list-style-type: none"> <li>• LCT main motor defective</li> <li>• Paper tray unit main motor connection loose</li> <li>• Too much load on the drive mechanism</li> </ul>
		A main motor lock signal is detected for more than 50 ms during rotation.	
510	B	LCT tray malfunction	<ul style="list-style-type: none"> <li>• LCT lift motor defective or disconnected.</li> <li>• Upper limit sensor defective or disconnected</li> <li>• Pick-up solenoid defective or disconnected</li> <li>• Paper end sensor defective</li> </ul>
		<ol style="list-style-type: none"> <li>1) One of the following has occurred:</li> <li>2) The LCT lift sensor does not activate for more than 18 seconds after the LCT lift motor turned on.</li> <li>3) The LCT lower limit sensor does not activate for more than 18 seconds after the LCT lift motor turned on.</li> <li>4) The LCT lift sensor is already activated when the LCT lift motor turns on.</li> <li>5) After the paper end sensor is actuated while the tray is raising, the upper limit sensor is not actuated within 5 s. A message is displayed to remind the user to set the paper and tray control halts. Resetting the display is done by opening and closing the LCT door.</li> <li>6) The state has been detected 3 times in succession.</li> </ol>	
520	D	Fusing/Feed-Out Motor Error	<ul style="list-style-type: none"> <li>• Motor lock caused by physical overload.</li> <li>• Motor drive board (PCB) defective.</li> </ul>
		The PLL lock signal remained HIGH while the fusing/feed-out motor was off, and when the motor was turned on, the signal remained LOW for 2 sec.	
541	A	Fusing thermistor open	<ul style="list-style-type: none"> <li>• Fusing thermistor disconnected</li> <li>• Fusing thermistor connector defective</li> <li>• Fusing thermistor damaged or warped</li> <li>• Fusing temperature –15% less than the standard input voltage</li> </ul>
		The fusing temperature detected by the thermistor was below 7°C (44.6°F) for 5 seconds, or 2 seconds after reaching 45°C (113°F) the temperature does not reach an additional 15°C (59°F) after checking five times at 0.1 intervals.	
542	A	Fusing temperature warm-up error	<ul style="list-style-type: none"> <li>• Fusing lamp defective</li> <li>• Poor fusing unit connector</li> <li>• Thermistor warped or broken</li> <li>• Thermostat has tripped</li> <li>• BICU defective</li> <li>• Power supply board defective</li> </ul>
		The fusing temperature does not reach the fusing standby temperature of 45°C (113°F) within 9 seconds [for the B291/B296 (35 cpm)]/14 seconds [for the B295/B297 (45 cpm)] after switching on the main power or closing the front cover, or 40 seconds after reaching 50°C the fusing roller does not reach warm-up temperature.	
543	A	Fusing overhear error (software detection)	<ul style="list-style-type: none"> <li>• Power supply unit defective</li> <li>• I/O board (IOB) defective</li> <li>• BICU defective</li> <li>• Fusing thermistor defective</li> </ul>
		A fusing temperature of over 230°C (446°F) is detected for 5 seconds by the fusing thermistors at the center or at either end of the fusing roller.	

Trouble-shooting

## SERVICE CALL CONDITIONS

544	A	Fusing overheat error (hardware circuit detection)	<ul style="list-style-type: none"> <li>• Power supply unit defective</li> <li>• I/O board (IOB) defective</li> <li>• BICU defective</li> <li>• Fusing thermistor defective</li> </ul>
		The dual monitoring circuitry of the BICU detects extremely high temperature and tripped the relay circuit off.	
545	A	Fusing lamp remains on	<ul style="list-style-type: none"> <li>• Thermistor is out of position.</li> </ul>
		After warm-up the fusing lamp remains at full power for 10 seconds without the hot roller rotating.	
546	A	Fusing ready temperature unstable	<ul style="list-style-type: none"> <li>• Thermistor connection loose</li> <li>• Fusing unit connector loose</li> </ul>
		The fusing temperature is fluctuating.	
547	D	Zero cross signal error	<ul style="list-style-type: none"> <li>• Switch the main switch off and on</li> <li>• Defective fusing relay, replace the PSU</li> </ul>
		One of the following occurred: 1) The fusing relay remained off for 50 ms after power on and continued to remain off after 3 attempts to detect the zero-cross signal. 2) During 11 zero-cross signal detections, two zero-cross signal detections were below 44 Hz. 3) The zero-cross signal could not be detected within 3 sec. after the fusing relay switched on.	
548	A	Fusing unit installation error	<ul style="list-style-type: none"> <li>• Fusing unit is not installed</li> <li>• Fusing unit connection loose</li> </ul>
		The machine cannot detect the fusing unit when the front cover and right cover are closed.	
557	C	Zero-cross frequency over	<ul style="list-style-type: none"> <li>• Noise on the ac power line</li> </ul>
		The applied power ac frequency was detected less than 66 Hz more than 10 times, or less than 44 Hz one time.	

559	A	Fusing unit jam	<ul style="list-style-type: none"> <li>• Remove the paper that is stopped in the fusing unit.</li> <li>• Check that the fusing unit is clean and has no obstacles in the paper feed path.</li> <li>• If the error persists, replace the fusing unit</li> </ul>
		The fusing exit sensor detected a fusing unit paper late jam three times. The paper was late and the fusing exit sensor could not detect the paper three times.	

### Important

- SC559 code does not operate until SP1159 has been set to "1" (ON). This sets the machine to count the number of occurrences of paper late jams in the fusing unit. The default setting is "0" (OFF).
- SC559 is issued after the third occurrence of a paper late jam in the fusing unit. Once this SC has been issued, the machine cannot be used until the service technician removes the cause of the jam and restores it to normal operation.
- The jam counter is reset after a sheet of paper successfully passes the fusing exit sensor after the cause of the jam has been removed.

## SERVICE CALL CONDITIONS

599	D	1-Bin tray motor lock	<ul style="list-style-type: none"> <li>• 1-bin tray motor locked from overload</li> <li>• 1-bin tray motor defective</li> <li>• 1-bin tray motor connection loose</li> </ul>
		A 1-bin tray motor lock signal is not detected for more than 300 ms during rotation.	

601	D	Communication error between BICU and scanner unit	<ul style="list-style-type: none"> <li>• Serial line connecting the BICU and SIB defective</li> <li>• External noise on the serial line</li> <li>• SIB board defective</li> <li>• BICU board defective</li> </ul>
		Within 800 ms after power on, after 3 attempts the BICU does not communicate with the SIB via the serial line.	
610	D	Communication timeout error between BICU and ADF	<ul style="list-style-type: none"> <li>• BICU board and ADF main board serial line connection defective</li> <li>• External noise</li> <li>• ADF main board defective</li> <li>• BICU board defective</li> </ul>
		The BICU cannot receive a response within 100 ms after 3 attempts after sending data to the ARDF.	
611	D	Communication break error between BICU and ADF	<ul style="list-style-type: none"> <li>• Serial line connecting BICU and ADF unstable</li> <li>• External noise</li> <li>• ADF main board defective</li> <li>• BICU board defective</li> </ul>
		The BICU receives a break signal from the ADF main board.	
612	D	Communication command error between BICU and ADF	<ul style="list-style-type: none"> <li>• Abnormal operation performed by software</li> </ul>
		The BICU sends a command to the ADF main board that it cannot execute.	
620	D	Communication timeout error between BICU and finisher or mailbox	<ul style="list-style-type: none"> <li>• Serial line connecting BICU and finisher unstable</li> <li>• External noise</li> <li>• BICU board and finisher main board connection defective or loose</li> <li>• Finisher main board defective</li> <li>• BICU board defective</li> </ul>
		The BICU cannot receive a response within 100 ms after 3 attempts after sending data to the finisher or mailbox.	
621	D	Communication timeout error between BICU and finisher or mailbox	<ul style="list-style-type: none"> <li>• Serial line connecting BICU and finisher unstable</li> <li>• External noise</li> </ul>
		A break (low) signal was received from the finisher or the mailbox.	
623	D	Communication timeout error between BICU and paper tray unit	<ul style="list-style-type: none"> <li>• Serial line connecting BICU and paper tray unit unstable</li> <li>• External noise</li> <li>• BICU board and paper tray main board connection defective or loose</li> <li>• Paper tray main board defective</li> <li>• BICU board defective</li> </ul>
		The BICU cannot receive a response within 100 ms after 3 attempts after sending data to the paper tray unit.	
624	D	Communication break error between BICU and paper tray unit	<ul style="list-style-type: none"> <li>• Serial line connecting BICU and paper tray unit unstable</li> <li>• External noise</li> <li>• BICU board and LCT main board connection defective or loose</li> <li>• Optional paper feed unit interface board defective</li> <li>• BICU board defective</li> </ul>
		The BICU cannot communicate with the paper tray unit normally as a result of receiving a break signal.	

Trouble-shooting

SERVICE CALL CONDITIONS

626	D	Communication timeout error between BICU and LCT	<ul style="list-style-type: none"> <li>• Serial line connecting BICU and LCT unit unstable</li> <li>• External noise</li> <li>• BICU board and LCT main board connection defective or loose</li> <li>• LCT interface board defective</li> <li>• BICU board defective</li> </ul>
		The BICU cannot receive a response within 100 ms after 3 attempts after sending data to the LCT.	
627	D	Communication break error between BICU and LCT	<ul style="list-style-type: none"> <li>• Serial line connecting BICU and LCT unit unstable</li> <li>• External noise</li> <li>• BICU board and LCT main board connection defective or loose</li> <li>• LCT interface board defective</li> <li>• BICU board defective</li> </ul>
		The BICU cannot communicate with the LCT unit normally as a result of receiving a break signal.	
630	D	Communication failure with CSS (RSS)	<ul style="list-style-type: none"> <li>• Occurred with a SC call, CC call, Supply Management call, User call, or CE call.</li> <li>• Timeout while no response from the LADP, and signal on the RS-485 line between PI and LADP is abnormal.</li> </ul>
		The communication from the copier was detected as abnormal at the CSS center. This error occurs when the acknowledge signal from the LADP does not complete normally.	
632	B	Key/card counter device error 1	<ul style="list-style-type: none"> <li>• The serial line from the device to the copier is unstable, disconnected, or defective.</li> </ul>
		After 1 data frame is sent to the device, an ACK signal is not received within 100 ms, and is not received after 3 retries.	
633	B	Key/card counter device error 2	<ul style="list-style-type: none"> <li>• The serial line from the device to the copier is unstable, disconnected, or defective.</li> </ul>
		During communication with the device, the BCU received a break (Low) signal.	
634	B	Key/card counter device error 3	<ul style="list-style-type: none"> <li>• Replace the RAM backup battery.</li> </ul>
		The backup battery of the counter device RAM is low.	
635	B	Key/card counter device error 4	<ul style="list-style-type: none"> <li>• Device control board defective</li> <li>• Device control board backup battery defective</li> </ul>
		After installation of the device a message alerts user to a battery voltage abnormal error.	
640	C	BICU-to-Controller Data Transfer Error 1: Sum Check Error	<ul style="list-style-type: none"> <li>• No action required</li> <li>• The log count increments by one for every error</li> </ul>
		The system detected an error during sum check for data transfer from the BICU to the controller board. <b>Note:</b> This error is simply logged and the machine does not return an error number on the display.	
641	C	BICU-to-Controller Data Transfer Error 2: Frame Error	<ul style="list-style-type: none"> <li>• No action required</li> <li>• The log count increments by one for every error</li> </ul>
		The system detected an error after data was sent from the BICU to the controller board.	

## SERVICE CALL CONDITIONS

670	D	Engine startup error	
		The BCU failed to respond with the prescribed time when the machine was turned on.	<ul style="list-style-type: none"> <li>• Connections between BCU and controller board are loose, disconnected, or damaged</li> <li>• Replace the BCU</li> <li>• Replace the controller board</li> </ul>
672	D	Controller startup error	
		<ul style="list-style-type: none"> <li>• After power on, the line between the controller and the operation panel did not open for normal operation.</li> <li>• After normal startup, communication with the controller stopped.</li> </ul>	<ul style="list-style-type: none"> <li>• Controller stalled</li> <li>• Controller installed incorrectly</li> <li>• Controller board defective</li> <li>• Operation panel harness disconnected or defective</li> </ul>
692	D	GAVD block I2C bus error	
		The I2C bus is defective.	<ul style="list-style-type: none"> <li>• Replace the BICU.</li> </ul>

700	D	ARDF original pick-up malfunction	Original stopper HP sensor (output abnormal) Pick-up motor defective (not rotating) Timing belt out of position <ul style="list-style-type: none"> <li>• ADF main board defective</li> </ul>
		After the pick-up motor is turned on, the original stopper HP sensor is not detected.	
701	D	ARDF original pick-up/paper lift mechanism malfunction	<ul style="list-style-type: none"> <li>• Original pick-up HP sensor defective.</li> <li>• Pick-up motor defective</li> <li>• ADF main board defective</li> </ul>
		The original pick-up HP sensor does not activate three times consecutively after the pick-up motor has turned on.	
722	B	Finisher jogger motor error	<ul style="list-style-type: none"> <li>• Jogger HP sensor defective</li> <li>• Jogger motor defective</li> </ul>
		The finisher jogger HP sensor does not return to the home position, or move out of the home position, within the specified time.	
724	B	Finisher staple hammer motor error	<ul style="list-style-type: none"> <li>• Staple jam</li> <li>• Stapler overload caused by trying to staple too many sheets</li> <li>• Staple hammer motor defective</li> </ul>
		Stapling does not finish within 600 ms after the staple hammer motor turned on.	
725	B	Finisher stack feed-out motor error	<ul style="list-style-type: none"> <li>• Stack feed-out HP sensor defective</li> <li>• Stack feed-out motor overload</li> <li>• Stack feed-out motor defective</li> </ul>
		The stack feed-out belt HP sensor does not activate within a certain time after the stack feed-out motor turned on.	
726	D	Finisher shift tray 1 lift motor error	<ul style="list-style-type: none"> <li>• Shift motor defective or overloaded</li> <li>• Shift tray lift motor defective or overloaded</li> </ul>
		Tray shift does not finish within the specified time after the shift motor turned on, or the stack height sensor does not activate within the specified time after the shift tray lift motor turned on.	

Trouble-shooting

## SERVICE CALL CONDITIONS

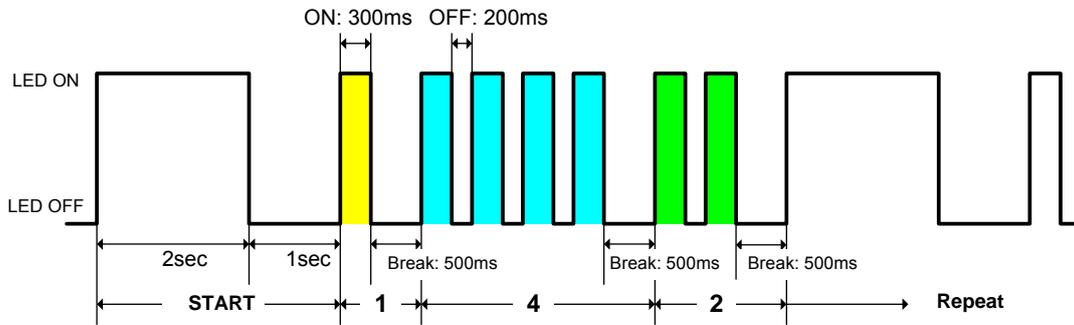
727	B	Finisher stapler rotation motor error	<ul style="list-style-type: none"> <li>• Stapler rotation motor defective or overloaded</li> <li>• Stapler rotation motor connection loose or connector defective</li> </ul>
		Stapler rotation does not finish within the specified time after the staple rotation motor turned on, or the stapler does not return to its home position within the specified time after stapling finished.	
729	B	Finisher punch motor error	<ul style="list-style-type: none"> <li>• Punch motor defective or overloaded</li> <li>• Punch HP sensor defective</li> <li>• Punch motor connection loose or connector defective</li> </ul>
		After the punch motor is turned on, the punch HP sensor does not activate within the specified time.	
730	B	Finisher stapler positioning motor error	<ul style="list-style-type: none"> <li>• Stapler positioning motor defective or overloaded</li> <li>• Stapler HP sensor defective</li> <li>• Stapler positioning motor connection loose or connector defective</li> </ul>
		After the stapler motor is turned on, the stapler does not return to its home position within the specified time, or the stapler HP sensor does not activate within the specified time after the stapler motor is turned on.	
731	D	Finisher exit guide open/close motor error	<ul style="list-style-type: none"> <li>• Finisher exit guide open/close motor defective</li> <li>• Open/close sensor defective</li> </ul>
		After the finisher exit guide open/close motor is turned on, the open/close sensor does not activate within the specified time.	
732	D	Finisher upper tray shift motor error	<ul style="list-style-type: none"> <li>• Upper tray shift motor defective or overloaded</li> <li>• Upper tray shift sensor defective</li> </ul>
		The upper tray shift motor does not stop within the specified time.	
733	D	Finisher lower tray lift motor error	<ul style="list-style-type: none"> <li>• Lower tray lift motor defective or overloaded</li> <li>• Upper stack height sensor defective</li> <li>• Lower tray lower limit sensor defective</li> </ul>
		The stack height sensor does not activate within a certain time period after the lower tray lift motor turned on.	
734	D	Finisher lower tray shift motor error	<ul style="list-style-type: none"> <li>• Lower tray shift motor defective or overloaded</li> <li>• Lower tray shift sensor defective</li> </ul>
		The lower tray shift motor driving the lower tray does not stop within the specified time.	

740	D	Booklet finisher error 1: Not Saddle Stitch	<ul style="list-style-type: none"> <li>• See description below</li> </ul>
741	D	Booklet finisher error 2: Saddle Stitch	

SC740 and SC741 are issued when an error occurs in the 1000-Sheet Saddle-Stitch Finisher B546. Specific details about these SC codes are not displayed on the operation panel display. However, you can determine the specific cause of an error by observing the number of flashes and the lengths of the intervals between flashes.

**To Read SC740/SC741 from LED 2**

1. Remove the upper rear cover.
2. Look at LED 2 and observe the number of flashes and the lengths of the intervals between flashes.



What You See	What It Means
500 ms ON, 500 ms OFF	Finisher operating normally
2 s ON, 1 s OFF	START
Example: 1-4-2	The numbers refer to the flashes and intervals in the illustration above.
1	300ms ON, 500ms OFF
4	300ms ON, 200ms OFF (Repeats 3 times), 300ms ON, 500ms OFF (break)
2	300 ms ON, 200ms OFF, 300 ms ON, 500ms OFF (break)
	Returns to START and repeats (2 s ON, 1 s OFF, then 1-4-2)

Trouble-shooting

SERVICE CALL CONDITIONS

Pattern	Error	Status	Possible Cause
1-1-1	Shutter movement	The shutter position switch does not turn on within 1 second after the transport motor starts to turn in reverse.	<ul style="list-style-type: none"> <li>• Transport motor defective</li> <li>• Shutter position switch defective</li> <li>• Shift tray safety switch defective</li> </ul>
1-1-2		The shutter sensor does not deactivate within 1 second after the transport motor starts to turn in reverse.	
1-1-3		The shutter position switch is off when the shift tray safety switch is off.	
1-2-1	Exit motor	After the exit motor turns on, the exit motor sensor does not send the proper signal to the finisher board.	<ul style="list-style-type: none"> <li>• Exit motor defective</li> <li>• Exit motor sensor defective</li> </ul>
1-2-2		The exit motor sensor does not send the clock signal to the finisher board for certain period while the exit motor is on.	
1-3-1	Upper exit plate movement	The upper exit guide 2 switch does not turn on within 1s after the guide plate motor turns on.	<ul style="list-style-type: none"> <li>• Guide plate motor defective</li> <li>• Upper exit guide 2 switch defective</li> <li>• Upper exit guide sensor defective</li> <li>• Shift tray safety switch defective</li> </ul>
1-3-2		The upper exit guide sensor does not activate within 1s after the guide plate motor turns on.	
1-3-3		The upper exit guide 2 switch does not turn on when the shift tray safety switch is off.	
1-3-4		The guide plate motor sensor does not send the clock signal to the finisher board for certain period while the exit motor is on.	
1-4-1	Jogger motor	After the jogger motor turns on to move the jogger fence from its home position, the jogger HP sensor does not deactivate within 2s.	<ul style="list-style-type: none"> <li>• Jogger motor defective</li> <li>• Jogger HP sensor defective</li> </ul>
1-4-2		After the jogger motor turns on to return the jogger fence to its home position, the jogger HP sensor does not activate within 2s.	
1-5-1	Stapler motor	After the stapler motor turns on to move the stapler unit from its home position, the stapler unit HP sensor does not deactivate within 4s.	<ul style="list-style-type: none"> <li>• Stapler motor defective</li> <li>• Stapler unit HP sensor defective</li> </ul>
1-5-2		After the stapler motor turns on to return the stapler unit to its home position, the stapler unit HP sensor does not activate within 4s.	
1-6-1	Staple hammer motor	The staple hammer HP sensor does not deactivate within 0.5s after the staple hammer motor turns on.	<ul style="list-style-type: none"> <li>• Staple hammer motor defective</li> <li>• Staple hammer HP sensor defective</li> </ul>
1-6-2		The staple hammer HP sensor does not activate within 0.5s after the staple hammer motor turns on.	

SERVICE CALL CONDITIONS

Pattern	Error	Status	Possible Cause
1-7-1	Tray lift motor	The tray lift motor does not stop within 15s after being turned on. The shift tray HP sensor does not activate within 15s after the tray lift motor turns on.	<ul style="list-style-type: none"> <li>• Tray lift motor defective</li> <li>• Lift motor sensor 1 defective</li> <li>• Lift motor sensor 2 defective</li> <li>• Shift tray HP sensor defective</li> <li>• Shift tray upper limit switch defective</li> </ul>
1-7-2		The shift tray upper limit switch turns on while the shift tray is being raised.	
1-7-3		Lift motor sensors 1 & 2 do not send the clock signals to the finisher board every 200ms while the tray lift motor is on.	
1-8-1	Shift tray height sensor	Abnormal communication data between finisher board and shift tray height sensor.	<ul style="list-style-type: none"> <li>• Shift tray height sensor defective</li> <li>• Finisher board defective</li> </ul>
1-8-2		No communication between finisher board and shift tray height sensor for a certain period.	
1-8-3		The finisher board detects a connection error with the connector for the shift tray height sensor.	
1-8-4		Adjustment error during shift tray height sensor adjustment.	
1-9-1	Back-up RAM	The check sum is abnormal when the main switch is turned on.	<ul style="list-style-type: none"> <li>• Finisher board defective</li> </ul>
1-10-1	Communication	Communication error between finisher board and copier mainframe.	<ul style="list-style-type: none"> <li>• Finisher board defective</li> </ul>
1-10-2		Communication error between finisher board and booklet unit board.	<ul style="list-style-type: none"> <li>• Booklet unit board defective</li> <li>• Poor connection of the interface harness</li> </ul>
1-11-1	Positioning plate motor	After the positioning plate motor turns on to move the positioning plate from its home position, the positioning plate HP sensor does not deactivate within 1.25s.	<ul style="list-style-type: none"> <li>• Positioning plate motor defective</li> <li>• Positioning plate HP sensor defective</li> </ul>
1-11-2		After the positioning plate motor turns on to return the positioning plate to its home position, the positioning plate HP sensor does activate within 1s.	
1-12-2	Folder roller motor	The folder roller motor sensor doesn't send the clock pulse to the booklet unit board within a certain period after the folder roller motor turns on.	<ul style="list-style-type: none"> <li>• Folder roller motor defective</li> <li>• Folder roller motor sensor defective</li> </ul>
1-13-1	Shutter guide motor	After the shutter guide motor turns on to move the shutter guide from its home position, the shutter guide HP sensor does not deactivate within 0.4s.	<ul style="list-style-type: none"> <li>• Shutter guide motor defective</li> <li>• Shutter guide HP</li> </ul>

Trouble-shooting

## SERVICE CALL CONDITIONS

Pattern	Error	Status	Possible Cause
1-13-2		After the shutter guide motor turns on to return the shutter guide to its home position, the shutter guide HP sensor does not activate within 1s.	sensor defective
1-14-1	Booklet jogger motor	After the booklet jogger motor turns on to move the booklet jogger plate from its home position, the booklet jogger HP sensor does not deactivate within 0.5s.	<ul style="list-style-type: none"> <li>• Booklet jogger motor defective</li> <li>• Booklet jogger HP sensor defective</li> </ul>
1-14-2		After the booklet jogger motor turns on to return the booklet jogger plate to its home position, the booklet jogger HP sensor does not activate within 1s.	
1-15-1	Front stapler motor	The front staple hammer HP switch does not turn off within 0.5s after the front stapler motor turns on.	<ul style="list-style-type: none"> <li>• Front stapler motor defective</li> <li>• Front staple hammer HP switch defective</li> </ul>
1-15-2		The front staple hammer HP switch does not turn on within 0.5s after the front stapler motor turns on during jam recovery.	
1-16-1	Rear stapler motor	The rear staple hammer HP switch does not turn off within 0.5s after the rear stapler motor turns on.	<ul style="list-style-type: none"> <li>• Rear stapler motor defective</li> <li>• Rear staple hammer HP switch defective</li> </ul>
1-16-2		The rear staple hammer HP switch does not turn on within 0.5s after the rear stapler motor turns on during jam recovery.	
1-17-1	Folder plate motor error	After the folder plate motor turns on to return the folder plate to its home position, the folder plate HP sensor does not activate within 0.3s.	<ul style="list-style-type: none"> <li>• Folder plate motor defective</li> <li>• Folder plate HP sensor defective</li> <li>• Folder plate return sensor defective</li> <li>• Folder plate motor sensor defective</li> </ul>
1-17-2		After the folder plate motor turns on to move the folder plate from its home position, the folder plate HP sensor does not deactivate within 0.3s.	
1-17-3		After the folder plate motor turns on to return the folder plate to its home position, the folder plate return sensor does not deactivate within 0.3s.	
1-17-4		The pulse count from the folder plate motor sensor is lower than the target minimum.	
1-18-1	Connector	The connector of the shutter guide HP sensor is not connected.	<ul style="list-style-type: none"> <li>• Poor connection or no connection of the shutter guide HP sensor connector</li> </ul>
1-18-2		The connector of the folder plate HP sensor is not connected.	

SERVICE CALL CONDITIONS

Pattern	Error	Status	Possible Cause
1-18-3		The connector of the folder plate return sensor is not connected.	<ul style="list-style-type: none"> <li>• Poor connection or no connection of the folder plate HP sensor connector</li> <li>• Poor connection or no connection of the folder plate return sensor connector</li> </ul>
1-19-1	Switch	When the booklet entrance guide sensor, lower door sensor and booklet exit cover sensor are all activated (doors closed), the booklet entrance guide safety switch does not turn on within 1s after a copy job or warm-up idling begins.	<ul style="list-style-type: none"> <li>• Booklet entrance guide safety switch defective</li> <li>• Lower door safety switch defective</li> <li>• Booklet exit cover safety switch defective</li> </ul>
1-19-2		When the booklet entrance guide sensor, lower door sensor and booklet exit cover sensor are all activated (doors closed), the lower door safety switch does not turn on within 1s after a copy job or warm-up idling begins.	
1-19-3		When the booklet entrance guide sensor, lower door sensor and booklet exit cover sensor are all activated (doors closed), the booklet exit cover safety switch does not turn on within 1s after a copy job or warm-up idling begins.	

Trouble-shooting

## SERVICE CALL CONDITIONS

818	C	Watchdog error		<ul style="list-style-type: none"> <li>• System program defective; switch off/on, or change the controller firmware if the problem cannot be solved</li> <li>• Controller board defective</li> <li>• Controller option malfunction</li> </ul>
		The bus is being held by another device, or a CPU-device infinite loop has occurred. A module that the watchdog is monitoring has not closed properly at the conclusion of its task, or the module cannot continue processing.		
819	C	Fatal kernel error		<ul style="list-style-type: none"> <li>• System program defective</li> <li>• Controller board defective</li> <li>• Optional board defective</li> <li>• Replace controller firmware</li> </ul>
		Due to a control error, a RAM overflow occurred during system processing. One of the following messages was displayed on the operation panel.		
		0x696e	init died	
		0x766d	vm_pageout: VM is full	
		4361	Cache Error	
	Other			

For more details about this SC code error, execute **SP5990** to print an SMC report so you can read the error code. The error code is not displayed on the operation panel.

820	D	Self-Diagnostic Error: CPU		<ul style="list-style-type: none"> <li>• Controller board defective</li> <li>• Software defective</li> </ul>
		The central processing unit returned an error during the self-diagnostic test.		
821	D	Self-diagnostic error 2: ASIC		<ul style="list-style-type: none"> <li>• ASIC (controller board defective)</li> </ul>
		The ASIC provides the central point for the control of bus arbitration for CPU access, for option bus and SDRAM access, for SDRAM refresh, and for management of the internal bus gate.		

**NOTE:** For more details about this SC code error, execute **SP5990** to print an SMC report so you can read the error code. The error code is not displayed on the operation panel.

822	B	Self-diagnostic error 3: HDD		
		3003	Check performed when HDD is installed: <ul style="list-style-type: none"> <li>• HDD device busy for over 31 s.</li> <li>• After a diagnostic command is set for the HDD, but the device remains busy for over 6 s.</li> </ul> A diagnostic command is issued to the HDD device but the result is an error	<ul style="list-style-type: none"> <li>• HDD defective</li> <li>• HDD harness disconnected, defective</li> <li>• Controller board defective</li> </ul>
		3004	No response to the self-diagnostic command from the ASIC to the HDD	<ul style="list-style-type: none"> <li>• HDD defective</li> </ul>

## SERVICE CALL CONDITIONS

823	B	Self-diagnostic Error: NIC	<ul style="list-style-type: none"> <li>• Network interface board defective</li> <li>• Controller board defective</li> </ul>
		The network interface board returned an error during the self-diagnostic test.	
824	D	Self-diagnostic error 4: NVRAM	<ul style="list-style-type: none"> <li>• NVRAM defective</li> <li>• Controller board defective</li> <li>• NVRAM backup battery exhausted</li> <li>• NVRAM socket damaged</li> </ul>
		NVRAM device does not exist, NVRAM device is damaged, NVRAM socket damaged	

826	D	Self-diagnostic Error: NVRAM/Optional NVRAM	<ul style="list-style-type: none"> <li>• Make sure NVRAM is seated correctly in its socket</li> <li>• Replace the NVRAM on the controller board</li> </ul>
		The NVRAM or optional NVRAM returned an error during the self-diagnostic test.	

827	D	Self-diagnostic Error: RAM	<ul style="list-style-type: none"> <li>• Update controller firmware again</li> <li>• Replace RAM DIMM</li> </ul>
		The resident RAM returned a verify error during the self-diagnostic test.	

828	D	Self-diagnostic error 7: ROM	<ul style="list-style-type: none"> <li>• Software defective</li> <li>• Controller board defective</li> <li>• ROM defective</li> </ul>
		<ul style="list-style-type: none"> <li>• Measuring the CRC for the boot monitor and operating system program results in an error.</li> <li>• A check of the CRC value for ROMFS of the entire ROM area results in an error.</li> </ul>	

**NOTE:** For more details about this SC 833, SC834 error, execute **SP5990** to print an SMC report so you can read the error code. The error code is not displayed on the operation panel. The additional error codes (0F30, 0F31, etc. are listed in the SMC report.

829	B	Self-diagnostic Error: Optional RAM	<ul style="list-style-type: none"> <li>• Replace the optional memory board</li> <li>• Controller board defective</li> </ul>
		The optional RAM returned an error during the self-diagnostic test.	

838	D	Self-diagnostic Error: Clock Generator	<ul style="list-style-type: none"> <li>• Replace the controller board</li> </ul>
		A verify error occurred when setting data was read from the clock generator via the I2C bus.	

Trouble-shooting

## SERVICE CALL CONDITIONS

850	B	Net I/F error	
		<ul style="list-style-type: none"> <li>• Duplicate IP addresses.</li> <li>• Illegal IP address.</li> <li>• Driver unstable and cannot be used on the network.</li> </ul>	<ul style="list-style-type: none"> <li>• IP address setting incorrect</li> <li>• Ethernet board defective</li> <li>• Controller board defective</li> </ul>
851	B	IEEE 1394 I/F error	<b>Not supported by this machine.</b>
		Driver setting incorrect and cannot be used by the 1394 I/F.	<ul style="list-style-type: none"> <li>• NIB (PHY), LINK module defective; change the Interface Board</li> <li>• Controller board defective</li> </ul>
853	B	Wireless LAN Error 1	
		During machine start-up, the machine can get access to the board that holds the wireless LAN, but not to the wireless LAN card (802.11b or Bluetooth).	<ul style="list-style-type: none"> <li>• Wireless LAN card missing (was removed)</li> </ul>
854	B	Wireless LAN Error 2	
		During machine operation, the machine can get access to the board that holds the wireless LAN, but not to the wireless LAN card (802.11b or Bluetooth).	<ul style="list-style-type: none"> <li>• Wireless LAN card missing (was removed)</li> </ul>
855	B	Wireless LAN error 3	
		An error was detected on the wireless LAN card (802.11b or Bluetooth).	<ul style="list-style-type: none"> <li>• Wireless LAN card defective</li> <li>• Wireless LAN card connection incorrect</li> </ul>
856	B	Wireless LAN error 4	
		An error was detected on the wireless LAN card (802.11b or Bluetooth).	<ul style="list-style-type: none"> <li>• Wireless LAN card defective</li> <li>• PCI connector (to the mother board) loose</li> </ul>
857	B	USB I/F Error	
		The USB driver is not stable and caused an error.	<ul style="list-style-type: none"> <li>• Bad USB card connection</li> <li>• Replace the controller board</li> </ul>
860	B	HDD startup error at main power on	
		<ul style="list-style-type: none"> <li>• HDD is connected but a driver error is detected.</li> <li>• The driver does not respond with the status of the HDD within 30 s.</li> </ul>	<ul style="list-style-type: none"> <li>• HDD is not initialized</li> <li>• Level data is corrupted</li> <li>• HDD is defective</li> </ul>

## SERVICE CALL CONDITIONS

861	D	HDD re-try failure	
		At power on the HDD was detected. Power supply to the HDD was interrupted after the system entered the energy save mode, but after the HDD was awakened from the energy save mode it did not return to the ready status within 30 sec.	<ul style="list-style-type: none"> <li>• Harness between HDD and controller board disconnected, defective</li> <li>• HDD power connector disconnected</li> <li>• HDD defective</li> <li>• Controller board defective</li> </ul>

863	D	HDD data read failure	
		The data written to the HDD cannot be read normally, due to bad sectors generated during operation.	<ul style="list-style-type: none"> <li>• HDD defective</li> </ul> <p><b>Note:</b> If the bad sectors are generated at the image partition, the bad sector information is written to NVRAM, and the next time the HDD is accessed, these bad sectors will not be accessed for read/write operation.</p>

864	D	HDD data CRC error	
		During HDD operation, the HDD cannot respond to an CRC error query. Data transfer did not execute normally while data was being written to the HDD.	<ul style="list-style-type: none"> <li>• HDD defective</li> </ul>

865	D	HDD access error	
		HDD responded to an error during operation for a condition other than those for SC863, 864.	<ul style="list-style-type: none"> <li>• HDD defective.</li> </ul>

866	B	SD card error 1: Confirmation	
		The machine detects an electronic license error in the application on the SD card in the controller slot immediately after the machine is turned on. The program on the SD card contains electronic confirmation license data. If the program does not contain this license data, or if the result of the check shows that the license data in the program on the SD card is incorrect, then the checked program cannot execute and this SC code is displayed.	
			<ul style="list-style-type: none"> <li>• Program missing from the SD card</li> <li>• Download the correct program for the machine to the SD card</li> </ul>

867	D	SD card error 2: SD card removed	
		The SD card in the boot slot when the machine was turned on was removed while the machine was on.	<ul style="list-style-type: none"> <li>• Insert the SD card, then turn the machine off and on.</li> </ul>

## SERVICE CALL CONDITIONS

868	D	SD card error 3: SC card access	
		An error occurred while an SD card was used.	<ul style="list-style-type: none"> <li>• SD card not inserted correctly</li> <li>• SD card defective</li> <li>• Controller board defective</li> </ul> <p><b>Note:</b> If you want to try to reformat the SC card, use SD Formatter Ver 1.1.</p>

870	B	Address book data error	
		Address book data on the hard disk was detected as abnormal when it was accessed from either the operation panel or the network. The address book data cannot be read from the HDD or SD card where it is stored, or the data read from the media is defective.	<ul style="list-style-type: none"> <li>• Software defective. Turn the machine off/on. If this is not the solution for the problem, then replace the controller firmware.</li> <li>• HDD defective.</li> </ul>
		<p>More Details</p> <ul style="list-style-type: none"> <li>• Do <b>SP5846 050</b> (UCS Settings – Initialize all Directory Info.) to reset all address book data.</li> <li>• Reset the user information with <b>SP5832 006</b> (HDD Formatting– User Information).</li> <li>• Replace the HDDs.</li> <li>• Boot the machine from the SD card.</li> </ul>	

872	B	HDD mail receive data error	
		<ul style="list-style-type: none"> <li>• The machine detected that the HDD was not operating correctly at power on.</li> <li>• The machine detected that the HDD was not operating correctly (could neither read nor write) while processing incoming email</li> </ul>	<ul style="list-style-type: none"> <li>• HDD defective</li> <li>• Machine was turned off while the HDD was being accessed.</li> <li>• Do SP5832 007 to format the mail RX data on the HDD.</li> </ul>

873	B	HDD mail send data error	
		An error was detected on the HDD immediately after the machine was turned on, or power was turned off while the machine used the HDD.	<ul style="list-style-type: none"> <li>• Do SP5832-007 (Format HDD – Mail TX Data) to initialize the HDD.</li> <li>• Replace the HDD</li> </ul>

874	D	Delete All error 1: HDD	
		A data error was detected for the HDD/NVRAM after the Delete All option was used. <b>Note:</b> The source of this error is the Data Overwrite Security Unit B660 running from an SD card.	<ul style="list-style-type: none"> <li>• Turn the main switch off/on and try the operation again.</li> <li>• Install the Data Overwrite Security Unit again. For more, see section “1. Installation”.</li> <li>• HDD defective</li> </ul>

## SERVICE CALL CONDITIONS

875	D	Delete All error 2: Data area	
		An error occurred while the machine deleted data from the HDD. <b>Note:</b> The source of this error is the Data Overwrite Security Unit B660 running from an SD card.	<ul style="list-style-type: none"> <li>• Turn the main switch off/on and try the operation again.</li> </ul>

876	D	Log data abnormal	
		An error was detected in the handling of the log data at power on or during machine operation. This can be caused by switching the machine off while it is operating.	<ul style="list-style-type: none"> <li>• Software error. Update the firmware</li> <li>• NVRAM defective</li> <li>• HDD defective</li> </ul>

880	B	File Format Converter (MLB) error	
		A request to get access to the MLB was not answered within the specified time.	<ul style="list-style-type: none"> <li>• MLB defective, replace the MLB</li> </ul>

900	D	Electrical total counter error	
		The total counter contains something that is not a number.	<ul style="list-style-type: none"> <li>• NVRAM incorrect type</li> <li>• NVRAM defective</li> <li>• NVRAM data scrambled</li> <li>• Unexpected error from external source</li> </ul>

901	D	SC901 Mechanical total count error	
		The IO board cannot receive the mechanical total count data.	<ul style="list-style-type: none"> <li>• Mechanical total counter defective</li> </ul>

920	B	Printer error 1	
		An internal application error was detected and operation cannot continue.	<ul style="list-style-type: none"> <li>• Software defective; turn the machine off/on, or change the controller firmware</li> <li>• Insufficient memory</li> </ul>

Trouble-shooting

## SERVICE CALL CONDITIONS

925	B	<p>Net File function error</p> <p>The NetFile file management on the HDD cannot be used, or a NetFile management file is corrupted and operation cannot continue. The HDDs are defective and they cannot be debugged or partitioned, so the Scan Router functions (delivery of received faxes, document capture, etc.), Web services, and other network functions cannot be used. HDD status codes are displayed below the SC code:</p>	<ul style="list-style-type: none"> <li>Refer to the four procedures below (Recovery from SC 925).</li> </ul>
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Here is a list of HDD status codes:

Display	Meaning
(-1)	HDD not connected
(-2)	HDD not ready
(-3)	No label
(-4)	Partition type incorrect
(-5)	Error returned during label read or check
(-6)	Error returned during label read or check
(-7)	"filesystem" repair failed
(-8)	"filesystem" mount failed
(-9)	Drive does not answer command
(-10)	Internal kernel error
(-11)	Size of drive is too small
(-12)	Specified partition does not exist
(-13)	Device file does not exist

## Recovery from SC 925

### Procedure 1

If the machine shows SC codes for HDD errors (SC860 ~ SC865) with SC 925, do the recovery procedures for SC860 ~ SC865.

### Procedure 2

If the machine does not show one of the five HDD errors (SC860 ~ SC865), turn the machine power off and on. If this is not the solution for the problem, then initialize the NetFile partition on the HDD with **SP5832-011** (HDD Formatting – Ridoc I/F).

NetFiles: Jobs printed from the document server using a PC and DeskTopBinder

Before you initialize the NetFile partition on the HDD, tell the customer that:

- Received faxes on the delivery server will be erased
- All captured documents will be erased
- DeskTopBinder/Print Job Manager/Desk Top Editor job history will be erased
- Documents on the document server, and scanned documents, will not be erased.
- The first time that the network gets access to the machine, the management information must be configured again (this will use a lot of time).

Before you initialize the Netfile partition with **SP5832-011**, do these steps:

1. Go into the User Tools mode and do “Delivery Settings” to print all received fax documents that are scheduled for delivery. Then erase them.
2. In the User Tools mode, do Document Management> Batch Delete Transfer Documents.
3. Do **SP5832-011**, and then turn the machine power off and on.

### Procedure 3

If “Procedure 2” is not the solution for the problem, do **SP5832-001** (HDD Formatting – All), then turn the machine power off and on.

**SP5832-001** erases all document and address book data on the hard disks. Ask the customer before you do this SP code.

### Procedure 4

If “Procedure 3” is not the solution for the problem, replace the HDD.

SERVICE CALL CONDITIONS

951	D	F-gate error at write request	<ul style="list-style-type: none"> <li>• Software defective</li> <li>• BICU defective</li> </ul>
		After the IPU receives an F-gate signal, it receives another F-gate signal.	
953	D	Scanner setting error	<ul style="list-style-type: none"> <li>• Software defective</li> </ul>
		The IPU does not respond with the scanner setting signal required to start scanning processing.	
954	D	Printer setting error	<ul style="list-style-type: none"> <li>• Software defective</li> </ul>
		The IPU does not respond with the settings that are required to start image processing by the printer.	
955	D	Memory setting error	<ul style="list-style-type: none"> <li>• Software defective</li> </ul>
		The IPU does not respond with the settings that are required to start image processing using the memory.	

980	NVRAM value error	<ul style="list-style-type: none"> <li>▪ See the description below</li> </ul>
	A critical SP code setting is not within range. If the machine is allowed to operate in this condition, this could lead to toner overflow and damage the machine.	
	<b>SP Code</b>	<b>Acceptable Range</b>
	SP2005 004 Charge Roller Adjustment 2	-1000 to -2000 V
	SP2802 001 TD Sensor Manual Setting VTS	1.00 to 5.00 V
	SP2802 002 TD Sensor Manual Setting VTMAX	1.00 to 5.00 V
	SP2802 003 TD Sensor Manual Setting VTMIN	1.00 to 5.00 V
	SP9503 004 <b>DFU</b>	51 to 255
	SP9508 001 <b>DFU</b>	51 to 255
	SP9508 002 <b>DFU</b>	51 to 255
	SP9517 002 <b>DFU</b>	401 to 802

**Recovery from SC980**

Continued use of the machine with one or more of the SP codes listed above out of range could lead to toner overflow or other problems that could cause damage to the machine.

1. Enter the SP mode and check the setting of SP2802 001, 002, 003.
2. If these SP codes are within range, turn the machine power off and on.  
-or-

If one or more of these SP codes is out of range, do SP2801 001 (TD Sensor Initial Setting) then turn the machine power off and on.

3. Enter the SP mode and do SP5990 001 (SMC Printout – SP Mode Data List).
4. Check the following SP codes and confirm that their settings are within range.

SP No.	Name	Range
2005 004	Charge Roller Voltage Adjustment 2	-1000 to -2000 V
SP2802 001	TD Sensor Manual Setting – Vts	1.00 to 5.00 V
SP2802 002	TD Sensor Manual Setting – Vtmax	
SP2802 003	TD Sensor Manual Setting – Vtmin	



## SERVICE CALL CONDITIONS

984	D	Print image data transfer error	<ul style="list-style-type: none"> <li>• Controller board defective</li> <li>• BICU defective</li> <li>• Connectors between BICU and controller loose or defective</li> </ul>
		The image transfer from the controller to the engine via the PCI bus does not end within 15 s after starting.	
985	D	Scanner image data transfer error	<ul style="list-style-type: none"> <li>• Controller board defective</li> <li>• BICU defective</li> <li>• Connectors between BICU and controller loose or defective</li> <li>• SIB defective</li> </ul>
		The image transfer from the engine to the controller via the PCI bus does not end within 3 s after starting.	
986	D	Software write parameter setting error	<ul style="list-style-type: none"> <li>• Software defective</li> </ul>
		An unstable area at the storage destination in the settings table is set NULL for the parameter received by the write module.	

990	D	Software error 1	<ul style="list-style-type: none"> <li>• Software defective, re-boot<sup>*1</sup></li> </ul>
		The software performs an unexpected function and the program cannot continue.	
991	C	Software error 2	<ul style="list-style-type: none"> <li>• Software defective, re-boot<sup>*1</sup></li> </ul>
		The software performs an unexpected function. However, unlike SC990, recovery processing allows the program to continue.	

<sup>\*1</sup>: In order to get more details about SC990 and SC991:

- 1) Execute SP7403 or print an SMC Report (SP5990) to read the history of the 10 most recent logged errors.
- 2) If you press the zero key on the operation panel with the SP selection menu displayed, you will see detailed information about the recently logged SC990 or SC991, including the software file name, line number, and so on. 1) is the recommended method, because another SC could write over the information for the previous SC.

995	D	Machine Type Information Error	<ul style="list-style-type: none"> <li>• Replace the controller board with the correct type of board.</li> </ul>
		After the machine is powered on, a mismatch is detected between the CPM information sent from the controller to the engine. The controller board was replaced with the incorrect type of controller board.	

996	D	FCU Board Error	<ul style="list-style-type: none"> <li>• FCU board hardware or firmware defective</li> <li>• Replace FCU board</li> </ul>
		The FCU board is installed but it has not entered READY status.	

## SERVICE CALL CONDITIONS

997	B	Software Error 4: Cannot select application function
		<p>An application does not start after the user pushed the correct key on the operation panel.</p> <ul style="list-style-type: none"> <li>• Software bug</li> <li>• A RAM or DIMM option necessary for the application is not installed or not installed correctly.</li> </ul>
998	D	Software Error 5: Application cannot start
		<p>Register processing does not operate for an application within 60 s after the machine power is turned on. No applications start correctly, and all end abnormally.</p> <ul style="list-style-type: none"> <li>• Software bug</li> <li>• A RAM or DIMM option necessary for the application is not installed or not installed correctly.</li> </ul>
999	D	Program download error
		<p>The download (program, print data, language data) from the IC card does not execute normally.</p> <ul style="list-style-type: none"> <li>• Board installed incorrectly</li> <li>• BICU defective</li> <li>• IC card defective</li> <li>• NVRAM defective</li> <li>• Loss of power during downloading</li> <li>• Important Notes About SC999</li> <li>• Primarily intended for operating in the download mode, logging is not performed with SC999.</li> </ul> <p><b>Note:</b> If the machine loses power while downloading, or if for some other reason the download does not end normally, this could damage the controller board or the PCB targeted for the download and prevent subsequent downloading. If this problem occurs, the damaged PCB must be replaced.</p>

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shooting

## 4.2 ELECTRICAL COMPONENT DEFECTS

### 4.2.1 SENSORS

Component (Symbol)	CN	Condition	Symptom
Scanner Home Position (S1)	504-5(SIB)	Open	SC121 is displayed.
		Shorted	SC120 is displayed.
Platen Cover (S2)	504-8 (SIB)	Open	APS and ARE do not function properly.
		Shorted	No symptom.
Original Width (S3)	505-3, 4 (SIB)	Open	CPU cannot detect the original size properly. APS and ARE do not function correctly.
		Shorted	
Original Length-1 (S4)	505-8,9 (SIB)	Open	CPU cannot detect the original size properly. APS and ARE do not function correctly.
		Shorted	
LD Unit Home Position (S6)	204-B2 (IOB)	Open	SC328 is displayed when the laser beam pitch is changed.
		Shorted	SC327 is displayed when the laser beam pitch is changed.
Toner Density (TD) (S7)	222-5 (IOB)	Open	The add toner indicator blinks even if there is toner in the development unit.
		Shorted	SC390-01 is displayed.
Paper Exit (S8)	202-B2 (IOB)	Open	The Paper Jam indicator will light whenever a copy is made.
		Shorted	The Paper Jam indicator lights even if there is no paper.
Registration (S9)	224-B2 (IOB)	Open	The Paper Jam indicator lights even if there is no paper.
		Shorted	The Paper Jam indicator will light whenever a copy is made.
Image Density (ID) (S10)	203-5 (IOB)	Open	SC350-03 is displayed after copying.
		Shorted	SC350-01 is displayed after copying.
Upper Paper Height (S11)	220-2 (IOB)	Open	Add Paper is displayed even if there is paper. If this condition occurred four times, SC501-02 will be displayed.
		Shorted	SC501-01 is displayed.
Lower Paper Height (S12)	214-2 (IOB)	Open	Add Paper is displayed even if there is paper. If this condition occurred four times, SC502-02 will be displayed.
		Shorted	SC502-01 is displayed.

## ELECTRICAL COMPONENT DEFECTS

Component (Symbol)	CN	Condition	Symptom
Upper Paper End (S13)	220-8 (IOB)	Open	The Paper End indicator lights even if paper is placed in the upper paper tray.
		Shorted	The Paper End indicator does not light even if there is no paper in the upper paper tray.
Lower Paper End (S14)	214-8 (IOB)	Open	The Paper End indicator lights even if paper is placed in the lower paper tray.
		Shorted	The Paper End indicator does not light even if there is no paper in the lower paper tray.
Upper Relay (S15)	220-5 (IOB)	Open	The Paper Jam indicator will light whenever a copy is made.
		Shorted	The Paper Jam indicator lights even if there is no paper.
Lower Relay (S16)	214-5 (IOB)	Open	The Paper Jam indicator will light whenever a copy is made.
		Shorted	The Paper Jam indicator lights even if there is no paper.
Transfer Belt Position (S19)	202-A10 (IOB)	Open	No symptom
		Shorted	SC403 is displayed

Trouble-shooting

## BLOWN FUSE CONDITIONS

### 4.2.2 SWITCHES

Component (Symbol)	CN	Condition	Symptom
Right Lower Cover (SW1)	216-4 (IOB)	Open	"Doors/Covers Open" is displayed even if the right lower cover is closed.
		Shorted	The LCD goes blank when the lower cover is opened.
Main (SW3)	102-1~4 (PSU) 107-1	Open	The machine does not turn on.
		Shorted	The machine does not turn off.
Front Cover Safety (SW4)	107-1 (PSU)	Open	"Doors/Covers Open" is displayed even if the front cover is closed.
		Shorted	"Doors/Covers" Open is not displayed even if the front cover is opened.

### 4.3 BLOWN FUSE CONDITIONS

Fuse	Rating		Symptom at power on
	115V	210 ~ 230V	
<b>Power Supply Board</b>			
<b>FU1</b>	6.3A / 125V	6.3A / 250V	"Doors/Covers Open" is displayed
<b>FU2</b>	6.3A / 125V	6.3A / 250V	"Doors/Covers Open" for the finisher is displayed
<b>FU3</b>	6.3A / 125V	6.3A / 250V	Paper end condition
<b>FU5</b>	6.3A / 125V	6.3A / 250V	SC302, or SC403, or SC405 displayed
<b>FU6</b>	3.15A/125V	3.15A/250V	
<b>FU9</b>	5A/125V	5A/250V	
<b>FU10</b>	3.15A/250V	2A/250V	
<b>FU11</b>	5A/250V	5A/250V	
<b>FU101</b>	15A / 125V	8A/250V	No response
<b>FU102</b>	10A / 125V	5A / 250V	No response
<b>FU103</b>	2A / 125V	1A / 250V	Normal operation (optional heaters do not work)

## 4.4 LEDS

### BICU LED Sequences

	LED 101 (Green)	LED 102 (Yellow)	LED 103 (Red)
Normal Operation	Flashes	Off	Flashes
System Startup	Flashes	On (1~2s) then Off	Flashes
Firmware Update: Normal Execution	Flashes	On	Flashes
Firmware Update: Error	Flashes	Flashes	Flashes
Firmware Update: Normal End	Flashes	Off	Flashes
Energy Save Mode	Off	Off	Off

### Controller LED Sequences

	LED 1 (Red)	LED 2 (Red)
System Startup (including Self-Diagnostics)	On	Off
Self-Diagnostic Error	On	On
Normal Operation	Flashes	Off
Firmware Update: Normal Execution	Flashes	Flashes
Firmware Update: Error	Off	Off
Firmware Update: Normal End	On	On

**NOTE:** LED 1 monitors Data Bus Bit 14; LED 2 monitors Data Bus Bit 15.

## 4.5 TEST POINTS

### Controller Board

Number	Monitored Signal
TP1	GND
TP3	GND
TP6	GND
TP8	DB0 RXD
TP9	DB0 TXD
TP10	GND
TP11	+5VE
TP12	GND
TP13	+5V
TP14	+5VE
TP15	GND
TP16	R_FGATE
TP17	W_FGATE



# SERVICE TABLES

<b>SERVICE TABLES REVISION HISTORY</b>		
<b>Page</b>	<b>Date</b>	<b>Added/Updated/New</b>
35	06/28/2007	Updated Information – SP5045 Accounting Counter
38	02/01/2007	Updated Information – SP5307 Summer Time
42	07/07/2009	Updated Information – SP5801 Memory Clear
48	05/18/2007	Updated Information – Error Codes added to SP5816-208
48	07/07/2009	Updated Information – SP5824 NVRAM Data Upload
71	03/30/2007	Updated Information – Paper Jam Counter SP7504
125	06/28/2007	New Information – Errors During Firmware Update
126	06/28/2007	New Page Number only
126 ~ 128	07/07/2009	Updated Information – Uploading/Downloading NVRAM Data



## 5. SERVICE TABLES

### ⚠ CAUTION

**Never turn off the main power switch when the power LED is lit or flashing. To avoid damaging the hard disk or memory, press the operation power switch to switch the power off, wait for the power LED to go off, and then switch the main power switch off.**

**NOTE:** The main power LED lights or flashes while the platen cover or ARDF is open, while the main machine is communicating with a facsimile or the network server, or while the machine is accessing the hard disk or memory for reading or writing data.

### 5.1 SERVICE PROGRAM MODE OPERATION

The service program (SP) mode is used to check electrical data, change modes, and adjust values.

### ⚠ CAUTION

**Never turn off the main power switch when the power LED is lit or flashing. To avoid damaging the hard disk or memory, press the operation switch to switch the power off, wait for the power LED to go off, and then switch the main power switch off.**

#### *Service Mode Lock/Unlock*

At locations where the machine contains sensitive data, the customer engineer cannot operate the machine until the Administrator turns the service mode lock off. This function makes sure that work on the machine is always done with the permission of the Administrator.

1. If you cannot go into the SP mode, ask the Administrator to log in with the User Tool and then set "Service Mode Lock" to OFF. After he or she logs in:  
**[User Tools] > System Settings > Administrator Tools > Service Mode Lock > OFF**
  - This unlocks the machine and lets you get access to all the SP codes.
  - The service technician can do servicing on the machine and turn the machine off and on. It is not necessary to ask the Administrator to log in again each time the machine is turned on.
2. If you must use the printer bit switches, go into the SP mode and set **SP5169** to "1".
3. After machine servicing is completed:
  - Change **SP5169** from "1" to "0".
  - Turn the machine off and on.
  - Tell the administrator that you completed servicing the machine.
  - The administrator will then set the "Service Mode Lock" to ON.

## 5.2 SERVICE PROGRAM MODE TABLES

Please note these general changes in this section:

- Group 8(Data Log 2) is a new group of counters.
- Along with the addition of Group 8, many of the Group 7 counters have been removed.

### 5.2.1 SERVICE TABLE KEY

Notation	What it means
[range / default / step]	Example: [-9 ~ +9 / +3.0 / 0.1 mm step]. The setting can be adjusted in the range $\pm 9$ , value reset to +3.0 after an NVRAM reset, and the value can be changed in 0.1 mm steps with each key press.
*	Value stored in NVRAM. After a RAM reset, this default value (factory setting) is restored.
35 cpm	B291/B296
45 cpm	B295/B297
DFU	Denotes "Design or Factory Use". Do not change this value.
Japan only	The feature or item is for Japan only. Do not change this value.

### 5.2.2 SERVICE MODE LOCK/UNLOCK

At locations where the machine contains sensitive data, the customer engineer cannot operate the machine until the Administrator turns the service mode lock off. This function makes sure that work on the machine is always done with the permission of the Administrator.

4. If you cannot go into the SP mode, ask the Administrator to log in with the User Tool and then set "Service Mode Lock" to OFF. After he or she logs in:  
**[User Tools] > System Settings > Administrator Tools > Service Mode Lock > OFF**
  - This unlocks the machine and lets you get access to all the SP codes.
  - The service technician can do servicing on the machine and turn the machine off and on. It is not necessary to ask the Administrator to log in again each time the machine is turned on.
5. If you must use the printer bit switches, go into the SP mode and set **SP5169** to "1".
6. After machine servicing is completed:
  - Change **SP5169** from "1" to "0".
  - Turn the machine off and on.
  - Tell the administrator that you completed servicing the machine.
  - The administrator will then set the "Service Mode Lock" to ON.

## 5.2.3 SERVICE TABLES

**SP1-xxx: Feed**

1001*	Leading Edge Registration	
	Adjusts the printing leading edge registration using the trimming area pattern (SP2-902-3, No.11). [+9 ~ -9 / <b>3.0</b> / 0.1 mm] Use  to toggle between ± before entering the value. Specification: 3 ±2 mm	

1002*	Side-to-Side Registration	
	Adjusts the printing side-to-side registration from the 3rd paper feed station using the trimming area pattern (SP2-902-3, No.11). <i>Tray3, Tray4 for Paper Feed Unit.</i> Use the  key to toggle between + and – before entering the value. Specification: 2 ±1.5 mm	
1002 1	Tray 1	[-9 ~ +9/ <b>+3.0 mm</b> / 0.1 mm step]
1002 2	Tray 2	[-9 ~ +9/ <b>+3.0 mm</b> / 0.1 mm step]
1002 3	Tray 3	[-9~ +9/ <b>+2.0 mm</b> / 0.1 mm/step]
1002 4	Tray 4	[-9~ +9/ <b>+2.0 mm</b> / 0.1 mm/step]
1002 5	From Duplex Unit	[-9 ~ +9/ <b>+0.0 mm</b> / 0.1 mm/step]
1002 6	Bypass Feed	[-9 ~ +9/ <b>+3.0 mm</b> / 0.1 mm/step]
1002 7	LCT	[-9 ~ +9/ <b>+1.5 mm</b> / 0.1 mm/step]

1003*	Registration Buckle Adjustment	
	Adjusts the relay clutch timing at registration. Relay clutch timing determines the amount of paper buckle at registration. (A “+” setting causes more buckling.)	
1003 1	Trays 2,3,4 LCT	[-9 ~+9 / <b>0</b> /1 mm step]
1003 2	Duplex	
1003 3	Bypass	
1003 4	Tray 1 Feed	[-9 ~+9 / <b>1</b> /1 mm step]
1003 5	Bypass Thick Paper	[-9 ~+9 / <b>-2</b> /1 mm step]

1007*	By-pass Feed Paper Size Display	
	Displays the paper width sensor data for the by-pass feed table.	

1012*	Exit Junction Solenoid Start Timing	
	Adjusts the timing of the solenoids at the entrance and exit of the paper exit section to accommodate the increased speed of the duplex unit. <i>This SP has been added to compensate for the increased operation speed of the duplex unit for this machine. Increase the value if the leading edges are jamming. Decrease the value if trailing edges are bending at the entrance</i>	
1012 1*	Exit Entrance Junction Solenoid	35 CPM: [200 ~ 450 ms / <b>370 ms</b> / 10 ms] 45 CPM: [200 ~ 450 ms / <b>300 ms</b> /10 ms]
1012 2*	Exit Last Junction Solenoid	35 CPM: [200 ~ 450 ms / <b>370 ms</b> / 10 ms] 45 CPM: [200 ~ 450 ms / <b>370 ms</b> /10 ms]]

## SERVICE PROGRAM MODE TABLES

1103*	<b>Fusing Idling</b> Switches fusing idling on/off. When on, printing will not start until enough time has elapsed so the hot roller can reach optimum temperature. This ensures even heat on the hot roller. <i>Switch on if fusing on the 1st and 2nd copies is incomplete (this may occur if the room is cold.) You must switch SP1103-1 ON before you set the fusing interval with SP1103-2.</i>	
1103 1*	Enable Fusing Idling	<b>0 = Off, 1 = On</b>
1103 2*	Fusing Idling Interval	[0 ~ 60 sec. / <b>30 sec.</b> / 1 sec.]
1103 3*	Fusing Pre-Rotation	Sets the machine to fusing idling only for 5 sec. for every job (when the original is set on the ARDF, when the ARDF cover is opened, etc.) and the fusing unit has reached the reload temperature (optimum temperature for operation). 0: Off. No 5 sec. idling done before a job. 1: On. 5 sec. idling done before every job. <b>Note</b> <ul style="list-style-type: none"> <li>• The pre-fusing idling set with SP5959 executes after the 5 sec. idling selected with this SP is finished.</li> <li>• The idling stops if a new job is received before the idling completes.</li> </ul>

1104*	<b>Fusing Temperature Control</b> Selects the fusing temperature control method. After changing this setting, be sure the power the machine off and on again with the main power switch to enable the new setting. [0~1 / <b>0</b> / 1] 0: Normal (ON/OFF control). Allows full application from ac power supply to bring the hot roller up to the target fusing temperature then shuts off. Determines the on time from the present temperature (detected by the thermistor on the hot roller) and the temperature of 1 cycle before. 1: Phase (hysteresis) control. Sets the upper and lower limits for the temperature; at the lower temperature the fusing lamp is on and at the higher temperature the fusing lamp is off. Change this setting to "0" only if the user has excessive electrical noise or interference on the power supply line. Such interference can cause voltage to drop when power is applied using the ON/OFF control method. Interference can be caused by the general poor quality of the power supply lines, or if the machine is sharing a power supply with other electrical devices such as fluorescent lights. Before changing this setting, make sure that the machine is connected to a power supply not shared by other electrical equipment. <b>Note:</b> Selecting Phase control ("1") could cause the fusing temperature control board to emit low pitched noise.	
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SERVICE PROGRAM MODE TABLES

1105*	Fusing Temperature Adjustment	
	<p><i>Allows adjustment of the hot roller temperature at the center and ends of the roller for the quality or thickness of the paper. The hot roller in this machine has two fusing lamps: one heats the center of the roller, the other heats both ends. Each fusing lamp can be adjusted separately.</i></p> <p><i>The "re-load temperature" is the "print ready temperature. When the fusing temperature exceeds this setting, the machine can operate. Do not set up a re-load temperature (<b>Re-load Temp. = Fusing. Temp – SP Value.</b>) that is higher than the SP1-105-2 setting.</i></p>	
1105 1	Roller Center: Trays	35 cpm: [120 ~ 200 / <b>160</b> / 1 deg.] 45 cpm: [120 ~ 200 / <b>170</b> / 1 deg.]
	Adjusts the fusing temperature at the center of the hot roller.	
1105 2	Roller Ends: Trays	35 cpm: [120 ~ 200 / <b>165</b> / 1 deg.] 45 cpm: [120 ~ 200 / <b>175</b> / 1 deg.]
	Adjusts the fusing temperature at the ends of the hot roller.	
1105 3	Roller Center: Bypass	35 cpm: [120 ~ 220 / <b>170</b> / 1 deg.] 45 cpm: [120 ~ 220 / <b>170</b> / 1 deg.]
	Adjusts the fusing temperature at the center of the hot roller for bypass feed.	
1105 4	Roller Center: Ends	35 cpm: [120 ~ 220 / <b>170</b> / 1 deg.] 45 cpm: : [120 ~ 220 / <b>170</b> / 1 deg.]
	Adjusts the fusing temperature at the ends of the hot roller for bypass feed.	
1105 5	Re-load Temp. Minus: Roller Center	[0 ~ 60 / <b>30</b> / 1 step]
	<p>Sets the reload temperature for the center of the hot roller. This setting depends on the target temperature.</p> <p>Reload temp. = Target Temp – This SP Setting</p> <p><b>Note:</b> Do not set a temperature that is higher than the setting for SP1105 1 (Roller Center: Trays)</p>	
1105 6	Re-load Temp. Minus: Roller Ends	[0 ~ 60 / <b>10</b> / 1 step]
	<p>Sets the reload temperature for the ends of the hot roller. This setting depends on the target temperature.</p> <p>Reload temp. = Target Temp – This SP Setting</p> <p><b>Note:</b> Do not set a temperature that is higher than the setting for SP1105 2 (Roller Ends: Trays)</p>	
1105 7	Roller Center: Bypass (Thick Paper)	35 cpm: [120 ~ 220 / <b>170</b> / 1 deg] 45 cpm: [120 ~ 220 / <b>170</b> / 1 deg]
	Adjusts the fusing temperature at the center of the hot roller for thick paper.	
1105 8	Roller Ends: Bypass (Thick Paper)	35 cpm: [120 ~ 220 / <b>170</b> / 1 deg] 45 cpm: [120 ~ 220 / <b>170</b> / 1 deg]
	Adjusts the fusing temperature at the ends of the hot roller for thick paper.	
1105 9*	Re-load Temp. Minus: Roller Center (Thick Paper)	35 cpm: [0 ~ 60 / <b>0°C</b> / 5] 45 cpm: [0~ 60 / <b>5°C</b> /1]
	Sets the temperature for re-heating the hot roller center for thick paper.	
1105 10*	Re-load Temp. Minus: Roller Ends (Thick Paper)	35 cpm: [0 ~ 60 / <b>0°C</b> / 5] 45 cpm: [0~ 60 / <b>5°C</b> /1]
	Sets the temperature for re-heating the hot roller ends for thick paper.	

## SERVICE PROGRAM MODE TABLES

1106	Fusing Temperature Display	
1106 1	Roller Center	Displays the fusing temperature for the center of the hot roller.
1106 2	Roller Ends	Displays the fusing temperature for the ends of the hot roller.
1106 3	I/O Board Temp. at Power On	Displays in the internal temperature of the machine when it was powered on.

1109*	Fusing Nip Band Check	
	Checks the fusing nip band. [0=Off, 1=On]	

1111*	Paper Reverse Timing (Duplex)	[+5 ~ -5 / 0 mm / 1 mm step]
	Adjusts the timing for stopping the rotation of the reverse roller after the trailing edge of the paper passes the duplex entrance sensor. <i>Adjust the timing if paper frequently jams at the inverter gate in the duplex unit.</i>	

1159	Fusing Jam SC Setting	
	This SP setting determines whether SC559 is issued after three paper late jams occur in the fusing unit. After this SP code is turned on, a counter monitors the number of paper late jams that occur in the fusing unit. After the 3rd occurrence of a fusing jam, SC559 is issued and the machine cannot be used until the service technician releases the error. <b>Note:</b> Switching the machine off/on does not reset this jam counter. The counter is reset after the cause of the jam has been removed and a sheet of paper successfully passes the fusing exit sensor. [0~1/0/1] 0:OFF, 1:ON	

1801*	Motor Speed Adjustment	
	Adjusts the speeds of the main motor, feed/development motor, and fusing exit motor. Each step decreases or increases motor speed in 0.15% increments	
1801 1	Main Motor	[-4 ~ +4 / 0 / 0.15%]
1801 2	Feed/Development Motor	[-4 ~ +4 / 0 / 0.15%]
1801 3	Fusing/Exit Motor	[-4 ~ +4 / 0 / 0.15%]

**SP2-xxx: Drum**

2001*	Charge Roller Bias Adjustment	
2001 1*	Copying	[−1000 ~ −2000 / −1500V / 10V step]
	Adjusts the voltage applied to the charge roller for copying.	
2001 2*	ID Sensor Pattern	[0 ~ 700 / 250V / 10V step]
	Adjusts the voltage applied to the charge roller when making the VSDP ID sensor pattern (for charge roller voltage correction). The actual charge roller voltage is this value plus the value of SP2001 1.	

2005*	Charge Roller Bias Correction	
2005 1*	Charge Roller Voltage Correction 1	[0.1 ~ 1.0 / 0.85 / 0.05 step]
	Adjusts the lower threshold value for the charge roller correction. <i>When the value of VSP/VSG is greater than this value, the charge roller voltage increases by 30 V (e.g., from −500 to −530).</i>	
2005 2*	Charge Roller Voltage Correction 2	[0.1 ~ 1.0 / 0.90 / 0.05 step]
	Adjusts the upper threshold value for the charge roller correction. <i>When the value of VSP/VSG is greater than this value, the charge roller voltage decreases by 30 V (absolute value).</i>	
2005 3*	Charge Roller Voltage Adjustment 1	[−1000 ~ −2000 / −1500V / 10V step]
	Adjusts the lower limit value for charge roller voltage correction.	
2005 4*	Charge Roller Voltage Adjustment 2	[−1000 ~ −2000 / −2000V / 10V step]
	Adjusts the upper limit value for charge roller voltage correction.	
2005 5*	Charge Roller Voltage Step	[0 ~ 100V / 30V / 10V step]
	Adjusts the correction voltage adjustment step size.	

2101*	Printing Erase Margin	
	Adjusts the leading edge (top), trailing edge (bottom), left, and right margins	
2101 1*	Leading Edge (Top)	[0.9 ~ 9.0 / 3 / 0.1 mm step] Spec: ±2 mm
2101 2*	Trailing Edge (Bottom)	[0.9 ~ 9.0 / 3 / 0.1 mm step] Spec: ±2 mm
2101 3*	Left Edge	[0.9 ~ 9.0 / 2 / 0.1 mm step] Spec: ±1.5 mm
2101 4*	Right Edge	[0.9 ~ 9.0 / 2 / 0.1 mm step] Spec: ±1.5 mm
2101 5*	Trailing Edge - Back side	[0.0 ~ 4.0 / 1.2 / 0.1 mm step] <i>Recommended: 2 ±1.5 mm</i>
2101 6*	Back Side - Right	[0.0 ~ 9.0 / 4.0 / 0.1 mm step] <i>Recommended: 2 ±1.5 mm</i>
2101 7*	Back Side - Left	[0.0 ~ 9.0 / 4.0 / 0.1 mm step] <i>Recommended: 2 +2.5/-1.5 mm</i>

2103*	LD Power Adjustment	<b>DFU</b>
	Adjusts the intensity of the laser for the copier, printer, and fax unit. The Copier and Printer/Fax settings can be adjusted separately.	
2103 1*	LD1 (Copier)	35 cpm: [−30~+64/−24/1 LSB step] 45 cpm: [−30~64/5/1 LSB step]]
2103 2*	LD2 (Copier)	35 cpm: [−30~+79/−24/1 LSB step] 45 cpm: [−30~79/−5/1 LSB step]]
2103 3*	LD1 (Printer, FAX)	[−50 ~ −35 / −25 / 1 LSB step]
2103 4*	LD2 (Printer, FAX)	[−50 ~ −35 / −25 / 1 LSB step]
2103 5*	LD1 Adjustment Start/End	OFF/ON
2103 6*	LD2 Adjustment Start/End	OFF/ON

SERVICE PROGRAM MODE TABLES

2109*	LD Beam Pitch Adjustment	
	Adjusts the beam gap for the dual beam system. After replacing the LD unit or replacing or clearing the NVRAM, use this SP mode to adjust the laser beam pitch. <i>This adjustment is performed by specifying the number of pulses to the stepper motor that will adjust the angle of rotation of the LD unit from the home position.</i>	
2109 1*	400 dpi	[400 dpi: [8~ 262 / <b>144</b> / 1 pulse step]
	Adjusts the laser beam pitch value for 400 dpi resolution. <i>After replacing the LD unit or replacing or clearing NVRAM, use this SP and SP2-109-3 to adjust the laser beam pitch.</i>	
2109 2*	600 dpi	[600 dpi: [30 ~ 284 / <b>168</b> / 1 pulse step]
	Adjusts the laser beam pitch value for 600 dpi resolution. <i>After replacing the LD unit or replacing or clearing NVRAM, use this SP and SP2-109-4 to adjust the laser beam pitch.</i>	
2109 3*	400 dpi Initial Setting	
	Initializes the laser beam pitch for 400 dpi using the value for SP2-109-1. <i>After entering a value for SP2-109-1, this SP must be used.</i>	
2109 4*	600 dpi Initial Setting	
	Initializes the laser beam pitch for 600 dpi using the value for SP2-109-2. <i>After entering a value for SP2-109-2, this SP must be used.</i>	
2109 5*	Auto Pitch Adjustment Interval	[0 ~ 65535 / <b>1000</b> / 1 step]
	Sets the interval for automatic laser beam pitch adjustment. <i>When the number of times that the resolution has been changed reaches this value, the laser unit position is automatically corrected.</i>	
2109 6	Current LD Unit Position	
	Displays the current LD unit position (number of pulses from home position). If this is different from the value of 2-109-1 or 2-109-2, LD unit positioning has failed.	
2109 7	Beam Pitch Change Counter	
	Displays how many times the LD unit position has been changed (how many times the resolution has changed.) <i>When the laser beam pitch adjustment is done, this counter is reset to zero.</i>	
2109 8	Beam Pitch Data Reset	
	Resets the values of SP2-109-6 and SP2-109-7. <i>After replacing the LD unit, this SP mode must be performed. See the LD Unit Removal Procedure.</i>	

2110	Test Mode dpi	<b>DFU</b> , [See below / <b>8</b> / 0 ~ 18]
	Sets the scanning resolution (dpi). <b>Note:</b> Any setting other than 0, 4, or 8 will cause an error.	
	0 = 400 x 400 dpi	15 = 439 x 430 dpi
	1 = 391 x 406 dpi	16 = 476 x 476 dpi
	4= 300 x 300 dpi	17 = 483 x 465 dpi
	<b>8= 600 x 600 dpi</b>	18= 465 x 483 dpi

## SERVICE PROGRAM MODE TABLES

2112	Polygon Motor Off Timer	[0 ~ 60 s / <b>10 s</b> / 5 s step]
	Input the time that the polygon motor is to switch off after the printer has remained idle for the specified time and entered the standby mode. <i>If set to zero, the polygon motor never switches off in standby mode. However, if the machine enters the energy saver mode, the polygon motor will ignore the zero setting and switch itself off.</i>	

2201*	Development Bias Adjustment	
2201 1*	Development Bias	[-200 ~ -700 / <b>-560V</b> / 10V step]
	Adjusts the development bias for copying. <i>Use as a temporary measure to correct faint copies from an aging drum.</i>	
2201 2*	ID Sensor Pattern	[- 200 ~ -700 / <b>-400V</b> / 10V step]
	Adjusts the development bias for the ID sensor pattern for VSP	

2207	Forced Toner Supply	
	Forces the toner bottle to supply toner at 1-second intervals for up to 30 seconds. To start, press .	

2208*	Toner Supply Mode	[0: Sensor control, 1: Image pixel count]
	Selects the toner mode. <i>If you select 1, SP2-209-002 should be set to its default value. Use image pixel count modes only as a temporary measure if the ID or TD sensor is defective.</i>	

2209*	Toner Supply Rate	
	2209 1	Toner Rate
Sets the amount of toner supplied every second by the toner supply motor. The length of time the motor remains on is determined by the data read by the TD sensor and ID sensor. <i>Increasing this value reduces the toner supply clutch on time. Use a lower value if the user tends to make lots of copies that have a high proportion of black.</i>		
2209 2*	Toner Supply Correction Data	[25 ~ 300 / <b>300</b> / 25 step]
	Displays the toner supply correction coefficient (K). It can also be used to adjust K, but the value is changed again when VT is measured for the next copy. <i>The toner supply rate depends on the amount of toner in the toner bottle. This change is corrected using this coefficient. This SP can be used to check the toner supply condition. The lower the value of K, the lower the toner density</i>	

2210*	ID Sensor Pattern Interval	
	Sets the interval between ID sensor pattern prints.	
2210 1*	Job Page Count	[0 ~ 200 / <b>10</b> / 1]
	Sets the interval between ID sensor pattern printing. For users that do not make many copies daily, set a smaller interval to compensate for the effects of seasonal and weather changes.	
2210 2*	Forced Page Count	[2 ~ 999 / <b>200</b> / 1]
	Forces creation of the ID sensor pattern to prevent low density copies for customers who use the copier for long copy jobs.	

## SERVICE PROGRAM MODE TABLES

2213*	Copies After Toner Near-End
	<p>Selects the number of copies that can be printed once the copier has detected toner near-end.                      [0~2/0/1 step]                      [0: 90 copies, 1: No copies, 2: 10 copies]</p> <p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>• If "1" is selected the machine stops printing when the TD sensor output drops below the prescribed level.</li> <li>• Select 1 or 2 if the customer normally makes copies of very high density.</li> </ul>

2220*	Vref Manual Setting
	<p>Adjusts the TD sensor reference voltage (Vref). Change this value after replacing the development unit with another development unit that contains toner.                      [1.0 ~ 5.00 V / <b>4.00V</b> / 2.0 step]</p> <ol style="list-style-type: none"> <li>1. Check the value of SP2-220 in both the machine containing the test unit and the machine that you are going to move it to.</li> <li>2. Install the test development unit, and then input the VREF for this unit into SP2-220.</li> <li>3. After the test, put back the old development unit, and change SP2-220 back to the original value.</li> </ol> <p>Notes:</p>

2223*	Vt Display
2223 1	Current
	Displays the TD sensor output voltage for the immediately previous copy.
2223 2	Average Previous 10 copies
	Displays the average of the most recent TD sensor outputs (from the previous 10 copies).
2223 3	Rate of Change
	Displays the rate of change in the TD sensor output.
2223 4	GAIN
	Displays the GAIN value used to calculate the on time for the toner supply motor.
2223 5	Image Pixel Count
	Displays the image pixel count.

SERVICE PROGRAM MODE TABLES

2301	Transfer Current Adjustment	
2301 1	1st Side of Paper	35 CPM: [20 ~ 100 $\mu$ A / <b>35</b> / 1 $\mu$ A step] 45 CPM: [20 ~ 100 $\mu$ A / <b>45</b> ] / 1 $\mu$ A step]
	Adjusts the transfer current for printing the first side of the paper (image area). <i>If the user uses thicker paper, the current may have to be increased to ensure sufficient transfer of toner.</i>	
2301 2	2nd Side of Paper	35 CPM: [20 ~ 100 $\mu$ A / <b>35</b> / 1 $\mu$ A step] 45 CPM: [20 ~ 100 $\mu$ A / <b>40</b> ] / 1 $\mu$ A step]
	Adjusts the transfer current for printing the second side of the paper (image area).	
2301 3	Leading Edge	35 CPM: [20 ~ 100 $\mu$ A / <b>20</b> / 1 $\mu$ A step] 45 CPM: [20 ~ 100 $\mu$ A / <b>20</b> ] / 1 $\mu$ A step]
	Adjusts the transfer current for copying at leading edge of the paper. <i>Increase the current to separate the paper from the drum properly in high humidity and high temperature conditions.</i>	
2301 4	Bypass Feed (45ppm)	45 CPM: [20 ~ 100 $\mu$ A / <b>45</b> / 1 $\mu$ A step]
	Adjusts the transfer current for copying from the by-pass tray (image area) for the 45 CPM(45 cpm). <i>If the user normally feeds thicker paper from the bypass tray, use a higher setting.</i>	
2301 5	Leading Edge Bypass Feed (45ppm)	45 CPM: [20 ~ 100 $\mu$ A / <b>60</b> / 1 $\mu$ A step]
	Adjusts the transfer current for copying at the leading edge of paper fed from the by-pass tray for the 45 CPM(45 cpm). <i>Increase the current to separate the paper from the drum properly in high humidity and high temperature conditions.</i>	
2301 6	Bypass Feed (35 ppm)	35 CPM: [20 ~ 100 $\mu$ A / <b>35</b> / 1 $\mu$ A step]
	Adjusts the transfer current for copying from the by-pass tray (image area) for the 35 CPM (35 cpm).	
2301 7	Leading Edge Bypass Feed (35 ppm)	35 CPM: [20 ~ 100 $\mu$ A / <b>45</b> / 1 $\mu$ A step]
	Adjusts the transfer current for copying at the leading edge of paper fed from the by-pass tray for the 35 CPM (35 cpm).	

## SERVICE PROGRAM MODE TABLES

<b>2309*</b>	Transfer Current Correction	
<b>2309 1</b>	Paper Lower Width (a)	[0 ~ 297 / <b>150</b> / 1 mm step]
	Adjusts the lower paper width threshold for the transfer current, charge voltage, and development bias corrections. <i>Use this SP when an image problem (e.g., insufficient toner transfer) occurs with a small width paper. If the paper width is smaller than this value, the transfer current will be multiplied by the factor in SP2-309-3 (paper tray) or SP2-309-5 (by-pass).</i>	
<b>2309 2</b>	Paper Upper Width (b)	[0 ~ 297 / <b>216</b> / 1 mm step]
	Adjusts the upper paper width threshold for the transfer current, charge voltage, and development bias corrections. <i>As for SP2-309-1, but the factors are in SP2-309-4 (paper tray) and SP2-309-6 (by-pass).</i>	
<b>2309 3</b>	Paper Tray (alpha)	[1.0 ~ 3 / <b>1.0</b> / 0.1 mm step]
	Adjusts the transfer current correction coefficient used if the paper width is less than the setting of SP2-309-1.	
<b>2309 4</b>	Paper Tray (beta)	[1.0 ~ 3 / <b>1.0</b> / 0.1 mm step]
	Adjusts the transfer current correction coefficient used if the paper width is less than the setting of SP2-309-2.	
<b>2309 5</b>	By-Pass Feed (gamma)	[1.0 ~ 3 / <b>1.5</b> / 0.1 mm step]
	Adjusts the transfer current correction coefficient used if the paper width is less than the setting of SP2-309-1.	
<b>2309 6</b>	By-Pass Feed (delta)	[1.0 ~ 3 / <b>1.5</b> / 0.1 mm step]
	Adjusts the transfer current correction coefficient used if the paper width is less than the setting of SP2-309-2.	

<b>2801*</b>	TD Sensor Initial Setting	
	Performs the TD sensor initial setting and allows the service technician to enter the lot number of the developer. (The lot number is embossed on the edge of the developer package.) This SP mode controls the voltage applied to the TD sensor to make the TD sensor output about 3.0 V. Press "Execute" to start. After finishing this, the TD sensor output voltage is displayed. <i>Use this mode only after installing the machine, changing the TD sensor, or adding new developer.</i>	

<b>2802*</b>	TD Sensor Manual Setting	
	Allows you to adjust the TD sensor output manually for the following.	
<b>2802 1</b>	VTS	[1.00 ~ 5.00V / <b>4.78V</b> / 0.02V step]
	Adjusts the TD sensor output (VT). <i>Change this value after replacing the development unit with another one that already contains toner. For example, when using a development unit from another machine for test purposes. To adjust VT, use a similar procedure as for SP2-220.</i>	
<b>2802 2</b>	VTMAX	[1.00 ~ 5.00V / <b>4.78V</b> / 0.02V step]
	Adjusts the maximum value for SP2802 1.	
<b>2802 3</b>	VTMIN	[1.00 ~ 5.00V / <b>1.00V</b> / 0.02V step]
	Adjusts the minimum value for SP2802 1.	

<b>2805*</b>	Developer Initialization	
	Performs the developer initialization. Press "Execute" to start. This SP should be performed after doing SP2801-1 at installation and after replacing the drum.	

## SERVICE PROGRAM MODE TABLES

2902	Test Pattern	
2902 2	IPU Test Pattern	Pattern 0 ~ 15 (●5.2.4)
	Prints the test patterns for the IPU chip. <i>This SP mode is useful for finding whether the BICU or the SBU is defective. If the printout is not OK, the BICU is defective.</i>	
2902 3	Printing Test Pattern	Pattern 0 ~ 38(●5.2.4)
	Prints the printer test patterns. Select the number of the test pattern that you want to print. <i>This SP mode is useful for finding whether the LDDR or the BICU is defective. If the printout is not satisfactory, the LDDR is defective.</i>	

2909*	Main Scan Magnification	
	Adjusts the magnification in the main scan direction for copy mode and printer mode. Press $\odot$ to toggle $\pm$ .	
2909 1*	Copier	[-2.0 ~ +2.0 / 0 / 0.1% step]
2909 2*	Printer	[-2.0 ~ +2.0 / 0 / 0.1% step]

<b>2911</b>	Transfer Current On/Off Timing	
<b>2911 1</b>	La (On Timing)	[-30 ~ +30 / 0 mm / 1 mm step]
	Adjusts the transfer current on timing at leading edge.	
<b>2911 2</b>	Lb (Switch Timing)	[0 ~ +30 / 10 mm / 1 mm step]
	Adjusts the transfer current switch timing. This determines when the leading edge stops and the image area current begins (see SP2-301).	
<b>2911 3</b>	Lc (Off Timing)	[-30 ~ +30 / 5 mm / 1 mm step]
	Adjusts the transfer current off timing. (e.g. -5 mm is 5 mm before the trailing edge.)	

<b>2912*</b>	Drum Reverse Rotation Interval	<b>DFU</b>
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<b>2913*</b>	Print Density for Test Pattern	[0 ~ 15 / 15 / 1]
	Sets the print density for the patterns printed with SP2-902-3.	

SERVICE PROGRAM MODE TABLES

2914*	Process Control Setting	
2914 1*	C-alpha	[0 ~ 400 / <b>150</b> / 10V step]
	Adjusts the charge roller voltage used when paper with a small width is fed from the by-pass tray. The paper width below which the correction starts depends on the value of SP2-309-1. <i>Use this SP when an image problem (such as white spots at the center of black dots or breaks in thin black lines) occurs when paper with a small width is fed from the by-pass feed tray.</i>	
2914 2*	C-beta	[0 ~ 400 / <b>0</b> / 10V step]
	Adjusts the charge roller voltage used when paper with a small width is fed from the by-pass tray. The paper width below which the correction starts depends on the value of SP2-309-2. <i>Use this SP when an image problem (see 2-914-1) occurs when paper with a small width is fed from the by-pass feed tray.</i>	
2914 3*	B-gamma	[0 ~ 300 / <b>200</b> / 10V step]
	Adjusts the development bias used when paper with a small width is fed from the by-pass tray. The paper width below which the correction starts depends on the value of SP2-309-1. <i>Use this SP when an image problem (see 2-914-1) occurs when paper with a small width is fed from the by-pass feed tray.</i>	
2914 4*	B-delta	[0 ~ 300 / <b>50</b> / 10V step]
	Adjusts the development bias used when paper with a small width is fed from the by-pass tray. The paper width below which the correction starts depends on the value of SP2-309-2. <i>Use this SP when an image problem (see 2-914-1) occurs when paper with a small width is fed from the by-pass feed tray.</i>	

<b>2920</b>	LD Off Check	<b>DFU</b>
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<b>2960*</b>	Toner Overflow Sensor	[0 = No, <b>1</b> = Yes]
	Selects whether or not the toner overflow sensor is activated.	

<b>2964*</b>	Transfer Cleaning Blade Forming	[0 ~ 30/ <b>0</b> / 1 sheets]
	Applies a pattern of toner to the transfer belt at a defined interval between sheets on the transfer belt in order to reduce friction between the belt surface and the cleaning blade. <i>Under conditions of high temperature and high humidity, the density control feature may reduce the amount of toner, which also reduces the amount of toner on the surface of the transfer belt. With less toner on the belt, the friction between the belt and the blade increases, and could cause the blade to bend or scour the surface of the belt.</i>	

SERVICE PROGRAM MODE TABLES

<b>2969*</b>	LD – PWM Selection	
<b>2969 1*</b>	Printer Output LD – PWM Selection	[1 ~ 4 / 1 / 1 step]
	Changes the LD power PWM control for printed copies. A smaller value produces a lighter image. Use this SP to adjust the image density for printing from a personal computer or printing a received fax message. 1: 87.5% 2: 75% 3: 62.5% 4: 50%	
<b>2969 2*</b>	Fax Output LD – PWM Selection	[1 ~ 4 / 1 / 1 step]
	Changes the LD power PWM control for printed fax messages. A smaller value produces a lighter image. Use this SP to adjust the image density for printing fax messages. 1: 87.5% 2: 75% 3: 62.5% 4: 50%	

<b>2971</b>	Toner Full Sensor Count	<b>DFU</b>
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<b>2972*</b>	Grayscale Limit	
	A new feature of this machine that controls the halftone density level to prevent deterioration of the OPC. The halftone density is detected by the ID sensor, and the machine adjusts the intensity of the LD beam according to the upper/lower limit setting.	
<b>2972 1*</b>	Upper Limit	[0 ~ 100 / <b>63</b> / 1 step] (35 cpm only)
	Defines the upper limit for grayscale. <i>A larger value allows a wider range of halftones at the pale end of the scale. If the image contains pale areas with fuzzy borders surrounded by dark areas, reduce this value to make the borders clearer.</i>	
<b>2972 2*</b>	Lower Limit	[0 ~ 100 / <b>57</b> / 1 step] (35 cpm only)
	Defines the lower limit for grayscale. <i>A smaller value allows a wider range of halftones at the dark end of the scale.</i>	

<b>2973*</b>	Grayscale Copy Interval Check	[0 ~ 1000 / <b>100</b> / 10 step]
	Sets the halftone operation interval in order to prevent deterioration of the OPC. If the number of copies exceeds this setting, at the end of the job, or if the door is opened and closed, charge correction is executed.	

<b>2974*</b>	Image Density Adjustment	[1 ~ 5 / <b>3</b> / 1 step]
	Adjusts image density. Changing this setting adjusts development bias and ID sensor output voltage that in turn raises or lowers image density.	

<b>2975*</b>	Toner End Detection ON Time	[0 ~ 2,000 / <b>0</b> / 10 s step]
	Sets a time limit for issuing the toner near end warning on the operation panel. The time may need to be shorter for customers who run especially large print jobs (working at night, for example) to ensure earlier warning of the toner near end condition so toner out does not interrupt a long job. 0: Normal end detection (90 sheets after near-end detected (SP2213))	

Service Tables

## SERVICE PROGRAM MODE TABLES

2976*	Toner Bottle Total Time On [0 ~ 2,000,000 / 0 / 1 ms step]
	<p>Displays the total ON time of the toner supply motor, calculated from when the toner bottle was replaced. Use this to check that the toner end count (SP2975) is working properly.</p> <p><i>When SP2975 is set to any value other than "0", this value is displayed when it matches the setting of SP2975. When SP2975 is set to "0", SP2976 is disabled. SP2976 is automatically set to zero by toner end recovery.)</i></p>
2980*	Charge Counter [0 ~ 1000000 / 0 / 1 step]
	<p>Sets the number of pages to print after toner and carrier initialization before the charge input is increased to compensate for deterioration over time in the polarity of the carrier.</p> <p><i>The strength in the polarity of the carrier in the toner will eventually decrease and cause lower charge output. Setting the charge output to increase after a specified number of copies can compensate for this effect.</i></p>
2981	<p>Polygon Mirror Rotation Switch <b>DFU</b></p> <p>Switches the number revolutions per minute of the polygon mirror motor.</p> <p><b>0:</b> Rpm determined by engine  <b>1:</b> Rpm for 35 CPM (35 cpm)  <b>2:</b> Rpm for 45 CPM(45 cpm)</p>

**SP3-xxx: Process**

3001*	ID Sensor Initial Setting	
3001 1	ID Sensor PWM Setting	[0 ~ 255 / <b>100</b> / 1 step]
	Allows you to reset the PWM of the ID sensor LED to avoid a service call error after clearing NVRAM or replacing the NVRAM. <i>The PWM data is stored by executing SP-3001-2.</i>	
3001 2	ID Sensor Initialization	—
	Performs the ID sensor initial setting. ID sensor output for the bare drum (VSG) is adjusted automatically to 4.0 ±0.2 V. <i>Press “Execute” to start. Perform this setting after replacing or cleaning the ID sensor, replacing the drum, or clearing NVRAM.</i>	

3103*	ID Sensor Output Display	
	Displays the current VSG, VSP, VSDP, and grayscale control. If the ID sensor does not detect the ID pattern, “VSP = 5.0 V/VSG = 5.0 V” is displayed and an SC code is generated. If the ID sensor does not detect the bare area of the drum, “VSP = 0.0 V/VSG = 0.0 V” is displayed and an SC code is generated.	
3103 1*	Vsg (Drum Surface Output)	[0V ~ 5.00V]
3103 2*	Vsp (Pattern Output)	[0V ~ 5.00V]
3103 3*	Vsdp (Immediate Post-Pattern Output).	[0V ~ 5.00V]
3103 4*	Vsm/Vsg (Grayscale Post-Pattern Output)	[0V ~ 5.00V]

3905*	Hot Roller Stripper Cleaning After Job	
	Toner and carbon clinging to the hot roller strippers can cause poor print quality. To prevent this, toner and carbon are dislodged from the hot roller strippers in two ways: 1) switching the fusing motor on/off after every print job, and 2) freely rotating the hot roller for 5 s at the beginning of every print job. These SP set up operation of the first method (switching the fusing motor on/off after a print job.)For details, see Section “6.6.2 Hot Roller Stripper Cleaning”. Also see SP 5959.	
3905 1*	Number Rotations	This SP sets the number of times the 1st Cleaning is done for the number of pages prescribed with SP3905 002 have been printed. [0.0~1.0/1.0/0.1] <b>Note:</b> <ul style="list-style-type: none"> <li>All fans remain on during cleaning and then switch off 60 sec. after the cleaning cycle ends.</li> <li>Raising this setting can increase wear on the hot roller and cleaning roller and shorten the service life of the hot roller.</li> </ul>
3905 2*	Number of Pages	This SP prescribes the number of pages to accumulate before the fusing motor is switched on/off (1 cycle). [0 ~ 1000 / <b>5</b> / 1] Unless you change this setting, 15 sec. after a total of 5 pages have been printed (the accumulated total of several small jobs), the fusing motor will switch on for 15 sec. and then switch off. This 15 sec. off/15 sec. on at the end of a cleaning job is the <i>1st Cleaning</i> .

## SERVICE PROGRAM MODE TABLES

3905 3*	<p>No. addtnl. sheets for 2nd HR stripper cleaning</p> <p>This SP prescribes the number of pages to print continuously before the fusing motor is switched on/off twice. [6 ~ 49 / <b>30</b> / 1]</p> <p>Unless you change this setting, 15 sec. after the end of every print job of 30 to 49 <u>continuous</u> pages, the <i>1st Cleaning</i> will be done twice (fusing motor is switched on/off twice at 15 sec. intervals).</p>
3905 4*	<p>No. addtnl. sheets for 3rd HR stripper cleaning</p> <p>This SP prescribes the number of pages to print continuously before the 1st Cleaning is done once at the end of the print job, pauses 45 sec., and then executes again. [50 ~ 999/ <b>100</b> / 1]</p> <p>Unless you change this setting, 15 sec. after the end of every print job of 50 to 999 continuous pages, the fusing motor will switch on for 15 sec., switch off for 4 sec. switch on for 15 sec. and then switch off. Switching the fusing motor on again for 15 sec. after 45 sec. have elapsed after the 1st Cleaning is called the <i>2nd Cleaning</i>.</p>
3905 5*	<p>No. of times for 3rd HR stripper cleaning</p> <p>This SP prescribes the number of times that the cleaning pattern of SP3905 004 is repeated for the number of pages prescribed by SP3905 004. [0~5/<b>0</b>/1]</p> <p>Unless you change this setting, the cleaning pattern of SP3904 (1st Cleaning, then the 2nd Cleaning after 35 sec.) is not repeated. If you change this setting to "1" for example, then the pattern will be repeated once.</p>
3905 6*	<p>Job/HR stripper cleaning priority setting</p> <p>This SP setting determines whether cleaning is canceled if another job starts while cleaning is in progress.</p> <p><b>0</b>: New job priority 1: Cleaning priority</p> <p>Setting this SP to "1" ensures that every cleaning cycle executes completely before another job is allowed to start.</p>

**SP4-xxx: Scanner**

4008*	Scanner Sub Scan Magnification	
	Adjusts the magnification of the sub scan direction during scanning. Changing this value changes the scanner motor speed. Press $\odot^{(*)}$ to toggle $\pm$ . [-0.9 ~ 0.9 / <b>0.0</b> / 0.1% step]	

4010*	Scanner Leading Edge Registration	
	Adjusts the leading edge registration for scanning. Press $\odot^{(*)}$ to toggle $\pm$ . [-0.9 ~ 0.9 / <b>0.0</b> / 0.1 mm step] <i>As you enter a negative value, the image moves toward the leading edge.</i>	

4011*	Scanner Side-to-Side Registration	
	Adjusts side-to-side registration for scanning. Press $\odot^{(*)}$ to toggle $\pm$ . [-4.6 ~ +4.6 / <b>0.0</b> / 0.1 mm step] <i>As you enter negative values, the image will disappear at the left, and as you enter positive values, the image will appear at the left.</i>	

4012*	Scanner Erase Margin	
	Adjusts scanning margins for the leading and trailing edges (sub scan) and right and left edge (main scan). Do not adjust unless the customer desires a scanner margin greater than the printer margin.	
4012 1*	Leading Edge	[0 ~ 9 / <b>1.0</b> / 0.1 mm step] (Specification: $3 \pm 2$ mm)
4012 2*	Trailing Edge	[0 ~ 9 / <b>0.5</b> / 0.1 mm step] (Specification: $2 \pm 2$ mm)
4012 3*	Right	[0 ~ 9 / <b>0.5</b> / 0.1 mm step] (Specification: $+2.5 \sim -1.5$ mm)
4012 4*	Left	[0 ~ 9 / <b>1.0</b> / 0.1 mm step] (Specification: $2 \pm 1.5$ mm)

4013	Scanner Free Run	
	Performs a scanner free run with the exposure lamp off. [OFF] [ON]	

## SERVICE PROGRAM MODE TABLES

4020*	<p>ADF Scan Glass Dust Check</p> <p>This function checks the narrow scanning glass of the ADF for dust that can cause black lines in copies. If dust is detected a system banner message is displayed, but processing does not stop.</p>
4020 1*	<p>Check On/Off Change</p> <p>Issues a warning if there is dust on the narrow scanning glass of the ADF when the original size is detected before a job starts. This function can detect dust on the white plate above the scanning glass, as well as dust on the glass. Sensitivity of the level of detection is adjusted with SP4999 2. [0 ~ 1 / 0 / 1] 0: Off. No dust warning. 1: On. Dust warning. This warning does not stop the job. <b>Note:</b> Before switching this setting on, clean the ADF scanning glass and the white plate above the scanning glass.</p>
4020 2*	<p>Detect Level</p> <p>Adjusts the sensitivity for dust detection on the ADF scanning glass. This SP is available only after SP49991 is switched on. [0~8/ 4/ 1] If you see black streaks in copies when no warning has been issued, raise the setting to increase the level of sensitivity. If warnings are issued when you see not black streaks in copies, lower the setting. <b>Note:</b> Dust that triggers a warning could be removed from the glass by the originals in the feed path. If the dust is removed by passing originals, this is not detected and the warning remains on.</p>

4301	<p>APS Sensor Output Display</p> <p>Displays the time required to detect the size of the paper on the scanner exposure glass. (7) [00011111] (0)</p>
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4303*	<p>APS A5/LT Size Detection</p> <p>Determines whether an original of non-standard size is detected as A5/HLT size by the APS sensor. 0: Non-standard size not detected as A5/HLT 1: Non-standard size detected as A5/HLT LEF 2: Non-standard size detected as A5/HLT SEF <i>If 0 is selected, "Cannot detect original size" will be displayed.</i></p>
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4305*	<p>Original Size Detection</p> <p>Selects whether or not the copier APS sensor detects the original as 8K/16K or A4/LT. 0: Normal (APS detects standard sizes) 1: A4 or LT original size detect enabled 1: 8K, 16K paper size detect enabled (Taiwan only)</p>
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## SERVICE PROGRAM MODE TABLES

4307*	APS Sensor Output Display
	Determines whether or not the original size is detected while the exposure lamp lights during initialization. 0: Original size detection at power on disabled. 1: Original size detection at power on enabled

4428	A456B24 <b>DFU</b>
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4495*	Scanner Evaluation Mode <b>DFU</b>
	This SP is used to test the operation of the scanner in the book (platen) mode and ARDF mode. [0~2/0/1] 0: Normal mode 1: Contact Glass Check. Exposure glass (book mode) evaluation mode with image through processing 2: DF Glass Check. Scanning glass (ARDF mode) (Lamp on> Shading> F-Gate assert at read position> Image through processing

4550*	Scanner: Text: Print	
	These SP codes set the MTF (Modular Transfer Function* <sup>1</sup> ) for text printed after scanning. <b>Note:</b> <ul style="list-style-type: none"> <li>• As a general rule, adjust the level (coefficient) before adjusting the strength.</li> <li>• Raising the brightness or contrast level may increase the occurrence of moiré</li> </ul>	
4550 1	MTF Filter Level: Main Scan	Set the MTF coefficient for main/sub scan directions. [0~15/8/1] 0: Weakest ← <b>8: Default</b> → 15: Strongest
4550 2	MTF Filter Level: Sub Scan	
4550 3	MTF Filter Strength: Main Scan	Set the MTF strength for main/sub scan directions. [0~7/4/1] 0: Weakest ← <b>4: Default</b> → 7: Strongest
4550 4	MTF Filter Strength: Sub Scan	
4550 5	Smoothing Filter	Selects the level of smoothing for originals that contain dithered images. [0~7/0/1] <b>0: Default (Off)</b> → 7: Strongest
4550 6	Brightness	Sets the overall brightness of the image. [1~255/128/1] 1: Weakest ← <b>128: Default</b> → 255: Strongest
4550 7	Contrast	Sets the overall contrast of the image. [1~255/128/1] 1: Weakest ← <b>128: Default</b> → 255: Strongest
4550 8	Isolated Dot Removal	Sets the level of independent dot erasure to improve the appearance of background. [0~7/0/1] <b>0: Default (Off)</b> → 7: Strongest

\*<sup>1</sup> When the CCD converts the original image to electrical signals, the contrast is reduced due to the influence that adjacent white and black pixels have on one another as a result of lens properties. Typically, you will see very narrow width and spacing between black and white areas. MTF corrects this problem and emphasizes image detail.

## SERVICE PROGRAM MODE TABLES

4551*	Scanner: Text: OCR	
	These SP codes set the MTF (Modular Transfer Function* <sup>1</sup> ) for OCR scan mode. <b>Note:</b>	
	<ul style="list-style-type: none"> <li>As a general rule, adjust the level (coefficient) before adjusting the strength.</li> <li>Raising the brightness or contrast level may increase the occurrence of moiré</li> </ul>	
4551 1	MTF Filter Level: Main Scan	Set the MTF coefficient for main/sub scan directions. [0~15/8/1] 0: Weakest ← <b>8: Default</b> → 15: Strongest
4551 2	MTF Filter Level: Sub Scan	
4551 3	MTF Filter Strength: Main Scan	Set the MTF strength for main/sub scan directions. [0~7/4/1] 0: Weakest ← <b>4: Default</b> → 7: Strongest
4551 4	MTF Filter Strength: Sub Scan	
4551 5	Smoothing Filter	Selects the level of smoothing. [0~7/0/1] <b>0: Default (Off)</b> → 7: Strongest
4551 6	Brightness	Sets the overall brightness of the image. [1~255/128/1] 1: Weakest ← <b>128: Default</b> → 255: Strongest
4551 7	Contrast	Sets the overall contrast of the image. [1~255/128/1] 1: Weakest ← <b>128: Default</b> → 255: Strongest
4551 8	Isolated Dot Removal	Sets the level of independent dot erasure to improve the appearance of background. [0~7/0/1] <b>0: Default (Off)</b> → 7: Strongest

\*1 When the CCD converts the original image to electrical signals, the contrast is reduced due to the influence that adjacent white and black pixels have on one another as a result of lens properties. Typically, you will see very narrow width and spacing between black and white areas. MTF corrects this problem and emphasizes image detail.

## SERVICE PROGRAM MODE TABLES

4552*	Scanner: Text/Photo	
	These SP codes set the MTF (Modular Transfer Function* <sup>1</sup> ) for Text/Photo mode. <b>Note:</b>	
	<ul style="list-style-type: none"> <li>• As a general rule, adjust the level (coefficient) before adjusting the strength.</li> <li>• Raising the brightness or contrast level may increase the occurrence of moiré</li> </ul>	
4552 1	MTF Filter Level: Main Scan	Set the MTF coefficient for main/sub scan directions. [0~15/8/1] 0: Weakest ← <b>8: Default</b> → 15: Strongest
4552 2	MTF Filter Level: Sub Scan	
4552 3	MTF Filter Strength: Main Scan	Set the MTF strength for main/sub scan directions. [0~7/4/1] 0: Weakest ← <b>4: Default</b> → 7: Strongest
4552 4	MTF Filter Strength: Sub Scan	
4552 5	Smoothing Filter	Selects the level of smoothing. [0~7/0/1] <b>0: Default (Off)</b> → 7: Strongest
4552 6	Brightness	Sets the overall brightness of the image. [1~255/128/1] 1: Weakest ← <b>128: Default</b> → 255: Strongest
4552 7	Contrast	Sets the overall contrast of the image. [1~255/128/1] 1: Weakest ← <b>128: Default</b> → 255: Strongest
4552 8	Isolated Dot Removal	Sets the level of independent dot erasure to improve the appearance of background. [0~7/0/1] <b>0: Default (Off)</b> → 7: Strongest

\*1 When the CCD converts the original image to electrical signals, the contrast is reduced due to the influence that adjacent white and black pixels have on one another as a result of lens properties. Typically, you will see very narrow width and spacing between black and white areas. MTF corrects this problem and emphasizes image detail.

## SERVICE PROGRAM MODE TABLES

4553*	Scanner: Photo	
	These SP codes set the MTF (Modular Transfer Function* <sup>1</sup> ) for Photo mode. <b>Note:</b>	
	<ul style="list-style-type: none"> <li>As a general rule, adjust the level (coefficient) before adjusting the strength.</li> <li>Raising the brightness or contrast level may increase the occurrence of moiré</li> </ul>	
4553 1	MTF Filter Level: Main Scan	Set the MTF coefficient for main/sub scan directions. [0~15/8/1] 0: Weakest ← <b>8: Default</b> → 15: Strongest
4553 2	MTF Filter Level: Sub Scan	
4553 3	MTF Filter Strength: Main Scan	Set the MTF strength for main/sub scan directions. [0~7/4/1] 0: Weakest ← <b>4: Default</b> → 7: Strongest
4553 4	MTF Filter Strength: Sub Scan	
4553 5	Smoothing Filter	Selects the level of smoothing. [0~7/0/1] <b>0: Default (Off)</b> → 7: Strongest
4553 6	Brightness	Sets the overall brightness of the image. [1~255/128/1] 1: Weakest ← <b>128: Default</b> → 255: Strongest
4553 7	Contrast	Sets the overall contrast of the image. [1~255/128/1] 1: Weakest ← <b>128: Default</b> → 255: Strongest
4553 8	Isolated Dot Removal	Sets the level of independent dot erasure to improve the appearance of background. [0~7/0/1] <b>0: Default (Off)</b> → 7: Strongest

\*1 When the CCD converts the original image to electrical signals, the contrast is reduced due to the influence that adjacent white and black pixels have on one another as a result of lens properties. Typically, you will see very narrow width and spacing between black and white areas. MTF corrects this problem and emphasizes image detail.

## SERVICE PROGRAM MODE TABLES

4556*	Scanner Grey Scale	
	These SP codes set the MTF (Modular Transfer Function* <sup>1</sup> ) for Grayscale..	
	<b>Note:</b>	
	<ul style="list-style-type: none"> <li>• As a general rule, adjust the level (coefficient) before adjusting the strength.</li> <li>• Raising the brightness or contrast level may increase the occurrence of moiré</li> </ul>	
4556 1	MTF Filter Level: Main Scan	Set the MTF coefficient for main/sub scan directions. [0~15/0/1] <b>0: Weakest</b> ← 8: Default → 15: Strongest
4556 2	MTF Filter Level: Sub Scan	
4556 3	MTF Filter Strength: Main Scan	Set the MTF strength for main/sub scan directions. [0~7/0/1] <b>0: Default (Off)</b> → 7: Strongest
4556 4	MTF Filter Strength: Sub Scan	
4556 5	Smoothing Filter	Selects the level of smoothing. [0~7/0/1] <b>0: Default (Off)</b> → 7: Strongest
4556 6	Brightness	Sets the overall brightness of the image. [1~255/128/1] 1: Weakest ← <b>128: Default</b> → 255: Strongest
4556 7	Contrast	Sets the overall contrast of the image. [1~255/128/1] 1: Weakest ← <b>128: Default</b> → 255: Strongest
4556 8	Isolated Dot Removal	Sets the level of independent dot erasure to improve the appearance of background. [0~7/0/1] <b>0: Default (Off)</b> → 7: Strongest

\*1 When the CCD converts the original image to electrical signals, the contrast is reduced due to the influence that adjacent white and black pixels have on one another as a result of lens properties. Typically, you will see very narrow width and spacing between black and white areas. MTF corrects this problem and emphasizes image detail.

4600*	SBU Version
	This SP displays the ID code of the SBU. This is an 8-byte display. Bytes 3 to 0 are fixed (0010). Bytes 7 to 4 display the ID code of the SBU.

4605*	Scanner Adjustment	
	Use these SP codes to 1) display the status of the white level peak adjustment for the SBU, and 2) do the adjustment manually.	
4605 1*	Flag Display	Displays the status of standard white plate density adjustment: 1: White level peak density adjusted 0: White level peak density not adjusted
4605 2*	Start	Sets the machine in the standard white plate density adjustment mode (a message is displayed on the LCD). Place a T6200 text chart on the exposure glass and press [1] to do the white level peak density adjustment with the standard white plate. After execution a message tells you whether the adjustment succeeded or not. 0: Off 1: On
4605 3*	Flag Reset	Resets the flag that indicates the status of the standard white plate density adjustment.

## SERVICE PROGRAM MODE TABLES

4610*	Standard White Level Adjustment: This Time	
	After the white peak level density has been adjusted manually with SP 4605 2, this SP code detects the difference between the adjustment and the target reference and stores this value in NVRAM. [0~255/ <b>150</b> /1]	

4613*	Standard White Pre-Level Adjustment: Last Time <b>DFU</b>	
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4616*	Standard White Level Adjustment: At Factory <b>DFU</b>	
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4624*	BK Adjustment <b>DFU</b>		
	These SP codes allow you to confirm the values for rough and detail adjustments of the black level even and odd channels when the machine was turned on. You can also adjust these values manually with the 10-key pad. If you change any of these SP codes manually, be sure to turn the machine off and on to enable the new settings.		
	4624 1	EVEN	Rough adjustment, this time
	4624 2	ODD	[0~255/ <b>200</b> /1]
	4624 3	EVEN	Detail adjustment, this time
4624 4	ODD	[0~255/ <b>200</b> /1]	

4629*	Gain Adjustment: Current	
	When the machine is turned on, the SBU performs separate fine adjustments for Ech (the even channel) and Och (the odd channel). These SP codes read the values of adjustments done after the machine was powered on. These SP codes should display $223 \pm 1$ , set by the white level peak adjustment as the fine gain adjustment and sent to the DAC. You can use these SP codes to adjust the value manually. Be sure to turn the printer off and on to enable any settings that you change.	
	4629 1	EVEN
4629 2	ODD	ODD Channel (Och) [0~255/ <b>0</b> /1]

4640*	SBU Setting <b>DFU</b>	Black Level Loop Count
4640 1	Black Level Loop Count: Offset 1	[0~255/ <b>0</b> /1]
4640 2	Black Level Loop Count: Offset 2	

4641*	SBU Setting <b>DFU</b>	White Level Loop Count
	Displays the number of loops executed during white peak level adjustment for AGC (Automatic Gain Control). This SP is for display only and the value cannot be adjusted. [0~255/ <b>0</b> /1]	

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4646*	SBU Setting <b>DFU</b>		Time-out Flag
	This SP determines whether the automatic scanner adjustment loop has exceeded the prescribed number of loops and flagged a timeout. [0~0xFF/0/1] The position of the bits that display "1" tell you where the error has occurred.		
	<b>Bit No.</b>	<b>Where the Error Occurred</b>	
	Bit 0 (LSB)	Ech Black Level Error	
	Bit 1	Och Black Level Error	
	Bit 2	Ech Gain Adjustment Timeout	
	Bit 3	Och Gain Adjustment Timeout	
	Bit 4	Reserved	
	Bit 5		
	Bit 6		
	Bit 7 (MSB)	Reference Ajustment Timeout	

4647	SBU Setting <b>DFU</b>		SBU Preset Error Flag
	This flag indicates that an ASIC read error has occurred, or that a hardware transmission error has occurred at LM98513. [0~0xFF/0/1] The position of the bits that display "1" tell you where the error has occurred.		
	<b>Bit No.</b>	<b>Where the Error Occurred</b>	
	Bit 0 (LSB)	LM98513 Read Error	
	Bit 1	GASBUP Read Error	
	Bit 2	Reserved	
	Bit 3		
	Bit 4		
	Bit 5		
	Bit 6		
	Bit 7 (MSB)		

4655*	BK Adjustment: Prev. <b>DFU</b>	
	These SP codes allow you to confirm the values for rough and detail adjustments of the black level even and odd channels before the machine was powered on. You can also adjust these values manually with the 10-key pad. If you change any of these SP codes manually, be sure to turn the machine off and on to enable the new settings.	
4655 1	EVEN	Rough adjustment – EVEN channel. [0~255/0/1]
4655 2	ODD	Rough adjustment – ODD channel. [0~255/200/1]
4655 3	EVEN	Detail adjustment – EVEN channel. [0~255/200/1]
4655 4	ODD	Detail adjustment – ODD channel. [0~255/200/1]

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4659*	Gain Adjustment: Prev	
	When the machine is turned on, the SBU performs separate fine adjustments for Ech (the even channel) and Och (the odd channel). These SP codes read the values of the adjustments in effect before the machine was powered on. These SP codes should display 223±1, set by the white level peak adjustment as the fine gain adjustment and sent to the DAC. You can use these SP codes to adjust the value manually. Be sure to turn the printer off and on to enable any settings that you change.	
4659 1	EVEN	[0~255/0/1]
4659 2	ODD	

4674*	BK Rough Adjustment: Factory <b>DFU</b>	
4674 1	EVEN	[0~255/200/1]
4674 2	ODD	
4674 3	EVEN	
4674 4	ODD	

4678*	Gain Adjustment: Factory <b>DFU</b>	
	When the machine is turned on, the SBU performs separate fine adjustments for Ech (the even channel) and Och (the odd channel). These SP codes read the values of the adjustments in effect before the machine was powered on. These SP codes should display 223±1, set by the white level peak adjustment as the fine gain adjustment and sent to the DAC. You can use these SP codes to adjust the value manually. Be sure to turn the printer off and on to enable any settings that you change.	
46781	EVEN	[0~255/0/1]
46782	ODD	

4691*	White Peak Level	
4691 1	EVEN	[0~255/0/1]
4691 2	ODD	

4694*	Black Level	
4694 1	EVEN	[0~255/0/1]
4694 2	ODD	

4800	SBU Setting <b>DFU</b>	Black Level Adjustment Mode
	This SP switches the black offset compensation mode on and off. Black offset correction is done during automatic image density correction (ADS). <b>Note:</b> This SP operates only if the black offset correction circuit is built into the SBU. <b>0: Off</b> <b>1: On</b>	

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4801*	SBU Setting <b>DFU</b>	Standard White Level Adjustment Loop Count
	Displays the number of loops executed during white peak level adjustment for AGC (Automatic Gain Control). This SP is for display only and the value cannot be adjusted.	

4901*	SBU Setting <b>DFU</b>
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4995	Scanner Evaluation Mode <b>DFU</b>
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4903*	Filter Setting	
	<i>Many filter setting SP modes have discussions in section 6. (6.2)</i>	
4903 5	Full Size Mode	0: No. Normal operation 1: Yes. Main scan magnification always full-size
	Selects whether the copy is always full size, even if the magnification ratio has been changed. Set to 1 to check the main scan magnification. If the magnification is not 100%, the image processing circuits could be malfunctioning. <i>This SP is used to determine whether magnification is operating correctly. If this SP is set to 1 can make it easier to determine which part of the IPU is malfunctioning.</i>	
4903 7	Image Shift in Magnification	<b>DFU</b> , [0~7199 / 0 / 1 step]
	Adjusts the amount of pixel shift in the main scan direction in the magnification mode.	
4903 8*	Fax 25%, 50% Reduction	<b>DFU</b> , [0~3 / 0 / 1 step]
	Determines whether 25% and 50% reduction is available in the fax mode. 0: Off 1: Conducts fax mode OR processing for main scan for resolution below 100 dpi in only Text mode. 2: Conducts pre-filter processing for fax mode. 3: Conducts fax Text mode OR processing for main scan for resolution below 100 dpi. Pre-filter processing is done in every mode except Fax Text mode.	
<b>4903 10 to 4903 16, Pre-Filter Processing (6.5)</b> The following 5 SP modes Selects the filter processing setting for smoothing in order to reduce the incidence of moiré in images in different original modes. Specifically, they set 1) the compression rate for parallel lines in the main scan direction and for long lines in the sub scan direction, and 2) the strength of smoothing. Enter the appropriate number with the 10-key pad then press #. <i>These settings attempt to smooth lines without making them stand out. Increasing the strength of a setting can reduce the incidence of moiré but can also decrease sharpness.</i>		
4903 10*	Pre-Filter: Text	[0~9 / 0 / 1]
4903 12*	Pre-Filter: Photo Mode	[0~9 / 0 / 1 step]
4903 13*	Pre-Filter: Text/Photo	[0~9 / 0 / 1 step]
4903 15*	Pre-Filter: Light	[0~9 / 0 / 1 step]
4903 16*	Pre-Filter: Generation	[0~9 / 0 / 1 step]
<b>4903 20 to 4903 35, Text Mode MTF Filter Coefficient and MTF Filter Strength</b> The following 15 SP modes select either the MTF filter coefficient (Level) or the MTF filter strength for text mode at various reproduction ratios. Each SP applies to either the main-scan direction or the sub-scan direction. (6.5)		
4903 20*	Main Filter Level: Text 25%-64%	[0~15 / 9 / 1 step]
4903 21*	Sub Filter Level: Text 25%-64%	[0~13 / 13 / 1 step]
4903 22*	Main Filter Strength: Text 25%-64%	[0~7 / 2 / 1 step]

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4903 23*	Sub Filter Strength: Text 25%-64%	[0~15 / 2 / 1 step]
4903 24*	Main Filter Level: Text 65%-154%	[0~7 / 12 / 1 step]
4903 25*	Main Filter Strength: Text 65%-154%	[0~13 / 13 / 1 step]
4903 26*	Sub Filter Level: Text 65%-154%	[0~7 / 2 / 1 step]
4903 27*	Sub Filter Strength: Text 65%-154%	[0~7 / 2 / 1 step]
4903 28*	Main Filter Level: Text 155%-256%	[0~15 / 14 / 1 step]
4903 29*	Sub Filter Level: Text 155%-256%	[0~13 / 13 / 1 step]
4903 30*	Main Filter Strength: Text 155%-256%	[0~7 / 2 / 1 step]
4903 31*	Sub Filter Strength: Text 155%-256%	[0~7 / 2 / 1 step]
4903 32*	Main Filter Level: Text 257%-400%	[0~15 / 15 / 1 step]
4903 33*	Sub Filter Level: Text 257%-400%	[0~13 / 13 / 1 step]
4903 34*	Main Filter Strength: Text 257%-400%	[0~7 / 2 / 1 step]
4903 35*	Sub Filter Strength: Text 257%-400%	[0~7 / 2 / 1 step]
	<b>4903 36 to 4903 38, Photo Mode MTF Filter Coefficients (☛6.5)</b> 4903 36: Selects the MTF filter coefficient for edges in the photo mode 4903 37: Selects the filter coefficient for smoothing in the photo mode. The higher the number you select, the greater the applied smoothing effect. 4903 38: Selects the MTF filter coefficient sharpening an entire image in the Photo mode. For 4903 36 and 4903 38, the higher the number you select, the greater the effect on sharpening low contrast text and thin lines. However, a high setting could cause background to drop or, or cause moiré to appear in photos shaded with dots. (0:Off, 1: Softest, 7: Sharpest)	
4903 36*	Photo MTF (Edge)	[[0~7 / 0 / 1]
4903 37*	Smoothing Filter in Photo Mode	[0~7 / 2 / 1]
4903 38*	Photo MTF (All)	[[0~7 / 0 / 1]
	<b>4903 39 to 4903 52, Text/Photo Mode MTF Filter Coefficient (☛6.5)</b> The following 8SP modes select the filter coefficients for either the edges (Edge) or for the entire image (All) for the Text/Photo mode at various reproduction ratios. Generally, increasing the value can improve the appearance of low contrast text; however, it can also cause background to fade or drop out completely or increase the incidence of moiré. Each SP has a range of 0~7 (0:Off, 1: Softest, 7: Sharpest)	
4903 39*	Text/Photo (Edge) Coefficient 25-64%	[0~7 / 1 / 1]
4903 40*	Text/Photo (All) Coefficient 25-64%	[0~7 / 4 / 1]
4903 43*	Text/Photo (Edge) Coefficient 65-154%	[0~7 / 1 / 1]
4903 44*	Text/Photo (All) Coefficient 65-154%	[0~7 / 4 / 1]
4903 47*	Text/Photo (Edge) Coefficient 155-256%	[0~7 / 1 / 1]
4903 48*	Text/Photo (All) Coefficient 155-256%	[0~7 / 4 / 1]
4903 51*	Text/Photo (Edge) Coefficient 257-400%	[0~7 / 1 / 1]
4903 52*	Text/Photo (All) Coefficient 257-400%	[0~7 / 4 / 1]
	<b>4903 55 and 4903 56, MTF Filter Coefficients for Light Originals (☛6.5)</b> These modes select the MTF filter coefficient (Level) and strength for originals scanned in the Pale mode. While these SPs can improve the appearance of low contrast originals, a high setting can also increase the incidence of moiré.	
4903 55*	Filter Level: Light Original	[0~6 / 6 / 1]
4903 56*	Filter Strength: Light Original	0: 1/32x, 1: 1/16x, 2: 1/8x, 3: 1/4x, 4: 1/2x, 5: 1x, 6: 2x, 7: 4x
	<b>4903 57 and 4903 58, MTF Filter Coefficients for Generation Copy (☛6.5)</b> These modes select the MTF filter coefficient (Level) and strength for originals scanned in the Generation Copy mode. While selecting a higher number strengthens the effect of the filter to improve contrast, a very high setting can increase the incidence of moiré.	
4903 57*	Filter Level: Generation Copy	[0~6 / 3 / 1 step]

SERVICE PROGRAM MODE TABLES

4903 58*	Filter Strength: Generation Copy	0: 1/32x, 1: 1/16x, 2: 1/8x, 3: 1/4x, 4: 1/2x, 5: 1x, 6: 2x, 7: 4x
	<b>4903 60 to 4903 64, Independent Dot Erase Level</b> The following 4 SP modes select the independent dot erase level for originals scanned in different modes. While selecting a higher setting erases more dots, setting a very high setting can cause very fine text or other detail to fade or drop out completely. 1: Weakest (fewest dots erased), 15: Strongest (most dots erased)	
4903 60*	Independent Dot Erase: Text Mode	[0~15 / 5 / 1 step]
4903 62*	Independent Dot Erase: Text/Photo	[0~15 / 0 / 1 step]
4903 63*	Independent Dot Erase: Light Original	[0~15 / 0 / 1 step]
4903 64*	Independent Dot Erase: Generation Copy	[0~15 / 8 / 1 step]
	<b>4903 65 to 4903 69, Background Erase Level</b> The following 5 SP modes adjust the threshold for background erase in originals scanned in different modes. A higher setting reduces more dirty background, but a very high setting can cause the image to reverse or cause other unexpected results. For all these modes, 0 = off (default).	
4903 65*	Background Erase Level: Text Mode	[0~255 / 0 / 1 step]
4903 66*	Background Erase Level: Photo Mode	[0~255 / 0 / 1 step]
4903 67*	Background Erase Level: Text/Photo Mode	[0~255 / 0 / 1 step]
4903 68*	Background Erase Level: Light Original	[0~255 / 0 / 1 step]
4903 69*	Background Erase Level: Generation Copy	[0~255 / 0 / 1 step]
	<b>4903 75 to 4903 77, Line Width Correction</b> 4903 75: Determines whether line thickness is adjusted in the main and/or sub scan direction. Enter the appropriate number with the 10-key pad then press $\text{\textcircled{\#}}$ 4903 76 and 4903 77: Select the threshold for line width detection in originals copied in the Generation Copy mode. Higher numbers make it easier to thicken thin lines.	
4903 75*	Line Width Correction: Generation Mode	0: None, 1: Thin, 2: Thin, 3: Thick
4903 76*	LWC Threshold (Main Scan): Generation Mode	[0~5 / 1 / 1 step]
4903 77*	LWC Threshold (Sub Scan): Generation Mode	[0~5 / 1 / 1 step]
	<b>4903 79 to 4903 93, Filter Strength: Edge, Filter Adj.: Edge Detection, Filter Adj.: Magnification (6.5)</b> The following 15 SP modes modify the effects of the MTF filter coefficients set by SP 4903 39 to 4903 52. The related SP mode is in parenthesis in the right column. See page 6-28 for details about how they work.	
4903 79*	Filter Strength: Text/Photo (Edge) 25-64%	[0~3 / 3 / 1] (SP4903 039)
4903 80*	Filter Adj.: Text/Photo (Edge Det.) 25-64%	[0~15 / 3 / 1] (SP4903 039)
4903 81*	Filter Adj.: Text/Photo (Mag.%) 25-64%	[0~15 / 12 / 1] (SP4903 039)
4903 82*	Filter Strength: Text/Photo (Edge) 65-154%	[0~3 / 3 / 1] (SP4903 043)
4903 83*	Filter Adj.: Text/Photo (Edge Det.) 65-154%	[0~15 / 3 / 1] (SP4903 043)
4903 84*	Filter Adj.: Text/Photo (Mag.%) 65-154%	[0~15 / 12 / 1] (SP4903 043)
4903 85*	Filter Strength: Text/Photo (Edge) 155-256%	[0~3 / 3 / 1] (SP4903 047)
4903 86*	Filter Adj.: Text/Photo (Edge Det.) 155-256%	[0~15 / 3 / 1] (SP4903 047)
4903 87*	Filter Adj.: Text/Photo (Mag.%) 155-256%	[0~15 / 12 / 1] (SP4903 047)
4903 88*	Filter Strength: Text/Photo (Edge) 257-400%	[0~3 / 3 / 1] (SP4903 051)
4903 89*	Filter Adj.: Text/Photo (Edge Det.) 257-400%	[0~15 / 3 / 1] (SP4903 051)
4903 90*	Filter Adj.: Text/Photo (Mag.%) 257-400%	[0~15 / 12 / 1] (SP4903 051)
4903 91*	Filter Strength: Photo (Edge)	[0~3 / 2 / 1] (SP4903 036)
4903 92*	Filter Adj.: Photo (Edge Det.)	[0~15 / 0 / 1] (SP4903 036)
4903 93*	Filter Adj.: Photo (Mag.%)	[0~15 / 15 / 1] (SP4903 036)

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4904*	IPU Setting				
	<i>Many IPU setting SP modes have discussions in section 6. (6.5)</i>				
4904 1*	Grayscale Photo Mode	<b>0:</b> Dithering and smoothing <b>1:</b> Error diffusion and MTF filter processing			
	Selects the method of grayscale processing for the Photo Mode. “Dithering and smoothing” is the same as the setting for “Print Photo” selected on the operation panel in Photo Mode. Dithering can be adjusted with SP4903 037. “Error diffusion and MTF filter processing” is the same as the setting for “Normal” or “Glossy Photo” selected on the operation panel in Photo Mode. Error diffusion can be adjusted with SP4903 036 and 038.				
4904 2*	Quality Photo Mode	<b>Value</b>	<b>Method</b>	<b>Lines</b>	<b>Effect</b>
		0	4-Value Error Diffusion	---	Best resolution
		1	Dither 8x 8	75	Screening
		3	Dither 8x 8	106	Best grayscale
		2	Dither 6 x 6	142	Grayscale priority
		4	Dither 4 x 4	212	Resolution priority
	Selects the size of the dither matrix for the photo mode.				
4904 3*	Density Setting for Low Density Original Mode	<b>0:</b> Selects $\gamma$ normal density <b>1:</b> Digitizes to near binary image			
	Selects the density $\gamma$ factor for the low-density original mode. <i>Use to achieve better balance between text and images, correct shadows that appear around text in handwritten documents, to enhance documents written in pencil, or to achieve stark contrast when copying blueprints, building plans, etc.</i>				
4904 4*	Density Setting for Copied Original Mode	<b>0:</b> Selects $\gamma$ normal density <b>1:</b> Digitizes to near binary image			
	Selects the density $\gamma$ factor for the copied original mode.				
4904 5*	Special Text Density	[0~7 / <b>0</b> / 1] <b>0:</b> Off, <b>1:</b> Weaker, <b>7:</b> Stronger			
	Enter the appropriate number with the 10-key pad then press (#). This SP code adjusts the density of the image to eliminate vertical black lines in originals that were caused by previous scanning with a dirty optics. While selecting a higher setting to erase more lines, selecting a very high setting can cause low contrast areas to become faint or cause them to drop out. (6.5)				
<b>4904 7*</b>	Error Diffusion Pattern	<b>0:</b> Edge threshold pattern is used. <b>1:</b> Texture Pattern (matrix) 0 is used <b>2:</b> Texture Pattern (matrix) 1 used. <b>3:</b> Texture Pattern 2 (matrix) used.			
	Adjusts the threshold level for error diffusion processing in the Text/Photo mode. The effect of error diffusion can vary, depending on the image of the original. Adjust this setting if the results of the texture in copies is not what you expect, especially before starting a large copy job.				
	<b>4904 8to 4904 12, Gray Adj.: Text/Photo (Edge Det.), Photo (Edge Det.)</b> The following 5 SP modes adjust the setting for edge detection during grayscale processing of originals scanned with the Custom Setting of the Text/Photo mode and Photo mode in the specified magnification range. At defined edges error diffusion executes on text to create sharp lines to better define text characters, but in other areas, error diffusion executes grayscale processing for photographs. Select a lower setting for better reproduction of photographs and a higher setting for sharper text. A lower setting improves the appearance of photographs, but can cause text and thin lines to drop out. A higher setting sharpens text and thin lines, but can also cause grayscale areas to degrade. (6.5)				
<b>4904 8*</b>	Gray Adj: Text/Photo (Edge Det.) 25-64%	[0~15 / <b>8</b> / 1]			

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<b>4904 9*</b>	Gray Adj.: Text/Photo (Edge Det.) 65-154%	
<b>4904 10*</b>	Gray Adj.: Text/Photo (Edge Det.) 155-256%	
<b>4904 11*</b>	Gray Adj.: Text/Photo (Edge Det.) 257-400%	[0~15 / 8 / 1]
<b>4904 13*</b>	Gray Adj.: Photo (Edge Det.)	[0~15 / 0 / 1]
	<b>4904 20 to 4904 23, Text (General) Quality (6.5)</b> The following 4 SP modes allow adjustment together with other SP codes to improve image quality of originals copied in Text Mode at magnification within the specified magnification range. Select a lower setting to prioritize reproduction of pictures without moiré, and select a higher setting to prioritize reproduction of text and thin lines. 0: Off, 1: Pictures highest priority, 13: Text/thin lines highest priority	
4904 20*	Text (General) Quality 25-64%	[0~13 / 0 / 1]
4904 21*	Text (General) Quality 65-154%	45 cpm [0~13 / 0 / 1]
		35 cpm [0~13 / 0 / 1]
4904 22*	Text (General) Quality 155-256%	[0~13 / 0 / 1]
4904 23*	Text (General) Quality 254-400%	
4904 24*	Photo (General) Quality	[0~10 / 0 / 1] 0: Off, 1: Picture high priority, 10:Text high priority
	Allows overall adjustment of photo images in originals scanned in the Photo mode. Select a lower setting to prioritize reproduction of pictures without moiré, and select a higher setting to prioritize reproduction of sharp text. (6.5)	
	<b>4904 25 to 4904 28, Text/Photo (General) Quality (6.5)</b> The following 4 SP modes allow adjustment with other SP codes to improve quality of images scanned in the Text/Photo mode and in the specified magnification range. Select a lower setting to prioritize reproduction of pictures without moiré, and select a higher setting to prioritize reproduction of sharp text. 0: Off, 1: Pictures highest priority, 10: Text highest priority	
4904 25*	Text/Photo (General) Quality 25-64%	[0~10 / 0 / 1]
4904 26*	Text/Photo (General) Quality 65-154%	[0~10 / 0 / 1]
4904 27*	Text/Photo (General) Quality 155-256%	[0~10 / 0 / 1]
4904 28*	Text/Photo (General) Quality 257-400%	[0~10 / 0 / 1]
4904 29*	Pale (General) Quality	[0~13 / 0 / 1] 0: Off, 1: Picture high priority, 13:Text high priority
	Allows adjustment with other SP codes to improve the overall quality of images scanned in Pale Mode. Select a lower setting to prioritize reproduction of pictures without moiré, and select a higher setting to prioritize reproduction of text and thin lines. (6.5)	
4904 30*	Generation (General) Quality	[0~13 / 0 / 1] 0: Off, 1: Picture high priority, 13:Text high priority
	Allows adjustment with other SP codes to improve the overall quality of images in originals scanned in Generation Copy mode. Select a lower setting to prioritize reproduction of pictures without moiré, and select a higher setting to prioritize reproduction of text and thin lines. (6.5)	

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<b>4905*</b>	Image Data Path	
	SP4905 1 allows switching between filter and magnification processing of the image for testing. SP4905 4 allows switching of the printout for testing.	
<b>4905 1*</b>	Filter Mag. Path Switch	<b>DFU</b> <b>0:</b> Uses settings of each application and mode 1: Through filter 2: Through magnification 3: Through filter, magnification
<b>4905 4*</b>	Printout Type Selection	<b>DFU</b> <b>0:</b> Uses settings of each application, mode 1: Reverses image logic (normally inverse black/white).

<b>4909*</b>	Image Data Path	
	SP4909 1 selects the method for image quality through processing. SP4909 20 Forces switching of the data output format between writing for the Ri10, CDIA for testing.	
<b>4905 1*</b>	Image Quality Through Processing	<b>DFU</b> <b>0:</b> Normal operation 1: Grayscale through processing 2: Gamma correction through processing 3: Printer gamma, grayscale through processing
<b>4905 20*</b>	Image Data Path – Printer	<b>DFU</b> <b>0:</b> Normal operation 1: Sets output from the Ri10 to the CDICA for grayscale output (1 pixel/8bits) 2: Sets output from the Ri10 to the write unit for grayscale output (4 pixels/8bits) 3: Sets output from the Ri10 to the CDICA for grayscale output (1 pixel/8bits), also sets output from the Ri10 to the write unit for grayscale output (4 pixels/8bit)

**SP5-xxx: Mode**

5024*	mm/inch Display Selection	0: Europe/Asia (mm), 1: North America (inch)
	Selects the unit of measurement. After selection, turn the main power switch off and on.	

5044*	Operation Panel Bit SW	DFU
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5045	Accounting Counter
	Selects whether the printer counter is displayed on the LCD. <b>NOTE:</b> You can change the setting only one time.  [0~1/0/1] 0: Displays total counter only. 1: Displays both total counter and printer counter.

5051	Toner Refill Detect Display
	This SP switches on/off the message that prompts the operator when it is necessary to replenish toner in the machine. <b>ON:</b> Message displayed (Default) <b>OFF:</b> Message not displayed

5055	Display IP add	Display IP Address
	Switches the banner display of the IP address off and on. (Default: *Off) [OFF] ON For example, if this SP is switched on, the IP address will be displayed below "Ready" while the printer is in standby mode: Ready 169.254.187.055	

5104*	A3/DLT Double Count
	Specifies whether the counter is doubled for A3/DLT. "Yes" counts except from the bypass tray. When "Yes" is selected, A3 and DLT paper are counted twice, that is A4 x2 and LT x2 respectively.

5106*	Density Level Setting	[1~7 / 4 / 1 notch per step]
	Selects the image density level used in ADS mode. Example: If you set SP5106 6 to "2": Pressing the Auto Image Density key toggles the display off and manual notch 2 is selected. <i>Adjust this SP if the customer cannot attain clean copies after performing automatic density adjustment</i>	

5112	Non-Std. Paper Sel.
	Determines whether a non-standard paper size can be input for the universal cassette trays (Tray 2, Tray 3) [0~1/1] 0: No 1: Yes. If "1" is selected, the customer will be able to input a non-standard paper size using the UP mode.

Service Tables

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5113	Optional Counter Type
001	<p>Default Optional Counter Type</p> <p>Selects the type of counter:</p> <p>0: None</p> <p>1: Key Card (RK3, 4) <b>Japan only</b></p> <p>2: Key Card Down</p> <p>3: Pre-paid Card</p> <p>4: Coin Rack</p> <p>5: MF Key Card</p> <p>11: Exp Key Card (Add)</p> <p>12: Exp Key Card (Deduct)</p>
002	<p>External Optional Counter Type</p> <p>Enables the SDK application. This lets you select a number for the external device for user access control.</p> <p><b>Note:</b> "SDK" refers to software on an SD card.</p> <p>[0~3/1]</p> <p>0: None</p> <p>1: Expansion Device 1</p> <p>2: Expansion Device 2</p> <p>3: Expansion Device 3</p>

5118	<p>Disable Copying</p> <p>Temporarily denies access to the machine. <b>Japan Only</b></p> <p>[0~1/1]</p> <p>0: Release for normal operation</p> <p>1: Prohibit access to machine</p>
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5120	<p>Mode Clear Opt. Counter Removal</p> <p>Do not change. <b>Japan Only</b></p> <p>[0~2/1]</p> <p>0: Yes. Normal reset</p> <p>1: Standby. Resets before job start/after completion</p> <p>2: No. Normally no reset</p>
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5121	<p>Counter Up Timing</p> <p>Determines whether the optional key counter counts up at paper feed-in or at paper exit. <b>Japan Only</b></p> <p>[0~1/1]</p> <p>0: Feed count</p> <p>1: No feed count</p>
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5127*	<p>APS Off Mode</p> <p><b>0: Enabled, 1: Disabled</b></p> <p>Selects whether the APS function is enabled or disabled with the contact of a pre-paid card or coin lock.</p>
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## SERVICE PROGRAM MODE TABLES

5131*	Paper Size Type Selection	0: Japan, 1: North America, 2: Europe
	Selects the paper size (type) for both originals and copy paper. (Default depends on DIP SW 101 setting.) <i>After changing the setting, turn the copier off and on. If the paper size of the archive files stored on the HDD is different, abnormal copies could result.</i>	

5150*	By-Pass Length Setting	0: Off, 1: On
	Determines whether the transfer sheet from the by-pass tray is used or not. <i>Normally the paper length for sub scanning paper from the by-pass tray is limited to 600 mm, but this can be extended with this SP to 1260 mm.</i>	

5162*	App. Switch Method	0: SW, 1: HW
	Determines whether the application screen is switched with a hardware switch or software switch. 0: Soft Key Set 1: Hard Key Set	

5167	Fax Printing Mode at Optional Counter Off	
	Enables or disables the automatic print out without an accounting device. This SP is used when the receiving fax is accounted for by an external accounting device. 0: Automatic printing 1: No automatic printing	

5169	CE Login	
	If you will change the printer bit switches, you must 'log in' to service mode with this SP before you go into the printer SP mode. [0~1/1] 0: Off. Printer bit switches cannot be adjusted. 1: On. Printer bit switches can be adjusted.	

5179*	Bypass Tray Paper Size Error	
	This SP determines whether a paper size error prompt appears when the machine detects the wrong paper size for the job and jams during feed from the bypass tray. [0~1/0/1] 0: Off 1: On	

5212	Page Numbering	
	5212 3	Duplex Printout Left/Right Position
5212 4	Duplex Printout High/Low Position	Vertically positions the page numbers printed on both sides during duplexing. [-10~+10/1 mm] 0 is center, minus is down, + is up.

Service Tables

<b>5228</b>	Scan Binary Bound <b>DFU</b>
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5302	<b>Set Time DFU</b>
	<p>Sets the time clock for the local time. This setting is done at the factory before delivery. The setting is GMT expressed in minutes.                  [-1440~1440/1 min.]                  JA: +540 (Tokyo)                  NA: -300 (NY)                  EU: +6- (Paris)                  CH: +480 (Peking)                  TW: +480 (Taipei)                  AS: +480 (Hong Kong)</p>



5307	<b>Summer Time</b>	
5307 1	Setting	ON/OFF [ 0 or 1 / <b>NA, EU, ASIA</b> / 1 /step] 0: Disabled 1: Enabled NA and EUR: 1, ASIA: 0
		Enables or disables the summer time mode. <a href="#">Note</a> <ul style="list-style-type: none"> <li>Make sure that both SP5-307-3 and -4 are correctly set. Otherwise, this SP is not activated even if this SP is set to "1".</li> </ul>
5307 3	Rule Set (Start)	Start <b>03200210</b> Specifies the start setting for the summer time mode. There are 8 digits in this SP. For months 1 to 9, the "0" cannot be input in the first digit, so the eight-digit setting for -2 or -3 becomes a seven-digit setting. 1st and 2nd digits: The month. [1 to 12] 3rd digit: The week of the month. [1 to 5] 4th digit: The day of the week. [0 to 6 = Sunday to Saturday] 5th and 6th digits: The hour. [00 to 23] 7th digit: The length of the advanced time. [0 to 9 / 1 hour /step] 8th digit: The length of the advanced time. [0 to 5 / 10 minutes /step] For example: 3500010 (EU default) The timer is advanced by 1 hour at am 0:00 on the 5th Sunday in March <ul style="list-style-type: none"> <li>The digits are counted from the left.</li> <li>Make sure that SP5-307-1 is set to "1".</li> </ul>
		End <b>11100200</b> Specifies the end setting for the summer time mode. There are 8 digits in this SP. 1st and 2nd digits: The month. [1 to 12] 3rd digit: The week of the month. [0 to 5] 4th digit: The day of the week. [0 to 6 = Sunday to Saturday] 5th and 6th digits: The hour. [00 to 23] The 7th and 8th digits must be set to "00". <ul style="list-style-type: none"> <li>The digits are counted from the left.</li> <li>Make sure that SP5-307-1 is set to "1".</li> </ul>

SERVICE PROGRAM MODE TABLES

5401	<b>Access Control DFU</b>	
	This SP stores the settings that limit uses access to SDK application data.	
<b>5401 6</b>	User Recognition – Copier	This SP codes are provided for future customization of the access control feature. This is to be done at the factory, not in the field.
<b>5401 16</b>	User Recognition – Document Server	
<b>5401 26</b>	User Recognition – Fax	
<b>5401 36</b>	User Recognition – Scanner	
<b>5401 46</b>	User Recognition – Printer	
<b>5401 76</b>	User Recognition – Expanded Function 1	
<b>5401 86</b>	User Recognition – Expanded Function 2	
<b>5401 96</b>	User Recognition – Expanded Function 2	
5401 103	<b>Default Document ACL</b>	
	Whenever a new login user is added to the address book in external certification mode (for Windows, LDAP, RDH), the default document ACL is updated according to this SP setting. [0~3/0/1] 0: View 1: Edit 2: Edit/Delete 3: Full control <b>Note:</b> This SP setting is ignored on a machine that is not using document server.	
5401 200	SDK1 Unique ID	"SDK" is the "Software Development Kit". This data can be converted from SAS (VAS) when installed or uninstalled.
5401 201	SDK1 Certification Method	
5401 210	SDK2 Unique ID	
5401 211	SDK2 Certification Method	
5401 220	SDK3 Unique ID	
5401 221	SDK3 Certification Method	

5404	<b>User Code Count Clear</b>
	Clears the counts for the user codes assigned by the key operator to restrict the use of the machine. Press [Execute] to clear.

5501*	<b>PM Alarm</b>	
5501 1*	PM Alarm Level	[0~9999 / 0 / 1 step] 0: Alarm off 1~9999: Alarm goes off when <i>Value (1~9999) ≥ PM counter</i>
5501 2*	Original Count Alarm	0: No alarm sounds 1: Alarm sounds after the number of originals passing through the ARDF ≥ 10,000

5504*	<b>Jam Alarm Japan Only</b>	
	Sets the alarm to sound for the specified jam level (document misfeeds are not included). [0~3 / 3 / 1 step] 0: Zero (Off) 1: Low (2.5K jams) 2: Medium (3K jams) 3: High (6K jams)	

## SERVICE PROGRAM MODE TABLES

5505*	Error Alarm
	Sets the error alarm level. <b>Japan only DFU</b> [0~255 / <b>50</b> / 100 copies per step]

<b>5507</b>	Supply Alarm	
5507 1	Paper Supply Alarm (0:Off 1:On)	Switches the control call on/off for the paper supply. <b>DFU</b> <b>0: Off</b> , 1: On 0: No alarm. 1: Sets the alarm to sound for the specified number transfer sheets for each paper size (A3, A4, B4, B5, DLT, LG, LT, HLT)
5507 2	Staple Supply Alarm (0:Off 1:On)	Switches the control call on/off for the stapler installed in the finisher. <b>DFU</b> <b>0: Off</b> , 1: On 0: No alarm 1: Alarm goes off for every 1K of staples used.
5507 3	Toner Supply Alarm (0:Off 1:On)	Switches the control call on/off for the toner end. <b>DFU</b> <b>0: Off</b> , 1: On If you select "1" the alarm will sound when the copier detects toner end.
5507 128*	Others	The "Paper Supply Call Level: nn" SPs specify the paper control call interval for the referenced paper sizes. <b>DFU</b> [00250 ~ 10000 / <b>1000</b> / 1 Step]
5507 132*	Interval: A3	
5507 133*	Interval: A4	
5507 134*	Interval: A5	
5507 141*	Interval: B4	
5507 142*	Interval: B5	
5507 160*	Interval: DLT	
5507 164*	Interval: LG	
5507 166*	Interval: LT	
5507 172*	Interval: HLT	

SERVICE PROGRAM MODE TABLES

5508	<b>CC Call (Japan Only)</b>	
5508 1	Jam Remains	Enables/disables initiating a call. [0~1/1] 0: Disable 1: Enable
5508 2	Continuous Jams	
5508 3	Continuous Door Open	
5508 4	Low Call Mode	Enables/disables the new call specifications designed to reduce the number of calls. [0~1/1] 0: Normal mode 1: Reduced mode
5508 11	Jam Detection: Time Length	Sets the length of time to determine the length of an unattended paper jam. [03~30/1] This setting is enabled only when SP5508-004 is enabled (set to 1).
5508 12	Jam Detection Continuous Count	Sets the number of continuous paper jams required to initiate a call. [02~10/1] This setting is enabled only when SP5508-004 is enabled (set to 1).
5508 13	Door Open: Time Length	Sets the length of time the remains opens to determine when to initiate a call. [03~30/1] This setting is enabled only when SP5508-004 is enabled (set to 1).
5508 21	Jam Operation: Time Length	Determines what happens when a paper jam is left unattended. [0~1/1] 0: Automatic Call 1: Audible Warning at Machine
5508 22	Jam Operation: Continuous Count	Determines what happens when continuous paper jams occur. [0~1/1] 0: Automatic Call 1: Audible Warning at Machine
5508 23	Door Operation: Time Length	Determines what happens when the front door remains open. [0~1/1] 0: Automatic Call 1: Audible Warning at Machine

⇒ 5801	Memory Clear (Refer to <b>IMPORTANT NOTE</b> in Sect. 5.4)	
	Resets NVRAM data to the default settings. Before executing any of these SP codes, print an SMC Report.	
5801 1	All Clear	Initializes items 2 ~ 15 below.
5801 2	Engine	Initializes all registration settings for the engine and copy process settings.
5801 3	SCS	Initializes default system settings, SCS (System Control Service) settings, operation display coordinates, and ROM update information.
5801 4	IMH Memory Clr	Initializes the image file system. (IMH: Image Memory Handler)
5801 5	MCS	Initializes the automatic delete time setting for stored documents. (MCS: Memory Control Service)
5801 6	Copier Application	Initializes all copier application settings.
5801 7	Fax Application	<b>Not used.</b>
5801 8	Printer Application	Initializes the printer defaults, programs registered, the printer SP bit switches, and the printer CSS counter.
5801 9	Scanner Application	Initializes the defaults for the scanner and all the scanner SP modes.
5801 10	Web Service/ Network Application	Deletes the Netfile (NFA) management files and thumbnails, and initializes the Job login ID. Netfiles: Jobs to be printed from the document server using a PC and the DeskTopBinder software
5801 11	NCS	Initializes the system defaults and interface settings (IP addresses also), the SmartNetMonitor for Admin settings, WebStatusMonitor settings, and the TELNET settings. (NCS: Network Control Service)
5801 12	R-Fax	Deletes received faxes.
5801 14	Clear DCS Setting	Initializes the DCS (Delivery Control Service) settings.
5801 15	Clear UCS Setting	Initializes the UCS (User Information Control Service) settings.
5801 16	MIRS Setting	Initializes the MIRS (Machine Information Report Service) settings.
5801 17	CCS	Initializes the CCS (Certification and Charge-control Service) settings.
5801 18	SRM Memory Clr	Initializes information in non-volatile RAM.
5801 19	LCS Memory Clr	Initializes information in non-volatile RAM.

5802*	Printer Free Run	<b>[Disable]</b> [Enable]
	Performs a free run. The scanner scans once and the printer prints for the number of copies requested. To perform the free run, after selecting "1", press the Copy Window to enter copy mode, input the number of copies, and then press the Start key. To stop the free run, press <b>[C/⊗]</b> .	

5803	Input Check	
	Displays the signals received from sensors and switches. (●5.2.5)	

5804	Output Check	
	Turns on the electrical components individually for test purposes. (●5.2.6)	

## SERVICE PROGRAM MODE TABLES

5807	Option Connection Check	
5807 1	ARDF	Execution will return either a "1" or "0": 0: Device not connected correctly. 1: Device connected correctly.
5807 2	Bank (Paper Tray Unit)	
5807 3	LCT	
5807 4	Finisher (1000-sheet, Two-Tray finisher)	

5811	Machine No. Setting <b>DFU</b>
	This SP presents the screen used to enter the 11-digit number of the machine. The allowed entries are "A" to "Z" and "0" to "9". The setting is done at the factory, and should not be changed in the field.

5812*	Service Tel. No. Setting	
	Use these SP modes to input service and support telephone numbers. Enter the number and press Press the  key to input a pause. Press the "Clear modes" key to delete the telephone number.	
5812 1*	Service	Service representative telephone number.
5812 2*	Facsimile	Fax number of service representative
5812 3*	Supply	Supplier of consumables
5812 4*	Operation	Operation support

5816	Remote Service	
5816 1	I/F Setting	Turns the remote diagnostics off and on. [0~2/1] 0: Remote diagnostics off. 1: Serial (CSS or NRS) remote diagnostics on. 2: Network remote diagnostics.
5816 2	CE Call	
5816 3	Function Flag	Enables and disables remote diagnosis over the NRS network. [0~1/1] 0: Disables remote diagnosis over the network. 1: Enables remote diagnosis over the network.
5816 6	Device Information Call Display	Controls if the item for initial setting of the screen for the NRS device-information notification-call is shown. [0~1/1] 0: Enabled. Item initial setting not shown. 1: Disable. Item for initial setting shown.
5816 7	SSL Disable	Controls if RCG (Remote Communication Gate) confirmation is done by SSL during an RCG send for the NRS over a network interface. [0~1/1] 0: Yes. SSL not used. 1: No. SSL used.

SERVICE PROGRAM MODE TABLES

5816 8	RCG Connect Timeout Sets the length of time (seconds) for the time-out when the RCG (Remote Communication Gate) connects during a call via the NRS network. [1~90/1 sec.]
5816 9	RCG Write to Timeout Sets the length of time (seconds) for the time-out when sent data is written to the RCG during a call over the NRS network. [0~100/1 sec.]
5816 10	RCG Read Timeout Sets the length of time (seconds) for the timeout when sent data is written from the RCG during a call over the NRS network. [0~100/1 sec.]
5816 11	Port 80 Enable Controls if permission is given to get access to the SOAP method over Port 80 on the NRS network. [0~1/1] 0: No. Access denied 1: Yes. Access granted.
5816 21	RCG – C Registered This SP displays the Cumin installation end flag. 1: Installation completed 2: Installation not completed
5816 22	RCG – C Registered Detail This SP displays the Cumin installation status. 0: Basil not registered 1: Basil registered 2: Device registered
5816 23	Connect Type (N/M) This SP displays and selects the Cumin connection method. 0: Internet connection 1: Dial-up connection
<b>5816 27</b>	<b>Connect Timeout DFU</b> Timeout time for connection to the GW URL. Operates only for Cumin. Default: <b>30</b>
<b>5816 28</b>	<b>Send Timeout DFU</b> HTTP send timeout. [0~100/ <b>30</b> /1]
<b>5816 29</b>	<b>Receive Timeout DFU</b> HTTP receive timeout. [0~100/ <b>30</b> /1]
<b>5816 30</b>	<b>Retry Timeout DFU</b> HTTP connection retry interval. This is the interval between retry attempts when connection with the GW URL fails. Default: <b>3</b>
<b>5816 31</b>	<b>Retry Count DFU</b> The number of HTTP connection retries. This is the number of retry attempts to make connection with the GW URL. After the last attempt, the attempt to connect stops. Default: <b>3</b>
<b>5816 32</b>	<b>Connect Send Delay DFU</b> HTTP connection request transmission delay. This is the standby time between the send request and the actual sending. Default: <b>5</b>

SERVICE PROGRAM MODE TABLES

5816 33	Max Multipart <b>DFU</b>
	This the number of TX/RX transmissions for a multi-part message to the GW URL. Default <b>10</b>
5816 34	Firm DL Interval <b>DFU</b>
	Firmware update retry interval. This is the time interval between attempts to complete a firmware update. [0~0xffff/300/1]
5816 35	Firm DL Retry Count <b>DFU</b>
	Firmware update retry attempts. This is the number of times the system attempts to complete a firmware update. [0~255/3/1]
5816 61	Cert. Expire Timing <b>DFU</b>
	Proximity of the expiration of the certification.
5816 62	Use Proxy
	This SP setting determines if the proxy server is used when the machine communicates with the service center.
5816 63	Proxy Host
	The is the address of the HTTP proxy server used to effect communication between Cumin-M and the Gateway. The length of the address is limited to 127 characters (characters beyond the 127th character are ignored).
5816 64	Proxy Port Number
	This is the port number of the HTTP proxy used to effect communication between Cumin-N and the Gateway. [0~0xffff/0/1]
5816 65	Proxy User name
	This is the user name used for certification of the HTTP proxy. The length of the name is limited to 31 characters (characters beyond the 31st character are ignored).
5816 66	Proxy Password
	This is the certification password of the HTTP proxy. The length of the password is limited to 31 characters (characters beyond the 31st character are ignored).

**Note:** The proxy number, user name, and password comprise proprietary customer information required by the service technician to do the necessary settings for Cumin-N. To prevent unauthorized access this information, these SP settings do not appear in the SMC report.

5816 67	CERT: Up State	
	Displays the state of the certification update used for Cumin. If Cumin has not been set up, These SP settings are done automatically as soon as Cumin is set up.	
	0	The certification used by Cumin is set correctly.
	1	The certification request (setAuthKey) for update has been received from the GW URL and certification is presently being updated.
	2	The certification update is completed and the GW URL is being notified of the successful update.
	3	The certification update failed, and the GW URL is being notified of the failed update.
	4	The period of the certification has expired and new request for an update is being sent to the GW URL.
	11	A rescue update for certification has been issued and a rescue certification setting is in progress for the rescue GW connection.
	12	The rescue certification setting is completed and the GW URL is being notified of the certification update request.
	13	The notification of the request for certification update has completed successfully, and the system is waiting for the certification update request from the rescue GW URL.
	14	The notification of the certification request has been received from the rescue GW URL, and the certification is being stored.

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	15	The certification has been stored, and the GW URL is being notified of the successful completion of this event.
	16	The storing of the certification has failed, and the GW URL is being notified of the failure of this event.
	17	The certification update request has been received from the GW URL, the GW URL was notified of the results of the update after it was completed, but an certification error has been received, and the rescue certification is being recorded.
	18	The rescue certification of No. 17 has been recorded, and the GW URL is being notified of the failure of the certification update.
5816 68	CERT: Error	
	Displays a number code that describes the reason for the notification requesting the certification update.	
	0	Normal. No request for certification update in progress.
	1	Certification update in progress due to expiration of certification.
	2	SSL error has been issued after the certification has expired.
	3	There has been a shift from a common to individual certification.
	4	There has been a common certification without ID2.
	5	No certification has been issued.
	6	GW URL does not exist.
5816 69	CERT: Up ID	
	The ID of the request for certification.	
5816 83	Firm Up Status	
	Displays the status of the firmware update.	
5816 84	Non-HDD Firm Up	
	This setting determines if the firmware can be updated, even without the HDD installed.	
5816 85	Firm Up User Check	
	This SP setting determines if the operator can confirm the previous version of the firmware before the firmware update execution. If the option to confirm the previous version is selected, a notification is sent to the system manager and the firmware update is done with the firmware files from the URL.	
5816 86	Firmware Size	
	Allows the service technician to confirm the size of the firmware data files during the firmware update execution.	
5816 87	CERT: Macro Version	
	Displays the macro version of the NRS certification	
5816 88	CERT: PAC Version	
	Displays the PAC version of the NRS certification.	
5816 89	CERT: ID2 Code	
	Displays ID2 for the NRS certification. Spaces are displayed as underscores (_). Asterisks (****) indicate that no NRS certification exists.	
5816 90	CERT: Subject	
	Displays the common name of the NRS certification subject. CN = the following 17 bytes. Spaces are displayed as underscores (_). Asterisks (****) indicate that no DESS exists.	
5816 91	CERT: Serial Number	
	Displays serial number for the NRS certification. Asterisks (****) indicate that no DESS exists.	
5816 92	CERT: Issuer	
	Displays the common name of the issuer of the NRS certification. CN = the following 30 bytes. Asterisks (****) indicate that no DESS exists.	
5816 93	CERT: Valid Start	
	Displays the start time of the period for which the current NRS certification is enabled.	

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5816 94	CERT: Valid End	
	Displays the end time of the period for which the current NRS certification is enabled.	
5816 200	Manual Polling	
	No information is available at this time.	
5816 201	Regist: Status	
	Displays a number that indicates the status of the NRS service device.	
	0	Neither the NRS device nor Cumin device are set.
	1	The Cumin device is being set. Only Box registration is completed. In this status the Basil unit cannot answer a polling request.
	2	The Cumin device is set. In this status the Basil unit cannot answer a polling request.
	3	The NRS device is being set. In this status the Cumin device cannot be set.
5816 202	Letter Number	
	Allows entry of the number of the request needed for the Cumin device.	
5816 203	Confirm Execute	
	Executes the inquiry request to the NRS GW URL.	
5816 204	Confirm Result	
	Displays a number that indicates the result of the inquiry executed with SP5816 203.	
	0	Succeeded
	1	Inquiry number error
	2	Registration in progress
	3	Proxy error (proxy enabled)
	4	Proxy error (proxy disabled)
	5	Proxy error (Illegal user name or password)
	6	Communication error
	7	Certification update error
5816 205	Confirm Place	
	Displays the result of the notification sent to the device from the GW URL in answer to the inquiry request. Displayed only when the result is registered at the GW URL.	
5816 206	Register Execute	
	Executes Cumin Registration.	
5816 207	Register Result	
	Displays a number that indicates the registration result.	
	0	Succeeded
	2	Registration in progress
	3	Proxy error (proxy enabled)
	4	Proxy error (proxy disabled)
	5	Proxy error (Illegal user name or password)
	6	Communication error
	7	Certification update error
	8	Other error
9	Registration executing	

Service  
Tables

5816 208	Error Code		
	Displays a number that describes the error code that was issued when either SP5816 204 or SP5816 207 was executed.		
	<b>Cause</b>	<b>Code</b>	<b>Definition</b>
	Illegal Modem Parameter	-11001	Chat parameter error
		-11002	Chat execution error
		-11003	Unexpected error
	Operation Error, Incorrect Setting	-12002	Inquiry, registration attempted without acquiring device status.
		-12003	Attempted registration without execution of an inquiry and no previous registration.
		-12004	Attempted setting with illegal entries for certification and ID2.
		-12005	@Remote communication is prohibited. The device has a problem with an internal @Remote function.
		-12006	After confirmation is completed, confirmation request was made again.
		-12007	Different request number was used for registration than the number which was used for confirmation.
		-12008	Certification update failed because the device was in use.
	Error Caused by Response from GW URL	-2385	Attempted dial up overseas without the correct international prefix for the telephone number.
		-2387	Not supported at the Service Center
		-2389	Database out of service
		-2390	Program out of service
		-2391	Two registrations for same device
		-2392	Parameter error
		-2393	External @Remote not managed
-2394		Device not managed	
-2395		Box ID for external @Remote is illegal	
-2396		Device ID for external @Remote is illegal	
-2397	Incorrect ID2 format		
-2398	Incorrect request number format		
5816 250	CommLog Print	Prints the communication log.	

5821*	Remote Service Address ( <b>Japan Only</b> )	
5821 1*	CSS PI Device Code	Sets the PI device code. After changing this setting, you must switch the machine off and on.
5821 2*	RCG IP Address	Sets the IP address of the RCG (Remote Communication Gate) destination for call processing at the remote service center. [00000000h ~ FFFFFFFFh/ 00000000h /



5824	NVRAM Data Upload (Refer to <b>IMPORTANT NOTE</b> in Sect. 5.4)	
	Uploads the UP and SP mode data (except for counters and the serial number) from NVRAM on the control board to a flash memory card. <i>While using this SP mode, always keep the front cover open. This prevents a software module accessing the NVRAM during the upload.</i>	

5825	NVRAM Data Download	
	Downloads the content of a flash memory card to the NVRAM on the cont. board.	

SERVICE PROGRAM MODE TABLES

5828	Network Setting				
5828 50	1284 Compatibility (Centro)	Enables and disables bi-directional communication on the parallel connection between the machine and a computer. [0~1/1] 0: Off 1: On			
5828 52	ECP (Centro)	Disables and enables the ECP feature (1284 Mode) for data transfer. [0~1/1] 0: Disabled 1: Enabled			
5828 65	Job Spool Setting	Switches job spooling on and off. <b>0</b> : No spooling <b>1</b> : Spooling enabled			
5828 66	Job Spool Clear	This SP determines whether the job interrupted at power off is resumed at the next power on. This SP operates only when SP5828065 is set to 1. <b>1</b> : Resumes printing spooled job. <b>0</b> : Clears spooled job.			
5828 69	Job Spool Protocol	This SP determines whether job spooling is enabled or disabled for each protocol. This is a 8-bit setting.			
		0	LPR	4	BMLinks ( <b>Japan Only</b> )
		1	FTP (Not Used)	5	DIPRINT
		2	IPP	6	Reserved (Not Used)
3	SMB	7	Reserved (Not Used)		
5828 84	Setting List Print Settings List	Prints a list of the NCS parameter settings.			
5828 90	TELNET Operation Settings TELNET (0:OFF 1:ON)	Disables or enables Telnet operation. If this SP is disabled, the Telnet port is closed. [0~1/1] 0: Disable 1: Enable			
5828 91	Web Operation Web (0:OFF 1:ON)	Disables or enables the Web operation. [0~1/1] 0: Disable 1: Enable			

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5832	HDD Formatting Enter the SP number for the partition to initialize, then press #. When the execution ends, cycle the machine off and on.
5832 1	HDD Formatting (All)
5832 2	HDD Formatting (IMH)
5832 3	HDD Formatting (Thumbnail)
5832 4	HDD Formatting (Job Log)
5832 5	HDD Formatting (Printer Fonts)
5832 6	HDD Formatting (User Info1)
5832 7	Mail RX Data
5832 8	Mail TX Data
5832 9	HDD Formatting (Data for Design)
5832 10	HDD Formatting (Log)
5832 11	HDD Formatting (Ridoc I/F) (for Ridoc Desk Top Binder)

5833	e-Cabinet Enable Enables the e-Cabinet function. Then, the user names in the cabinet are enabled for use with the POP server. [0~1/1] 0: Disabled 1: Enabled
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<b>5834</b>	Operation Panel Image Exposure	<b>0</b> : Off (disable), <b>1</b> : On (enable)
	Enables and disables the operation panel read (dump) feature. After powering on the machine, set this option to 1 to enable this feature. <i>To reset the machine to 0, the machine must be turned off and on again. Selecting 0 for this option without cycling the power off and on does not restore the default setting (0).</i>	

5836	Capture Setting
5836 1	Capture Function (0:Off 1:On) With this function disabled, the settings related to the capture feature cannot be initialized, displayed, or selected. [0~1/1] 0: Disable 1: Enable
5836 2	Panel Setting Determines whether each capture related setting can be selected or updated from the initial system screen. [0~1/1] 0: Disable 1: Enable The setting for SP5836-001 has priority.

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5836 71	Reduction for Copy Color	[0~3/1] 0:1 1:1/2 2:1/3 3:1/4 <b>DFU</b>
5836 72	Reduction for Copy B&W Text	[0~6/1] 0:1 1:1/2 2:1/3 3:1/4 6:2/3
5836 73	Reduction for Copy B&W Other	[0~6/1] 0:1 1:1/2 2:1/3 3:1/4 6:2/3
5836 74	Reduction for Printer Color	[0~3/1] 0:1 1:1/2 2:1/3 3:1/4 <b>DFU</b>
5836 75	Reduction for Printer B&W	[0~6/1] 0 1 1:1/2 2:1/3 3:1/4 6:2/3
5836 76	Reduction for Printer B&W HQ	[1~5/1] 1:1/2 3:1/4 4:1/6 5:1/8
5836 81	Format for Copy Color	[0~3/1] 0: JFIF/JPEG, 1: TIFF/MMR, 2: TIFF/MH, 3: TIFF/MR <b>DFU</b>
5836 82	Format for Copy B&W Text	[0~3/1] 0: JFIF/JPEG, 1: TIFF/MMR, 2: TIFF/MH, 3: TIFF/MR
5836 83	Format Copy B&W Other	[0~3/1] 0: JFIF/JPEG, 1: TIFF/MMR, 2: TIFF/MH, 3: TIFF/MR
5836 84	Format for Printer Color	[0~3/1] 0: JFIF/JPEG, 1: TIFF/MMR, 2: TIFF/MH, 3: TIFF/MR <b>DFU</b>
5836 85	Format for Printer B&W	[0~3/1] 0: JFIF/JPEG, 1: TIFF/MMR, 2: TIFF/MH, 3: TIFF/MR
5836 86	Format for Printer B&W HQ	[0~3/1] 0: JFIF/JPEG, 1: TIFF/MMR, 2: TIFF/MH, 3: TIFF/MR
5836 91	Default for JPEG	[5~95/1]
	Sets the JPEG format default for documents sent to the document management server with the MLB, with JPEG selected as the format. <i>Enabled only when optional File Format Converter (MLB: Media Link Board) is installed.</i>	

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5839	IEEE 1394	<b>Not supported by this machine.</b>
	This SP is displayed only when an IEEE 1394 (firewire) card is installed.	
5839 7	Cycle Master	Enables or disables the cycle master function for the 1394 bus standard. [0~1/1] 0: Disable (Off) 1: Enable (On)
5839 8	BCR Mode	Determines how BCR (Broadcast Channel Register) operates on the 1394 standard bus when the independent node is in any mode other than IRM. (NVRAM: 2-bits) [Always Effective]
5839 9	IRM 1394a Check	Conducts a 1394a check of IRM when the independent node is in any mode other than IRM. [0~1/1] 0: Checks whether IRM conforms to 1394a 1: After IRM is checked, if IRM does not conform then independent node switches to IRM.
5839 10	Unique ID	Lists the ID (Node_Unique_ID) assigned to the device by the system administrator. Bit0: Off Bit1: On OFF: Does not list the Node_Unique_ID assigned by the system administrator. Instead, the Source_ID of the GASP header in the ARP is used. ON: The Node_Unique_ID assigned by the system administrator is used, and the Source_ID of the GASP header in the ARP is ignored. Also, when the serial bus is reset, extra bus transactions are opened for the enumeration.
5839 11	Logout	Handles the login request of the login initiator for SBP-2. (1-bit) Bit0: Off Bit1: On OFF: Disable (refuse login). Initiator retry during login. Login refusal on arrival of login request (standard operation) ON: Enable (force logout). Initiator retry during login. Login refusal on arrival of login request, and the initiator forces the login.
5839 12	Login	Enables or disables the exclusive login feature (SBP-2 related). Bit0: Off Bit1: On OFF: Disables. The exclusive login (LOGIN ORB exclusive it) is ignored. ON: Enables. Exclusive login is in effect.
5839 13	Login MAX	Sets the maximum number of logins from the initiator (6-bits) [0~63/1] 0: Reserved 63: Reserved

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5840	IEEE 802.11b
5840 6	Channel MAX
	Sets the maximum range of the bandwidth for the wireless LAN. This bandwidth setting varies for different countries. [1~14/1]
5840 7	Channel MIN
	Sets the minimum range of the bandwidth for operation of the wireless LAN. This bandwidth setting varies for different countries. [1~14/1]
5840 11	WEP Key Select
	Determines how the initiator (SBP-2) handles subsequent login requests. [00~11/00/1] <b>Note:</b> There are four settings (binary numbers): 00, 01, 10, 11. These settings are possible only after the wireless LAN card has been installed. 00: 1st key. If the initiator receives another login request while logging in, the request is refused. 01, 10, 11: 2nd, 3rd, 4th keys are "Reserved".

5841	Supply Name Setting	
	Press the User Tools key. These names appear when the user presses the Inquiry button on the User Tools screen.	
5841 1	Toner Name Setting: Black	
5841 7	Org Stamp	
5841 11	StapleStd1	
5841 12	StapleStd2	Standard Staples for B698
5841 13	StapleStd3	Standard Staples for B700/B701
5841 14	Staple Std4	
5841 21	StapleBind1	
5841 22	StapleBind2	Booklet Staples for B700
5841 23	StapleBind3	

5842*	Net File Analysis Mode Setting	<b>DFU</b>	
	This is a debugging tool. It sets the debugging output mode of each Net File process. Bit SW 0011 1111	<b>Bit</b>	<b>Groups</b>
		0	System & other groups (LSB)
		1	Capture related
		2	Certification related
		3	Address book related
		4	Machine management related
		5	Output related (printing, delivery)
6	Repository related		

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5844*	USB	
5844 1*	Transfer Rate	Full Speed / <b>Auto Change</b>
	Sets the speed for USB data transmission. Full Speed: (12 Mbps fixed) Auto Change: 480 Mbps/12 Mbps auto adjust	
5844 2*	Vendor ID	[0x0000~0xFFFF/ <b>0x05CA</b> /1], <b>DFU</b>
	Sets the vendor ID: Initial Setting: 0x05CA Ricoh Company.	
5844 3*	Product ID	[0x0000~0xFFFF/ <b>0x0403</b> /1], <b>DFU</b>
	Sets the product ID.	
5844 4*	Device Release Number	[0000~9999/ <b>0100</b> /1], <b>DFU</b>
	Sets the device release number of the BCD (binary coded decimal) display. <i>Enter as a decimal number. NCS converts the number to hexadecimal number recognized as the BCD.</i>	

5845*	Delivery Server Setting	
	Provides items for delivery server settings.	
5845 1*	FTP Port No.	[0~65535 / <b>3670</b> / 1]
	Sets the FTP port number used when image files are sent to the Scan Router Server.	
5845 2*	IP Address (Primary)	Range: <b>000.000.000.000</b> ~ 255.255.255.255
	Use this SP to set the Scan Router Server address. The IP address under the transfer tab can be referenced by the initial system setting.	
5845 3*	Retry Time	[60~900/ <b>300</b> /1 sec.]
	Sets the length of time to elapse before attempting to resend image files to the Scan Router Server after an error occurs. <b>Note:</b> This SP setting is ignored if SP5845 004 is set to "0".	
5845 4*	Retry Attempts	[0~99/ <b>3</b> /1]
	Sets the number of attempts to resend image files to the Scan Router Server after an error occurs. <b>Note:</b> SP5845 003 sets the time to elapse between retry attempts.	
5845 6*	Delivery Error Display Time Netfiles:	[0~999 / <b>300</b> / 1]
	Use this setting to determine the length of time the prompt message is displayed when a test error occurs during document transfer with the NetFile application and an external device.	
5845 8*	IP Address (Secondary)	Range: <b>000.000.000.000</b> ~ 255.255.255.255
	Specifies the IP address assigned to the computer designated to function as the secondary delivery server of Scan Router. This SP allows only the setting of the IP address without reference to the DNS setting.	
5845 9*	Delivery Server Model	[0~4/ <b>0</b> / 1]
	Allows changing the model of the delivery server registered by the I/O device. 0: Unknown 1: SG1 Provided 2: SG1 Package 3: SG2 Provided 4: SG2 Package	

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5845 10*	Delivery Svr Capability
	Changes the capability of the registered that the I/O device registered. [0~255 / 0 / 1] (7) [0000 0000] (1)
	Bit7 = 1 Comment information exists
	Bit6 = 1 Direct specification of mail address possible
	Bit5 = 1 Mail RX confirmation setting possible
	Bit4 = 1 Address book automatic update function exists
	Bit3 = 1 Fax RX delivery function exists
	Bit2 = 1 Sender password function exists
	Bit1 = 1 Function to link MK-1 user and Sender exists
	Bit0 = 1 Sender specification required (if set to 1, Bit6 is set to "0")
5845 11	Delivery Svr.Capability (Ext)
	These settings are for future use. They will let you increase the number of registered devices (in addition to those registered for SP5845 010). There are eight bits (Bit 0 to Bit 7). All are unused at this time.

5846*	UCS Setting
5846 1	Machine ID (for Delivery Server)
	Displays the unique device ID in use by the delivery server directory. The value is only displayed and cannot be changed. This ID is created from the NIC MAC or IEEE 1394 EUI. The ID is displayed as either 6-byte or 8-byte binary. 6-byte %02X.%02X.%02X.%02X.%02X.%02X 8-byte %02X.%02X.%02X.%02X.%02X.%02X.%02X.%02X
5846 2	Machine ID Clear (Delivery Server)
	Clears the unique ID of the device used as the name in the file transfer directory. Execute this SP if the connection of the device to the delivery server is unstable. After clearing the ID, the ID will be established again automatically by cycling the machine off and on.
5846 3	Maximum Entries
	Changes the maximum number of entries that UCS can handle. [2000~50000/1] If a value smaller than the present value is set, the UCS managed data is cleared, and the data (excluding user code information) is displayed.
5846 6	Delivery Server Retry Timer
	Sets the interval for retry attempts when the delivery server fails to acquire the delivery server address book. [0~255/1 s] 0: No retries
5846 7	Delivery Server Retry Times
	Sets the number of retry attempts when the delivery server fails to acquire the delivery server address book. [0~255/1]

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5846 8	<p>Delivery Server Maximum Entries</p> <p>Lets you set the maximum number of account entries and information about the users of the delivery server controlled by UCS.</p> <p>[20000~50000/1]</p>
5846 10	<p>LDAP Search Timeout</p> <p>Sets the length of the time-out for the search of the LDAP server.</p> <p>[1~255/1]</p>
5846 40	<p>Addr Book Migration (SD -&gt; HDD)</p> <p>This SP moves the address book data from an SD card to the HDD. You must cycle the machine off and on after executing this SP.</p> <ol style="list-style-type: none"> <li>1. Turn the machine off.</li> <li>2. Install the HDD.</li> <li>3. Insert the SD card with the address book data in SD card Slot <b>C3</b>.</li> <li>4. Turn the machine on.</li> <li>5. Do SP5846 040.</li> <li>6. Turn the machine off.</li> <li>7. Remove the SD card from SD card Slot <b>C3</b>.</li> <li>8. Turn the machine on.</li> </ol> <p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>• Executing this SP overwrites any address book data already on the HDD with the data from the SD card.</li> <li>• We recommend that you back up all directory information to an SD card with SP5846 051 before you execute this SP.</li> <li>• After the address book data is copied to HDD, all the address book data is deleted from the source SD card. If the operation fails, the data is not erased from the SD card.</li> </ul>
5846 41	<p>Fill Addr Acl Info.</p> <p>This SP must be executed immediately after installation of an HDD unit in a basic machine that previously had no HDD. The first time the machine is powered on with the new HDD installed; the system automatically takes the address book from the NVRAM and writes it onto the new HDD. However, the new address book on the HDD can be accessed only by the system administrator at this stage. Executing this SP by the service technician immediately after power on grants full address book access to all users.</p> <p><b>Procedure</b></p> <ol style="list-style-type: none"> <li>1. Turn the machine off.</li> <li>2. Install the new HDD.</li> <li>3. Turn the machine on.</li> <li>4. The address book and its initial data are created on the HDD automatically. However, at this point the address book can be accessed by only the system administrator or key operator.</li> <li>5. Enter the SP mode and do SP5846 041. After this SP executes successfully, any user can access the address book.</li> </ol>
5846 47	<p>Initialize Local Address Book</p> <p>Clears all of the address information from the local address book of a machine managed with UCS.</p>
5846 48	<p>Initialize Delivery Addr Book</p> <p>Push [Execute] to delete all items (this does not include user codes) in the delivery address book that is controlled by UCS.</p>

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5846 49	Initialize LDAP Addr Book	
	Push [Execute] to delete all items (this does not include user codes) in the LDAP address book that is controlled by UCS.	
5846 50	Initialize All Addr Book	
	Clears everything (including users codes) in the directory information managed by UCS. However, the accounts and passwords of the system administrators are not deleted.	
5846 51	Backup All Addr Book	
	Uploads all directory information to the SD card.	
5846 52	Restore All Addr Book	
	Downloads all directory information from the SD card.	
5846 53	Clear Backup Info.	
	Deletes the address book uploaded from the SD card in the slot. Deletes only the files uploaded for that machine. This feature does not work if the card is write-protected. <b>Note:</b> After you do this SP, go out of the SP mode, turn the power off. Do not remove the SD card until the Power LED stops flashing.	
5846 60	Search Option	
	This SP uses bit switches to set up the fuzzy search options for the UCS local address book.	
	<b>Bit</b> <b>Meaning</b>	
	0	Checks both upper/lower case characters
	1	<b>Japan Only</b>
	2	
	3	
	4	--- Not Used ---
	5	--- Not Used ---
	6	--- Not Used ---
7	--- Not Used ---	
5846 62	Complexity Option 1	
	Use this SP to set the conditions for password entry to access the local address book. Specifically, this SP limits the password entry to <u>upper case</u> and sets the length of the password. [0~32/1] <b>Note:</b> <ul style="list-style-type: none"> <li>This SP does not normally require adjustment.</li> <li>This SP is enabled only after the system administrator has set up a group password policy to control access to the address book.</li> </ul>	
5846 63	Complexity Option 2	
	Use this SP to set the conditions for password entry to access the local address book. Specifically, this SP limits the password entry to <u>lower case</u> and defines the length of the password. [0~32/1] <b>Note:</b> <ul style="list-style-type: none"> <li>This SP does not normally require adjustment.</li> <li>This SP is enabled only after the system administrator has set up a group password policy to control access to the address book.</li> </ul>	

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5846 64	Complexity Option 3
	Use this SP to set the conditions for password entry to access the local address book. Specifically, this SP limits the password entry to <u>numbers</u> and defines the length of the password. [0~32/1] <b>Note:</b> <ul style="list-style-type: none"> <li>• This SP does not normally require adjustment.</li> <li>• This SP is enabled only after the system administrator has set up a group password policy to control access to the address book.</li> </ul>
5846 65	Complexity Option 4
	Use this SP to set the conditions for password entry to access the local address book. Specifically, this SP limits the password entry to <u>symbols</u> and defines the length of the password. [0~32/1] <b>Note:</b> <ul style="list-style-type: none"> <li>• This SP does not normally require adjustment.</li> <li>• This SP is enabled only after the system administrator has set up a group password policy to control access to the address book.</li> </ul>
5846 91	FTP Auth. Port Settings
	Sets the FTP port to get the delivery server address book that is used in the individual authorization mode. [0~65535/1]
5846 94	Encryption Start
	Shows the status of the encryption function of the address book on the LDAP server. [0~255/1] No default
<b>5846 98</b>	<b>Bit SW2 DFU</b>
	These are the output items of debug mode for the address book in the UCS module (User information Control Service). 0: Off 1: On
	Bit 0   Cache Trace
	Bit 1   New Database Trace
	Bit 2   Access Control Trace
	Bit 3   Back-up Restore Trace
	Bit 4   API Encryption/Encoding Trace
	Bit 5   Text Encoding Trace
	Bit 6   Address Book Encryption Trace
	Bit 7   Not Used

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<b>5846 99</b>	<b>Bit SW DFU</b>	
	These are the output items of debug mode for address book in the UCS module (User information Control Service). 0: Off 1: On	
	Bit 0	UCS API Trace (Always On)
	Bit 1	GWIPC Trace (Always On)
	Bit 2	Message Trace (Always On)
	Bit 3	Lock Condition Trace (Always On)
	Bit 4	Database Trace
	Bit 5	FTP Trace
	Bit 6	LDAP Trace
	Bit 7	I/O Process Trace

5847	Net File Resolution Reduction		
	5847 1 through 5847 6 changes the default settings of image data sent externally by the Net File page reference function. [0~2/1] 5847 21 sets the default for JPEG image quality of image files controlled by NetFile. "NetFile" refers to jobs to be printed from the document server with a PC and the DeskTopBinder software.		
5847 2	Rate for Copy B&W Text	[0~6/1]	0: 1x 1: 1/2x 2: 1/3x 3: 1/4x 4: 1/6x 5: 1/8x 6: 2/3x <sup>1</sup> <sup>1</sup> : "6: 2/3x" applies to 003, 005, 006 only.
5847 3	Rate for Copy B&W Other	[0~6/1]	
5847 5	Rate for Printer B&W	[0~6/1]	
5847 6	Rate for Printer B&W HQ	[0~6/1]	
5847 21	Network Quality Default for JPEG		
	Sets the default value for the quality of JPEG images sent as NetFile pages. This function is available only with the MLB (Media Link Board) option installed. [5~95/1]		

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5848	Web Service	
	5847 2 sets the 4-bit switch assignment for the access control setting. Setting of 0001 has no effect on access and delivery from Scan Router. 5847 100 sets the maximum size of images that can be downloaded. The default is equal to 1 gigabyte.	
5848 1	Access Control. : NetFile (Lower 4 Bits Only)	
	Bit switch settings. 0000: No access control 0001: Denies access to Desk Top Binder. Access and deliveries from Scan Router have no effect on capture.	
5848 2	Acc. Ctrl.: Repository (only Lower 4 Bits)	0000: No access control 0001: Denies access to DeskTop Binder.
5848 3	Acc. Ctrl.: Doc. Svr. Print (Lower 4 Bits)	Switches access control on and off. 0000: OFF, 0001: ON
5848 4	Acc. Ctrl.: User Directory (Lower 4 Bits)	
5848 5	Acc. Ctrl.: Delivery Input (Lower 4 Bits)	
5848 7	Acc. Ctrl Comm. Log Fax (Lower 4 Bits)	
5848 9	Acc. Ctrl.: Job Control (Lower 4 Bits)	
5848 11	Acc. Ctrl: Device Management (Lower 4 Bits)	
5848 21	Acc. Ctrl: Delivery (Lower 4 Bits)	
5848 22	Acc. Ctrl: User Administration (Lower 4 Bits)	
5848 41	Acc. Ctrl: Security Setting (Lower 4 Bits only)	
5848 99	Repository: Download Image Setting	
	This is a bit-switch setting. Only the lower bits are enabled/disabled.	
	<p><b>(7) 00000000 (0)</b></p> 	
	Set to "0" (disabled) or "1" (enabled) as needed for image download.	
	(1) Mac OS	
	(2) Windows OS	
	(3) OS other than Mac or Windows	
	<b>Note:</b> This SP is used primarily by designers.	
5848 100	Repository: Download Image Max. Size	[1~1024/1 K]
5848 201	Access Ctrl: Regular Trans	
	No information is available at this time.	
	0: Not allowed	
	1: Allowed	

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5848 210	Setting: Log Type: Job 1 <b>DFU</b> [0~0xFFFFFFFF/0/1]	<b>Note:</b> These SP codes are for display only; they cannot be changed.
5848 211	Setting: Log Type: Job 2 <b>DFU</b> [0~0xFFFFFFFF/0/1]	
5848 212	Setting: Log Type: Access <b>DFU</b> [0~0xFFFFFFFF/0/1]	
5848 213	Setting: Primary Srv <b>DFU</b>	
5848 214	Setting: Secondary Srv <b>DFU</b>	
5848 215	Setting: Start Time <b>DFU</b> [0~0xFFFFFFFF/0/1]	
5848 216	Setting: Interval Time <b>DFU</b> [1~100/1/1]	
5848 217	Setting: Timing <b>DFU</b> [0~2/0/1] 0: Transmission off 1: Transmission 1 by 1 2: Periodic transmission	

5849	Installation Date Displays or prints the installation date of the machine.	
5849 1	Display	The "Counter Clear Day" has been changed to "Installation Date" or "Inst. Date".
5849 2	Switch to Print	Determines whether the installation date is printed on the printout for the total counter. [0~1/1] 0: No Print 1: Print

5850*	<b>Address Book Function Japan Only</b> The machine is shipped ready to use with a G3 line. Some addresses in the address book may be registered for a G3 line. If a G4 line is added later, use this SP to switch all lines at once to G4. If the G4 line becomes unusable for some reason, use this SP to switch easily back to G3.
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Service Tables

<b>Search</b>	
PABX	G3Auto G3 G3-1 G3-2 G3-3 I-G3 G4
PSTN	G3Auto G3 G3-1 G3-2 G3-3 I-G3 G4
<b>Replacement</b>	
PABX	G3Auto G3 G3-1 G3-2 G3-3 I-G3 G4
PSTN	G3Auto G3 G3-1 G3-2 G3-3 I-G3 G4
Execute	Exit

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5851	Bluetooth Mode
	Sets the operation mode for the Bluetooth Unit. Press either key. [0:Public] [1: Private]

5853*	Stamp Data Download
	Use this SP to download the fixed stamp data stored in the firmware of the ROM and copy it to the HDD. This SP can be executed as many times as required. This SP must be executed after replacing or formatting the hard disks. <b>Note:</b> This SP can be executed only with the hard disks installed.

5856	Remote ROM Update
	When set to "1" allows reception of firmware data via the local port (IEEE 1284) during a remote ROM update. This setting is reset to zero after the machine is cycled off and on. [0~1 / 0 / 1] 0: Not allowed 1: Allowed

5857	Save Debug Log
001	On/Off (1:ON 0:OFF) Switches on the debug log feature. The debug log cannot be captured until this feature is switched on. [0~1/1] 0: OFF 1: ON
002	Target (2: HDD 3: SD Card) Selects the destination where the debugging information generated by the event selected by SP5858 will be stored if an error is generated [2~3 / 1] 2: HDD 3: SD Card
005	Save to HDD Specifies the decimal key number of the log to be written to the hard disk.
006	Save to SD Card Specifies the decimal key number of the log to be written to the SD Card.
009	Copy HDD to SD Card (Latest 4 MB) Takes the most recent 4 MB of the log written to the hard disk and copies them to the SD Card. A unique file name is generated to avoid overwriting existing file names on the SD Card. Up to 4MB can be copied to an SD Card. 4 MB segments can be copied one by one to each SD Card.

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010	Copy HDD to SD Card Latest 4 MB Any Key)	Takes the log of the specified key from the log on the hard disk and copies it to the SD Card. A unique file name is generated to avoid overwriting existing file names on the SD Card. Up to 4 MB can be copied to an SD Card. 4 MB segments can be copied one by one to each SD Card. This SP does not execute if there is no log on the HDD with no key specified.
011	Erase HDD Debug Data	Erases all debug logs on the HDD
012	Erase SD Card Debug Data	Erases all debug logs on the SD Card. If the card contains only debugging files generated by an event specified by SP5858, the files are erased when SP5857 010 or 011 is executed. To enable this SP, the machine must be cycled off and on.
013	Free Space on SD Card	Displays the amount of space available on the SD card.
014	Copy SD to SD (Latest 4MB)	Copies the last 4MB of the log (written directly to the card from shared memory) onto an SD card.
015	Copy SD to SD (Latest 4MB Any Key)	This SP copies the log on an SD card (the file that contains the information written directly from shared memory) to a log specified by key number.
016	Make HDD Debug	This SP creates a 32 MB file to store a log on the HDD.
017	Make SD Debug	This SP creates a 4 MB file to store a log on an SD card.

5858*	Debug Save When These SPs select the content of the debugging information to be saved to the destination selected by SP5857 002. SP58583 stores one SC specified by number. <i>Refer to Section 4 for a list of SC error codes.</i>	
58581*	Engine SC Error (0:OFF 1:ON)	Stores SC codes generated by copier engine errors.
58582*	Controller SC Error (0:OFF 1:ON)	Stores SC codes generated by GW controller errors.
58583*	Any SC Error (0:OFF 1:ON)	[0~65535 / 0 / 1]
58584*	Jam (0:OFF 1:ON)	Stores jam errors.

5859*	Debug Log Save Function	
5859 1*	Key 1	These SPs allow you to set up to 10 keys for log files for functions that use common memory on the controller board. (●5.3.1) [-9999999~9999999 / 0 / 1]
5859 2*	Key 2	
5859 3*	Key 3	
5859 4*	Key 4	
5859 5*	Key 5	
5859 6*	Key 6	
5859 7*	Key 7	
5859 8*	Key 8	
5859 9*	Key 9	
5859 10*	Key 10	

SERVICE PROGRAM MODE TABLES

5860	SMTP/POP3/IMAP4
5860 20	Partial Mail Receive Timeout [1~168/72/1] Sets the amount of time to wait before saving a mail that breaks up during reception. The received mail is discarded if the remaining portion of the mail is not received during this prescribed time.
5860 21	MDN Response RFC2298Compliance Determines whether RFC2298compliance is switched on for MDN reply mail. [0~1/1] 0: No 1: Yes
5860 22	SMTP Auth. From Field Replacement Determines whether the FROM item of the mail header is switched to the validated account after the SMTP server is validated. [0~1/1] 0: No. "From" item not switched. 1: Yes. "From" item switched.
5860 25	SMTP Auth Direct Sending Occasionally, all SMTP certifications may fail with SP5860 006 set to "2" to enable encryption during SMTP certification for the SMTP server. This can occur if the SMTP server does not meet RFC standards. In such cases you can use this SP to set the SMTP certification method directly. However, this SP can be used only after SP5860 003 has been set to "1" (On). Bit0: LOGIN Bit1: PLAIN Bit2: CRAM_MD5 Bit3: DIGEST_MD5 Bit4 to Bit 7: Not Used

5866	Email Date Field <b>DFU</b>
5866 5	Add Date Field This SP code adds the current date to the date field of an email alert that informs the operator that an error has occurred. [0~1/0/1] 0: Date not added 1: Date added
<b>5866 100</b>	Log Format This SP sets the output level for the MIRS module (Machine Information Report Service).

5870	Common Key Info Writing Writes to flash ROM the common proof for validating the device for NRS specifications.
5870 1	Writing
5870 3	Initialize
<b>Note:</b> These SPs are for future use and currently are not used.	

## SERVICE PROGRAM MODE TABLES

5871	<b>HDD Function Disable DFU</b>	
	Disables the HDD functions by suppressing all functions that write data to the HDD. After this SP is executed, the machine must be switched off and on to enable the setting. [0~1/1] 0: OFF 1: ON <b>Note:</b> This SP is intended for use during installation of the Data Overwrite Security Unit B735 (a new option). For more, see section "1. Installation".	

5873	<b>SD Card Appli Move</b>	
	Allows you to move applications from one SD card another. For more, please refer to the "Printer/Scanner Option Manual (Machine: D315)".	
5873 1	Move Exec	Executes the move from one SD card to another.
5873 2	Undo Exec	This is an undo function. It cancels the previous execution.

5875	<b>SC Auto Reboot</b>	
	This SP determines whether the machine reboots automatically when an SC error occurs. <b>Note:</b> The reboot does not occur for Type A SC codes.	
5875 1	Reboot Setting	The machine reboots automatically when the machine issues an SC error and logs the SC error code. If the same SC occurs again, the machine does not reboot.
5875 2	Reboot Type	The machine does not reboot when an SC error occurs.

5878	Option Setup	<b>Data Overwrite Security (DOS) Setup</b>
	Press [Execute] to initialize the Data Overwrite Security option for the copier. For more, see "1.18 Data Overwrite Security (B735)" in Section "1. Installation".	

5886	<b>ROM Update</b>	
	The setting of this SP allows or prohibits updating the ROM. *0:YES, 1:NO	

5907	<b>Plug &amp; Play Maker/Model Name</b>	
	Selects the brand name and the production name for Windows Plug & Play. This information is stored in the NVRAM. If the NVRAM is defective, these names should be registered again. After selecting, press the "Original Type" key and "#" key at the same time. When the setting is completed, the beeper sounds five times.	

5913	<b>Switchover Permission Time</b>	
5913 2	Print Application Timer	Sets the length of time to elapse before allowing another application to take control of the display when the application currently controlling the display is not operating because a key has not been pressed. [3~30/1 s]

## SERVICE PROGRAM MODE TABLES

5913 102	<p>Print Application Set</p> <p>This SP prescribes the time interval to expire before the machine shifts to another application when another application currently holds access control for the standby mode while there is no key input.</p> <p>[0~1/1/1]</p>
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5915	Mechanical Counter Detection	0: Not detected, 1: Detected, 2: Unknown
Confirms that the mechanical counter inside the inner cover is connected.		

5923*	Border Removal Area Switching	[0~1 / 0 / 1]
Toggles between two settings that affect the appearance of the pages for border removal and printed facing pages: (1) Using the original area as the allotted area, or (2) Using only the copy paper as the allotted area.		
0: Original		
1: Paper		

<b>5958*</b>	Feed Clutch Start Timing Adjustment, <b>DFU</b>	
Adjusts the clutch timing to optimize the intervals between fed sheets to reduce jams in the feed unit.		
<b>59581*</b>	Start Timing: Tray 1, 2	[35 ~ 57.5 / <b>42.5</b> / 2.5mm] <b>DFU</b>
<b>59582*</b>	Start Timing: Tray 3, 4, LCT	35 ~ 57.5 / <b>42.5</b> / 2.5mm] <b>DFU</b>
<b>59583*</b>	Leading Edge Detection	[19~34 / <b>26.5</b> / 2.5 mm] <b>DFU</b>

5959*	1st Print Delay Timing	[0~60 / 0 / 1 s]
Sets the amount of time the machine waits to project the latent image onto the drum after the feed/development motor, main motor, and fusing/feed-out motor switch on.		
This setting allows the drum and hot roller to turn freely in order to allow more time for cleaning toner and carbon that has accumulated on the hot roller strippers. Changing this can improve image quality but can also slow down the first print time. Adjust only when necessary.		

5961*	Large Capacity Exit Mode	0: OFF, 1: ON
Selects whether or not all stapled copies are sent to Shift Tray 1 when the Two-Tray finisher is installed.		

5962*	8K 16K Paper Mode	0: Off, 1: On.	
Switches on/off the use of 8-kai, and 16-kai paper sizes.			
If 'Off', 8-kai, 16-kai paper sizes are not displayed after pressing the selection key.			
If 'On', 8-kai, 16-kai paper sizes displayed after pressing the selection key. For this setting to take effect, "2" must be selected for SP5131.			
With "2" (Europe) selected for SP5131, the ADF can select 16-kai LEF. With SP5962 set for "0" (Off), the nearest size is detected as shown below.			
<b>Size Loaded</b>	16-kai SEF	6-kai LEF	8-kai SEF
<b>Size Detected</b>	B5 SEF	B5 LEF	B4 LEF

5963	Power Consumption Reduction Mode <b>DFU</b>
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## SERVICE PROGRAM MODE TABLES

5967*	Copy Server Set Function	<b>0:</b> ON, <b>1:</b> OFF
	Enables and disables the document server. This is a security measure that prevents image data from being left in the temporary area of the HDD. After changing this setting, you must switch the main switch off and on to enable the new setting.	

<b>5970*</b>	Debug Serial Output <b>DFU</b>	Determines whether the debug information is output by the serial port when the machine is powered on. [0~1 / <b>0</b> / 1] 0: Disable 1: Enable
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5974	Cherry Server	Selects which version of the Scan Router application program, "Light" or "Full (Professional)", is installed. [0 ~ 1 / <b>0</b> / 1 / step] 0: <i>Light version (supplied with this machine)</i> 1: <i>Full version (optional)</i>
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5985	Device Setting	The NIC and USB support features are built into the GW controller. Use this SP to enable and disable these features. In order to use the NIC and USB functions built into the controller board, these SP codes must be set to "1".
5985 1	On Board NIC	<b>0: Disable</b> 1: Enable
5985 2	On Board USB	

5990	SP Print Mode (SMC Printout)	
5990 1	All (Data List)	Prints all of the system parameter lists for the item selected. (☛ 5.2.7) Input the number for the item that you want to print, and then press  : "Execute" on the touch panel.
5990 2	SP (Mode Data List)	
5990 3	User Program	
5990 4	Logging Data	
5990 5	Diagnostic Report	
5990 6	Non-Default	
5990 7	NIB Summary	
5990 8	Capture Log	
5990 21	Copier User Program	
5990 22	Scanner SP	
5990 23	Scanner User Program	

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SERVICE PROGRAM MODE TABLES

**SP6-xxx: Peripherals**

6006*	ADF Registration Adjust	
	Adjusts the side-to-side and leading edge registration for simplex and duplex original feeding in ARDF mode. Press $\odot$ to toggle $\pm$ . SP6006 5 sets the maximum setting allowed for rear edge erase.	
6006 1*	Side-to-side	[-3 ~ +3 / <b>0.0</b> / 0.1 mm step]
6006 2*	Leading Edge (Thin Original)	[-30 ~ +30 / <b>0.0</b> / 0.17 mm step]
6006 3*	Leading Edge (Duplex Front)	[-42 ~ +42 / <b>0.0</b> / 0.12 mm step]
6006 4*	Leading Edge (Duplex Rear)	[-42 ~ +42 / <b>0.0</b> / 0.12 mm step]
6006 5*	Rear Edge Erase	[-20 ~ +20 / <b>-3.0</b> / 0.5 mm step]

6007	ADF Input Check	
6007 1	Group 1	Displays the signals received from sensors and switches of the ARDF. (☛ 5.2.5)
6007 2	Group 2	
6007 3	Group 3	

6008	ADF Output Check	
	Switches on each electrical component (ARDF motor, solenoid, etc.) of the ARDF for testing. (☛ 5.2.6)	

6009	ADF Free Run	
	Performs a free run with the ARDF for duplex and stamp testing. Input the number for the item you want to check, and then press $\odot$ to start. <i>This is a general free run controlled from the copier. For more detailed free run modes, see the ARDF manual.</i>	
6009 1	Duplex Mode	<b>OFF/ON</b>
6009 2	Stamp Mode	<b>OFF/ON</b>

6010*	ADF Stamp Position Adjustment	[-7~+7 / <b>0</b> / 0.5 mm steps]
	Adjusts the horizontal position of the stamp on the scanned originals.	

6016*	Original Size Decision Priority	<b>Japan</b>		
		<b>Bit</b>	<b>0</b>	<b>1</b>
		7	DLT SEF	11"x15"
		<b>North America</b>		
		<b>Bit</b>	<b>0</b>	<b>1</b>
		6	DLT SEF	11" x 15"
		5	LT LEF	US Exec LEF
		4	LT SEF	8"x10" SEF
		3	LG SEF	F4 SEF
		<b>Europe</b>		
		<b>Bit</b>	<b>0</b>	<b>1</b>
		2	DLT SEF	8-K SEF
		1	LT SEF	16-K SEF
0	LT LEF	16-K LEF		
	Determines which original sizes are detected when an original is detected that is larger than the size assigned to the original size sensor. This provides an alternate selection for detection, other than that assigned with SP5131.			

## SERVICE PROGRAM MODE TABLES

6017*	Sheet Through Magnification	[-50.0 ~ +50.0 / <b>0.0</b> / 0.1%/step]
	Adjusts the magnification in the sub-scan direction for ADF mode. Use the  key to toggle between + and - before entering the value	

6105*	Staple Position Adjustment	[-3.5~+3.5 / <b>0.0</b> / 0.5 mm step]
	Adjusts the staple position in the main scan direction when using the two-tray finisher. Press  to toggle ±. A larger value shifts the staple toward the edge of the paper.	

6113*	Punch Hole Adjustment	
	Adjusts the punch hole position. SP6113 1: 2-hole punches for Japan, North America, Europe, and 4-hole punches for Northern Europe. SP6113 2: 3-hole punches for North America, and 4-hole punches for Europe. Press  to toggle ±. A larger value shifts the holes toward the edge of the paper.	
6113 1*	2-Holes	[-7~+7 / <b>0</b> / 0.5 mm steps]
6113 2*	3-Holes	[-7~+7 / <b>0</b> / 0.5 mm steps]

6902*	Fold Position Adjustment	
	Allows fine adjustment of the fold position on paper when the Booklet Finisher is connected and used.	
6902 1*	A3/DLT	[-30~+30 / <b>0</b> / 0.5 mm]
6902 2*	B4	[-20~+20 / <b>0</b> / 0.5 mm]
6902 3*	A4/LT	[-15~+15 / <b>0</b> / 0.5 mm]

SERVICE PROGRAM MODE TABLES

**SP7-xxx: Data Log**

7001*	Main Motor Operation Time	Display: 00000000~99999999 min
	The number of prints and drive time for drum revolutions can be obtained by counting the main motor revolution time. If the amount of time required for the drum to revolve to print 1 copy increases, this data combined with the number of copies can be used to analyze problems and could be useful for future product development.	

7401*	Total SC Counter	Displays the total number of service calls that have occurred. Display range: 0000~9999
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7403*	SC History	Displays the most recent service calls successive groups of 10.
7403 1*	Latest	
7403 2*	Latest 1	
7403 3*	Latest 2	
7403 4*	Latest 3	
7403 5*	Latest 4	
7403 6*	Latest 5	
7403 7*	Latest 6	
7403 8*	Latest 7	
7403 9*	Latest 8	
7403 10*	Latest 9	

7502*	Total Paper Jam Counter	Displays the total number of copy jams. Display range: 0000~9999
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7503*	Total Original Jam Counter	Displays the total number of original jams. Display range: 0000~9999
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⇒ 7504*	Paper Jam Counter by Jam Location	Display range: 0000~9999
	<p>Displays the total number of copy jams by location.  <i>A "Paper Late" error occurs when the paper fails to activate the sensor at the precise time. A "Paper Lag" paper jam occurs when the paper remains at the sensor for longer than the prescribed time.</i></p>	
	<b>Error No.</b>	<b>Error</b>
	1*	At Power On
	3*	Tray 1 Paper Feed Sensor
	4*	Tray 2 Paper Feed Sensor
	5*	Tray 3 Paper Feed Sensor
	6*	Tray 4 Paper Feed Sensor
	7*	LCT Tray Relay Sensor
	8*	Vertical Transport Sensor 1
	9*	Vertical Transport Sensor 2
	10*	Vertical Transport Sensor 3
	13*	Reg. Sensor
	14*	Fusing Exit Sensor
	16*	Exit Sensor
	17*	Relay Sensor 1 (optional Bridge Unit)
	18*	Relay Sensor 2 (optional Bridge Unit)
	19*	Duplex Entrance Sensor
	23*	Duplex Exit Sensor
	24*	1-Bin Tray Sensor
	25*	Finisher Entrance
	26*	Finisher Proof Tray
	27*	Finisher Shift Tray
	28*	Finisher Stapler
	29*	Finisher Exit
	30*	Mailbox Entrance
	31*	Mailbox Proof Tray
	32*	Mailbox Relay
	33*	Mailbox MBX
	35*	Booklet FIN Entrance
	36*	Booklet FIN Transport
	37*	Booklet FIN Early
	38*	Booklet FIN Staple
	39*	Booklet FIN Late Saddle Stitch
	40*	Booklet FIN Stack Exit
	41*	Booklet FIN Saddle Stitch Staple
	57*	LCT relay Sensor Off
	58	Vertical Transport Sensor 1 Off
	59	Vertical Transport Sensor 2 Off
	60	Vertical Transport Sensor 3 Off
	61	Vertical Transport Sensor 4 Off
	63	Reg. Sensor OFF
	64	---
	66	Exit Sensor OFF
	67	Relay Sensor 1 (optional Bridge Unit) OFF
	68	Relay Sensor 2 (optional Bridge Unit) OFF
	69	Duplex Entrance Sensor OFF
	73	Duplex Exit Sensor OFF
	74	---

Service Tables

## SERVICE PROGRAM MODE TABLES

7505*	Total Original Jam by Location		Display range: 0000~9999
	Displays the total number of original jams by location. These jams occur when the original does not activate the sensors.		
	Note:		
	<ul style="list-style-type: none"> <li>• A “Check In” failure occurs when the paper fails to activate the sensor at the precise time.</li> <li>• A “Check Out” failure occurs when the paper remains at the sensor for longer than the prescribed time and causes a jam.</li> <li>• The 3rd column in the table below tells you the correct component name used in the service manual.</li> </ul>		
		<b>Operation Panel Display</b>	<b>Service Manual Name</b>
	1	At Power On	---
	3	Registration Sensor Check In Failure	Skew Correction Sensor
	4	Nip-in Sensor Check In Failure	Interval Sensor
	5	Registration Sensor (On Check)	---
	6	Relay Sensor (On Check)	
	7	Inverter Sensor (On Check)	
	53	Registration Sensor Check Out Failure	Skew Correction Sensor
	54	Nip-in Check Out Failure	Interval Sensor
	55	Registration Sensor (Off Check)	
56	Relay Sensor (Off Check)		
57	Inverter Sensor (Off Check)		

7506*	Jam Count by Copy Size	
7506 5*	A4 LEF	Displays the total number of copy jams by paper size.
7506 6*	A5 LEF	
7506 14*	B5 LEF	
7506 38*	LT LEF	
7506 44*	HLT LEF	
7506 132*	A3 SEF	
7506 133*	A4 SEF	
7506 134*	A5 SEF	
7506 141*	B4 SEF	
7506 142*	B5 SEF	
7506 160*	DLT SEF	
7506 164*	LG SEF	
7506 166*	LT SEF	
7506 172*	HLT SEF	
7506 255*	Others	

## SERVICE PROGRAM MODE TABLES

7507*	Copy Jam History (Transfer Sheet)	
	Displays the copy jam history of the transfer unit in groups of 10, starting with the most recent 10 jams. Display contents are as follows: <b>CODE</b> is the SP7-505-*** number. <b>SIZE</b> is the paper size code in hex. (See "Paper Size Hex Codes" below.) <b>TOTAL</b> is the total jam error count (SP7-003) <b>DATE</b> is the date the previous jam occurred	
7507 1*	Latest	Sample Display: CODE: 007 SIZE: 05h TOTAL: 0000334 DATE: Mon Mar 15 11:44:50 2000
7507 2*	Latest 1	
7507 3*	Latest 2	
7507 4*	Latest 3	
7507 5*	Latest 4	
7507 6*	Latest 5	
7507 7*	Latest 6	
7507 8*	Latest 7	
7507 9*	Latest 8	
7507 10*	Latest 9	

7508*	Original Jam History	
	Displays the original jam history of the transfer unit in groups of 10, starting with the most recent 10 jams. Display contents are as follows: <b>CODE</b> is the SP7-505-*** number. <b>SIZE</b> is the paper size code in hex. (See "Paper Size Hex Codes" below.) <b>TOTAL</b> is the total jam error count (SP7-003) <b>DATE</b> is the date the previous jam occurred	
75081*	Latest	Sample Display: CODE: 007 SIZE: 05h TOTAL: 0000334 DATE: Mon Mar 15 11:44:50 2000
75082*	Latest 1	
75083*	Latest 2	
75084*	Latest 3	
75085*	Latest 4	
75086*	Latest 5	
75087*	Latest 6	
75088*	Latest 7	
75089*	Latest 8	
750810*	Latest 9	

### Paper Size Hex Codes

These codes are displayed by SP7507 and SP7508.

Paper Size	Code (hex)	Paper Size	Code (hex)
A4 LEF	05	B4 SEF	8D
A5 LEF	06	B5 SEF	8E
B5 LEF	0E	DLT SEF	A0
LT LEF	26	LG SEF	A4
HLT LEF	2C	LT SEF	A6
A3 SEF	84	HLT SEF	AC
A4 SEF	85	Others	FF
A5 SEF	86		

SERVICE PROGRAM MODE TABLES

7801	ROM No./Firmware Version	Displays the ROM number and firmware version numbers.
------	--------------------------	---

7803*	PM Counter Display	Displays the PM counter since the last PM.
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7804	PM Counter Reset	Resets the PM counter. To reset, press ①.
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7807	SC/Jam Counter Reset	Resets the SC and jam counters. To reset, press ①.
	This SP does not reset the jam history counters: SP7-507, SP7-508.	

7826	<b>MF Error Counter Japan Only</b>	
	Displays the number of counts requested of the card/key counter.	
7826 1	Error Total	A request for the count total failed at power on. This error will occur if the device is installed but disconnected.
7826 2	Error Staple	The request for a staple count failed at power on. This error will occur if the device is installed but disconnected.

7827	MF Error Counter Clear	
	Press Execute to reset to 0 the values of SP7826. <b>Japan Only</b>	

7832	Self-Diagnosis Result Display	Opens the “Self-Diagnose Result Display”
	Execute to open the “Self-Diagnose Result Display” to view details about errors. Use the keys on in the display on the touch-panel to scroll through all the information. If no errors have occurred, you will see the “No Error” notation.	

7833	Pixel Coverage Ratio	
	Displays the coverage ratio of the output (the ratio of the total pixel area of the image data to the total printable area on the paper). Note that this value is not directly proportional to the amount of toner consumed, although of course it is one factor that affects this amount. The other major factors involved include: the type, total image area and image density of the original, toner concentration and developer potential.	
7833 1*	Last Pages	0% to 100%.
7833 2*	Average Pages	0% to 100%.
7833 3*	Toner Bottles In Use	0 to 65,535 copies
7833 4*	Copy Count: Previous Toner Bottle	0 to 999,999 copies
7833 5*	Copy Count: Toner Bottle Before Previous	0 to 999,999 copies

7834	Clear Pixel Coverage Data	
	These SPs clear the counters for the following items.	
7834 1	Last & Average	
7834 2	Toner Bottles	
7834 3	Page Count: Bottle	
7834 4	Dot Coverage Clear	
7834 255	All Coverage Counts	

## SERVICE PROGRAM MODE TABLES

7836	Total Memory Size	
	Displays the memory capacity of the controller system.	

7852*	ADF Exposure Glass	
	Counts the number of occurrences (0 ~ 65,535) when dust was detected on the scanning glass of the ADF.	
7852 1*	Dust Check Counter	Counts the occurrences. Counting is done only if SP4999 1 (ADF Scan Glass Dust Check) is switched on.
7852 2*	Dust Check Clear Counter	Clears the count. Memory All Clear (SP5801) resets this counter to zero.

7901*	Assert Info. <b>DFU</b>	
	These SP numbers display the results of the occurrence of the most recent SC code generated by the machine.	
7991 1*	Source File Name	Module name
7991 2*	Line Number	Number of lines
7991 3*	Result	Value

SERVICE PROGRAM MODE TABLES

**SP8-xxx: Data Log2**

Many of these counters are provided for features that are currently not available, such as sending color faxes, and so on. However, here are some Group 8 codes that when used in combination with others, can provide useful information.

SP Numbers	What They Do
SP8211~SP8216	The number of pages scanned to the document server.
SP8401~SP8406	The number of pages printed from the document server
SP8691~SP8696	The number of pages sent from the document server

Specifically, the following questions can be answered:

- How is the document server actually being used?
- What application is using the document server most frequently?
- What data in the document server is being reused?

Most of the SPs in this group are prefixed with a letter that indicates the mode of operation (the mode of operation is referred to as an 'application'). Before reading the Group 8 Service Table, make sure that you understand what these prefixes mean.

PREFIXES	WHAT IT MEANS	
T:	Total: (Grand Total).	Grand total of the items counted for all applications (C, F, P, etc.)..
C:	Copy application.	Totals (pages, jobs, etc.) executed for each application when the job was <i>not</i> stored on the document server.
F:	Fax application.	
P:	Print application.	
S:	Scan application.	
L:	Local storage (document server)	Totals (jobs, pages, etc.) for the document server. The L: counters work differently case by case. Sometimes, they count jobs/pages stored on the document server; this can be in document server mode (from the document server window), or from another mode, such as from a printer driver or by pressing the Store File button in the Copy mode window. Sometimes, they include occasions when the user uses a file that is already on the document server. Each counter will be discussed case by case.
O:	Other applications (external network applications, for example)	Refers to network applications such as Web Image Monitor. Utilities developed with the SDK (Software Development Kit) will also be counted with this group in the future.

The Group 8 SP codes are limited to 17 characters, forced by the necessity of displaying them on the small LCD of printers and faxes that also use these SPs. Read over the list of abbreviations below and refer to it again if you see the name of an SP that you do not understand.

### Key for Abbreviations

ABBREVIATION	WHAT IT MEANS
/	"By", e.g. "T:Jobs/Apl" = Total Jobs "by" Application
>	More (2> "2 or more", 4> "4 or more")
AddBook	Address Book
Apl	Application
B/W	Black & White
Bk	Black
C	Cyan
ColCr	Color Create
ColMode	Color Mode
Comb	Combine
Comp	Compression
Deliv	Delivery
DesApl	Designated Application. The application (Copy, Fax, Scan, Print) used to store the job on the document server, for example.
Dev Counter	Development Count, no. of pages developed.
Dup, Duplex	Duplex, printing on both sides
Emul	Emulation
FC	Full Color
FIN	Post-print processing, i.e. finishing (punching, stapling, etc.)
Full Bleed	No Margins
GenCopy	Generation Copy Mode
GPC	Get Print Counter. For jobs 10 pages or less, this counter does not count up. For jobs larger than 10 pages, this counter counts up by the number that is in excess of 10 (e.g., for an 11-page job, the counter counts up 11-10 =1)
IFax	Internet Fax
ImgEdt	Image Edit performed on the original with the copier GUI, e.g. border removal, adding stamps, page numbers, etc.
K	Black (YMCK)
LS	Local Storage. Refers to the document server.
LSize	Large (paper) Size
Mag	Magnification
MC	One color (monochrome)
NRS	New Remote Service, which allows a service center to monitor machines remotely. "NRS" is used overseas, "CSS" is used in Japan.
Org	Original for scanning
OrgJam	Original Jam
Palm 2	Print Job Manager/Desk Top Editor: A pair of utilities that allows print jobs to be distributed evenly among the printers on the network, and allows files to be moved around, combined, and converted to different formats.
PC	Personal Computer
PGS	Pages. A page is the total scanned surface of the original. Duplex pages count as two pages, and A3 simplex count as two pages if the A3/DLT counter SP is switched ON.
PJob	Print Jobs
Ppr	Paper

SERVICE PROGRAM MODE TABLES

ABBREVIATION	WHAT IT MEANS
PrtJam	Printer (plotter) Jam
PrtPGS	Print Pages
R	Red (Toner Remaining). Applies to the wide format model A2 only. This machine is under development and currently not available.
Rez	Resolution
SC	Service Code (Error SC code displayed)
Scn	Scan
Sim, Simplex	Simplex, printing on 1 side.
S-to-Email	Scan-to-E-mail
SMC	SMC report printed with SP5990. All of the Group 8 counters are recorded in the SMC report.
Svr	Server
TonEnd	Toner End
TonSave	Toner Save
TXJob	Send, Transmission
YMC	Yellow, Magenta, Cyan
YMCK	Yellow, Magenta, Cyan, Black

**NOTE:** All of the Group 8 service programs are reset with SP5 801 1 Memory All Clear, or the Counter Reset SP7 808.

## SERVICE PROGRAM MODE TABLES

<b>8001</b>	T:Total Jobs	<p>These SPs count the number of times each application is used to do a job. [0~9999999/ 0 / 1]</p> <p><b>Note:</b> The L: counter is the total number of times the other applications are used to send a job to the document server, plus the number of times a file already on the document server is used.</p>
<b>8002</b>	C:Total Jobs	
<b>8003</b>	F:Total Jobs	
<b>8004</b>	P:Total Jobs	
<b>8005</b>	S:Total Jobs	
<b>8006</b>	L:Total Jobs	

- These SPs reveal the number of times an application is used, not the number of pages processed.
- When an application is opened for image input or output, this counts as one job.
- Interrupted jobs (paper jams, etc.) are counted, even though they do not finish.
- Only jobs executed by the customer are counted. Jobs executed by the customer engineer using the SP modes are not counted.
- When using secure printing (when a password is required to start the print job), the job is counted at the time when either “Delete Data” or “Specify Output” is specified.
- A job is counted as a fax job when the job is stored for sending.
- When a fax is received to fax memory, the F: counter increments but the L: counter does not (the document server is not used).
- A fax broadcast counts as one job for the F: counter (the fax destinations in the broadcast are not counted separately).
- A fax broadcast is counted only after all the faxes have been sent to their destinations. If one transmission generates an error, then the broadcast will not be counted until the transmission has been completed.
- A printed fax report counts as one job for the F: counter.
- The F: counter does not distinguish between fax sending or receiving.
- When a copy job on the document server is printed, SP8022 also increments, and when a print job stored on the document server is printed, SP8024 also increments.
- When an original is both copied and stored on the document server, the C: and L: counters both increment.
- When a print job is stored on the document server, only the L: counter increments.
- When the user presses the Document Server button to store the job on the document server, only the L: counter increments.
- When the user enters document server mode and prints data stored on the document server, only the L: counter increments.
- When an image received from Palm 2 is received and stored, the L: counter increments.
- When the customer prints a report (user code list, for example), the O: counter increments. However, for fax reports and reports executed from the fax application, the F: counter increments.

## SERVICE PROGRAM MODE TABLES

8011	T:Jobs/LS	These SPs count the number of jobs stored to the document server by each application, to reveal how local storage is being used for input. [0~9999999/ 0 / 1] The L: counter counts the number of jobs stored from within the document server mode screen at the operation panel.
8012	C:Jobs/LS	
8013	F:Jobs/LS	
8014	P:Jobs/LS	
8015	S:Jobs/LS	
8016	L:Jobs/LS	
8017	O:Jobs/LS	

- When a scan job is sent to the document server, the S: counter increments. When you enter document server mode and then scan an original, the L: counter increments.
- When a print job is sent to the document server, the P: counter increments.
- When a network application sends data to the document server, the O: counter increments.
- When an image from Palm 2 is stored on the document server, the O: counter increments.
- When a fax is sent to the document server, the F: counter increments.

8021	T:Pjob/LS	These SPs reveal how files printed from the document server were stored on the document server originally. [0~9999999/ 0 / 1] The L: counter counts the number of jobs stored from within the document server mode screen at the operation panel.
8022	C:Pjob/LS	
8023	F:Pjob/LS	
8024	P:Pjob/LS	
8025	S:Pjob/LS	
8026	L:Pjob/LS	
8027	O:Pjob/LS	

- When a copy job stored on the document server is printed with another application, the C: counter increments.
- When an application like DeskTopBinder merges a copy job that was stored on the document server with a print job that was stored on the document server, the C: and P: counters both increment.
- When a job already on the document server is printed with another application, the L: counter increments.
- When a scanner job stored on the document server is printed with another application, the S: counter increments. If the original was scanned from within document server mode, then the L: counter increments.
- When images stored on the document server by a network application (including Palm 2), are printed with another application, the O: counter increments.
- When a copy job stored on the document server is printed with a network application (Web Image Monitor, for example), the C: counter increments.
- When a fax on the document server is printed, the F: counter increments.

## SERVICE PROGRAM MODE TABLES

8031	T:Pjob/DesApl	<p>These SPs reveal what applications were used to output documents from the document server.</p> <p>[0~9999999/ 0 / 1]</p> <p>The L: counter counts the number of jobs printed from within the document server mode screen at the operation panel.</p>
8032	C:Pjob/DesApl	
8033	F:Pjob/DesApl	
8034	P:Pjob/DesApl	
8035	S:Pjob/DesApl	
8036	L:Pjob/DesApl	
8037	O:Pjob/DesApl	

- When documents already stored on the document server are printed, the count for the application that started the print job is incremented.
- When the print job is started from a network application (Desk Top Binder, Web Image Monitor, etc.) the L: counter increments.

8041	T:TX Jobs/LS	<p>These SPs count the applications that stored files on the document server that were later accessed for transmission over the telephone line or over a network (attached to an e-mail, or as a fax image by I-Fax).</p> <p>[0~9999999/ 0 / 1]</p> <p><b>Note:</b> Jobs merged for sending are counted separately.</p> <p>The L: counter counts the number of jobs scanned from within the document server mode screen at the operation panel.</p>
8042	C:TX Jobs/LS	
8043	F:TX Jobs/LS	
8044	P:TX Jobs/LS	
8045	S:TX Jobs/LS	
8046	L:TX Jobs/LS	
8047	O:TX Jobs/LS	

- When a stored copy job is sent from the document server, the C: counter increments.
- When images stored on the document server by a network application or Palm2 are sent as an e-mail, the O: counter increments.

8051	T:TX Jobs/DesApl	<p>These SPs count the applications used to send files from the document server over the telephone line or over a network (attached to an e-mail, or as a fax image by I-Fax). Jobs merged for sending are counted separately.</p> <p>[0~9999999/ 0 / 1]</p> <p>The L: counter counts the number of jobs sent from within the document server mode screen at the operation panel.</p>
8052	C:TX Jobs/DesApl	
8053	F:TX Jobs/DesApl	
8054	P:TX Jobs/DesApl	
8055	S:TX Jobs/DesApl	
8056	L:TX Jobs/DesApl	
8057	O:TX Jobs/DesApl	

- If the send is started from Desk Top Binder or Web Image Monitor, for example, then the O: counter increments.

SERVICE PROGRAM MODE TABLES

8061	T:FIN Jobs [0~9999999/ 0 / 1]	
	These SPs total the finishing methods. The finishing method is specified by the application.	
8062	C:FIN Jobs [0~9999999/ 0 / 1]	
	These SPs total finishing methods for copy jobs only. The finishing method is specified by the application.	
8063	F:FIN Jobs [0~9999999/ 0 / 1]	
	These SPs total finishing methods for fax jobs only. The finishing method is specified by the application. Note: Finishing features for fax jobs are not available at this time.	
8064	P:FIN Jobs [0~9999999/ 0 / 1]	
	These SPs total finishing methods for print jobs only. The finishing method is specified by the application.	
8065	S:FIN Jobs [0~9999999/ 0 / 1]	
	These SPs total finishing methods for scan jobs only. The finishing method is specified by the application. Note: Finishing features for scan jobs are not available at this time.	
8066	L:FIN Jobs [0~9999999/ 0 / 1]	
	These SPs total finishing methods for jobs output from within the document server mode screen at the operation panel. The finishing method is specified from the print window within document server mode.	
8067	O:FIN Jobs [0~9999999/ 0 / 1]	
	These SPs total finishing methods for jobs executed by an external application, over the network. The finishing method is specified by the application.	
806x 1	Sort	Number of jobs started in Sort mode. When a stored copy job is set for Sort and then stored on the document server, the L: counter increments. (See SP8066 1)
806x 2	Stack	Number of jobs started out of Sort mode.
806x 3	Staple	Number of jobs started in Staple mode.
806x 4	Booklet	Number of jobs started in Booklet mode. If the machine is in staple mode, the Staple counter also increments.
806x 5	Z-Fold	Number of jobs started In any mode other than the Booklet mode and set for folding (Z-fold).
806x 6	Punch	Number of jobs started in Punch mode. When Punch is set for a print job, the P: counter increments. (See SP8064 6.)
806x 7	Other	Reserved. Not used.

## SERVICE PROGRAM MODE TABLES

8071	T:Jobs/PGS	[0~9999999/ 0 / 1]	
	These SPs count the number of jobs broken down by the number of pages in the job, regardless of which application was used.		
8072	C:Jobs/PGS	[0~9999999/ 0 / 1]	
	These SPs count and calculate the number of copy jobs by size based on the number of pages in the job.		
8073	F:Jobs/PGS	[0~9999999/ 0 / 1]	
	These SPs count and calculate the number of fax jobs by size based on the number of pages in the job.		
8074	P:Jobs/PGS	[0~9999999/ 0 / 1]	
	These SPs count and calculate the number of print jobs by size based on the number of pages in the job.		
8075	S:Jobs/PGS	[0~9999999/ 0 / 1]	
	These SPs count and calculate the number of scan jobs by size based on the number of pages in the job.		
8076	L:Jobs/PGS	[0~9999999/ 0 / 1]	
	These SPs count and calculate the number of jobs printed from within the document server mode window at the operation panel, by the number of pages in the job.		
8077	O:Jobs/PGS	[0~9999999/ 0 / 1]	
	These SPs count and calculate the number of "Other" application jobs (Web Image Monitor, Palm 2, etc.) by size based on the number of pages in the job.		
807x 1	1 Page	807x 8	21~50 Pages
807x 2	2 Pages	807x 9	51~100 Pages
807x 3	3 Pages	807x 10	101~300 Pages
807x 4	4 Pages	807x 11	301~500 Pages
807x 5	5 Pages	807x 12	501~700 Pages
807x 6	6~10 Pages	807x 13	701~1000 Pages
807x 7	11~20 Pages	807x 14	1001~ Pages

- For example: When a copy job stored on the document server is printed in document server mode, the appropriate L: counter (SP8076 0xx) increments.
- Printing a fax report counts as a job and increments the F: counter (SP 8073).
- Interrupted jobs (paper jam, etc.) are counted, even though they do not finish.
- If a job is paused and re-started, it counts as one job.
- If the finisher runs out of staples during a print and staple job, then the job is counted at the time the error occurs.
- For copy jobs (SP 8072) and scan jobs (SP 8075), the total is calculated by multiplying the number of sets of copies by the number of pages scanned. (One duplex page counts as 2.)
- The first test print and subsequent test prints to adjust settings are added to the number of pages of the copy job (SP 8072).
- When printing the first page of a job from within the document server screen, the page is counted.

## SERVICE PROGRAM MODE TABLES

8111	T:FAX TX Jobs	[0~9999999/ 0 / 1]
	These SPs count the total number of jobs (color or black-and-white) sent by fax, either directly or using a file stored on the document server, on a telephone line. <b>Note:</b> Color fax sending is not available at this time.	
8113	F:FAX TX Jobs	[0~9999999/ 0 / 1]
	These SPs count the total number of jobs (color or black-and-white) sent by fax directly on a telephone line. <b>Note:</b> Color fax sending is not available at this time.	

- These counters count jobs, not pages.
- This SP counts fax jobs sent over a telephone line with a fax application, including documents stored on the document server.
- If the mode is changed during the job, the job will count with the mode set when the job started.
- If the same document is faxed to both a public fax line and an I-Fax at a destination where both, are available, then this counter increments, and the I-Fax counter (812x) also increments.
- The fax job is counted when the job is scanned for sending, not when the job is sent.

8121	T:IFAX TX Jobs	[0~9999999/ 0 / 1]
	These SPs count the total number of jobs (color or black-and-white) sent, either directly or using a file stored on the document server, as fax images using I-Fax. <b>Note:</b> Color fax sending is not available at this time.	
8123	F:IFAX TX Jobs	[0~9999999/ 0 / 1]
	These SPs count the number of jobs (color or black-and-white) sent (not stored on the document server), as fax images using I-Fax. <b>Note:</b> Color fax sending is not available at this time.	

- These counters count jobs, not pages.
- The counters for color are provided for future use; the color fax feature is not available at this time.
- The fax job is counted when the job is scanned for sending, not when the job is sent.

## SERVICE PROGRAM MODE TABLES

8131	T:S-to-Email Jobs	[0~9999999/ 0 / 1]
	These SPs count the total number of jobs scanned and attached to an e-mail, regardless of whether the document server was used or not.	
8135	S:S-to-Email Jobs	
	These SPs count the number of jobs scanned and attached to an e-mail, without storing the original on the document server.	

- These counters count jobs, not pages.
- If the job is stored on the document server, after the job is stored it is determined to be color or black-and-white then counted.
- If the job is cancelled during scanning, or if the job is cancelled while the document is waiting to be sent, the job is not counted.
- If the job is cancelled during sending, it may or may not be counted, depending on what stage of the process had been reached when the job was cancelled.
- If several jobs are combined for sending to the Scan Router, Scan-to-Email, or Scan-to-PC, or if one job is sent to more than one destination. each send is counted separately. For example, if the same document is sent by Scan-to-Email as well as Scan-to-PC, then it is counted twice (once for Scan-to-Email and once for Scan-to-PC).

8141	T:Deliv Jobs/Svr	[0~9999999/ 0 / 1]
	These SPs count the total number of jobs scanned and sent to a Scan Router server.	
8145	S:Deliv Jobs/Svr	
	These SPs count the number of jobs scanned and sent to a Scan Router server.	

- These counters count jobs, not pages.
- The jobs are counted even though the arrival and reception of the jobs at the Scan Router server cannot be confirmed.
- If even one color image is mixed with black-and-white images, then the job is counted as a "Color" job.
- If the job is cancelled during scanning, or if the job is cancelled while the document is waiting to be delivered, the job is not counted.
- If the job is cancelled during sending, it may or may not be counted, depending on what stage of the process had been reached when the job was cancelled.
- Even if several files are combined for sending, the transmission counts as one job.

SERVICE PROGRAM MODE TABLES

8151	T:Deliv Jobs/PC	[0~9999999/ 0 / 1]
	These SPs count the total number of jobs scanned and sent to a folder on a PC (Scan-to-PC). <b>Note:</b> At the present time, 8151 and 8155 perform identical counts.	
8155	S:Deliv Jobs/PC	
	These SPs count the total number of jobs scanned and sent with Scan-to-PC.	

- These counters count jobs, not pages.
- If the job is cancelled during scanning, it is not counted.
- If the job is cancelled while it is waiting to be sent, the job is not counted.
- If the job is cancelled during sending, it may or may not be counted, depending on what stage of the process had been reached when the job was cancelled.
- Even if several files are combined for sending, the transmission counts as one job.

8161	T:PCFAX TX Jobs	These SPs count the number of PC Fax transmission jobs. A job is counted from when it is registered for sending, not when it is sent. [0~9999999/ 0 / 1] <b>Note:</b> At the present time, these counters perform identical counts.
8163	F:PCFAX TX Jobs	

- This counts fax jobs started from a PC using a PC fax application, and sending the data out to the destination from the PC through the copier.

## SERVICE PROGRAM MODE TABLES

8191	T:Total Scan PGS	These SPs count the pages scanned by each application that uses the scanner to scan images. [0~9999999/ 0 / 1]
8192	C:Total Scan PGS	
8193	F:Total Scan PGS	
8195	S:Total Scan PGS	
8196	L:Total Scan PGS	

- SP 8191 to 8196 count the number of scanned sides of pages, not the number of physical pages.
- These counters do not count reading user stamp data, or reading color charts to adjust color.
- Previews done with a scanner driver are not counted.
- A count is done only after all images of a job have been scanned.
- Scans made in SP mode are not counted.

### Examples

- If 3 B5 pages and 1 A3 page are scanned with the scanner application but not stored, the S: count is 4.
- If both sides of 3 A4 sheets are copied and stored to the document server using the Store File button in the Copy mode window, the C: count is 6 and the L: count is 6.
- If both sides of 3 A4 sheets are copied but not stored, the C: count is 6.
- If you enter document server mode then scan 6 pages, the L: count is 6.

SERVICE PROGRAM MODE TABLES

8201	T:LSize Scan PGS	[0~9999999/ 0 / 1]
8203	F Lsize Scan Pgs.	[0~9999999/ 0 / 1]
8205	S:LSize Scan PGS	[0~9999999/ 0 / 1]
<p>These SP codes count the total number of large pages input with the scanner for scan jobs only. Large size paper (A3/DLT) scanned for fax transmissions are not counted.</p> <p><b>Note:</b> These counters are displayed in the SMC Report, and in the User Tools display.</p>		

8211	T:Scan PGS/LS	<p>These SPs count the number of pages scanned into the document server.</p> <p>[0~9999999/ 0 / 1]</p> <p>The L: counter counts the number of pages stored from within the document server mode screen at the operation panel, and with the Store File button from within the Copy mode screen</p>
8212	C:Scan PGS/LS	
8213	F:Scan PGS/LS	
8215	S:Scan PGS/LS	
8216	L:Scan PGS/LS	

- Reading user stamp data is not counted.
- If a job is cancelled, the pages output as far as the cancellation are counted.
- If the scanner application scans and stores 3 B5 sheets and 1 A4 sheet, the S: count is 4.
- If pages are copied but not stored on the document server, these counters do not change.
- If both sides of 3 A4 sheets are copied and stored to the document server, the C: count is 6 and the L: count is 6.
- If you enter document server mode then scan 6 pages, the L: count is 6.

## SERVICE PROGRAM MODE TABLES

8221	ADF Org Feeds		[0~9999999/ 0 / 1]
These SPs count the number of pages fed through the ADF for front and backside scanning.			
8221 1	Front	Number of front sides fed for scanning: With an ADF that can scan both sides simultaneously, the Front side count is the same as the number of pages fed for either simplex or duplex scanning. With an ADF that cannot scan both sides simultaneously, the Front side count is the same as the number of pages fed for duplex front side scanning. (The front side is determined by which side the user loads face up.)	
8221 2	Back	Number of rear sides fed for scanning: With an ADF that can scan both sides simultaneously, the Back count is the same as the number of pages fed for duplex scanning. With an ADF that cannot scan both sides simultaneously, the Back count is the same as the number of pages fed for duplex rear-side scanning.	

- When 1 sheet is fed for duplex scanning the Front count is 1 and the Back count is 1.
- If a jam occurs during the job, recovery processing is not counted to avoid double counting. In addition, the pages are not counted if the jam occurs before the first sheet is output.

8231	Scan PGS/Mode		[0~9999999/ 0 / 1]
These SPs count the number of pages scanned by each ADF mode to determine the workload on the ADF.			
8231 1	Large Volume	Selectable. Large copy jobs that cannot be loaded in the ADF at one time.	
8231 2	SADF	Selectable. Feeding pages one by one through the ADF.	
8231 3	Mixed Size	Selectable. Select "Mixed Sizes" on the operation panel.	
8231 4	Custom Size	Selectable. Originals of non-standard size.	
8231 5	Platen	Book mode. Raising the ADF and placing the original directly on the platen.	

- If the scan mode is changed during the job, for example, if the user switches from ADF to Platen mode, the count is done for the last selected mode.
- The user cannot select mixed sizes or non-standard sizes with the fax application so if the original's page sizes are mixed or non-standard, these are not counted.
- If the user selects "Mixed Sizes" for copying in the platen mode, the Mixed Size count is enabled.
- In the SADF mode if the user copies 1 page in platen mode and then copies 2 pages with SADF, the Platen count is 1 and the SADF count is 3.

## SERVICE PROGRAM MODE TABLES

8241	T:Scan PGS/Org	[0~9999999/ 0 / 1]				
	These SPs count the total number of scanned pages by original type for all jobs, regardless of which application was used.					
8242	C:Scan PGS/Org	[0~9999999/ 0 / 1]				
	These SPs count the number of pages scanned by original type for Copy jobs.					
8243	F:Scan PGS/Org	[0~9999999/ 0 / 1]				
	These SPs count the number of pages scanned by original type for Fax jobs.					
8245	S:Scan PGS/Org	[0~9999999/ 0 / 1]				
	These SPs count the number of pages scanned by original type for Scan jobs.					
8246	L:Scan PGS/Org	[0~9999999/ 0 / 1]				
	These SPs count the number of pages scanned and stored from within the document server mode screen at the operation panel, and with the Store File button from within the Copy mode screen					
		<b>8241</b>	<b>8242</b>	<b>8243</b>	<b>8245</b>	<b>8246</b>
824x 1: Text		Yes	Yes	Yes	Yes	Yes
824x 2: Text/Photo		Yes	Yes	Yes	Yes	Yes
824x 3: Photo		Yes	Yes	Yes	Yes	Yes
824x 4: GenCopy, Pale		Yes	Yes	No	Yes	Yes
824x 5: Map		Yes	Yes	No	Yes	Yes
824x 6: Normal/Detail		Yes	No	Yes	No	No
824x 7: Fine/Super Fine		Yes	No	Yes	No	No
824x 8: Binary		Yes	No	No	Yes	No
824x 9: Grayscale		Yes	No	No	Yes	No
824x 11: Other		Yes	Yes	Yes	Yes	Yes

- If the scan mode is changed during the job, for example, if the user switches from ADF to Platen mode, the count is done for the last selected mode.

## SERVICE PROGRAM MODE TABLES

8251	T:Scan PGS/ImgEdt	<p>These SPs show how many times Image Edit features have been selected at the operation panel for each application. Some examples of these editing features are:</p> <ul style="list-style-type: none"> <li>• Erase&gt; Border</li> <li>• Erase&gt; Center</li> <li>• Image Repeat</li> <li>• Centering</li> <li>• Positive/Negative</li> </ul> <p>[0~9999999/ 0 / 1]</p> <p>Note: The count totals the number of times the edit features have been used. A detailed breakdown of exactly which features have been used is not given.</p>
8252	C:Scan PGS/ImgEdt	
8254	P:Scan PGS/ImgEdt	
8256	L:Scan PGS/ImgEdt	
8257	O:Scan PGS/ImgEdt	

The L: counter counts the number of pages stored from within the document server mode screen at the operation panel, and with the Store File button from within the Copy mode screen.

8281	T:Scan PGS/TWAIN	<p>These SPs count the number of pages scanned using a TWAIN driver. These counters reveal how the TWAIN driver is used for delivery functions.</p> <p>[0~9999999/ 0 / 1]</p> <p><b>Note:</b> At the present time, these counters perform identical counts.</p>
8285	S:Scan PGS/TWAIN	

8291	T:Scan PGS/Stamp	<p>These SPs count the number of pages stamped with the stamp in the ADF unit.</p> <p>[0~9999999/ 0 / 1]</p> <p>The L: counter counts the number of pages stored from within the document server mode screen at the operation panel, and with the Store File button from within the Copy mode screen</p>
8293	F:Scan PGS/Stamp	
8295	S:Scan PGS/Stamp	
8296	L:Scan PGS/Stamp	

SERVICE PROGRAM MODE TABLES

8301	T:Scan PGS/Size	[0~9999999/ 0 / 1]
	These SPs count by size the total number of pages scanned by all applications. Use these totals to compare original page size (scanning) and output (printing) page size [SP 8-441].	
8302	C:Scan PGS/Size	[0~9999999/ 0 / 1]
	These SPs count by size the total number of pages scanned by the Copy application. Use these totals to compare original page size (scanning) and output (printing) page size [SP 8-442].	
8303	F:Scan PGS/Size	[0~9999999/ 0 / 1]
	These SPs count by size the total number of pages scanned by the Fax application. Use these totals to compare original page size (scanning) and output page size [SP 8-443].	
8305	S:Scan PGS/Size	[0~9999999/ 0 / 1]
	These SPs count by size the total number of pages scanned by the Scan application. Use these totals to compare original page size (scanning) and output page size [SP 8-445].	
8306	L:Scan PGS/Size	[0~9999999/ 0 / 1]
	These SPs count by size the total number of pages scanned and stored from within the document server mode screen at the operation panel, and with the Store File button from within the Copy mode screen. Use these totals to compare original page size (scanning) and output page size [SP 8-446].	
830x 1	A3	
830x 2	A4	
830x 3	A5	
830x 4	B4	
830x 5	B5	
830x 6	DLT	
830x 7	LG	
830x 8	LT	
830x 9	HLT	
830x 10	Full Bleed	
830x 254	Other (Standard)	
830x 255	Other (Custom)	

## SERVICE PROGRAM MODE TABLES

8311	T:Scan PGS/Rez	[0~9999999/ 0 / 1]
	These SPs count by resolution setting the total number of pages scanned by applications that can specify resolution settings.	
8315	S:Scan PGS/Rez	[0~9999999/ 0 / 1]
	These SPs count by resolution setting the total number of pages scanned by applications that can specify resolution settings. <b>Note:</b> At the present time, 8311 and 8315 perform identical counts.	
831x 1	1200dpi ~	
831x 2	600dpi~1199dpi	
831x 3	400dpi~599dpi	
831x 4	200dpi~399dpi	
831x 5	~199dpi	

- Copy resolution settings are fixed so they are not counted.
- The Fax application does not allow finely-adjusted resolution settings so no count is done for the Fax application.

8381	T:Total PrtPGS	These SPs count the number of pages printed by the customer. The counter for the application used for storing the pages increments. [0~9999999/ 0 / 1] The L: counter counts the number of pages stored from within the document server mode screen at the operation panel. Pages stored with the Store File button from within the Copy mode screen go to the C: counter.
8382	C:Total PrtPGS	
8383	F:Total PrtPGS	
8384	P:Total PrtPGS	
8385	S:Total PrtPGS	
8386	L:Total PrtPGS	
8387	O:Total PrtPGS	

- When the A3/DLT double count function is switched on with SP5104, 1 A3/DLT page is counted as 2.
- When several documents are merged for a print job, the number of pages stored are counted for the application that stored them.
- These counters are used primarily to calculate charges on use of the machine, so the following pages are not counted as printed pages:
  - Blank pages in a duplex printing job.
  - Blank pages inserted as document covers, chapter title sheets, and slip-sheets.
  - Reports printed to confirm counts.
  - All reports done in the service mode (service summaries, engine maintenance reports, etc.)
  - Test prints for machine image adjustment.
  - Error notification reports.
  - Partially printed pages as the result of a copier jam.

## SERVICE PROGRAM MODE TABLES

8391	LSize PrtPGS	[0~9999999/ 0 / 1]
	<p>These SPs count pages printed on paper sizes A3/DLT and larger.</p> <p><b>Note:</b> In addition to being displayed in the SMC Report, these counters are also displayed in the User Tools display on the copy machine.</p>	

8401	T:PrtPGS/LS	<p>These SPs count the number of pages printed from the document server. The counter for the application used to print the pages is incremented.</p> <p>The L: counter counts the number of jobs stored from within the document server mode screen at the operation panel.</p> <p>[0~9999999/ 0 / 1]</p>
8402	C:PrtPGS/LS	
8403	F:PrtPGS/LS	
8404	P:PrtPGS/LS	
8405	S:PrtPGS/LS	
8406	L:PrtPGS/LS	

- Print jobs done with Web Image Monitor and Desk Top Binder are added to the L: count.
- Fax jobs done with Web Image Monitor and Desk Top Binder are added to the F: count.

8411	Prints/Duplex	<p>This SP counts the amount of paper (front/back counted as 1 page) used for duplex printing. Last pages printed only on one side are not counted.</p> <p>[0~9999999/ 0 / 1]</p>
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## SERVICE PROGRAM MODE TABLES

8421	T:PrtPGS/Dup Comb	[0~9999999/ 0 / 1]
	These SPs count by binding and combine, and n-Up settings the number of pages processed for printing. This is the total for all applications.	
8422	C:PrtPGS/Dup Comb	[0~9999999/ 0 / 1]
	These SPs count by binding and combine, and n-Up settings the number of pages processed for printing by the copier application.	
8423	F:PrtPGS/Dup Comb	[0~9999999/ 0 / 1]
	These SPs count by binding and combine, and n-Up settings the number of pages processed for printing by the fax application.	
8424	P:PrtPGS/Dup Comb	[0~9999999/ 0 / 1]
	These SPs count by binding and combine, and n-Up settings the number of pages processed for printing by the printer application.	
8425	S:PrtPGS/Dup Comb	[0~9999999/ 0 / 1]
	These SPs count by binding and combine, and n-Up settings the number of pages processed for printing by the scanner application.	
8426	L:PrtPGS/Dup Comb	[0~9999999/ 0 / 1]
	These SPs count by binding and combine, and n-Up settings the number of pages processed for printing from within the document server mode window at the operation panel.	
8427	O:PrtPGS/Dup Comb	[0~9999999/ 0 / 1]
	These SPs count by binding and combine, and n-Up settings the number of pages processed for printing by Other applications	
842x 1	Simplex> Duplex	
842x 2	Duplex> Duplex	
842x 3	Book> Duplex	
842x 4	Simplex Combine	
842x 5	Duplex Combine	
842x 6	2>	2 pages on 1 side (2-Up)
842x 7	4>	4 pages on 1 side (4-Up)
842x 8	6>	6 pages on 1 side (6-Up)
842x 9	8>	8pages on 1 side (8-Up)
842x 10	9>	9 pages on 1 side (9-Up)
842x 11	16>	16 pages on 1 side (16-Up)
842x 12	Booklet	
842x 13	Magazine	

- These counts (SP8421 to SP8427) are especially useful for customers who need to improve their compliance with ISO standards for the reduction of paper consumption.
- Pages that are only partially printed with the n-Up functions are counted as 1 page.
- Here is a summary of how the counters work for Booklet and Magazine modes:

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

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

Service Tables

SERVICE PROGRAM MODE TABLES

8431	T:PrtPGS/ImgEdt	[0~9999999/ 0 / 1]
	These SPs count the total number of pages output with the three features below, regardless of which application was used.	
8432	C:PrtPGS/ImgEdt	[0~9999999/ 0 / 1]
	These SPs count the total number of pages output with the three features below with the copy application.	
8434	P:PrtPGS/ImgEdt	[0~9999999/ 0 / 1]
	These SPs count the total number of pages output with the three features below with the print application.	
8436	L:PrtPGS/ImgEdt	[0~9999999/ 0 / 1]
	These SPs count the total number of pages output from within the document server mode window at the operation panel with the three features below.	
8437	O:PrtPGS/ImgEdt	[0~9999999/ 0 / 1]
	These SPs count the total number of pages output with the three features below with Other applications.	
843x 1	Cover/Slip Sheet	Total number of covers or slip sheets inserted. The count for a cover printed on both sides counts 2.
843x 2	Series/Book	The number of pages printed in series (one side) or printed as a book with booklet right/left pagination.
843x 3	User Stamp	The number of pages printed where stamps were applied, including page numbering and date stamping.

## SERVICE PROGRAM MODE TABLES

8441	T:PrtPGS/Ppr Size	[0~9999999/ 0 / 1]
	These SPs count by print paper size the number of pages printed by all applications.	
8442	C:PrtPGS/Ppr Size	[0~9999999/ 0 / 1]
	These SPs count by print paper size the number of pages printed by the copy application.	
8443	F:PrtPGS/Ppr Size	[0~9999999/ 0 / 1]
	These SPs count by print paper size the number of pages printed by the fax application.	
8444	P:PrtPGS/Ppr Size	[0~9999999/ 0 / 1]
	These SPs count by print paper size the number of pages printed by the printer application.	
8445	S:PrtPGS/Ppr Size	[0~9999999/ 0 / 1]
	These SPs count by print paper size the number of pages printed by the scanner application.	
8446	L:PrtPGS/Ppr Size	[0~9999999/ 0 / 1]
	These SPs count by print paper size the number of pages printed from within the document server mode window at the operation panel.	
8447	O:PrtPGS/Ppr Size	[0~9999999/ 0 / 1]
	These SPs count by print paper size the number of pages printed by Other applications.	
844x 1	A3	
844x 2	A4	
844x 3	A5	
844x 4	B4	
844x 5	B5	
844x 6	DLT	
844x 7	LG	
844x 8	LT	
844x 9	HLT	
844x 10	Full Bleed	
844x 254	Other (Standard)	
844x 255	Other (Custom)	

- These counters do not distinguish between LEF and SEF.

SERVICE PROGRAM MODE TABLES

8451	PrtPGS/Ppr Tray	[0~9999999/ 0 / 1]
	These SPs count the number of sheets fed from each paper feed station.	
8451 1	Bypass	Bypass Tray
8451 2	Tray 1	Copier
8451 3	Tray 2	Copier
8451 4	Tray 3	Paper Tray Unit (Option)
8451 5	Tray 4	Paper Tray Unit (Option)
8451 6	Tray 5	LCT (Option)
8451 7	Tray 6	Currently not used.
8451 8	Tray 7	Currently not used.
8451 9	Tray 8	Currently not used.
8451 10	Tray 9	Currently not used.

8461	T:PrtPGS/Ppr Type	[0~9999999/ 0 / 1]
	These SPs count by paper type the number pages printed by all applications.	
	<ul style="list-style-type: none"> <li>• These counters are not the same as the PM counter. The PM counter is based on feed timing to accurately measure the service life of the feed rollers. However, these counts are based on output timing.</li> <li>• Blank sheets (covers, chapter covers, slip sheets) are also counted.</li> <li>• During duplex printing, pages printed on both sides count as 1, and a page printed on one side counts as 1.</li> </ul>	
8462	C:PrtPGS/Ppr Type	[0~9999999/ 0 / 1]
	These SPs count by paper type the number pages printed by the copy application.	
8463	F:PrtPGS/Ppr Type	[0~9999999/ 0 / 1]
	These SPs count by paper type the number pages printed by the fax application.	
8464	P:PrtPGS/Ppr Type	[0~9999999/ 0 / 1]
	These SPs count by paper type the number pages printed by the printer application.	
8466	L:PrtPGS/Ppr Type	[0~9999999/ 0 / 1]
	These SPs count by paper type the number pages printed from within the document server mode window at the operation panel.	
846x 1	Normal	
846x 2	Recycled	
846x 3	Special	
846x 4	Thick	
846x 5	Normal (Back)	
846x 6	Thick (Back)	
846x 7	OHP	
846x 8	Other	

## SERVICE PROGRAM MODE TABLES

8471	PrtPGS/Mag	[0~9999999/ 0 / 1]
	These SPs count by magnification rate the number of pages printed.	
8471 1	~49%	
8471 2	50%~99%	
8471 3	100%	
8471 4	101%~200%	
8471 5	201% ~	

- Counts are done for magnification adjusted for pages, not only on the operation panel but performed remotely with an external network application capable of performing magnification adjustment as well.
- Magnification adjustments done with printer drivers with PC applications such as Excel are also counted.
- Magnification adjustments done for adjustments after they have been stored on the document server are not counted.
- Magnification adjustments performed automatically during Auto Reduce/Enlarge copying are counted.
- The magnification rates of blank cover sheets, slip sheets, etc. are automatically assigned a rate of 100%.

8481	T:PrtPGS/TonSave
8484	P:PrtPGS/TonSave
	These SPs count the number of pages printed with the Toner Save feature switched on. <b>Note:</b> These SPs return the same results as this SP is limited to the Print application. [0~9999999/ 0 / 1]

## SERVICE PROGRAM MODE TABLES

8511	T:PrtPGS/Emul	[0~9999999/ 0 / 1]	
	These SPs count by printer emulation mode the total number of pages printed.		
8514	P:PrtPGS/Emul	[0~9999999/ 0 / 1]	
	These SPs count by printer emulation mode the total number of pages printed.		
8514 1	RPCS		
8514 2	RPDL		
8514 3	PS3		
8514 4	R98		
8514 5	R16		
8514 6	GL/GL2		
8514 7	R55		
8514 8	RTIFF		
8514 9	PDF		
8514 10	PCL5e/5c		
8514 11	PCL XL		
8514 12	IPDL-C		
8514 13	BM-Links		<b>Japan Only</b>
8514 14	Other		

- SP8511 and SP8514 return the same results, as they are both limited to the Print application.
- Print jobs output to the document server are not counted.

## SERVICE PROGRAM MODE TABLES

8521	T:PrtPGS/FIN	[0~9999999/ 0 / 1]
	These SPs count by finishing mode the total number of pages printed by all applications.	
8522	C:PrtPGS/FIN	[0~9999999/ 0 / 1]
	These SPs count by finishing mode the total number of pages printed by the Copy application.	
8523	F:PrtPGS/FIN	[0~9999999/ 0 / 1]
	These SPs count by finishing mode the total number of pages printed by the Fax application. <b>Note:</b> <ul style="list-style-type: none"> <li>Print finishing options for received faxes are currently not available.</li> </ul>	
8524	P:PrtPGS/FIN	[0~9999999/ 0 / 1]
	These SPs count by finishing mode the total number of pages printed by the Print application.	
8525	S:PrtPGS/FIN	[0~9999999/ 0 / 1]
	These SPs count by finishing mode the total number of pages printed by the Scanner application.	
8526	L:PrtPGS/FIN	[0~9999999/ 0 / 1]
	These SPs count by finishing mode the total number of pages printed from within the document server mode window at the operation panel.	
852x 1	Sort	
852x 2	Stack	
852x 3	Staple	
852x 4	Booklet	
852x 5	Z-Fold	
852x 6	Punch	
852x 7	Other	

- NOTE:** 1) If stapling is selected for finishing and the stack is too large for stapling, the unstapled pages are still counted.  
2) The counts for staple finishing are based on output to the staple tray, so jam recoveries are counted.

8531	Staples	This SP counts the amount of staples used by the machine. [0~9999999/ 0 / 1]
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8581	T:Counter	[0~9999999/ 0 / 1]
	These SPs count the total output broken down by color output, regardless of the application used. In addition to being displayed in the SMC Report, these counters are also displayed in the User Tools display on the copy machine. <b>Note:</b> This SP is expanded for color MFP and color LP machines. For this machine, the count is done for black only.	

## SERVICE PROGRAM MODE TABLES

8591	O:Counter	[0~9999999/ 0 / 1]
	These SPs count the totals for A3/DLT paper use, number of duplex pages printed, and the number of staples used. These totals are for Other (O:) applications only.	
8591 1	A3/DLT	
8591 2	Duplex	
8591 3	Staple	

8631	T:FAX TX PGS	[0~9999999/ 0 / 1]
	These SPs count by color mode the number of pages sent by fax to a telephone number. <b>Note:</b> This SP is expanded for color MFP and color LP machines. For this machine, the count is done for black only.	
8633	F:FAX TX PGS	[0~9999999/ 0 / 1]
	These SPs count by color mode the number of pages sent by fax to a telephone number. <b>Note:</b> This SP is expanded for color MFP and color LP machines. For this machine, the count is done for black only.	

- If a document has color and black-and-white pages mixed, the pages are counted separately as B/W or Color.
- At the present time, this feature is provided for the Fax application only so SP8631 and SP8633 are the same.
- The counts include error pages.
- If a document is sent to more than one destination with a Group transmission, the count is done for each destination.
- Polling transmissions are counted but polling RX are not.
- Relay, memory, and confidential mailbox transmissions and are counted for each destination.

## SERVICE PROGRAM MODE TABLES

8641	T:FAX TX PGS	[0~9999999/ 0 / 1]
	These SPs count by color mode the number of pages sent by fax as fax images using I-Fax. <b>Note:</b> This SP is expanded for color MFP and color LP machines. For this machine, the count is done for black only.	
8643	F:FAX TX PGS	[0~9999999/ 0 / 1]
	These SPs count by color mode the number of pages sent by Fax as fax images using I-Fax. <b>Note:</b> This SP is expanded for color MFP and color LP machines. For this machine, the count is done for black only.	

- If a document has color and black-and-white pages mixed, the pages are counted separately as B/W or Color.
- At the present time, this feature is provided for the Fax application only so SP8641 and SP8643 are the same.
- The counts include error pages.
- If a document is sent to more than one destination with a Group transmission, the count is done for each destination.
- Polling transmissions are counted but polling RX are not.
- Relay, memory, and confidential mailbox transmissions and are counted for each destination.

SERVICE PROGRAM MODE TABLES

8651	T:S-to-Email PGS	[0~9999999/ 0 / 1]
	<p>These SPs count by color mode the total number of pages attached to an e-mail for both the Scan and document server applications.  <b>Note:</b> This SP is expanded for color MFP and color LP machines. For this machine, the count is done for black only.</p>	
8655	S:S-to-Email PGS	[0~9999999/ 0 / 1]
	<p>These SPs count by color mode the total number of pages attached to an e-mail for the Scan application only.  <b>Note:</b> This SP is expanded for color MFP and color LP machines. For this machine, the count is done for black only.</p>	

- NOTE:**
- 1) The count for B/W and Color pages is done after the document is stored on the HDD. If the job is cancelled before it is stored, the pages are not counted.
  - 2) If Scan-to-Email is used to send a 10-page document to 5 addresses, the count is 10 (the pages are sent to the same SMTP server together).
  - 3) If Scan-to-PC is used to send a 10-page document to 5 folders, the count is 50 (the document is sent to each destination of the SMB/FTP server).
  - 4) Due to restrictions on some devices, if Scan-to-Email is used to send a 10-page document to a large number of destinations, the count may be divided and counted separately. For example, if a 10-page document is sent to 200 addresses, the count is 10 for the first 100 destinations and the count is also 10 for the second 100 destinations, for a total of 20.).

8661	T:Deliv PGS/Svr	[0~9999999/ 0 / 1]
	<p>These SPs count by color mode the total number of pages sent to a Scan Router server by both Scan and LS applications.  <b>Note:</b> This SP is expanded for color MFP and color LP machines. For this machine, the count is done for black only.</p>	
8665	S:Deliv PGS/Svr	[0~9999999/ 0 / 1]
	<p>These SPs count by color mode the total number of pages sent to a Scan Router server by the Scan application.  <b>Note:</b> This SP is expanded for color MFP and color LP machines. For this machine, the count is done for black only.</p>	

- NOTE:**
- 1) The B/W and Color counts are done after the document is stored on the HDD of the Scan Router server.
  - 2) If the job is canceled before storage on the Scan Router server finishes, the counts are not done.
  - 3) The count is executed even if regardless of confirmation of the arrival at the Scan Router server.

## SERVICE PROGRAM MODE TABLES

8671	T:Deliv PGS/PC	[0~9999999/ 0 / 1]
	These SPs count by color mode the total number of pages sent to a folder on a PC (Scan-to-PC) with the Scan and LS applications. <b>Note:</b> This SP is expanded for color MFP and color LP machines. For this machine, the count is done for black only.	
8675	S:Deliv PGS/PC	[0~9999999/ 0 / 1]
	These SPs count by color mode the total number of pages sent with Scan-to-PC with the Scan application. <b>Note:</b> This SP is expanded for color MFP and color LP machines. For this machine, the count is done for black only.	

8681	T:PCFAX TXPGS	These SPs count the number of pages sent by PC Fax. These SPs are provided for the Fax application only, so the counts for SP8681 and SP8683 are the same. [0~9999999/ 0 / 1]
8683	F:PCFAX TXPGS	

- This counts pages sent from a PC using a PC fax application, from the PC through the copier to the destination.
- When sending the same message to more than one place using broadcasting, the pages are only counted once. (For example, a 10-page fax is sent to location A and location B. The counter goes up by 10, not 20.)

8691	T:TX PGS/LS	These SPs count the number of pages sent from the document server. The counter for the application that was used to store the pages is incremented. [0~9999999/ 0 / 1] The L: counter counts the number of pages stored from within the document server mode screen at the operation panel. Pages stored with the Store File button from within the Copy mode screen go to the C: counter.
8692	C:TX PGS/LS	
8693	F:TX PGS/LS	
8694	P:TX PGS/LS	
8695	S:TX PGS/LS	
8696	L:TX PGS/LS	

- NOTE:**
- 1) Print jobs done with Web Image Monitor and Desk Top Binder are added to the count.
  - 2) If several documents are merged for sending, the number of pages stored are counted for the application that stored them.
  - 3) When several documents are sent by a Fax broadcast, the F: count is done for the number of pages sent to each destination.

8701	TX PGS/Port	[0~9999999/ 0 / 1]
	These SPs count the number of pages sent by the physical port used to send them. For example, if a 3-page original is sent to 4 destinations via ISDN G4, the count for ISDN (G3, G4) is 12.	
8701 1	PSTN-1	
8701 2	PSTN-2	
8701 3	PSTN-3	
8701 4	ISDN (G3,G4)	
8701 5	Network	

SERVICE PROGRAM MODE TABLES

8 711	T:Scan PGS/Comp	[0~9999999/ 1]
	These SPs count the number of compressed pages scanned into the document server, counted by the formats listed below.	
8 711 1	JPEG/JPEG2000	
8 711 2	TIFF (Multi/Single)	
8 711 3	PDF	
8 711 4	Other	

8715	S:Scan PGS/Comp	[0~9999999/ 1]
	These SPs count the number of compressed pages scanned by the scan application, counted by the formats listed below.	
8 715 1	JPEG/JPEG2000	
8 715 2	TIFF (Multi/Single)	
8 715 3	PDF	
8 715 4	Other	

8741	RX PGS/Port	[0~9999999/ 0 / 1]
	These SPs count the number of pages received by the physical port used to receive them.	
8741 1	PSTN-1	
8741 2	PSTN-2	
8741 3	PSTN-3	
8741 4	ISDN (G3,G4)	
8741 5	Network	

8771	Dev Counter	[0~9999999/ 0 / 1]
	These SPs count the frequency of use (number of rotations of the development rollers) for black and other color toners. <b>Note:</b> For machines that do not support color, the Black toner count is the same as the Total count.	

8781	Pixel Coverage Ratio	
	This SP displays the number of toner bottles used. The count is done based on the equivalent of 1,000 pages per bottle.	

8791	LS Memory Remain	This SP displays the percent of space available on the document server for storing documents. [0~100/ 0 / 1]
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8801	Toner Remain	[0~100/ 0 / 1]
	This SP displays the percent of toner remaining for each color. This SP allows the user to check the toner supply at any time. <b>Note:</b> <ul style="list-style-type: none"> <li>This precise method of measuring remaining toner supply (1% steps) is better than other machines in the market that can only measure in increments of 10 (10% steps).</li> <li>This SP is expanded for color MFP and color LP machines. For this machine, the count is done for black only.</li> </ul>	

SERVICE PROGRAM MODE TABLES

8831	Pixel Cover Ave.	Average Pixel Coverage
8831 1	Accum. Ave. K	
8831 2	Accum. Ave. M	Do not display for this machine.
8831 3	Accum. Ave. C	
8831 4	Accum. Ave. Y	

8841	Pixel Cover Last	Average Pixel Coverage
001	Last Page K	
002	Last Page M	Do not display for this machine.
003	Last Page C	
004	Last Page Y	

8851	Toner Coverage 0-10%		[0~9999999]
	These SPs count the percentage of dot coverage for black other color toners.		
8851 1	K	Black toner	Do not display for this machine.
8851 2	M	Magenta toner	
8851 3	C	Cyan toner	
8851 4	Y	Yellow toner	

8861	Toner Coverage 11-20%		[0~9999999]
	These SPs count the percentage of dot coverage for black other color toners.		
8861 1	K	Black toner	Do not display for this machine.
8861 2	M	Magenta toner	
8861 3	C	Cyan toner	
8861 4	Y	Yellow toner	

8871	Toner Coverage 21-30%		[0~9999999]
	These SPs count the percentage of dot coverage for black other color toners.		
8871 1	K	Black toner	Do not display for this machine.
8871 2	M	Magenta toner	
8871 3	C	Cyan toner	
8871 4	Y	Yellow toner	

8881	Toner Coverage 31 -%		[0~9999999]
	These SPs count the percentage of dot coverage for black other color toners.		
8881 1	K	Black toner	Do not display for this machine.
8881 2	M	Magenta toner	
8881 3	C	Cyan toner	
8881 4	Y	Yellow toner	

8901	Coverage Display (Toner Bottle: Previous) <b>DFU</b>
8911	Coverage Display (Toner Bottle: Before Previous) <b>DFU</b>

Service  
Tables

SERVICE PROGRAM MODE TABLES

8941	Machine Status	[0~9999999/ 0 / 1]
	These SPs count the amount of time the machine spends in each operation mode. These SPs are useful for customers who need to investigate machine operation for improvement in their compliance with ISO Standards.	
8941 1	Operation Time	Engine operation time. Does not include time while controller is saving data to HDD (while engine is not operating).
8941 2	Standby Time	Engine not operating. Includes time while controller saves data to HDD. Does not include time spent in Energy Save, Low Power, or Off modes.
8941 3	Energy Save Time	Includes time while the machine is performing background printing.
8941 4	Low Power Time	Includes time in Energy Save mode with Engine on. Includes time while machine is performing background printing.
8941 5	Off Mode Time	Includes time while machine is performing background printing. Does not include time machine remains powered off with the power switches.
8941 6	SC	Total down time due to SC errors.
8941 7	PrtJam	Total down time due to paper jams during printing.
8941 8	OrgJam	Total down time due to original jams during scanning.
8941 9	Supply PM Unit End	Total down time due to toner end.

8951	AddBook Register		
	These SPs count the number of events when the machine manages data registration.		
8951 1	User Code	User code registrations.	[0~9999999/ 0 / 1]
8951 2	Mail Address	Mail address registrations.	
8951 3	Fax Destination	Fax destination registrations.	
8951 4	Group	Group destination registrations.	
8951 5	Transfer Request	Fax relay destination registrations for relay TX.	
8951 6	F-Code	F-Code box registrations.	
8951 7	Copy Program	Copy application registrations with the Program (job settings) feature.	[0~255 / 0 / 255]
8951 8	Fax Program	Fax application registrations with the Program (job settings) feature.	
8951 9	Printer Program	Printer application registrations with the Program (job settings) feature.	
8951 10	Scanner Program	Scanner application registrations with the Program (job settings) feature.	

## 5.2.4 TEST PATTERN PRINTING: SP2-902

**NOTE:** Always print a test pattern to confirm correct operation of the machine.

1. Enter the SP mode and select SP2-902.
2. Press **2** or **3**.
  - **2** IPU Test Print
  - **3** Test Pattern
3. Enter the number for the test pattern that you want to print and press **#**. (See the tables below.)
4. When you are prompted to confirm your selection, press Yes. This selects the test pattern for printing.
5. Press Copy Window to open the copy window and then select the settings for the test print (paper size, etc.)
6. Press Start **Ⓢ** twice. (Ignore the “Place Original” messages) to start the test print.
7. Press SP Mode (highlighted) to return to the SP mode display.

### ***Test Pattern Table (SP2-902-2: IPU Test Print)***

No.	Test Pattern	No.	Test Pattern
0	None	8	Grayscale (Horizontal)
1	Vertical Line (1-dot)	9	Grayscale (Vertical)
2	Horizontal Line (1-dot)	10	Cross Pattern
3	Vertical Line (2-dot)	11	Cross Shape
4	Horizontal Line (2-dot)	12	Argyle Pattern
5	Alternating Dot Pattern	13	Cross Pattern (256)
6	Grid Pattern (1-dot)	14	Cross Pattern (64)
7	Vertical Strips		

SERVICE PROGRAM MODE TABLES

**Test Pattern Table: SP2-902-3 Printing Test Patterns**

No.	Test Pattern
0	None
1	Vertical Line (1-dot)
2	Horizontal Line (1-dot)
3	Vertical Line (2-dot)
4	Horizontal Line (2-dot)
5	Grid Pattern (1-dot)
6	Independent Pattern (1-dot)
7	Independent Pattern (2-dot)
8	Full Dot Pattern
9	Black Band
10	Trimming Area
11	Argyle Pattern
12	Hounds Tooth Check (2-Dot Horizontal)
13	Checker Flag Pattern
14	Black Band (Vertical)
15	Independent Pattern (4-Dot)
16	Horizontal Line (1-Dot) (Reversed LD1, LD2)
17	Grid Pattern (1-dot pair) (Reversed LD1, LD2)
18	Independent Pattern (1-dot) (Reversed LD1, LD2)
19	Grayscale (Horizontal)
20	Grayscale (Vertical)
21	Grayscale (Horizontal/Vertical)
22	Grayscale (Grid)
23	Grayscale (Horizontal Margin)
24	Grayscale (Vertical Margin)
25	Grayscale (Vertical/Horizontal Margin)
26	White Pattern
27	Grid (1-dot pair) (OR Outside Data 1)

## 5.2.5 INPUT CHECK

### **Main Machine Input Check: SP5-803**

1. Enter the SP mode and select SP5-803.
2. Enter the number (1 – 13) for the item that you want to check. A small box will be displayed on the SP mode screen with a series of 0's and 1's.  
The meaning of the display is as follows.

<b>0 0 0 0 0 0 0 0</b>
------------------------

Bit    7 6 5 4 3 2 1 0

3. Check the status of each item against the corresponding bit numbers listed in the table below.

Number	Bit	Description	Reading	
			0	1
1: Paper Feed 1 (Upper Tray)	7	Fusing Exit Sensor	Activated	Deactivated
	6	Near End Sensor 2	Activated	Deactivated
	5	Near End Sensor 1	Activated	Deactivated
	4	Not Used	---	---
	3	Paper Size Sensor 4	Activated	Deactivated
	2	Paper Size Sensor 3	Activated	Deactivated
	1	Paper Size Sensor 2	Activated	Deactivated
	0	Paper Size Sensor 1	Activated	Deactivated
2: Paper Feed 2 (Lower Tray)	7	Duplex Unit Set Sensor	Unit set	Unit not set
	6	Near End Sensor 2	Off	On
	5	Near End Sensor 1	Off	On
	4	Fusing/Paper Output Motor Lock	Not Locked	Locked
	3	Paper Size Sensor 4	Activated	Deactivated
	2	Paper Size Sensor 3	Activated	Deactivated
	1	Paper Size Sensor 2	Activated	Deactivated
	0	Paper Size Sensor 1	Activated	Deactivated
3: Registration and Others	7	Zero Cross Signal	Detected	Not detected
	6	Transfer Belt Unit HP Sensor	Not present	Present
	5	Exhaust Fan Lock Signal	Not locked	Locked
	4	Cooling Fan Lock Signal	Not locked	Locked
	3	Main Motor Lock Signal	Not locked	Locked
	2	Toner Overflow Sensor	Tank not full	Tank full
	1	Cover Open	Cover closed	Cover opened
	0	Registration Sensor	Paper detected	Paper not detected

SERVICE PROGRAM MODE TABLES

Number	Bit	Description	Reading	
			0	1
4: By-pass Feed	7	Duplex reverse path door	Closed	Open
	6	Paper End Sensor	Paper detected	Paper not detected
	5	Not used		
	4	Paper Size Sensor 4, By-pass	Activated	Deactivated
	3	Paper Size Sensor 3, By-pass	Activated	Deactivated
	2	Paper Size Sensor 2, By-pass	Activated	Deactivated
	1	Paper Size Sensor 1, By-pass	Activated	Deactivated
	0	Unit Set Signal	Yes	No
5: Relay Unit (Bridge Unit)	7	Not used	Yes	No
	6	Unit Set Signal	Connected	Not connected
	5	Paper Sensor	Paper detected	Paper not detected
	4	Relay Sensor	Paper detected	Paper not detected
	3	Exit Sensor	Paper detected	Paper not detected
	2	Left Cover Switch	Switch pressed (cover closed)	Switch not pressed
	1	Middle Cover Switch	Switch pressed (cover closed)	Switch not pressed
	0	Right Cover Switch	Switch pressed (cover closed)	Switch not pressed
6: Unit Set	7	Feed Motor Lock	No	Yes
	6	F-Gate Signal	Active	Not active
	5	Height Sensor	Feed height	Not feed height
	4	Paper Exit Sensor	Paper detected	Paper not detected
	3	Fusing Unit	Detected	Not detected
	2	Total Counter	Not detected	Detected
	1	Key Counter	Detected	Not detected
	0	Key Card Present	Detected	Not detected
7: Paper End	7	Front cover/open closed	Open	Closed
	6	Vertical feed path	Clear	Not clear
	5	2nd Tray Height Sensor	Paper not at upper limit	Paper at upper limit
	4	1st Tray Height Sensor	Paper not at upper limit	Paper at upper limit
	3	Lower Relay Sensor	Paper detected	Paper not detected
	2	Upper Relay Sensor	Paper detected	Paper not detected
	1	Lower Paper End Sensor	Paper not detected	Paper detected
	0	Upper Paper End Sensor	Paper not detected	Paper detected

SERVICE PROGRAM MODE TABLES

Number	Bit	Description	Reading			
			0	1		
8: DIP Switches	7	Dip Switch - 8	On			Off
	6	Dip Switch - 7	On			Off
	5	Dip Switch - 6	On			Off
	4	Dip Switch - 5	On			Off
	3	Dip Switch - 4	On			Off
	2	Dip Switch - 3	On			Off
	1	Dip Switch - 2	On			Off
	0	Dip Switch - 1	On			Off
9: Duplex Unit	7	Not used				
	6	Right cover open/closed	Closed			Open
	5	1-Bin Unit Set	Detected			Not detected
	4	LD, HP sensor	Positioned			Not positioned
	3	Exit Sensor (Jam)	Paper detected			Paper not detected
	2	Entrance Sensor (Jam)	Paper detected			Paper not detected
	1	Paper End Sensor	Paper detected			Paper not detected
	0	Duplex Unit Switch	Cover closed			Cover open
10: Remainder of Feed Tray 1	7	Tray 4: Bit 1				
	8	Tray 4: Bit 0	<b>Bit 1</b>	<b>Bit 0</b>	<b>Capacity</b>	
	5	Tray 3: Bit 1	1	1	Full	
	4	Tray 3: Bit 0	1	0	50% or more	
	3	Tray 2: Bit 1	0	1	10% or more	
	2	Tray 2: Bit 0	0	0	Out, or tray not set	
	1	Tray 1: Bit 1				
	0	Tray 1: Bit 0				
11: Remainder of Feed Tray 2	7	By-pass Yes/No				
	6	Not Used				
	5	Not Used				
	4	Not Used				
	3	Not Used	<b>Bit 2</b>	<b>Bit 1</b>	<b>Bit 0</b>	<b>Capacity</b>
	2	LCT: Bit 2	1	1	1	Full
	1	LCT: Bit 1	1	0	0	80% or more
	0	LCT: Bit 0	0	1	1	50% or more
		0	1	0	30% or more	
		0	0	0	10% or more	

Service Tables

SERVICE PROGRAM MODE TABLES

Number	Bit	Description	Reading	
			0	1
12: Full Exit Tray 1	7	Mailbox 9-bin	Not full or no tray	Full
	6	Mailbox 8-bin	Not full or no tray	Full
	5	Not used	-	-
	4	Finisher: Shift Tray 1	Not full or no tray	Full
	3	Finisher: Shift Tray 2	Not full or no tray	Full
	2	Not used	-	-
	1	1-Bin Exit	Not full or no tray	Full
	0	Machine Exit	Not full or no tray	Full
13: Full Exit Tray 2	7	Mailbox 7-bin	Not full or no tray	Full
	6	Mailbox 6-bin	Not full or no tray	Full
	5	Mailbox 5-bin	Not full or no tray	Full
	4	Mailbox 4-bin	Not full or no tray	Full
	3	Mailbox 3-bin	Not full or no tray	Full
	2	Mailbox 2-bin	Not full or no tray	Full
	1	Mailbox 1-bin	Not full or no tray	Full
	0	Mailbox Proof Tray	Not full or no tray	Full

**Table 1: By-pass Feed Table Paper Size Data**

Number.	Bit 4	Bit 3	Bit 2	Bit 1	Paper Width
4: By-pass	1	1	1	1	Post Card
	1	1	1	0	B6 SEF
	1	1	0	1	B5 SEF
	1	1	0	0	A5 SEF / 5.5"
	1	0	1	1	B4 SEF
	1	0	0	1	A4 SEF / 8.5" / 8"
	0	1	1	1	A3 SEF
	0	0	1	1	11" x 17"

**ARDF Input Check: SP6-007**

1. Enter the SP mode and select SP6-007.
2. Enter the number (1 – 3) for the item that you want to check. A small box will be displayed on the SP mode screen with a series of 0's and 1's.  
The meaning of the display is as follows.

0 0 0 0 0 0 0 0
-----------------

Bit    7 6 5 4 3 2 1 0

3. Check the status of each item against the corresponding bit numbers listed in the table below.

Group	Bit No.	Description	Reading	
			0	1
1	7	Original width sensor 4	Paper not detected	Paper detected
	6	Original width sensor 3	Paper not detected	Paper detected
	5	Original width sensor 2	Paper not detected	Paper detected
	4	Original width sensor 1	Paper not detected	Paper detected
	3	Skew correction sensor	Paper not detected	Paper detected
	2	Original set sensor	Paper not detected	Paper detected
	1	Original B5 sensor	Paper not detected	Paper detected
	0	Original LG sensor	Paper not detected	Paper detected
2	7	Original stopper HP sensor	Original stopper up	Original stopper down
	6	Pick-up HP sensor	Cover closed	Cover opened
	5	Top cover Sensor	Cover closed	Cover opened
	4	Lift sensor	Pick-up roller up	Pick-up roller down
	3	Inverter sensor	Paper not detected	Paper detected
	2	Exit sensor	Paper not detected	Paper detected
	1	Registration sensor	Paper not detected	Paper detected
	0	Interval Sensor	Paper not detected	Paper detected
3	0	Original A4 sensor		

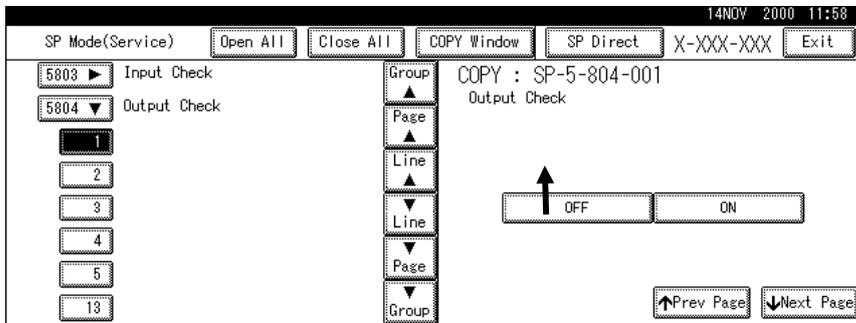
Service Tables

### 5.2.6 OUTPUT CHECK

**NOTE:** Motors keep turning in this mode regardless of upper or lower limit sensor signals. To prevent mechanical or electrical damage, do not keep an electrical component on for a long time.

#### **Main Machine Output Check: SP5-804**

1. Open SP mode 5-804.
2. Select the SP number that corresponds to the component you wish to check. (Refer to the table on the next page.)
3. Press On then press Off to test the selected item.



**NOTE:** You cannot exit and close this display until you press off to switch off the output check currently executing. Do not keep an electrical component switched on for a long time.

**SP5-804 Output Check Table**

<b>No.</b>	<b>Description</b>	<b>No.</b>	<b>Description</b>
1	1st Paper Feed CL	45	Duplex Junction Gate Solenoid
2	2nd Paper Feed CL		
3	3rd Paper Feed CL (PTU)	47	Relay Junction Gate Solenoid
4	4th Paper Feed CL (PTU)		
5	By-pass Paper Feed CL	50	Tray Junction Gate Solenoid
6	LCT Paper Feed CL	51	Stapler Junction Gate Solenoid
		52	Positioning Roller Solenoid (Finishers)
13	By-pass Pick-up Solenoid		
14	LCT Pick-up Solenoid	56	Toner Bottle Motor
		57	Transfer Belt Positioning Clutch
17	Transport Motor 1 (Finisher)		
18	Transport Motor 2 (Finisher)	62	Quenching Lamp
19	Exit Motor (Finisher)	63	Charge Bias
20	Staple Motor (Finisher)		
21	Punch Motor (Finisher)	67	Development Bias
25	LCT Motor	69	Transfer Belt Voltage
26	Bank Motor (Paper Tray Unit)	70	ID Sensor LED
27	Fusing Exit Motor		
28	Main Motor	75	Exhaust Fan Motor
29	Duplex Transport Motor	76	Elec. Equipment Cooling Fan Motor
30	Duplex Inverter Motor (Rev.)		
31	Duplex Inverter Motor (Fwd.)	78	Relay Fan Motor
32	Feed/Development Motor	79	Fusing Fan Motor
		85	Total Counter
35	Bank Relay Clutch (Paper Tray Unit)		
36	Relay Clutch		
38	LCT Relay Clutch	92	Shift Tray Lift Motor (Finisher)
39	Registration Clutch	93	Jogger Motor (Finisher)
40	Development Clutch	94	Stapler Positioning Motor
41	Exit Junction Gate Solenoid (Upper Unit)	95	Stack Feed Out Motor (Finisher)
42	Duplex Junction Gate Solenoid (Lower Unit)	96	Shift Motor (Finishers)
		97	Stapler Rotation Motor (Two-Tray Finisher)

## SERVICE PROGRAM MODE TABLES

### **ARDF Output Check: SP6-008)**

1. Open SP mode SP6-008.
2. Select the SP number that corresponds to the component you wish to check. (Refer to the table below.)
3. Press On then press Off to test the selected item. You cannot exit and close this display until you click Off to switch off the output check currently executing.

No.	Description
1	Feed Motor (Forward)
2	Feed Motor (Reverse)
3	Drive Motor (Forward)
4	Inverter Motor (Forward)
5	Inverter Motor (Reverse)
6	Feed Clutch
7	Inverter Solenoid
8	Pick-up Motor (Forward)
9	Pick-up Motor (Reverse)

### **5.2.7 SMC PRINT OUT LISTS: SP5-990**

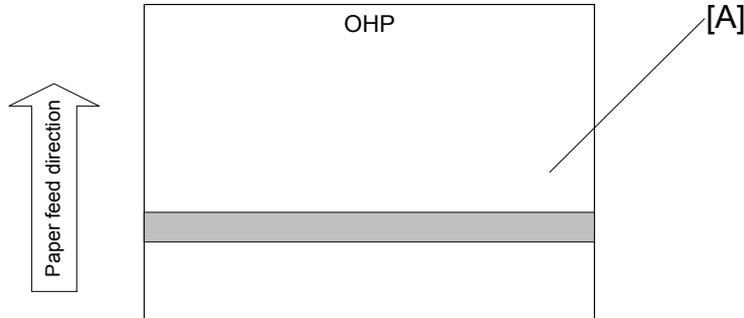
1. Open SP mode 5-990 and select the number corresponding to the list that you wish to print.

SMC (System Parameter and Data Lists)	
1	All Data List
2	SP Mode Data List
3	UP Mode Data List
4	Logging Data List
5	Self-Diagnostics Results List
6	Non-Default
7	NIB Summary
8	NetFile Log
21	Copy UP Mode List
22	Scanner SP Mode List
23	Scanner UP Mode List

2. Press "Execute" on the touch panel.
3. Select "Single Face" or "Both Face".
4. After printing the list, press "Close" to return to the SP mode display.
5. Press Exit twice to close the SP Mode screen and return to copy mode.

### 5.2.8 NIP BAND WIDTH ADJUSTMENT: SP1-109

When paper wrinkling or image offset occurs, the pressure from the pressure roller



can be adjusted by changing the position of the pressure springs. At this time, the nip bandwidth can also be checked with SP1-109.

1. Execute SP5-802 to perform a free run of about 50 sheets.
2. Open SP1-109-1, press  $\text{\textcircled{\#}}$ , and then press Yes to confirm the selection.
3. Press Copy Window to return to the copy window.
4. Place an OHP sheet (A4/8.5" x 11" sideways) on the by-pass feed tray.
5. Press Start  $\text{\textcircled{\text{D}}}$  twice. The OHP sheet will stop in the fusing unit for about 10 seconds, then it exits automatically.
6. Check the nip bandwidth [A]. The relationship between the position of the pressure spring and the bandwidth is as follows.

**NOTE:** Check the nip bandwidth around the center of the OHP.

Pressure spring position	Nip width
Upper (default position)	6.0 ± 0.5 mm
Lower	6.5 ± 0.6 mm

If the width is out of the above specification, the pressure spring should be replaced.

### 5.2.9 MEMORY CLEAR: SP5-801

Executing Memory All Clear resets all the settings stored in the NVRAM to their default settings except the following:

SP7-003-1:	Electrical total counter value
SP5-811-1:	Machine serial number
SP5-907:	Plug & Play Brand Name and Production Name Setting

1. Execute SP5-990 to print out all SMC Data Lists.
2. Open SP mode 5-801.
3. Press the number for the item that you want to initialize. The number you select determines which application is initialized. For example, press 1 if you want to initialize all modules or select the appropriate number from the table below.

<b>5801</b>	<b>Memory Clear</b>	<b>Comments</b>
5801 1	All Clear	Initializes items 2 ~ 12 below. *1
5801 2	Engine	Initializes all registration settings for the engine and processing settings. *1
5801 3	SCS	Initializes default system settings, CSS settings, operation display coordinates, and ROM update information. *1
5801 4	IMH Memory Clr	Initializes the registration setting for the image memory handler by deleting all image files on the HDD.
5801 5	MCS	Initializes the automatic delete time setting for stored documents.
5801 6	Copier application	Initializes all copier application settings.
5801 7	Fax application	Initializes the fax reset time, job login ID, all TX/RX settings, local storage file numbers, and off-hook timer.
5801 8	Printer application	Initializes the printer defaults, programs registered, the printer SP Bit SW, and printer CSS counter.
5801 9	Scanner application	Initializes the scanner defaults for the scanner and all the Scanner SP modes.
5801 10	Web Service/Network Application	Deletes the NFA management files and thumbnails, and initializes the JOB login ID.
5801 11	NCS	Initializes the system defaults and interface settings (IP addresses also), the SmartNetMonitor for Admin, WebStatusMonitor settings, and the TELNET settings.
5801 12	R-FAX	Initializes the Job login ID, SmartNetMonitor for Admin, Job History, and local storage file numbers.
5801 13	Clear DCS Settings	Initialization
5801 14	Clear UCS Settings	Initialization

\*1: Resetting 1~3 resets the operation panel screen coordinates, so after executing 1, 2, or 3, you must re-calibrate the screen.

4. Press Execute, and then follow the prompts on the display to complete the procedure.
5. Make sure that you perform the following settings:
  - Do the laser beam pitch adjustment (SP2-109).
  - Do the printer and scanner registration and magnification adjustments (➡3.21).
  - Do the touch screen calibration (➡ 3.21.4).
  - Referring to the SMC data lists, re-enter any values, which had been changed from their factory settings.
  - Do SP 3-001-2 (ID Sensor Initial Setting).
6. Check the copy quality and the paper path, and do any necessary adjustments.

## 5.2.10 SOFTWARE RESET

The software can be reboot when the machine hangs up. Use the following procedure.

Turn the main power switch off and on.

-Or-

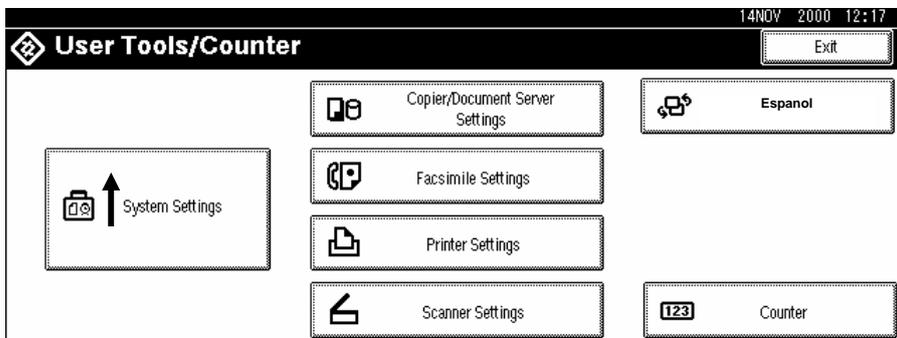
Press and hold down   together for over 10 seconds. When the machine beeps once release both buttons. After “Now loading. Please wait” is displayed for a few seconds the copy window will open. The machine is ready for normal operation.

## 5.2.11 SYSTEM SETTINGS AND COPY SETTING RESET

### *System Setting Reset*

The system settings in the UP mode can be reset to their defaults. Use the following procedure.

1. Press User Tools/Counter .
2. Hold down  and then press System Settings.  
**NOTE:** You must press  first.

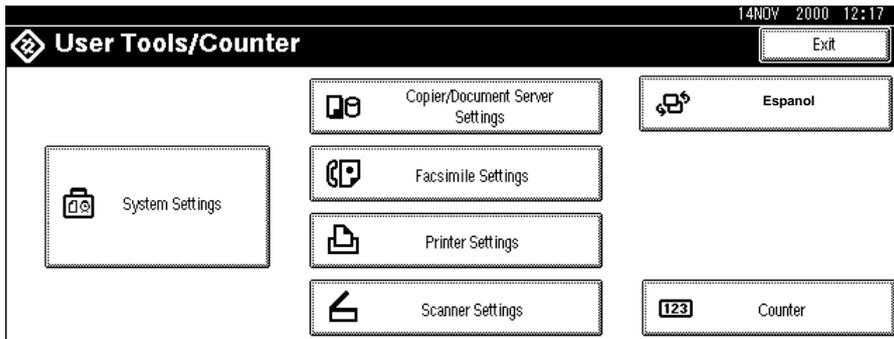


3. When the message prompts you to confirm that you want to reset the system settings, press Yes.
4. When the message tells you that the settings have been reset, press Exit.

### Copier Setting Reset

The copy settings in the UP mode can be reset to their defaults. Use the following procedure.

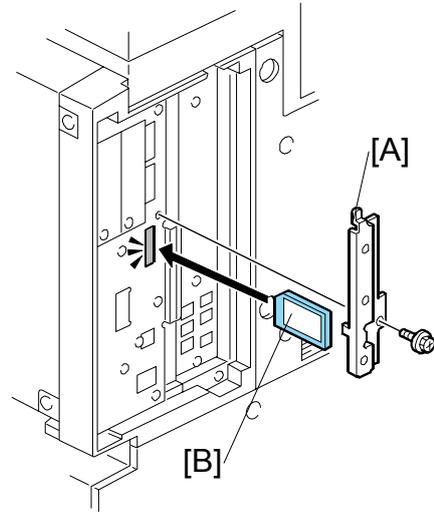
1. Press User Tools/Counter .
2. Hold down  and then press Copier/Document Server Settings.  
**NOTE:** You must press  first.



3. When the message prompts you to confirm that you want to reset the Copier Document Server settings, press Yes.
4. When the message tells you that the settings have been reset, press Exit.

## 5.3 UPDATING THE FIRMWARE

1. Turn off the main power switch.
2. Remove the SD card [A] cover.
3. Insert the SD card [B] containing the software you wish to download into SD card slot C3.
4. Turn on the main power.
5. Follow the instructions displayed on the LCD panel
6. Monitor the downloading status on the operation panel.
  - While downloading is in progress, the LCD will display “Writing”. When downloading has been completed, the panel will display “OK.”
  - For operation panel software, the Start key lights red while downloading is in progress, and then lights green again after downloading is completed.



### **⚠ CAUTION**

Never switch off the power while downloading. Switching off the power while the new software is being downloading will damage the boot files in the controller.

7. After confirming that downloading is completed, turn off the main power and remove the SD card.
8. If more software needs to be downloaded, repeat steps 1 to 7.
9. Turn the main power on and confirm that the new software loads and that the machine starts normally.

## ⇒ 5.3.1 ERRORS DURING FIRMWARE UPDATE

If an error occurs during the download, an error message will display. The error code consists of the letter “E” and a number (e.g., “E20”).

**Error Message Table**

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

## 5.4 UPLOADING/DOWNLOADING NVRAM DATA

⇒ The content of the NVRAM can be uploaded to and downloaded from an SD card.

### IMPORTANT NOTE:

The following data stored in the NVRAM will **not** be saved on the SD Card when performing an NVRAM Data Upload (SP5824):

- Total count categories (SP7-003-\*\*\* Copy Counter)
- C/O, P/O Counter (SP7-006-\*\*\* C/O, P/O Count Display)
- Dupelx, A3/DLT/Over 420 mm, Stapler and Scanner application scanning counters (system settings).
- Engine SP Data

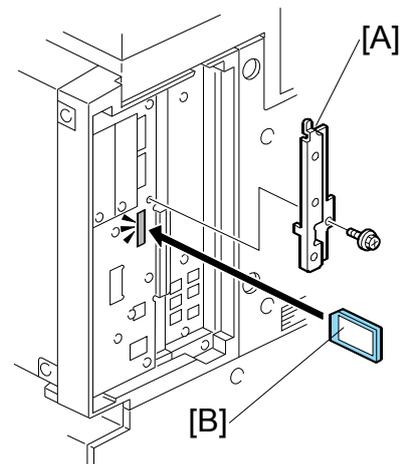
Therefore, whenever an NVRAM Upload/Download is performed, make sure to print out the SP Data List before performing SP5801-001 (Memory Clear: All Clear) or SP5801-002 (Memory Clear: Engine).

### NVRAM Upload/Download Procedure:

- 1) Print out the SP Data list from SP5990-002.
- 2) Perform the NVRAM Data Upload (to the SD Card) according to the procedure below.
- 3) Perform the Memory Clear (SP5801-001 or 002).
- 4) Perform the NVRAM Data Download (from the SD Card) according to the procedure below.
- 5) Manually input the data listed above.

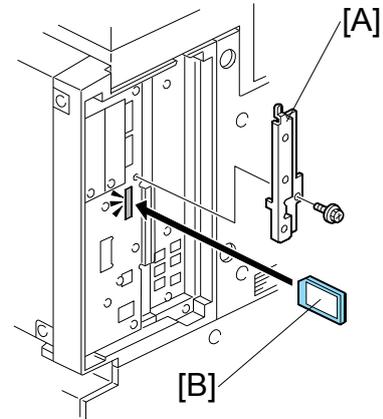
### 5.4.1 UPLOADING NVRAM DATA (SP5-824)

1. Turn OFF the Main Switch.
2. Remove the SD card cover [A].
3. Insert the SD card [B] into SD card slot C3.
4. Turn ON the Main Switch.
5. Execute SP5-824.
6. Press ① to start uploading the NVRAM data.



## 5.4.2 DOWNLOADING NVRAM DATA (SP5-825)

1. Turn OFF the Main Switch.
2. Remove the SD card cover [A].
3. Plug the SD card [B] into SD card slot C3..
4. Turn ON the Main Switch.
5. Execute SP5-825.
6. Press ① to start downloading the NVRAM data.



Note that the following errors could occur during downloading:

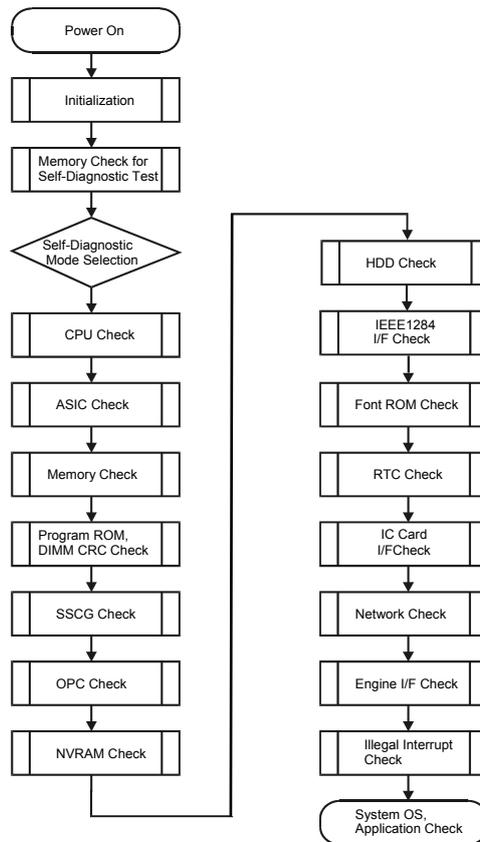
- If a card is not installed in the card slot and a message tells you that downloading cannot proceed, you cannot execute downloading, even by pressing ①.
- If the correct card for the NVRAM data is not inserted in the card slot, after you press ① a message will tell you that downloading cannot proceed because the card is abnormal and the execution will halt.

## 5.5 SELF-DIAGNOSTIC MODE

### 5.5.1 SELF-DIAGNOSTIC MODE AT POWER ON

As soon as the main machine is powered on, the controller waits for the initial settings of the copy engine to take effect and then starts an independent self-diagnostic test program. The self-diagnostic test follows the path of the flow chart shown below and checks the CPU, memory, HDD, and so on. An SC code is displayed in the touch panel if the self-diagnostic program detects any malfunction or abnormal condition.

**Self-Diagnostic Test Flow**



**5.5.2 DETAILED SELF-DIAGNOSTIC MODE**

In addition to the self-diagnostic test initiated every time the main machine is powered on, you can set the machine in a more detailed diagnostic mode manually in order to test other components or conditions that are not tested during self-diagnosis after power on. The following device is required in order to put the machine in the detailed self-diagnosis mode.

No.	Name
G02119350	Parallel Loopback Connector

**Executing Detailed Self-Diagnosis**

Follow this procedure to execute detailed self-diagnosis.

1. Switch off the machine, and connect the parallel loopback device to the Centronics I/F port.
2. Hold down **#**, press and hold down **\***, and then while pressing both keys at the same time, switch on the machine.  
You will see “Now Loading” on the touch-panel, and then you will see the results of the test.

A report like the one below is printed every time a detailed self-diagnostic test is executed, whether errors were detected or not.

MODEL NAME XXXX

Self-Diagnosis Report

Serial No. : ACLD000034    Firmware P/# : ACP82XXXX    [1/1]  
 Firmware Version : 2.49.01    Wed Nov 22 13:15:30 2000

---

[System Construction]

Kernel Version	: NetBSD 1.3.3 (SHINYOKOHAMA_ROM) #0: Sat Nov 11 16:15:35 JST 2000	CPU Pipeline Clock	: 200.0 MHz
CPU System Bus Clock	: 100.0 MHz	ASIC Version	: 1397306160
Board Type	: 7	RAM Capacity	: 100.663296 MB
RTC Existence	: existence	HDD Model	:
HDD Existence	: existence		

[Total Counter ]

0001000

[Program No. @]

MAIN	: ACP82XXXX	ENGINE	: Ver1.96
LCDC	: V1.39	PI	:
ADF	: B3515620B	SIB	: B0045383
FIN	:	FIN_SDL	:
BANK	: A6825150	LCT	:
MBX	:	FCU	:
DPX	:		

[Error List @@@]

SCCODE (ERROR CODE)	SC CODE (ERROR CODE)	SC CODE (ERROR CODE)	SC CODE (ERROR CODE)
SC835 (110C)	SC820 (0001)	SC820 (0002)	SC820 (0003)
SC820 (0004)	SC820 (0005)		

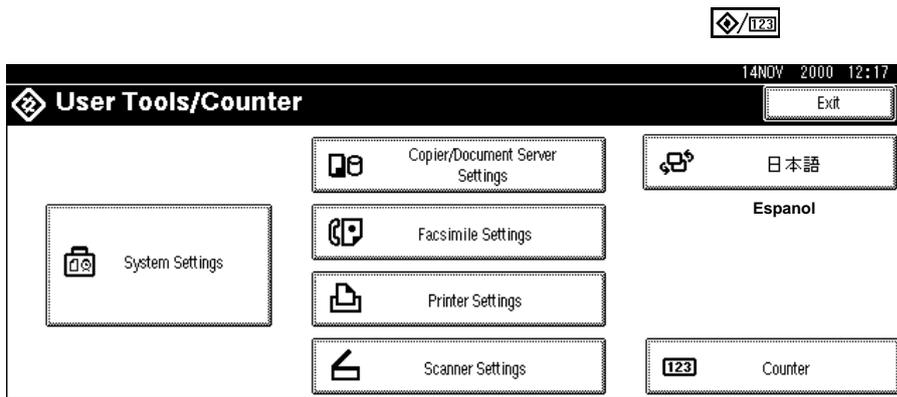


## 5.6 USER PROGRAM MODE

The user program (UP) mode is accessed by users and operators, and by sales and service staff. UP mode is used to input the copier's default settings. The default settings can be reset at any time by the user. (☛ 5.2.11)

### 5.6.1 HOW TO USE UP MODE

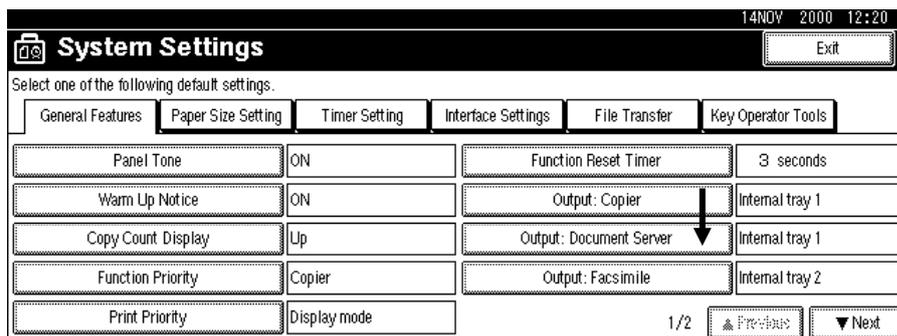
#### *UP Mode Initial Screen: User Tools/Counter Display*



#### **System Settings**

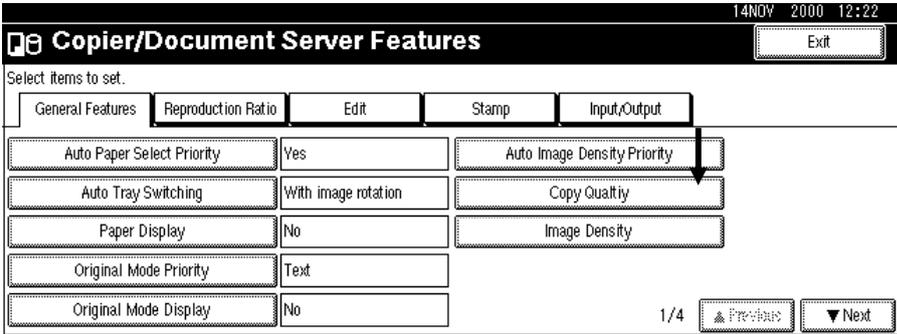
In the User Tools/Counter display, press System Settings.

Click a tab to display the settings. If the Next button is lit in the lower right corner, press to display more options. Perform the settings, press Exit to return to the User Tools/Counter display, and then press exit to return to the copy window.



**Copier/Document Server Features**

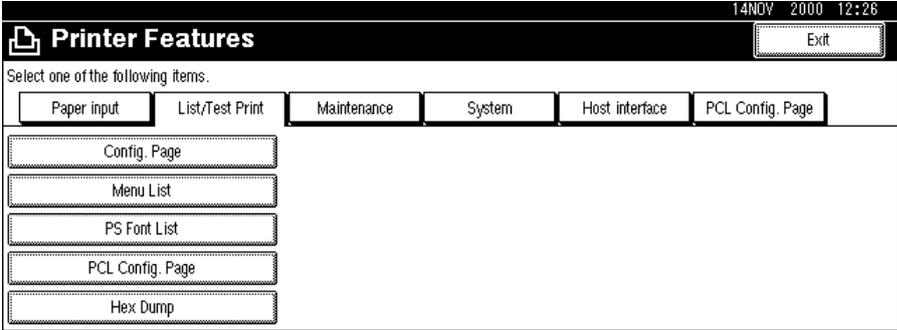
Settings.



Click a tab to display the settings. If the Next button is lit in the lower right corner, press to display more options. Perform the settings, press Exit to return to the User Tools/Counter display, and then press Exit to return to the copy window.

**Printer, Facsimile, Scanner Settings**

In the User/Tools Counter display, press Printer Settings, Facsimile, or Scanner Settings to open the appropriate screen and then click the tab to display more settings. The screen below shows the Printer Features screen.



Service Tables

## USER PROGRAM MODE

### **Counter**

In the User/Tools Counter display, press Counter.

123 Counter		14NOV 2000 12:24	
▶ Total	9998032	Exit	
▶ Copier	9998012	▶ A3	9998000
Print Counter List			

View the settings, press Print Counter Exit to return to the User Tools/Counter display, and then press Exit to return to the copy window.

## 5.7 DIP SWITCHES

### Controller: DIP SW1

DIP SW No.	ON	OFF
1	ROM Boot	SD Card Boot
2~7	Keep at "OFF"	
8	Keep at "ON"	

### I/O Board: DIP SW101

DIP SW No.	Function	ON			OFF		
1	Copy Speed	35 cpm (180 mm/s)			45 cpm (230 mm/s)		
2	Jam Detection (see Note)	Jam Detection Off			On		
3	---	---			Keep at "OFF".		
4	Print Output for Debugging	---			Keep at "OFF".		
5	SC Detection	SC Detection Off			SC Detection On		
		JPN	NA	EUR	Taiwan	Asia	Korea
6	Destination	OFF	ON	OFF	ON	ON	OFF
7		OFF	OFF	ON	OFF	ON	ON
8		OFF	OFF	OFF	ON	OFF	ON

**NOTE:** Disabling jam detection is effective only for the main machine (not for the options).

## 5.8 USING THE DEBUG LOG

This machine provides a Save Debug Log feature that allows the Customer Engineer to save and retrieve error information for analysis.

Every time an error occurs, debug information is recorded in volatile memory but this information is lost when the machine is switched off and on.

To capture this debug information, the Save Debug Log feature provides two main features:

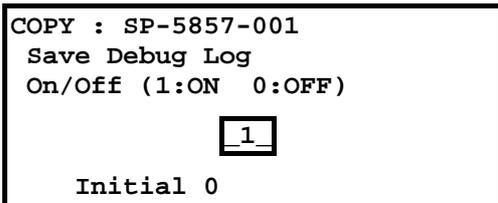
- Switching on the debug feature so error information is saved directly to the HDD for later retrieval.
- Copying the error information from the HDD to an SD card.

When a user is experiencing problems with the machine, follow the procedure below to set up the machine so the error information is saved automatically to the HDD. Then ask the user to reproduce the problem.

### 5.8.1 SWITCHING ON AND SETTING UP SAVE DEBUG LOG

The debug information cannot be saved until the “Save Debug Log” function has been switched on and a target has been selected.

1. Enter the SP mode.
  - Press  (Clear Modes) then use the 10-key pad to enter ①①⑦.
  - Press and hold down  (Clear/Stop) for more than 3 seconds.
  - Press “Copy SP” on the touch-panel.
  - Enter ⑤⑧⑤⑦ then press ③.
2. Under “5857 Save Debug Log”, press ①.



```
COPY : SP-5857-001
Save Debug Log
On/Off (1:ON 0:OFF)
  1
Initial 0
```

3. On the control panel keypad, press “1” then press ③. This switches the Save Debug Log feature on.

**NOTE:** The default setting is “0” (OFF). This feature must be switched on in order for the debug information to be saved.

- Next, select the target destination where the debug information will be saved. Under “5857 Save Debug Log”, touch “2 Target”, enter “2” with the operation panel key to select the hard disk as the target destination, then press (#).

```

COPY : SP-5-857-002
Save Debug Log
Target (2:HDD 3:SD Card)

  2

Initial 2
    
```

**NOTE:** Select “3 SD Card” to save the debug information directly to the SD card if it is inserted in the service slot.

- Now touch “5858” and specify the events that you want to record in the debug log. SP5858(Debug Save When) provides the following items for selection.

1	Engine SC Error	Saves data when an engine-related SC code is generated.
2	Controller SC Error	Saves debug data when a controller-related SC Code is generated.
3	Any SC Error	Saves data only for the SC code that you specify by entering code number.
4	Jam	Saves data for jams.

**NOTE:** More than one event can be selected.

**Example 1: To Select Items 1, 2, 4**

Touch the appropriate items(s). Press “ON” for each selection. This example shows “Engine SC Error” selected.

```

COPY : SP-5-858-001
Debug Save When
Engine SC Error

  OFF  ON
    
```



**Example 2: To Specify an SC Code**

Touch “3 Any SC Error”, enter the 3-digit SC code number with the control panel number keys, then press (#). This example shows an entry for SC670.

```

COPY : SP-5-858-001
Debug Save When
Any SC Error

  670
    
```

**NOTE:** For details about SC code numbers, please refer to the SC tables in Section “4. Troubleshooting”.

## USING THE DEBUG LOG

6. Next, select the one or more memory modules for reading and recording debug information. Touch “5859”.

Under “5859” press the appropriate key item for the module that you want to record.

Enter the appropriate 4-digit number, then press (#).

**NOTE:** Refer to the two tables below for the 4-digit numbers to enter for each key.

The example below shows “Key 1” with “2222” entered.

COPY : SP-5-859-001 Debug Save Key No. Key 1 <div style="text-align: right; margin-right: 50px;"> <input style="width: 50px; text-align: center;" type="text" value="2222"/> </div>
--

The following keys can be set with the corresponding numbers. (The initials in parentheses indicate the names of the modules.)

### 4-Digit Entries for Keys 1 to 10

KEY NO.	COPY	PRINTER	SCANNER	WEB
1	2222 (SCS)			
2	2223 (SRM)			
3	256 (IMH)			
4	1000 (ECS)			
5	1025 (MCS)			
6	4848(COPY)	4400 (GPS)	5375 (Scan)	5682 (NFA)
7	2224 (BCU)	4500 (PDL)	5682 (NFA)	6600 (WebDB)
8		4600 (GPS-PM)	3000 (NCS)	3300 (PTS)
9		2000 (NCS)	2000 (NCS)	6666 (WebSys)
10		2224 (BCU)		2000 (NCS)

**NOTE:** The default settings for Keys 1 to 10 are all zero (“0”).

### Key to Acronyms

Acronym	Meaning	Acronym	Meaning
ECS	Engine Control Service	NFA	Net File Application
GPS	GW Print Service	PDL	Printer Design Language
GSP-PM	GW Print Service – Print Module	PTS	Print Server
IMH	Image Memory Handler	SCS	System Control Service
MCS	Memory Control Service	SRM	System Resource Management
NCS	Network Control Service	WebDB	Web Document Box (Document Server)

The machine is now set to record the debugging information automatically on the HDD (the target selected with SP5-857-002) for the events that you selected SP5-858 and the memory modules selected with SP5-859.

Please keep the following important points in mind when you are doing this setting:

- Note that the number entries for Keys 1 to 5 are the same for the Copy, Printer, Scanner, and Web memory modules.
- The initial settings are all zero.
- These settings remain in effect until you change them. Be sure to check all the settings, especially the settings for Keys 6 to 10. To switch off a key setting, enter a zero for that key.
- You can select any number of keys from 1 to 10 (or all) by entering the corresponding 4-digit numbers from the table.
- You cannot mix settings for the groups (COPY, PRINTER, etc.) for 006~010. For example, if you want to create a PRINTER debug log you must select the settings from the 9 available selections for the "PRINTER" column only.
- One area of the disk is reserved to store the debug log. The size of this area is limited to 4 MB.

## 5.8.2 RETRIEVING THE DEBUG LOG FROM THE HDD

1. Insert the SD card into service slot of the copier.
2. Enter the SP mode and execute SP5857 009 (Copy HDD to SD Card (Latest 4 MB) to write the debugging data to the SD card.  
**NOTE:** The SD card can hold up to 4MB of data. If the debugging data is larger than 4MB, you can switch to another SD card.
3. Use a card reader to copy the file and send it for analysis to your local Ricoh representative by email, or just send the SD card by mail.

## 5.8.3 RECORDING ERRORS MANUALLY

Since only SC errors and jams are recorded to the debug log automatically, for any other errors that occur while the customer engineer is not on site, please instruct customers to perform the following immediately after occurrence to save the debug data. Such problems would include a controller or panel freeze.

**NOTE:** In order to use this feature, the customer engineer must have previously switched on the Save Debug Feature (SP5857-001) and selected the hard disk as the save destination (SP5857-002).

1. When the error occurs, on the operation panel, press  (Clear Modes).
2. On the control panel, enter "01" then hold down  for at least 3 sec. until the machine beeps then release. This saves the debug log to the hard disk for later retrieval with an SD card by the service representatives.
3. Switch the machine off and on to resume operation.

The debug information for the error is saved on the hard disk so the service representatives can retrieve it on their next visit by copying it from the HDD to an SD card.

## 5.8.4 NEW DEBUG LOG CODES

### ***SP5857-015 Copy SD Card-to-SD Card: Any Desired Key***

This SP copies the log on an SD card (the file that contains the information written directly from shared memory) to a log specified by key number. The copy operation is executed in the log directory of the SD card inserted in the same slot. (This function does not copy from one slot to another.) Each SD card can hold up to 4 MB of file data. Unique file names are created for the data during the copy operation to prevent overwriting files of the same name. This means that log data from more than one machine can be copied onto the same SC card. This command does not execute if there is no log on the HDD for the name of the specified key.

### ***SP5857-016 Create a File on HDD to Store a Log***

This SP creates a 32 MB file to store a log on the HDD. However, this is not a completely empty file. The created file will hold the number “2225” as the SCS key number and other non-volatile information. Even if this SP is not executed, a file is created on the HDD when the first log is stored on the HDD, but this operation takes time. This creates the possibility that the machine may be switched off and on before the log can be created completely. If you execute this SP to create the log file beforehand, this will greatly reduce the amount of time required to acquire the log information and save onto the HDD. With the file already created on the HDD for the log file, the data only needs to be recorded; a new log file does not require creation. To create a new log file, execute SP5857-011 to delete the debug log data from the HDD and then execute this SP (SP5857-016).

### ***SP5857-017 Create a File on SD Card to Store a Log***

This SP creates a 4 MB file to store a log on an SD card. However, this is not a completely empty file. The created file will hold the number “2225” as the SCS key number and other non-volatile information. Even if this SP is not executed, a file is created on the SD card when the first log is stored on the SD card, but this operation takes time. This creates the possibility that the machine may be switched off and on before the log can be created completely. If you execute this SP to create the log file beforehand, this will greatly reduce the amount of time required to acquire the log information and save onto the SD card. With the file already created on the SD card for the log file, the data only needs to be recorded; a new log file does not require creation. To create a new log file, execute SP5857-012 to delete the debug log data from the SD card and then execute this SP (SP5857-017).



# DETAILED DESCRIPTIONS

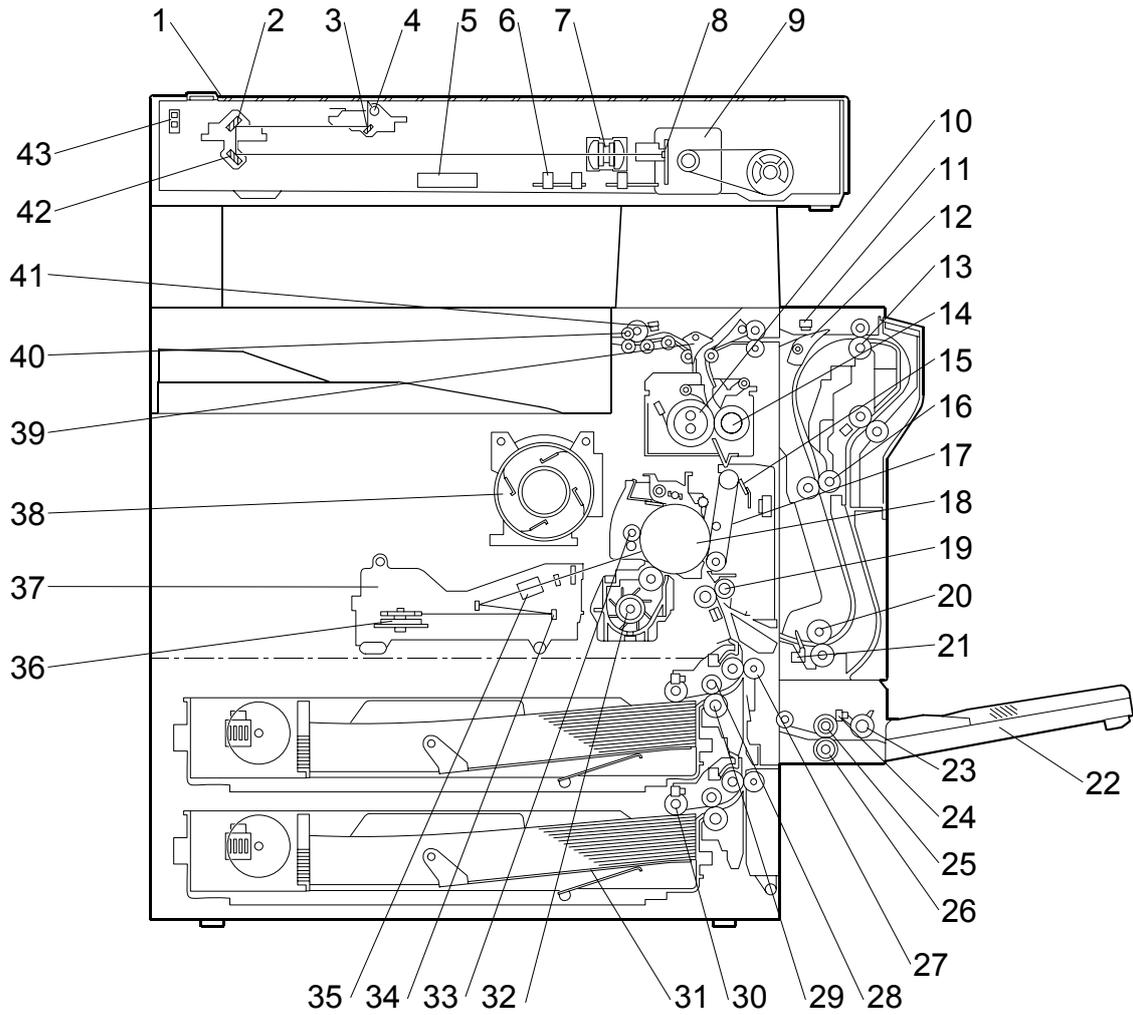
DETAILED DESCRIPTIONS REVISION HISTORY		
Page	Date	Added/Updated/New
		None



## 6. DETAILED SECTION DESCRIPTIONS

### 6.1 OVERVIEW

#### 6.1.1 COMPONENT LAYOUT

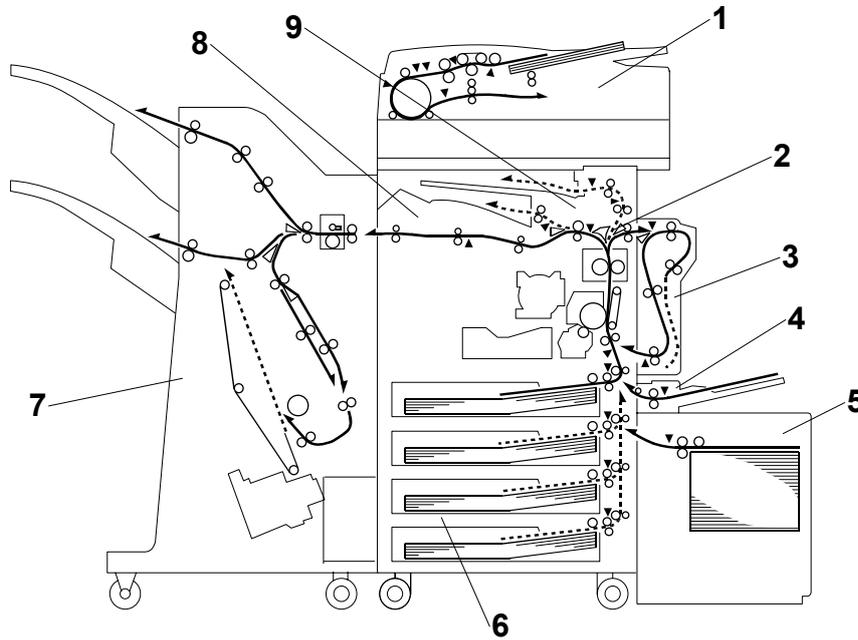


Detailed Descriptions

## OVERVIEW

- |    |                              |    |                            |
|----|------------------------------|----|----------------------------|
| 1  | Exposure Glass               | 23 | By-pass Pick-up Roller     |
| 2  | 2nd Mirror                   | 24 | By-pass Paper End Sensor   |
| 3  | 1st Mirror                   | 25 | By-pass Paper Feed Roller  |
| 4  | Exposure Lamp                | 26 | By-pass Separation Roller  |
| 5  | Original Width Sensors       | 27 | Upper Relay Roller         |
| 6  | Original Length Sensors      | 28 | Feed Roller                |
| 7  | Lens                         | 29 | Separation Roller          |
| 8  | SBU                          | 30 | Pick-up Roller             |
| 9  | Scanner Motor                | 31 | Bottom Plate               |
| 10 | Hot Roller                   | 32 | Development Unit           |
| 11 | Entrance Sensor              | 33 | Charge Roller              |
| 12 | Inverter Gate                | 34 | F $\theta$ Mirror          |
| 13 | Inverter Roller              | 35 | Barrel Toroidal Lens (BTL) |
| 14 | Pressure Roller              | 36 | Polygonal Mirror Motor     |
| 15 | Transfer Belt Cleaning Blade | 37 | Laser Unit                 |
| 16 | Upper Transport Roller       | 38 | Toner Bottle Holder        |
| 17 | Transfer Belt                | 39 | Exit Junction Gate         |
| 18 | OPC Drum                     | 40 | Exit Roller                |
| 19 | Registration Roller          | 41 | Paper Exit Sensor          |
| 20 | Lower Transport Roller       | 42 | 3rd Mirror                 |
| 21 | Duplex Exit Sensor           | 43 | Scanner HP Sensor          |
| 22 | By-pass Tray                 |    |                            |

### 6.1.2 PAPER PATH

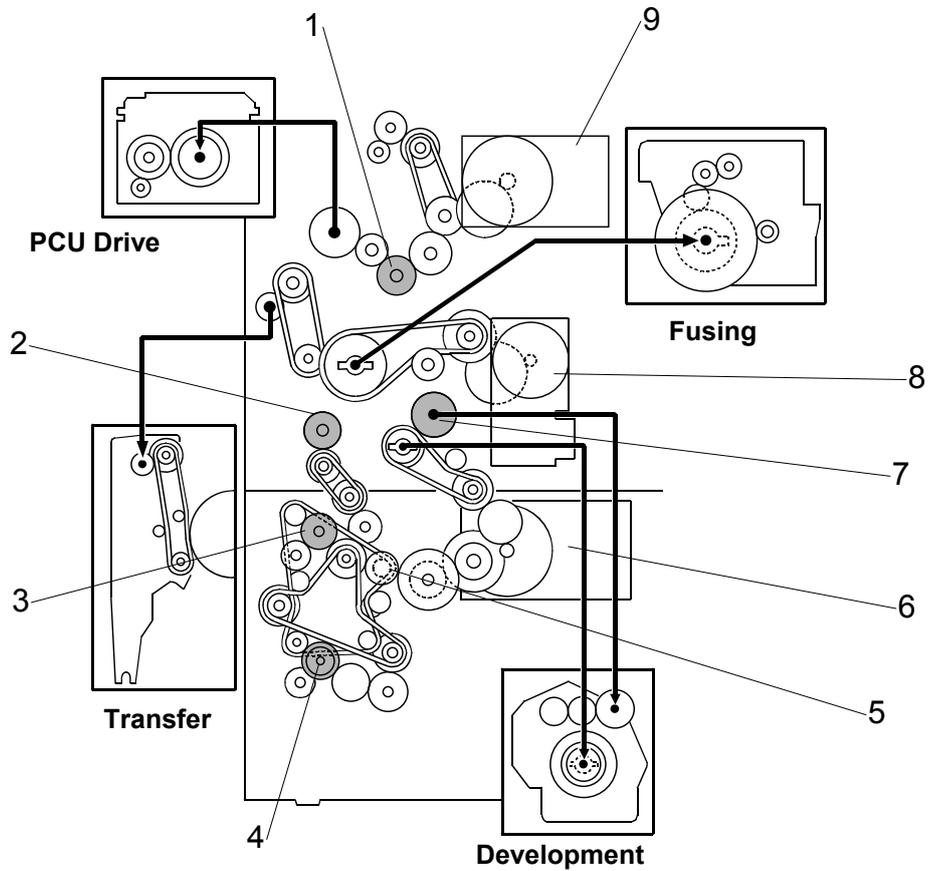


- 1 ARDF
- 2 Interchange unit
- 3 Duplex unit
- 4 By-pass tray
- 5 Large Capacity Tray (LCT)
- 6 Paper tray unit
- 7 Two-Tray Finisher
- 8 Bridge unit
- 9 1-Bin Tray

Detailed  
Descriptions

## OVERVIEW

### 6.1.3 DRIVE LAYOUT

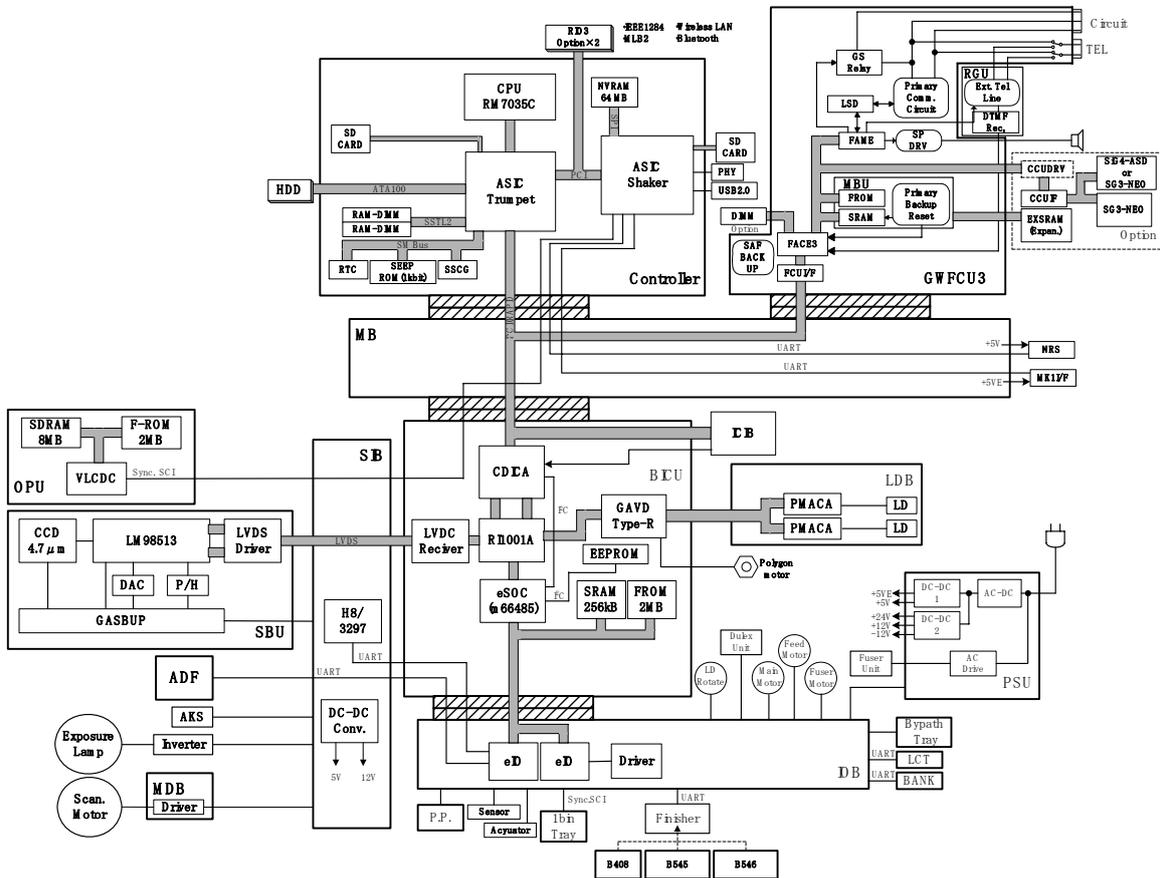


- |                                |                                |
|--------------------------------|--------------------------------|
| 1 Transfer Belt Contact Clutch | 6 Paper Feed/Development Motor |
| 2 Registration Clutch          | 7 Development Clutch           |
| 3 Upper Paper Feed Clutch      | 8 Main Motor                   |
| 4 Lower Paper Feed Clutch      | 9 Fusing/Exit Motor            |
| 5 Relay Clutch                 |                                |

In this machine, the development unit is provided with its own motor, separate from the main motor.

## 6.2 BOARD STRUCTURE

### 6.2.1 BLOCK DIAGRAM



This machine uses the GW (Grand Workware) architecture, which allows the copier to be expanded as an MFP by installing simple modular components (SD cards) on the controller board. The BICU and FCU are connected to the controller via a PCI bus.

Detailed Descriptions

## BOARD STRUCTURE

**SBCU (Scanner and Base engine and Image Control Unit).** This is the engine control board. It controls the following functions.

- Engine sequence
- Timing control for peripherals
- Image processing, video control
- Scanner Motor

**Controller.** The GW Controller (05S) controls memory and all peripheral devices. The NCU (Network Control Unit) and USB 2.0 are built into this control board.

**FCU (Facsimile Control Unit).** This option controls fax communications and fax features.

**ICIB (Copy Data Security Unit).** This option provides copy protection of sensitive documents. Once a document is copied or printed with an RCPS or other printer driver that supports this function, the hard copy cannot be copied on a copier that supports hard copy protection.

**IOB (Input/Output Board).** The IOB uses the new eI0 chips and handles the following functions.

- Drive control for the sensors, motors, and solenoids of the main unit
- PWM control for the high voltage supply board
- Serial interface with peripherals
- Fusing control
- Paper feed control

The IOB is located behind the rear covers for easy access. The same IOB is used for both the B291/B296 and B295/B297 but the DIP switches must be set correctly for each model. (➡3.19.2)

**LDB (Laser Drive Board).** Holds the laser diodes. The board and diodes are controlled by the GAVD Type-R mounted on the BICU not the LDB itself.

**MB (Mother Board).** Interfaces the BICU with controller and the optional FCU.

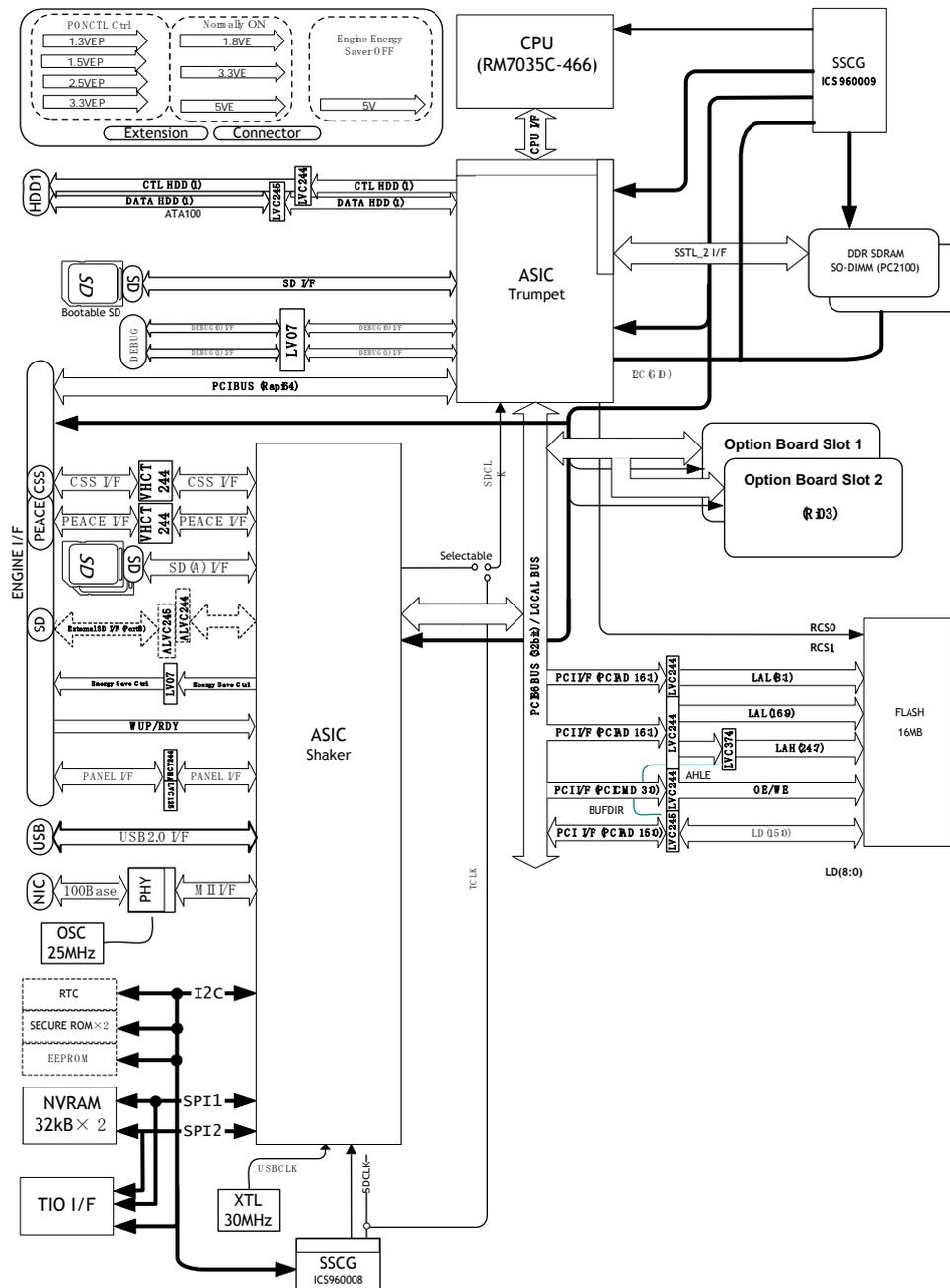
**OPU (Operation Panel Unit).** Controls operation panel and display.

**PSU (Power Supply Unit).** The improved PSU on this machine consumes less than 1 W when the machine is in the energy save (low power) mode.

**SBU (Sensor Board Unit).** Receives analog signals from the CCD (now encased in plastic, not ceramic) and converts them into digital signals.

**SIB (Scanner Interface Board).** Controls the scanner, and serves as the signal I/F board for the SBU and the OPU. The SIB passes signals between the BICU and the scanner unit components, and transmits video signals from the SBU to the BICU.

### 6.2.2 CONTROLLER



Detailed Descriptions

The controller controls all applications, including copier, printer, scanner, and fax applications. To add the optional printer, scanner, or fax applications, SD cards must be inserted in the SD card slots of the controller. The fax option, however, requires installation of an FCU.

## BOARD STRUCTURE

**ASCI Trumpet.** Contains the dedicated GW controller chips of the shared resources (the CPU, memory, and HDD hardware) for the copying and printing functions.

- **CPU (RM7035C-466)** The central processing unit that controls the operation of the controller board.
- **HDD.** The interface for connection of the flat film cable connection to the HDD unit.
- **SD (Bootable C3).** Service slot for firmware version updates, moving applications to other SD cards, and downloading/uploading NVRAM contents.
- **DDR SDRAM.** The image memory for the printer function where image compression, image rotation and other operations are done.

**ASIC Shaker.** Controls the following functions: USB, Ethernet, PCI (optional boards for Bluetooth, FireWire, Wireless LAN, and Centronics), debug serial, I2C, applications on SD cards mounted in SD card slots C1 and C2, and the energy save features.

- **SD.** This is the interface for SD card slots C1 and C2.
- **Board Option Slots 1, 2.** Only one of the following options can be installed in either Slot 1 or Slot 2: IEEE1284 Interface Board B679 (Centronics), IEEE802.11b G813 (Wireless LAN), or Bluetooth Interface Unit B736. The following options can also be installed in either slot: File Format Converter B609 (MLB), and Key Browser Unit B720
- **Flash ROM.** Stores the program. Maximum capacity: 32 MB.
- **USB.** The interface for USB 2.0 devices. Supports both low-speed and high-speed modes. USB support is built-into the controller. No installation is required for the USB function. But, **SP5985 002** must be set to "1" to enable the network functions.
- **NIB.** The Ethernet interface connection. Network support is built-into the controller. No installation is required for the network function. But, **SP5985 001** must be set to "1" to enable the network functions.
- **EEPROM.** Stores the data for the SP code settings.
- **NVRAM.** The memory that stores the system configuration and other information.

**HDD:** A 3.5" HDD (more than 20 GB) can be connected using an IDE I/F. The hard disk is partitioned as shown below.

### How the HDD Is Partitioned

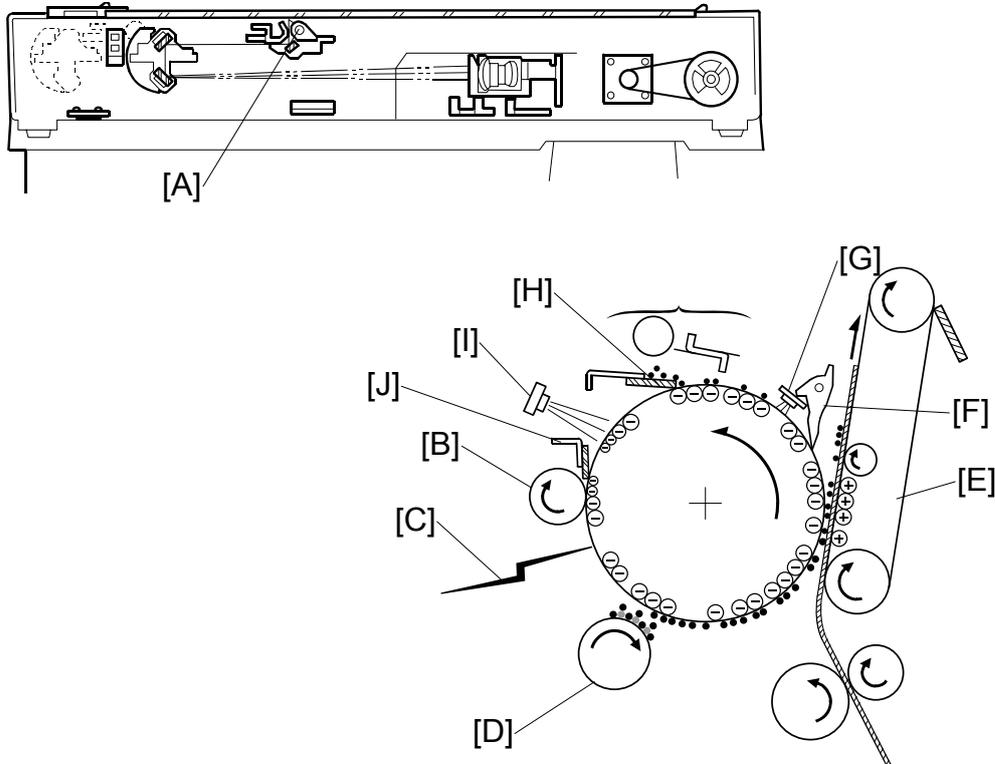
Name	Power OFF	Size (MB)	Files	Function	Comments
<b>a</b>	Remains	256	256	Object Area	ROM update, etc.
<b>b</b>	Remains	256	---	Swap Area	Debugging
<b>d</b>	Remains	7900	3000	Copy server, local storage, print job storage, document storage	Document server application.
	Remains	1000	---	Management (user stamps, etc.)	Stamps: 100 MB Image Overlays: 900 MB
	Erased	5370	100	Electronic sorting	imh management, used for other applications
<b>e</b>	Remains	300	2500	SAF Thumbnails	SAF = Store and Forward
<b>f</b>	Remains	500	6600	Font download, form registration	Stored on HDD even after cycling machine off/on.
<b>g</b>	Remains	500	5000	Job spooling area	Spooling long print jobs
<b>h</b>	Remains	2000	1000	LS thumbnails	MCS
<b>i</b>	Remains	200	---	SDK Log	SDK = Software Development Kit
<b>j</b>	Remains	1000	10000	For SDK	SDK
<b>k</b>	Remains	200	50	Job Log	
<b>l</b>	Remains	150	30	Fax, Debug Log	SCS, Fax
<b>m</b>	Remains	300	256	Address Book (Local, Distribution, LADP)	UCS
<b>n</b>	Remains	200	10	---	DCS
<b>o</b>	Remains	1002	16102	Distribution History (Application), Temporary area for emails, For email TX (DCS)	2 MB used for DCS/Scanner applications.
<b>p</b>	Remains	500	10100	---	---
<b>q</b>	Erased	500	1000	Temporary storage area for printer.	For print jobs using PDF, PCL, PS, RTIFF. Jobs erased after machine is cycled off/on.
<b>r</b>	Remains	30	1~2	ROM update data	This ROM data on the HDD s used in the rescue or recover modes.
<b>Total</b>		<b>22.1 GB</b>			

BOARD STRUCTURE

Allotment of Temporary Pages on the HDD

<b>Application</b>	<b>Capacity (MB)</b>	<b>Pages</b>
Common Area	4415	1000
Copy	400	200
NFA	25	50
Fax	256	1000
Print Collating	100	100
Scanner	100	50
Remote Fax	64	100
Sample Print	---	---
MCS Thumbnails	10	10
Swapping	---	---
Other	---	---

## 6.3 COPY PROCESS OVERVIEW



### ***Exposure***

The xenon lamp [A] exposes the original. The reflected light is passed to the CCD, where it is converted into analog data, processed, and stored in the memory. The data is retrieved and sent to the laser diode for printing

### ***Drum charge***

The charge roller [B] gives a negative charge to the organic photoconductive (OPC) drum. The charge remains on the surface of the drum because the OPC layer has a high electrical resistance in the dark.

### ***Laser exposure***

Processed data from the scanned original is retrieved from the memory and transferred to the drum by two laser beams [C], which form an electrostatic latent image on the drum surface. The amount of charge remaining as a latent image on the drum depends on the laser beam intensity, controlled by the BICU.

### ***Development***

The magnetic developer brush on the development roller [D] contacts the latent image on the drum. Toner particles are electro-statically attracted to the areas of the drum surface where the laser reduced the negative charge on the drum.

## COPY PROCESS OVERVIEW

### ***Image transfer***

Paper is fed into the area between the drum surface and the transfer belt [E] at the proper time to align it with the image on the drum. The transfer bias roller applies a high positive charge to the reverse side of the paper through the transfer belt. This positive charge pulls the toner particles from the drum surface onto the paper while the paper is electro-statically attracted to the transfer belt.

### ***Separation***

Paper separates from the drum as a result of the electrical attraction between the paper and the transfer belt. Pick-off pawls [F] help separate the paper from the drum.

### ***ID sensor***

The ID sensor [G] measures the reflectivity of the pattern formed by the laser on the surface of the drum. This output signal is used for toner supply control and also measures the drum surface reflectivity, which is used for charge roller voltage control.

### ***Cleaning***

The drum cleaning blade [H] removes any toner remaining on the drum surface after the image is transferred to the paper.

### ***Quenching***

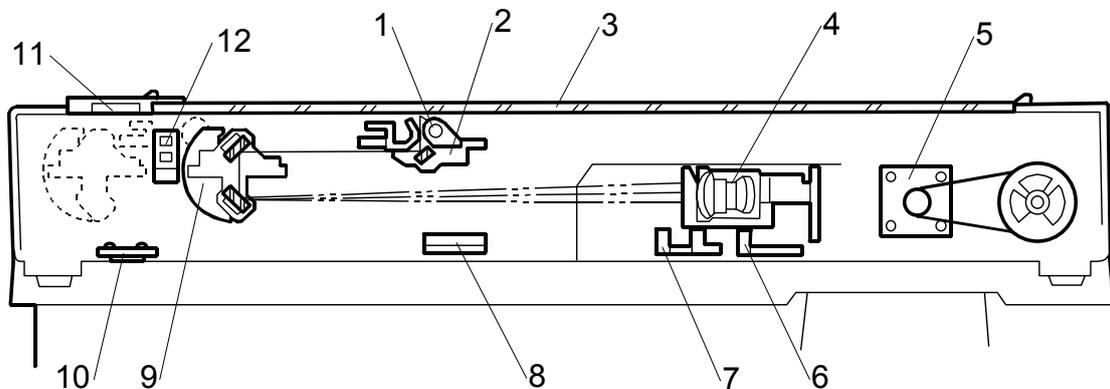
The light from the quenching lamp [I] electrically neutralizes the charge on the drum surface.

### ***Cleaning***

The 2nd drum cleaning blade [J] removes any remaining toner.

## 6.4 SCANNING

### 6.4.1 OVERVIEW



- |                            |   |
|----------------------------|---|
| 1 Exposure lamp            | 7 Original length sensors 1, 2          |
| 2 1st Scanner              | 8 Original width sensors                |
| 3 Exposure glass           | 9 2nd Scanner                           |
| 4 Lens block               | 10 Anti-condensation heater (option)    |
| 5 Scanner drive motor      | 11 Exposure glass (for document feeder) |
| 6 Original length sensor 3 | 12 Scanner HP sensor                    |

The original is illuminated by the exposure lamp (a xenon lamp). The image is reflected onto a CCD (charge coupled device) on the lens block via the 1st, 2nd, and 3rd mirrors, and through the lens on the lens block.

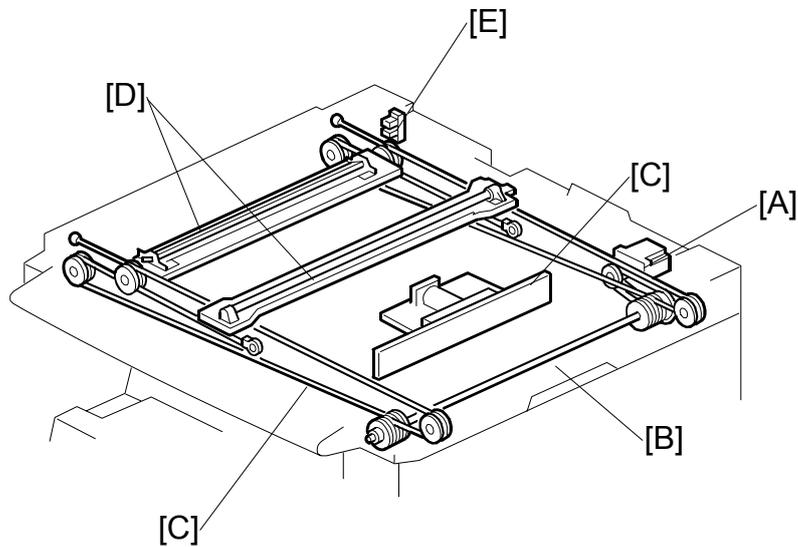
The 1st scanner consists of the exposure lamp, a reflector, and the 1st mirror.

The exposure lamp is energized by a dc supply to avoid uneven light intensity while the 1st scanner moves in the sub scan direction (down the page). The entire exposure lamp surface is frosted to ensure even exposure in the main scan direction (across the page).

The light reflected by the reflector is of almost equal intensity in all directions, to reduce shadows on pasted originals.

When the optional optics anti-condensation heater is installed on the left side of the scanner, it turns on whenever the power cord is plugged in.

## 6.4.2 SCANNER DRIVE



### **Book Mode**

Scanner drive motor [A] and timing belt drive the scanner drive shaft [B]. The drive shaft drives the pulleys attached to the two scanner wires [C] (front and back). The scanner wires move the 1st and 2nd scanners [D] on their rails. The 2nd scanner speed is half that of the 1st scanner.

The scanner interface board (SIB) controls the scanner drive motor. In full size mode, the 1st scanner speed is 230 mm/s during scanning.

In reduction or enlargement mode, the scanning speed depends on the magnification ratio. The returning speed is always the same, whether in full size or magnification mode. The image length change in the sub scan direction is done by changing the scanner drive motor speed, and in the main scan direction it is done by image processing on the BICU board.

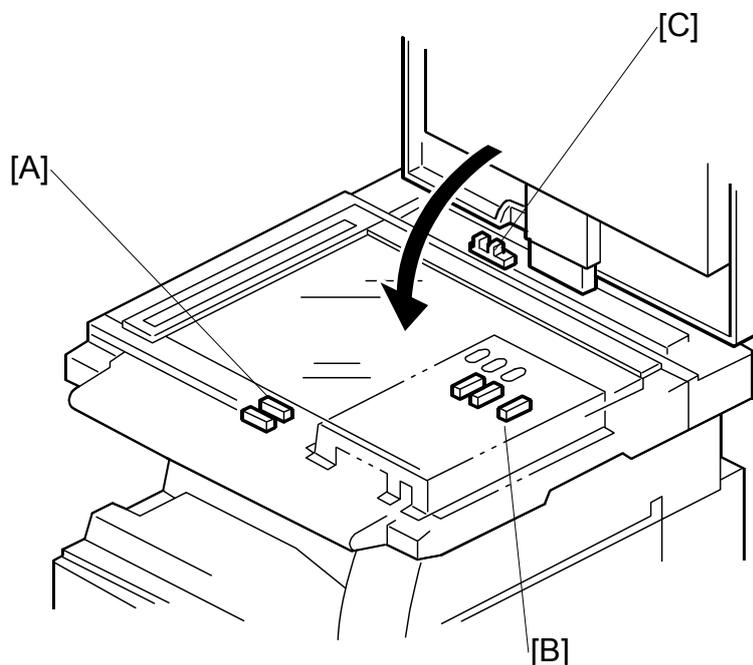
**NOTE:** Magnification in the sub-scan direction can be adjusted by changing the scanner drive motor speed using SP4-008.

### **ADF mode**

The scanners are always kept at their home position (the scanner home position sensor [E] detects the 1st scanner) to scan the original. The ADF motor feeds the original through the ADF. In reduction/enlargement mode, the image length change in the sub-scan direction is done by changing the ADF motor speed. Magnification in the main scan direction is done in the BICU board, like for book mode.

**NOTE:** Magnification in the sub-scan direction can be adjusted by changing the ADF motor speed using SP6-017. In the main scan direction, it can be adjusted with SP2-909, like for book mode.

### 6.4.3 ORIGINAL SIZE DETECTION IN PLATEN MODE

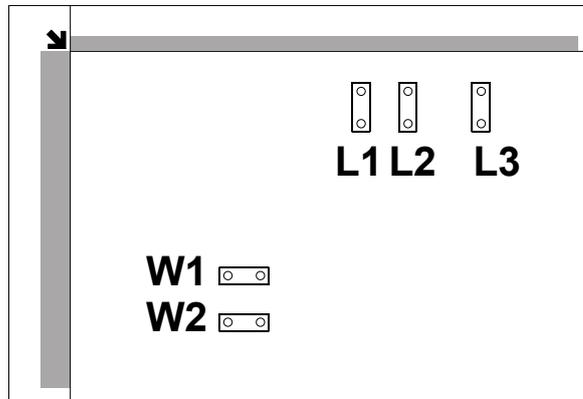


The original width sensors [A] detect the original width, and the original length sensors [B] detect the original length. These reflective photo sensors are referred to collectively as the APS (Auto Paper Select) sensors.

While the power is on, these sensors are active and the original size data is always sent to the CPU. However, the CPU checks the data only when the platen cover sensor [C] is activated after the platen reaches about 15 cm above the exposure glass as it is closed. The main CPU detects the original size by the on/off signals received from the APS sensors.

**NOTE:** If the copy is made with the platen fully open, the main CPU determines the original size from the sensor outputs after the Start  key is pressed.

SCANNING



Original Size		Length Sensor			Width Sensor		SP4-301 display
A4/A3 version	LT/DLT version	L3	L2	L1	W2	W1	
A3	11" x 17"	O	O	O	O	O	00011111
B4	10" x 14"	O	O	O	X	O	00011101
F4	8.5" x 14" (8" x 13")	O	O	O	X	X	00011100
A4-L	8.5" x 11"	X	O	O	X	X	00001100
B5-L		X	X	O	X	X	00000100
A4-S	11" x 8.5"	X	X	X	O	O	00000011
B5-S		X	X	X	X	O	00000001
A5-L, A5-S	5.5" x 8.5", 8.5" x 5.5"	X	X	X	X	X	00000000

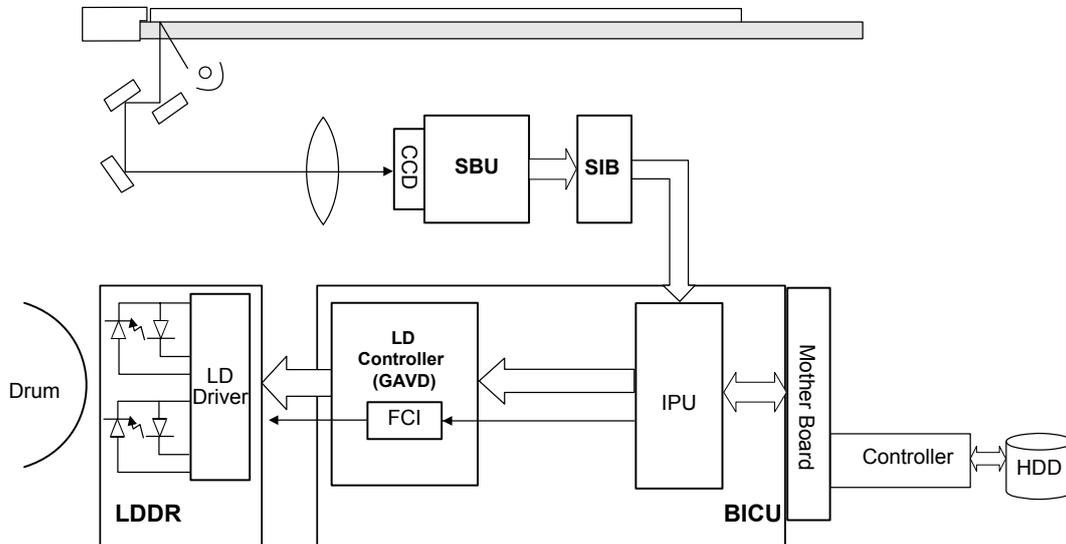
**NOTE:** L: Lengthwise, S: Sideways, O: Paper present X: Low

For other combinations, "CANNOT DETECT ORIG. SIZE" will be indicated on the operation panel display.

The above table shows the outputs of the sensors for each original size. This original size detection method eliminates the necessity for a pre-scan and increases the machine's productivity.

However, if the by-pass tray is used, note that the machine assumes that the copy paper is lengthwise (L). For example, if A4 sideways paper is placed on the by-pass tray, the machine assumes it is A3 paper and scans a full A3 area, disregarding the original size sensors.

## 6.5 IMAGE PROCESSING



### 6.5.1 OVERVIEW

**SBU:** The SBU (Sensor Board Unit) converts the analog signal from the CCD to an 8-bit digital signal and sends it to the SIB.

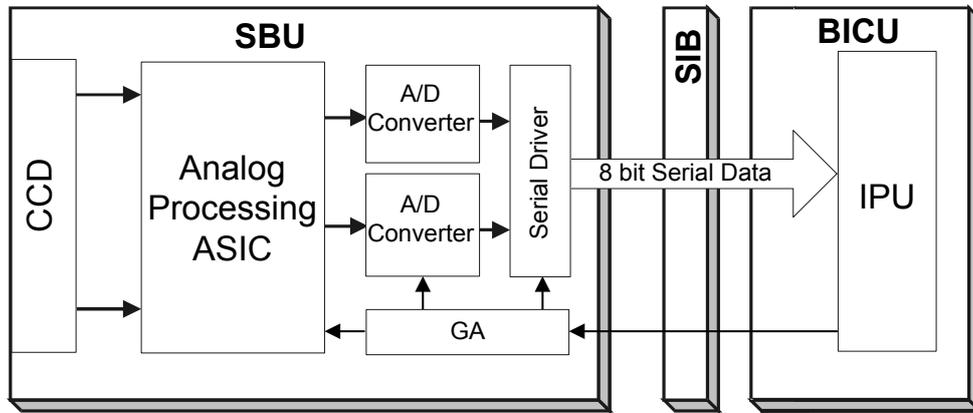
**SIB:** Relays image signals and controls the scanner.

**BICU:** The BICU (Base Engine Image Control Unit) performs timing control and command control. The IPU on the BICU processes auto shading, filtering, magnification,  $\gamma$  correction, and gradation. The memory controller performs image compression, decompression, and memory address control (for binary picture processing mode only)

**LD Unit:** Performs dual channel multi-beam exposure, multiple exposure, and synchronous detection.

**Controller:** Performs dual channel multi-beam exposure, multiple exposure, and synchronous detection.

### 6.5.2 SBU (SENSOR BOARD UNIT)



The CCD converts the light reflected from the original into an analog signal. The CCD line has 7200 pixels at a resolution of 600 dpi.

The CCD has two output lines to the analog processing ASIC, one for handling odd and one for handling even pixels. The analog processing ASIC performs the following operations on the signals received from the CCD:

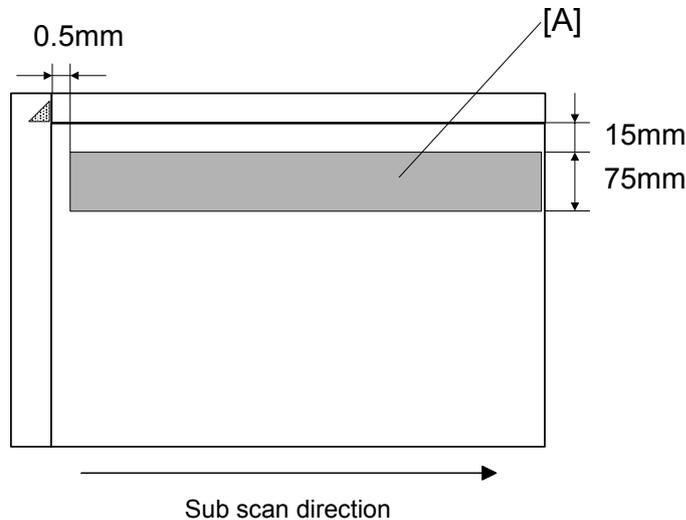
**Z/C (Zero/Clamp):** Adjusts the black level for even pixels to match the odd pixels.

**Signal composition:** Analog signals for odd and even pixels from the CCD are merged by a switching device.

**Signal amplification:** The analog signal is amplified by amplifiers in the AGC circuit. The maximum gains of the amplifiers are controlled by the CPU on the BICU board.

After the above processing, the analog signals are converted to 8-bit signals by the A/D converter. This gives a value for each pixel on a scale of 256 shades of gray. Then, this data goes to the BICU via the SIB.

### 6.5.3 AUTO IMAGE DENSITY (ADS)



This mode prevents the background of an original from appearing on copies.

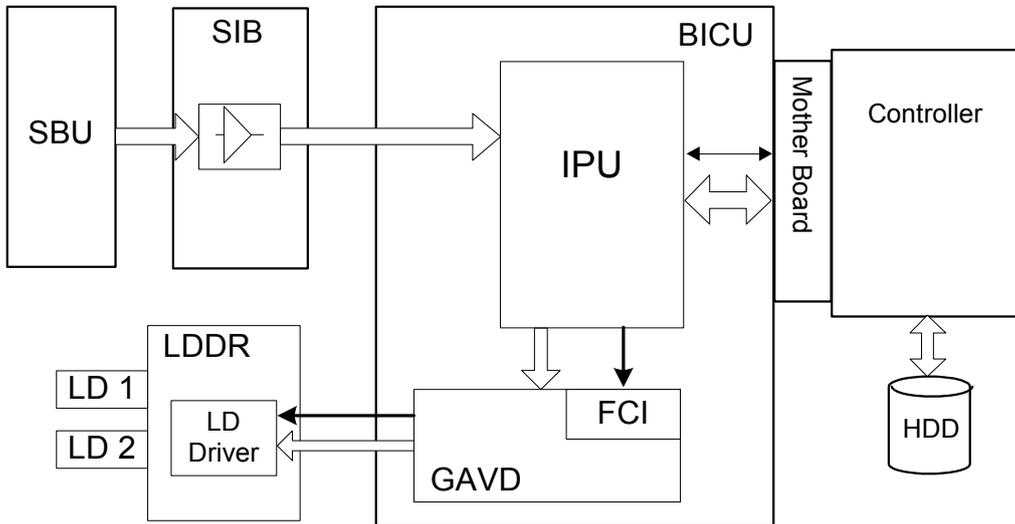
The copier scans the auto image density detection area [A]. This corresponds to a narrow strip at one end of the main scan line, as shown in the diagram. As the scanner scans down the page, the IPU on the BICU detects the peak white level for each scan line, within this narrow strip only. From this peak white level, the IPU determines the reference value for A/D conversion for the scan line. Then, the IPU sends the reference value to the A/D controller on the SBU.

When an original with a gray background is scanned, the density of the gray area is the peak white level density. Therefore, the original background will not appear on copies. Because peak level data is taken for each scan line, ADS corrects for any changes in background density down the page.

As with previous digital copiers, the user can select manual image density when selecting auto image density mode and the machine will use both settings when processing the original.

## 6.5.4 IPU (IMAGE PROCESSING UNIT)

### Overview



The image data from the SBU goes to the IPU (Image Processing Unit) IC on the BICU board, which carries out the following processes on the image data:

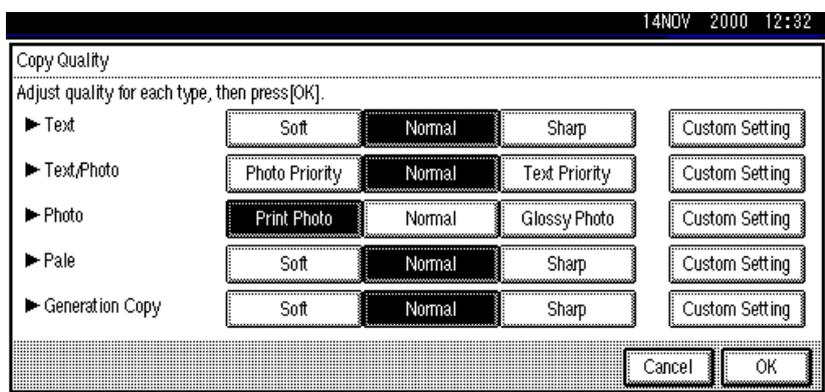
1. Auto shading
2. Filtering (MTF and smoothing)
3. Magnification
4.  $\gamma$  correction
5. Grayscale processing
6. Binary picture processing
7. Error diffusion
8. Dithering
9. Video path control
10. Test pattern generation

The image data then goes to the HDD.

### 6.5.5 IMAGE PROCESSING MODES

The user can select one of the following modes with the User Tools screen: Text, Text/Photo, Photo, Pale, Generation. Each of these modes has a range of different settings (e.g. Soft, Normal, Sharp, etc). For each mode, a Custom Setting options is also available. This Custom Setting holds the values selected with the SP modes, which can be adjusted to meet special requirements that cannot be covered by the standard settings.

To display this screen, press User Tools/Counter> Copier/Document Server Settings> General Features> Copy Quality.

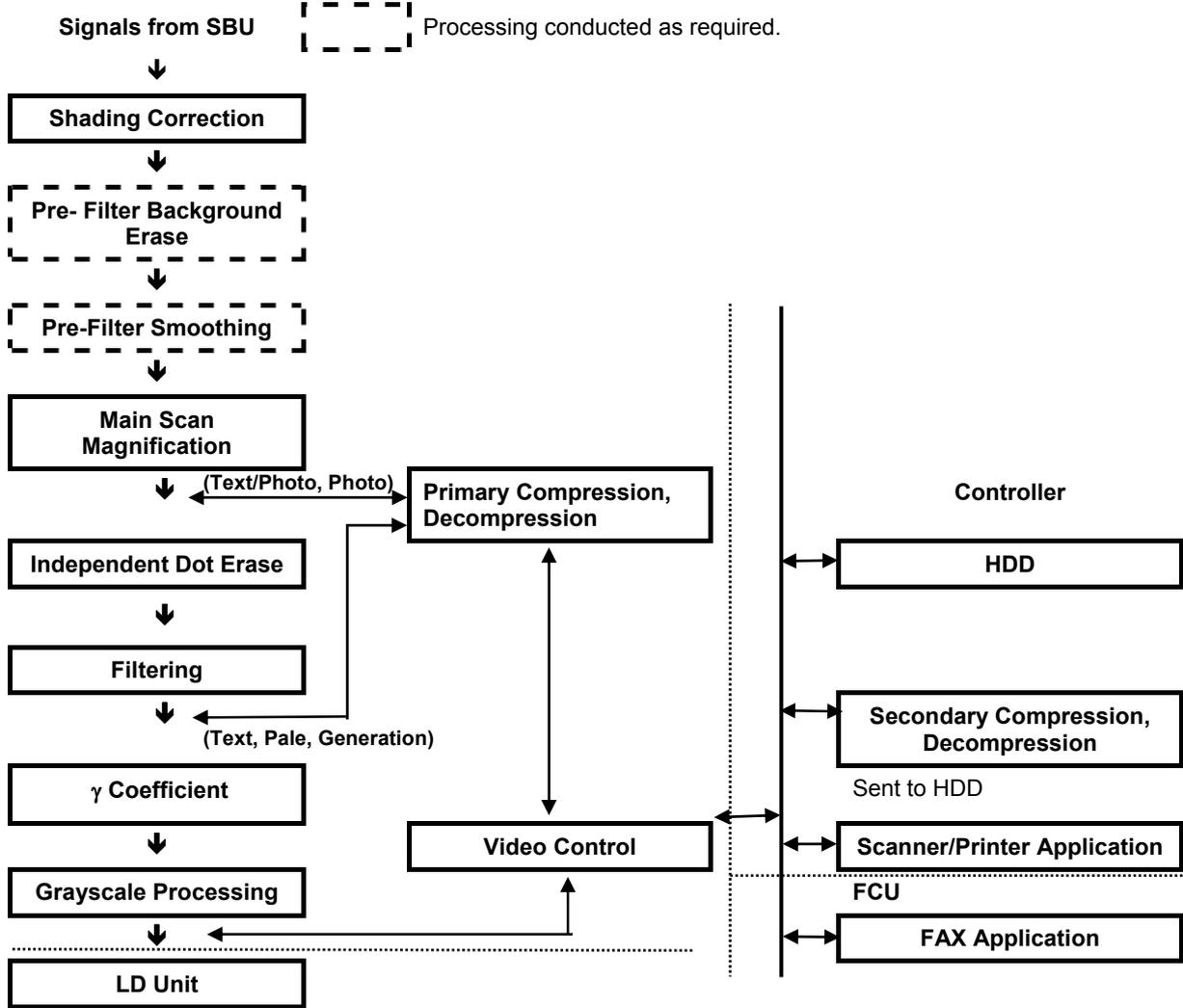


Mode	Function
Text	Best reproduction of text and sharp lines. Ignores background texture. (☛ pg. 6-24)
Text/Photo	Good reproduction of mixed text and photographs with accurate gray scaling, better than that achieved in the Text mode. (☛ pg. 6-25)
Photo	Best possible reproduction of photographs. (☛ pg.6-26)
Pale	Reproduction similar to Text mode, but of lower contrast. Ideal for copying thin originals. (☛ pg.6-27)
Generation Copy	Attempts to achieve the best reproduction of copied originals, which have faded due to making copies of copies. (☛ pg.6-28)

Detailed Descriptions

IMAGE PROCESSING

**General Image Processing Flow**



## 6.5.6 SUMMARY OF IMAGE PROCESSING FUNCTIONS

**Shading correction:** Compensates for the possible differences in the amount of light at the edges and center of a scanned image caused by the scanner lens, or scatter among pixels of the CCD.

**Pre-Filter Background erase:** Attempts to eliminate the heavy background texture from copies (newspaper print or documents printed on coarse paper). Elements below the selected threshold level are eliminated.

**Pre-Filter Smoothing:** Reproduces halftones while reducing the incidence of moiré which can occur as a result of compressing and then decompressing the image.

**Main scan magnification:** Adjusts magnification to the desired level by processing adjusting multiple, adjacent pixels in the direction of main scanning. Adjustment of magnification in the sub scan direction is done by changing the scanning speed.

**Independent dot erase:** Attempts to recognize and eliminate scattered, independent dots in copies. Processes only pixels of high density and eliminates those of low density.

**Filtering (MTF filter/smoothing):** Performs mainly edge enhancement with the MTF filter. Performs smoothing only in the Photo mode. The matrix size of the filter is 9 pixels x 7 lines.

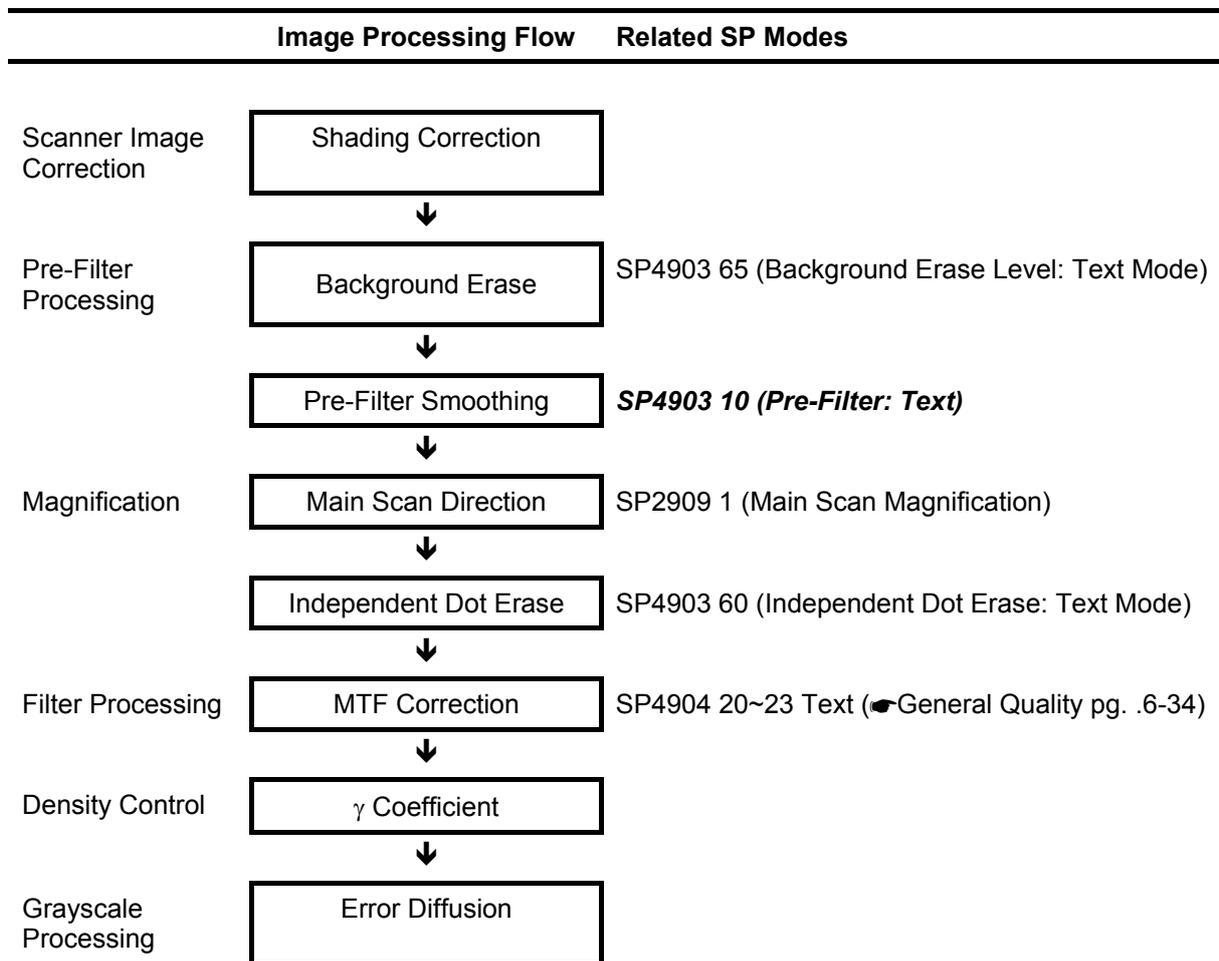
**Gamma ( $\gamma$ ) coefficient:** Controls the image density for images processed with gray scaling. Copy density adjustment is achieved with special notch  $\gamma$  coefficient conversion. The best  $\gamma$  coefficient suited for the selected mode can be stored and adjusted as needed.

**Grayscale processing:** Performs reproduction of grayscales, using mainly error diffusion. (In the Photo mode, conducts processing with dithering.)

### 6.5.7 IMAGE PROCESSING STEPS AND RELATED SP MODES

#### Text Mode

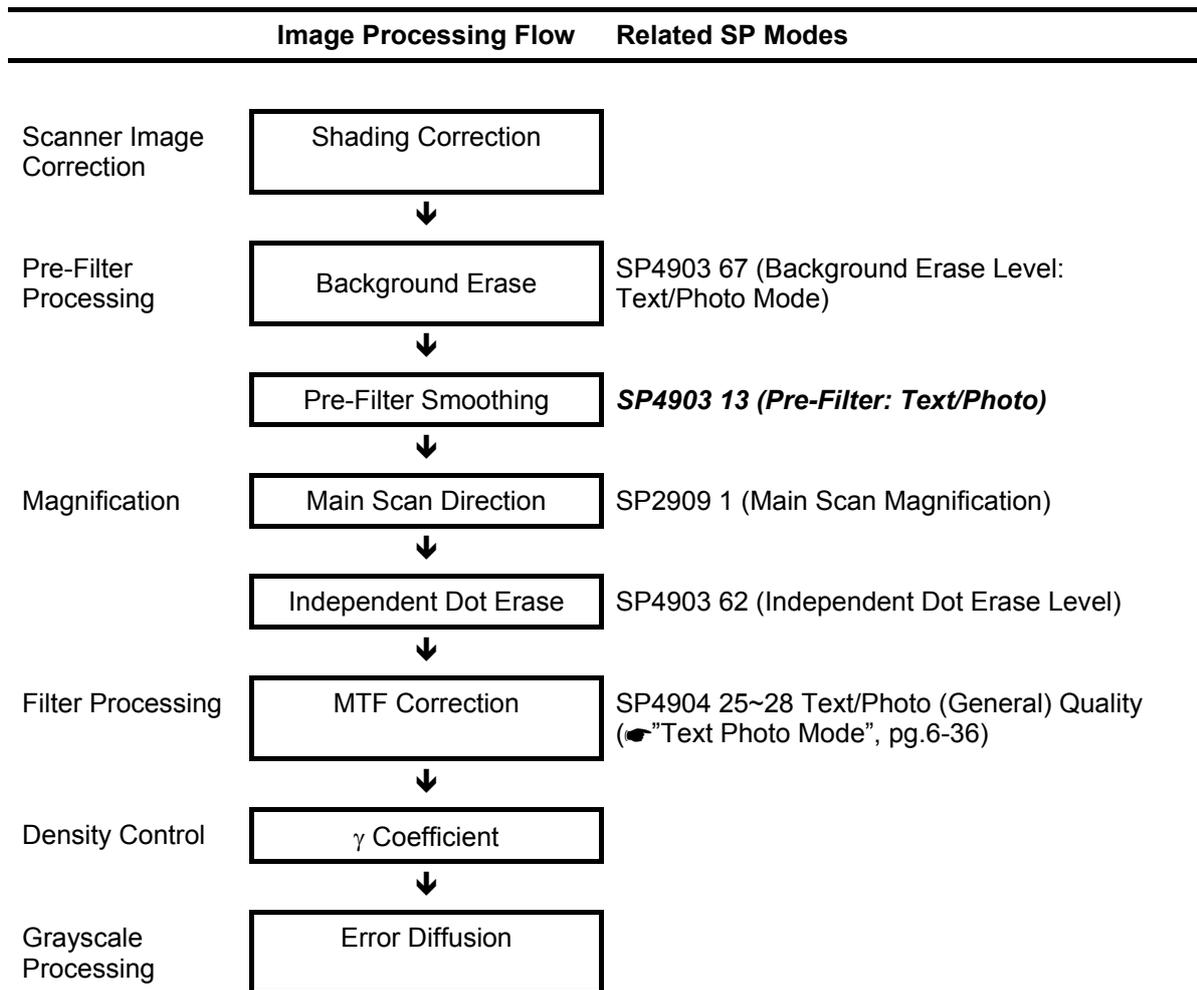
The Text mode achieves quality reproduction of text and sharp lines and ignores background texture. Processing is conducted with a high resolution MTF filter; special processing with the  $\gamma$  coefficient prevents background reproduction and achieves the best reproduction of images with error diffusion. Because the Soft and Normal settings use a weak MTF filter, the quality of the image is improved with the elimination of moiré. The Sharp selection uses an MTF filter stronger than that of the Normal setting, thus increasing the sharpness of lines.



**NOTE:** An SP code number and name set in ***bold italic*** denotes an SSP (Special Service Program) mode. To access an SSP, enter the SP mode: press and hold down  $\text{\textcircled{\#}}$  on the 10-key pad then “Copy SP” on the touch-screen.

**Text/Photo Mode**

Text/Photo mode achieves high quality reproduction of pictures with accurate gray scaling. Processing is conducted with the special  $\gamma$  coefficient which reproduces a wide range of grayscale. Compared with the Text mode, text reproduced in the Text/Photo mode appears lighter and textured backgrounds could appear on copies, but the incidence of moiré is reduced with an edge detection filter. Because Photo Priority uses an MTF filter weaker than that of the Normal setting, the quality of the image is improved with the elimination of moiré. The Text Priority selection uses an MTF filter stronger than that of the Normal setting, thus increasing the sharpness of lines.



Detailed Descriptions

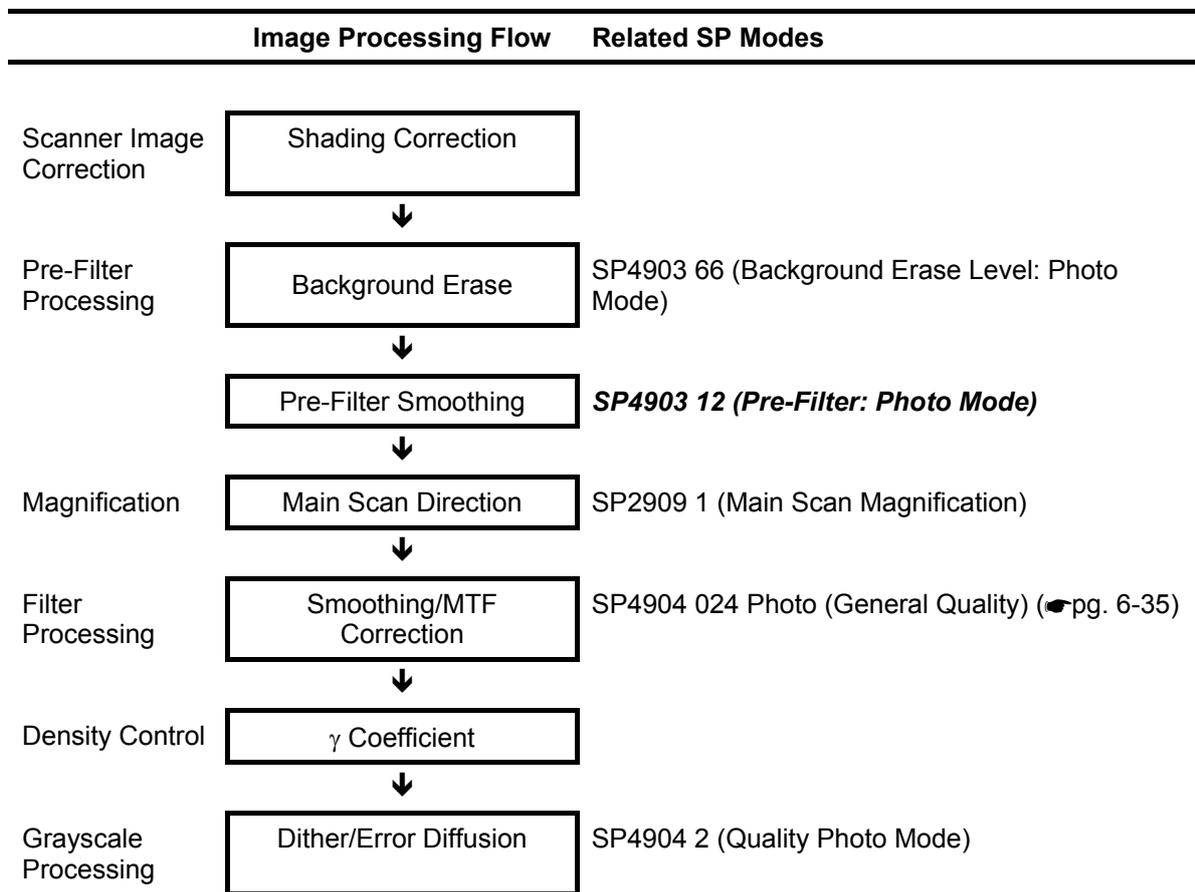
**NOTE:** An SP code number and name set in **bold italic** denotes an SSP (Special Service Program) mode. To access an SSP, enter the SP mode: press and hold down  $\#$  on the 10-key pad then "Copy SP" on the touch-screen.

## IMAGE PROCESSING

### **Photo Mode**

Photo mode emphasizes grayscale processing to achieve the best possible reproduction of photographs and eliminate moiré by using the highest density and  $\gamma$  coefficient in the reproduction of grayscales and dithering. Print Photo performs smoothing and dithering for photos copied from magazines, newspapers, etc. The Normal selection uses a higher resolution setting and employs error diffusion but does not use smoothing to improve the appearance of text in photographs. Glossy photo paper employs MTF filter processing and error diffusion to copy glossy or matte photographs and achieves a low incidence of moiré, thus reproducing copies of photographs of high resolution.

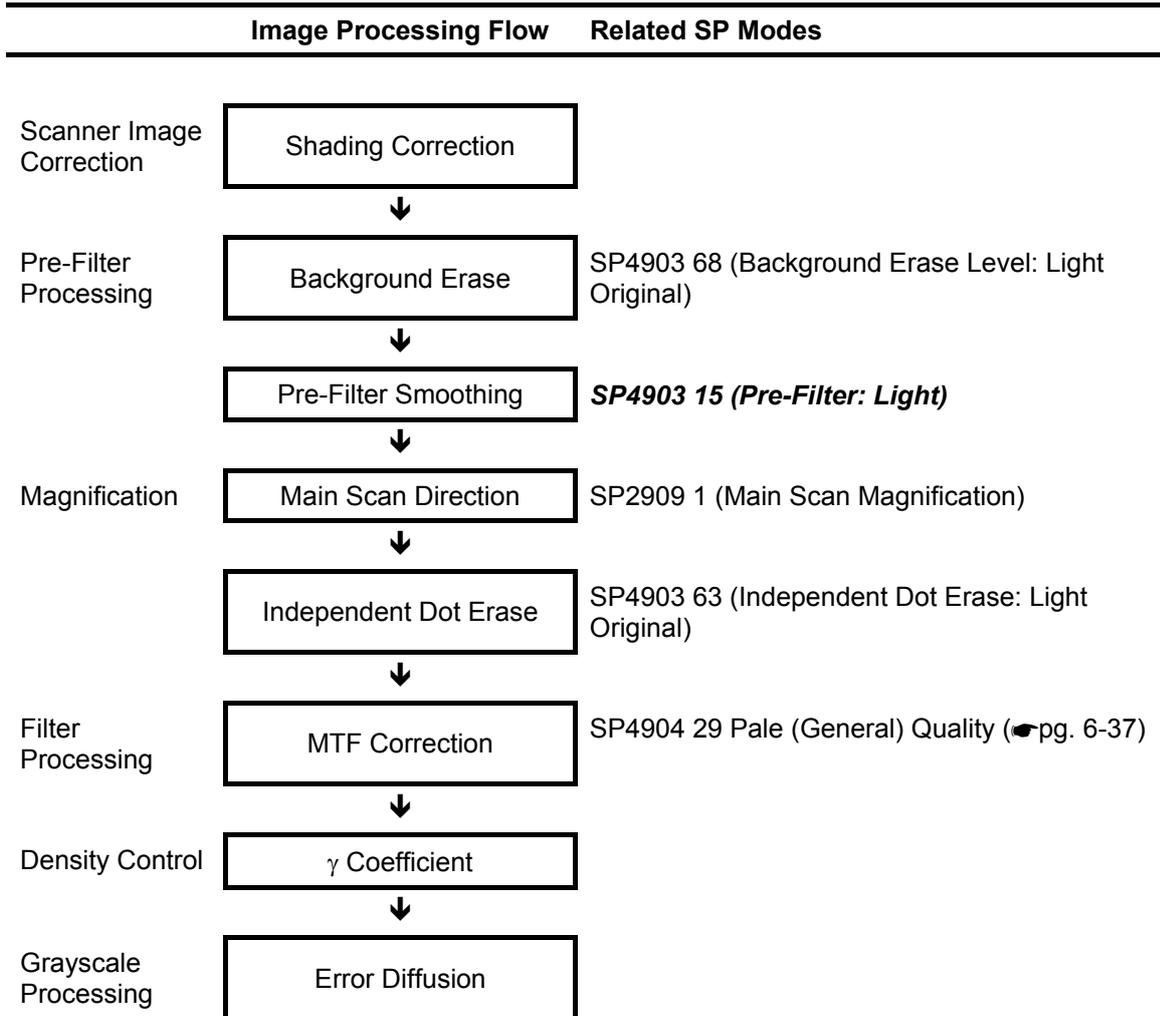
For photo mode, the features used depend on which type of gray scale processing has been selected for Photo mode (either 'dithering and smoothing' or 'error diffusion and MTF'); this depends on the setting of SP 4904 001. Details are explained later in this section.



**NOTE:** An SP code number and name set in **bold italic** denotes an SSP (Special Service Program) mode. To access an SSP, enter the SP mode: press and hold down  $\#$  on the 10-key pad then "Copy SP" on the touch-screen.

**Pale (Low-Density Mode)**

Pale achieves image quality comparable with Text mode, but of lower contrast. Pale employs an MTF filter stronger than that employed by the Text mode and uses a darker  $\gamma$  coefficient, thus increasing the incidence of copying textured backgrounds. Ideal for copying extremely thin originals. Soft employs an MTF filter weaker than Normal, thus achieving a softer image with less moiré. Sharp employs an MTF filter stronger than that of Normal, thus increasing the sharpness of lines.

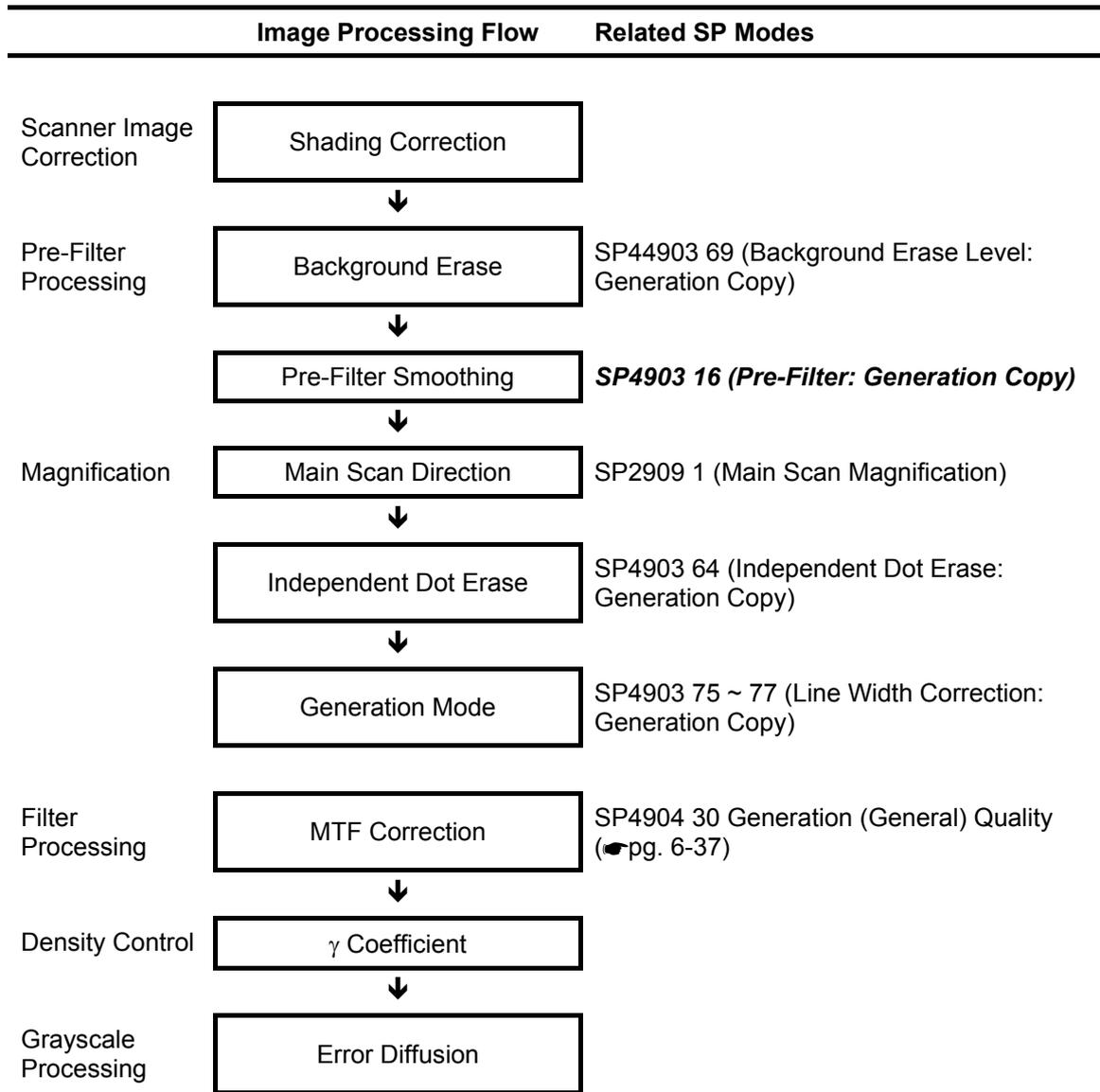


Detailed Descriptions

**NOTE:** An SP code number and name set in **bold italic** denotes an SSP (Special Service Program) mode. To access an SSP, enter the SP mode: press and hold down # on the 10-key pad then “Copy SP” on the touch-screen.

**Generation Copy Mode**

Generation Copy, based mainly on Text mode, aims to achieve the best reproduction of copied originals (so called “generation copies” or copies of copies). This mode 1) employs an MTF filter weaker than that of the Text mode to eliminate spurious dots, 2) uses the  $\gamma$  coefficient to smooth the image, and 3) uses generation processing to thicken thin lines. Soft employs an MTF filter weaker than the Normal setting to achieve a softer image with less moiré. Sharp employs an MTF filter stronger than that for Normal to emphasize lines for better image quality.



**NOTE:** An SP code number and name set in **bold italic** denotes an SSP (Special Service Program) mode. To access an SSP, enter the SP mode: press and hold down  $\text{\#}$  on the 10-key pad then “Copy SP” on the touch-screen.

## 6.5.8 PRE-FILTERING

SP mode settings 4903 10 ~ 15 select pre-filters by changing the filter coefficient settings.

Original Mode	SP No.	Default	Setting	Mag.	Smoothing
Text	<b>SP4903 10</b>	0	0	25% ~ 400%	OFF
Photo	<b>SP4903 12</b>	0	1	25% ~ 50%	Weak
Text/Photo	<b>SP4903 13</b>	0	2	25% ~ 50%	Medium
Pale	<b>SP4903 15</b>	0	3	25% ~ 50%	Strong
Generation	<b>SP4903 16</b>	0	4	25% ~ 99%	Weak
			5	25% ~ 99%	Medium
Range	0 ~ 9		6	25% ~ 99%	Strong
			7	25% ~ 400%	Weak
			8	25% ~ 400%	Medium
			9	25% ~ 400%	Strong

**NOTE:** An SP code number and name set in ***bold italic*** denotes an SSP (Special Service Program) mode. To access an SSP, enter the SP mode: press and hold down  on the 10-key pad then “Copy SP” on the touch-screen.

These SP mode settings are provided to reduce the incidence of moiré in the reproduction of images whose data signals have been compressed in the direction of the main scan. However, these SP adjustments can cause different effects in the reproduction of images depending on:

- Whether they contain areas shaded with dot screening (newspaper, magazine photos)
- Their reduction ratios.

These adjustments can also cause blurring in the reproduction of images that contain:

- Low density dots
- Low contrast text characters
- Fine lines

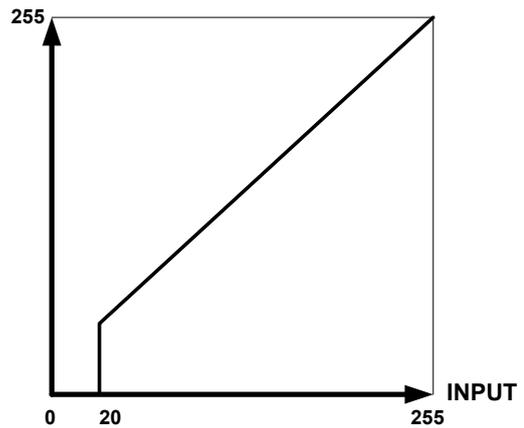
While filter processing is provided to reduce the incidence of moiré generated from digital signals, you must always pay attention to how these adjustments affect text characters and fine lines.

### 6.5.9 BACKGROUND ERASE

SP4903 65 ~ 69 cut the background from around images scanned from an original of rough texture such as a newspaper or parchment. The larger the setting done for this SP, the more background drops out from behind the image or text.

This SP mode setting for image processing executes separately from the ADS (Auto Density Setting) function that is performed in the SBU to set the peak white level for scanning to eliminate background.

For example, if this SP is set for “20”, then the scanning data up to 20 is set to “0” and cut from the image. The range for this SP code adjustment is 0 ~ 255. The recommended range for a normal document is 0 ~ 60. An official document on rough texture paper would fall in the recommended range of 120 ~ 160. The correct setting for any original will vary with the texture and quality of the background, but remember that selecting a higher numbers for this setting will eventually lower the quality of the document or cause unexpected results.



Mode	Background Erase Filter	Default	Range
Text	SP4903 65	0	0 ~ 255
Photo	SP4903 66	0	
Text/Photo	SP4903 67	0	
Pale	SP4903 68	0	
Generation Copy	SP4903 69	0	

**NOTE:** The “0” setting switches off the background erase filter.

### 6.5.10 INDEPENDENT DOT ERASE

Independent dot erase (set with the SP mode settings listed in the table below) remains in effect even when a “Custom Setting” is selected with the User Tools.

Independent dot erase targets for elimination random, irregular shaped black dots on the surface of the original that would otherwise appear in the copy after scanning and printing. The strength of the application of this feature can be adjusted for each mode.

The filter compares each pixel with the pixels around an area 7 pixels x 7 lines. If the sum of the pixels at the edges is smaller than the threshold value, the object pixel is changed to zero (white), depending on the strength of the SP mode setting. Setting a larger setting increases the number of dots erased, but if set too high, this SP can also remove small or fine text characters or even portions of large text characters.

Mode	Independent Dot Erase Filter	Default	Range
Text	SP4903 60	5	0 ~ 15
Text/Photo	SP4903 62	0	
Pale	SP4903 63	0	
Generation Copy	SP4903 64	8	

**NOTE:** The “0” setting switches off the filter.

### 6.5.11 LINE WIDTH CORRECTION

This section describes how to select a setting for line width correction (LWC) for the Generation Copy mode. LWC (Line Width Correction) can make lines thicker or thinner in generation copies.

#### SP4903 75 LWC: Generation Mode

Setting	Effect
0	No correction
1	Lighter lines
2	Darker lines (Default)
3	Thick lines

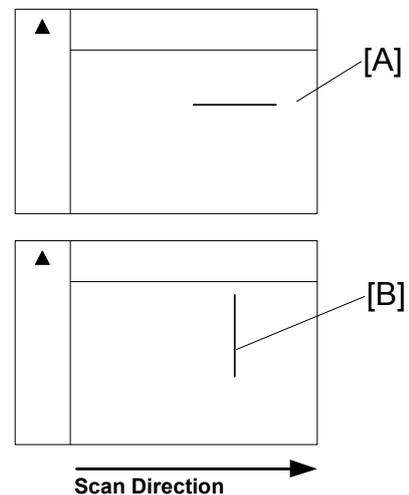
SP4903 75 adjusts the thickness of lines in faint generation copies. Specifically, this adjustment affects the lines targeted for adjustment by:

- SP4903 76 (LWC Threshold (Main Scan): Generation Mode). Targets main scan, lines parallel to the direction of feed [A].
- SP4903 77 LWC Threshold (Sub Scan): Generation Mode). Targets sub scan, lines at right angles to the direction of feed [B].

For sharp thin lines, set SP4903 75 for a higher LWC setting, and for softer lines set a lower setting. For thick lines, select "3".

- To thin (or thicken) lines in the main scan direction, select an SP4903 75 setting larger (or smaller) than the setting for SP4903 76
- To thin (or thicken) lines in the sub scan direction select an SP4903 75 setting larger (or smaller) than the setting for SP4903 77.

However, remember that too large a setting can cause unexpected results in copied images.



SP Mode	Default	Range
SP4903 76 LWC Threshold (Main Scan): Generation Mode	1	0 ~ 5
SP4903 77 LWC Threshold (Sub Scan): Generation Mode	1	

## 6.5.12 FILTERING

### *Interactive SP Codes*

#### *Overview*

The tables in this section are for quick reference. For details about how each SP code operates and interacts with other SP settings, please refer to the sections that follow.

Many of the SP codes used for image processing adjustments are interactive in that they exist as master and slave SPs. Use the *master* SP codes for gross adjustment. If you need to fine adjust a master setting, set the master setting to “0” to access its *slave* SP codes.

**NOTE:** In the tables below, the master SP codes are set in **bold** type. The slave SP codes are indented and set in normal type.

Keep the following points in mind while you are using these SP codes:

- The slave SP codes cannot be accessed until the master SP is set to “0”.
- For the slave SP code settings to take effect, the master SP code must remain set to “0”.
- If the master SP code is reset to any value other than “0”, then the slave SP codes are disabled and their adjustments have no effect on image processing.
- If a master SP code is provided with both a Strength and Level (coefficient) adjustment, adjust the Strength setting first to achieve the approximate effect that you want, and then do the Level adjustment.

## IMAGE PROCESSING

### *Text Mode*

Adjust the image for the Text mode with the four master settings within their allowed ranges (for ranges see Section “5. Service Tables”. To fine adjust a master setting set it to “0” then perform the adjustments listed below.

<b>SP4904 020 = 0</b>	Text (General) Quality 25-64%
SP4903 020	Main Scan Filter Level: Text 25%-64%
SP4903 021	Sub Scan Filter Level: Text 25%-64%
SP4903 022	Main Scan Filter Strength: Text 25%-64%
SP4903 023	Sub Scan Filter Strength: Text 25%-64%
<b>SP4904 021 = 0</b>	Text (General) Quality 65-154%
SP4903 024	Main Scan Filter Level: Text 65%-154%
SP4903 025	Sub Scan Filter Level: Text 65%-154%
SP4903 026	Main Scan Filter Strength: Text 65%-154%
SP4903 027	Sub Scan Filter Strength: Text 65%-154%
<b>SP4904 022 = 0</b>	Text (General) Quality 155-256%
SP4903 028	Main Scan Filter Level: Text 155%-256%
SP4903 029	Sub Scan Filter Level: Text 155%-256%
SP4903 030	Main Scan Filter Strength: Text 155%-256%
SP4903 031	Sub Scan Filter Strength: Text 155%-256%
<b>SP4904 023 = 0</b>	Text (General) Quality 257%-400%
SP4903 032	Main Scan Filter Level: Text 257%-400%
SP4903 033	Sub Scan Filter Level: Text 257%-400%
SP4903 034	Main Scan Filter Strength: Text 257%-400%
SP4903 035	Sub Scan Filter Strength: Text 257%-400%

**Photo Mode**

*Dithering or Error Diffusion for Photo Mode*

Use SP4904 001 to select either dithering or error diffusion to process image fills and halftones.

- 0:** Selects the dithering and smoothing filter.
- 1:** Selects the error diffusion and MTF filter.

*Photo Mode Dithering: SP4904 001 = 0*

If you select “0” for SP4904 001 to enable dithering halftones, only one SP code is available for fine adjusting dithering.

SP4903 037	Smoothing Filter in Photo Mode
------------	--------------------------------

*Photo Mode Error Diffusion: SP4904 001 = 1*

If you select “1” for SP4904 001 to enable error diffusion, all the SP codes in the Mode tables below (Text Mode, Text/Photo Mode, etc.) are available for adjustment.

Use the *master* SP codes gross adjustment of the image processing mode after you have set SP4904 001 = 1 for error diffusion. If you need to fine adjust a master setting, set the master setting to “0” to access its slave SP codes.

Adjust the image for the Photo mode with the one master setting within its allowed range (for the range, see Section “5. Service Tables”). To fine adjust the master setting set it to “0” then perform the adjustments listed below.

<b>SP4904 024 = 0</b>	<b>Photo (General Quality)</b>
SP4903 036	Photo MTF (Edge)
SP4903 038	Photo MTF (All)
<b>SP4903 091</b>	<b>Filter Strength: Photo (Edge)</b>
<b>SP4903 092</b>	<b>Filter Adj.: Photo (Edge Det.)</b>
<b>SP4903 093</b>	<b>Filter Adj.: Photo (Mag.%)</b>
<b>SP4904 013</b>	<b>Halftone Adjustment: Edge Detection</b>

**NOTE:** An SP code number and name set in **bold italic** denotes an SSP (Special Service Program) mode. To access an SSP, enter the SP mode: press and hold down **#** on the 10-key pad then “Copy SP” on the touch-screen.

Detailed Descriptions

**Text/Photo Mode**

Adjust the image for the Text/Photo mode with the four master settings within their allowed ranges (for ranges, see Section “5. Service Tables”). To fine adjust a master setting set it to “0” then perform the adjustments listed below.

<b>SP4904 025 = 0</b>	<b>Text/Photo (General) Quality 25%-64%</b>
SP4903 039	Text/Photo (Edge) Coefficient 25%-64%
SP4903 040	Text/Photo (All) Coefficient 25%-64%
<b>SP4903 079</b>	<b>Filter Strength: Text/Photo (Edge) 25%-64%</b>
<b>SP4903 080</b>	<b>Filter Adj.: Text/Photo (Edge Det.) 25%-64%</b>
<b>SP4903 081</b>	<b>Filter Adj.: Text/Photo (Mag.%) 25%-64%</b>
<b>SP4904 008</b>	<b>Gray Adj: Text/Photo (Edge Det.) 25-64%</b>
<b>SP4904 026 = 0</b>	<b>Text/Photo (General) Quality 65%-154%</b>
SP4903 043	Text/Photo (Edge) Coefficient 65%-154%
SP4903 044	Text/Photo (All) Coefficient 65%-154%
<b>SP4903 082</b>	<b>Filter Strength: Text/Photo (Edge) 65%-154%</b>
<b>SP4903 083</b>	<b>Filter Adj.: Text/Photo (Edge Det.) 65-154%</b>
<b>SP4903 084</b>	<b>Filter Adj. Text/Photo (Mag.%) 65%-154%</b>
<b>SP4904 009</b>	<b>Gray Adj.: Text/Photo (Edge Det.) 65-154%</b>
<b>SP4904 027 = 0</b>	<b>Text/Photo (General Quality) 155%-256%</b>
SP4903 047	Text/Photo (Edge) Coefficient 155%-256%
SP4903 048	Text/Photo (All) Coefficient 155%-256%
<b>SP4903 085</b>	<b>Filter Strength: Text/Photo (Edge) 155%-256%</b>
<b>SP4903 086</b>	<b>Filter Adj.: Text/Photo (Edge Det.) 155%-256%</b>
<b>SP4903 087</b>	<b>Filter Adj.: Text/Photo (Mag.%) 155%-256%</b>
<b>SP4904 010</b>	<b>Gray Adj.: Text/Photo (Edge Det.) 155-256%</b>
<b>SP4904 028 = 0</b>	<b>Text/Photo (General) Quality 257%-400%</b>
SP4903 051	Text/Photo (Edge) Coefficient 257%-400%
SP4903 052	Text/Photo (All) Coefficient 257%-400%
<b>SP4903 088</b>	<b>Filter Strength: Text/Photo (Edge) 257%-400%</b>
<b>SP4903 089</b>	<b>Filter Adj.: Text/Photo (Edge Det.) 257%-400%</b>
<b>SP4903 090</b>	<b>Filter Adj.: Text/Photo (Mag.%) 257%-400%</b>
<b>SP4904 011</b>	<b>Gray Adj.: Text/Photo (Edge Det.) 257-400%</b>

**NOTE:** An SP code number and name set in **bold italic** denotes an SSP (Special Service Program) mode. To access an SSP, enter the SP mode: press and hold down **#** on the 10-key pad then “Copy SP” on the touch-screen.

Also, SP4904 007 adjusts the error diffusion process that is used in text/photo mode.

Gray adjustment: At areas defined as edges, error diffusion is done on text to create sharp lines to better define text characters, but in other areas, grayscale processing for photographs is done. Select a lower setting for better reproduction of photographs and a higher setting for sharper text. For details, refer to the SP table.

***Pale Mode***

Adjust the image for the Pale mode with the one master setting within its allowed range (for range see Section “5. Service Tables”. To fine adjust the master setting set it to “0” then perform the adjustments listed below.

<b>SP4904 029 = 0</b>	Pale (General) Quality
SP4903 055	Filter Level: Light Original
SP4903 056	Filter Strength: Light Original

***Generation Copy Mode***

Adjust the image for the Generation Copy mode with the one master setting within its allowed range (for range see Section “5. Service Tables”. To fine adjust the master setting set it to “0” then perform the adjustments listed below.

<b>SP4904 030 = 0</b>	Generation (General) Quality
SP4903 057	Filter Level: Generation Copy
SP4903 058	Filter Strength: Generation Copy

**Text Mode MTF Filter**

This section describes how to select the MTF filter coefficient and filter strength for the Text mode. You can use the SP mode settings listed in the table below to adjust these items for scanning in Text mode:

- MTF filter coefficient for the main scan and sub scan
- MTF filter strength for the main scan and sub scan

Text Mode (Mag.)	Coefficient		Strength	
	Main Scan .	Sub Scan .	Main Scan .	Sub Scan .
25% ~ 64%	SP4903 20	SP4903 21	SP4903 22	SP4903 23
65% ~ 154%	SP4903 24	SP4903 25	SP4903 26	SP4903 27
155% ~ 256%	SP4903 28	SP4903 29	SP4903 30	SP4903 31
257% ~ 400%	SP4903 32	SP4903 33	SP4903 34	SP4903 35
Ranges	0 ~ 15	0 ~ 13	0 ~ 7	0 ~ 7

Strengthening the MTF filter sharpens the edges of text characters and improves the appearance of low contrast text but can also cause moiré to appear in photos on the same original.

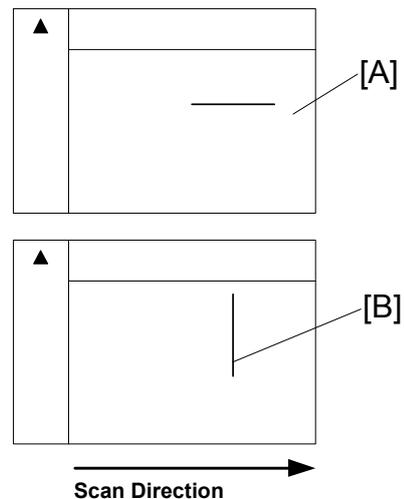
Conversely, weakening the MTF filter softens the edges of text characters and reduces the occurrence of moiré but low contrast characters may fade.

Strengthen or weaken the MTF filter for the Text mode only when necessary.

Adjustment of the MTF filter coefficient performs very fine level adjustment of the applied strength of the MTF filter. Adjustment of the MTF filter strength greatly affects the rate of the change applied to the image. Basically, you should first just the MTF filter strength in 1 step increments without adjusting the coefficient to achieve nearly the effect you want, and then use the coefficient settings for fine adjustment.

Coefficient and strength adjustments for main scan affect lines parallel to the direction of scanning [A].

Coefficient and strength adjustments for sub scan affect lines at right angles to the direction of scanning [B].



**Text/Photo, Photo Mode Filter**

SP mode settings listed in Columns 2~4 below adjust the clarity of originals that contain text, thin lines, and photos; the SP codes of Columns 5~6 are intended to adjust the clarity of originals with text and thin lines or only photos.

**NOTE:** The photo mode settings are only valid if SP 4904 001 is set to 1.

Mode, Mag.	Filter Setting: Edge	Filter Setting: All	Filter Strength: Edge	Filter Adj.: Edge Det.	Filter Adj.: Mag.
Text/Photo 25 ~ 64%	SP4903 39	SP4903 40	<b>SP4903 79</b>	<b>SP4903 80</b>	<b>SP4903 81</b>
Text/Photo 65 ~ 154%	SP4903 43	SP4903 44	<b>SP4903 82</b>	<b>SP4903 83</b>	<b>SP4903 84</b>
Text/Photo 155 ~ 256%	SP4903 47	SP4903 48	<b>SP4903 85</b>	<b>SP4903 86</b>	<b>SP4903 87</b>
Text/Photo 257 ~ 400%	SP4903 51	SP4903 52	<b>SP4903 88</b>	<b>SP4903 89</b>	<b>SP4903 90</b>
Photo (Error Diffusion)	SP4903 36	SP4903 38	<b>SP4903 91</b>	<b>SP4903 92</b>	<b>SP4903 93</b>
Ranges	0~7	0~7	0~3	0~15	0~15

**NOTE:** An SP code number and name set in **bold italic** denotes an SSP (Special Service Program) mode. To access an SSP, enter the SP mode: press and hold down  $\text{\#}$  on the 10-key pad then “Copy SP” on the touch-screen.

**Filter Setting: Edge (Column 2):** Provides filter processing of edges to improve the clarity of originals that contain text and lines. Selecting a larger value sharpens the clarity. However, increasing the value also increases the possibility of producing moiré in the image.

**Filter Setting: All (Column 3):** Provides filter processing for the overall image, not to improve just text, lines, or photographs, but to improve the image as a whole. This filter coefficient reduces the incidence of moiré in images that contain shaded areas created with dots. Increasing the value improves reproduction of low contrast text and lines. However, increasing the value also increases the possibility of producing moiré in the image.

**Filter Strength: Edge (Column 4):** Aims to increase the *strength* of the “Filter Setting: Edge” effect that processes edges to improve the clarity of originals that contain text and lines. Increasing this setting not only increases the strength of the effect and creates thicker text characters and lines, but can also cause moiré to appear in the image. On the other hand, decreasing this setting lessens the effect, creating thinner characters and lines and also reduces the incidence of moiré.

**Filter Adj.: Edge Detection (Column 5):** Broadens the *range* of the effect of the “Filter Setting Edge” SP. Lowering this setting broadens the range for edge filter processing and increases clarity. Also, using this SP together with “Filter Adj. Mag.” below can sharpen edges to an extent that an abnormal looking image is created.

**Filter Adj.: Magnification (Column 6):** Allows gradual adjustment of clarity in original images that contain varying degrees of clarity between text and lines, or between areas of the same image. Increasing these settings in large increments could easily cause moiré to appear in the images. These settings should always be changed in small increments.

Follow these general rules with these settings:

- Increasing the settings dramatically increases clarity but can also increase the incidence of moiré.
- Reducing the settings produces a smoother image, reduces the incidence of moiré, but also reduces the effect of the filters.
- Adjusting the “Filter Adj. Mag.” SPs in combination with other settings can even produce abnormal images.

Also, SP4904 007 adjusts the error diffusion process that is used in text/photo mode.

***Pale, Generation Mode Filter***

The SP mode settings listed in the table below are used to adjust MTF filter coefficient and strength for the Pale mode and Generation Copy modes.

Mode	Coefficient	Strength
Pale Mode	SP4903 55	SP4903 56
Generation Copy	SP4903 57	SP4903 58
Ranges	0 ~ 6	0 ~ 7

Strengthening the MTF filter sharpens the edges of text characters and improves the appearance of low contrast text but can also cause moiré to appear in photos on the same original. Conversely, weakening the MTF filter softens the edges of text characters and reduces the occurrence of moiré but low contrast characters may fade.

Strengthen or weaken the MTF filter for the Text mode only when necessary.

Adjustment of the MTF filter coefficient performs very fine level adjustment of the applied strength of the MTF filter. Adjustment of the MTF filter strength greatly affects the rate of the change applied to the image. Basically, you should first just the MTF filter strength in 1 step increments without adjusting the coefficient to achieve the effect you want, and then use the coefficient settings for fine adjustment.

### ***Photo Mode Smoothing for Dithering***

Strengthening this SP4903 37 (Smoothing Filter in Photo Mode) makes images smoother and reduces the occurrence of moiré but can also cause fading. Strengthen this setting only when necessary.

**NOTE:** This setting is valid only if SP 4901 001 is at 0.

Smoothing Coefficient	Range
SP4903 37 (Smoothing Filter in Photo Mode)	0 ~ 7

### ***Photo Mode Grayscale***

This SP mode adjustment sets how grayscales are processed when the user selects Photo mode on the operation panel.

#### **SP4904 1 Grayscale Photo Mode**

Setting	Description
0	Dithering and smoothing
1	Error diffusion, MTF filter correction for edges

If “0” is selected, the image grayscales are processed with dithering and filter processing, just as they are processed with the “Print Photo” selection on the operation panel. In this case the filter processing means smoothing only. The filter coefficient for smoothing can be adjusted with SP4904 37 (Smoothing Filter in Photo Mode).

If “1” is selected, then the image grayscales are processed with error diffusion processing, just as they are processed with the “Normal” and “Glossy Photo” settings on the operation panel. The MTF filter applied is the same as that applied for the “Normal” setting.

To achieve better photo image quality with slightly less clarity in lines and text, select “0” for dithering. You can also adjust SP4904 2 to achieve better reproduction of photographs.

On the other hand, to achieve better clarity in text and lines, with a slight sacrifice in the quality grayscale and smoothness in photographs, select “1” for error diffusion. To improve the clarity of fine lines and text, you can also increase the strength of the MTF filter. However, increasing the strength of the filter can also increase the incidence of moiré in areas of newspaper, magazine, or other photographs created with dot screening.

**Photo Mode Image Quality**

This section describes how to select a setting to improve image quality in the Photo mode with dithering in order to create an extremely smooth photo image.

Generally, a larger dithering matrix uses rougher dither pattern to reproduce a smoother gray image, but lowering the resolution can make text and lines more difficult to see. Conversely, a smaller dithering matrix uses a finer dithering pattern to reproduce a gray image of rougher texture, but raising the resolution can make text and lines easier to see.

**SP4904 002 Quality Photo Mode**

Setting	Dither Pattern	Picture Quality	Text Quality	Processing Priority
0	8 x 8 (75 lines)	High	Low	Dot screen areas
1	8 x 8 (106 lines)	Highest	Low	Filled areas (highest priority) Default
2	6 x 6 (142 lines)	Medium	Medium	Filled areas
3	4 x 4 (212 lines)	Low	High	Resolution

For these dither adjustments to take effect, SP4904 1 (Grayscale Photo Mode) must be set to “0” to enable dithering.

Here are some general rules:

- If your main concern is reproducing legible text, use the smaller matrixes, but a smaller matrix could cause spurious lines to appear in images.
- When using the smallest matrix with setting “3” (4 x 4), you should switch off the smoothing filter for the Photo mode by setting SP4903 37 to “0”.
- Use the largest dither matrix (setting “0”) for originals that contain dot screening such as newspaper and magazine photographs.

## 6.5.13 OTHERS

### ***Vertical Black Line Correction***

This section describes how to select a setting to correct vertical black lines. SP4904 5 (Special Text Density) adjusts the overall intensity of the image to eliminate vertical black lines in originals caused by documents scanned on a copy machine with dirty optics.

SP Mode	Default	Range
SP4904 5 Special Text Density	0	0 ~ 7

Normally, the default setting (0) leaves this feature switched off.

Select a higher setting to increase the effect or a lower setting to decrease the effect. High density vertical black lines may require a higher setting, but a higher setting could cause the overall density of the copy to lower, or could cause low density areas to drop out completely.

**NOTE:** Generally, this SP code corrects most low density vertical black lines but may not be able to correct extremely dark or wide black lines.

### ***Density Settings***

This section describes how to adjust the density settings for the Pale mode Generation Copy mode, and Text mode.

SP4904 3 is used to switch the density characteristics to binary digital processing for black and white originals to achieve better balance between text and images, correct shadows that appear around text in handwritten documents, to enhance documents written in pencil, or to achieve stark contrast when copying blueprints, building plans, etc.

#### **SP4903 3 Density Setting for Low Density Original Mode**

Settings	Density Characteristics
0	Selects $\gamma$ normal density (Default).
1	Digitizes to near binary image.

SP4904 4 is used to switch between normal density and better reproduction of areas with graduated fill in originals copied in the Generation Copy mode. To improve the appearance of graduated fill areas of high density, set to “1” so the process can ignore black and more accurately reproduce areas with graduated fill. For example, the “1” setting is ideal for copying Generation Copy originals of medical charts that contain images of internal organs.

**SP4904 4 Density Setting for Copied Original Mode**

Settings	Density Characteristics
0	Selects normal density (Default) for Generation Copy originals.
1	Produces better gradation in fill areas of high density.

If “1” is selected for SP4904, the following SP mode settings may also need adjustment.

SP No.	Function	Recommended Setting
SP4903 57	Filter Level: Generation Copy	4 (or change as required)
SP4903 58	Filter Strength: Generation Copy	2 (or change as required)
SP4903 64	Independent Dot Erase: Generation Copy	0 (OFF)
SP4903 69	Background Erase Level: Generation Copy	0 OFF
SP4903 75	Line Width Correction: Generation Mode	0 (LWC OFF)

**ADS Level**

This section shows you how to adjust the center notch for the ADS (Automatic Density Setting) level. The notches are not displayed during ADS adjustment. Of 7 steps (notches) the center notch is 4. This is the value adjusted with this SP code.

SP5106 6 (ADS Level Selection) selects the image density used in ADS mode. For example, if you set SP5106 66 to “2”, pressing the Auto Image Density key toggles the display off and manual notch 2 is selected. This SP code is adjusted, if the customer cannot attain clean copies after performing automatic density adjustment.

This mode prevents the background of an original from appearing on copies.

The copier scans the auto image density detection area, a narrow strip at one end of the main scan line. As the scanner scans down the page, the IPU on the BICU detects the peak white level for each scan line in this narrow strip only. The IPU uses this peak white level as a reference value for analog-to-digital conversion of the scan line, then the IPU sends the reference value to the A/D controller on the SBU.

When an original with a gray background is scanned, for example, the density of the gray area becomes the peak white level density, so the original background will not appear on copies. Because peak level data is taken for each scan line, ADS corrects for any changes in background density down the page.

As with previous digital copiers, the user can select manual image density when selecting auto image density mode and the machine will use both settings when processing the original.

## 6.5.14 PRACTICAL APPLICATION OF SP MODES

### Solving Problems

This section describes some common problems that can be solved with SP code adjustments. This table lists the recommended settings; fine adjustments may be required for the actual type of originals that the customer is copying.

**NOTE:** To do the settings in the table below, first you must set the Master SP code to "0". (☛"FILTERING", pg. 6-23~6-31)

Job	User Tool	Custom Setting Adjustment
Eliminate blue lines from graph paper, or erase shadows caused by originals that have been pasted up for layout.	<ul style="list-style-type: none"> <li>• Lighten the image density for Text mode.</li> <li>• Select "Soft" for Text mode (User Tools).</li> </ul>	<ul style="list-style-type: none"> <li>• Increase the setting of SP4903 60 (Independent Dot Erase) to about 6 ~ 10.</li> <li>• Increase the setting of SP4903 65 (Background Erase) to about 20 ~ 60.</li> </ul>
Eliminate orange or other color backgrounds from official documents.		<ul style="list-style-type: none"> <li>• Increase the setting of SP4903 60 (Independent Dot Erase) to about 10 ~ 15.</li> <li>• Increase the setting of SP4903 65 (Background Erase) to about 120 ~ 160.</li> </ul>
Reproduce blue lines of graph paper.	<ul style="list-style-type: none"> <li>• Darken the image density for Text/Photo mode.</li> <li>• Select "Sharp" for the Text/Photo mode (User Tools).</li> </ul>	
De-emphasize fine lines in jagged valleys and reduce the occurrence of moiré.	<ul style="list-style-type: none"> <li>• Select "Soft" for Text mode (User Tools).</li> </ul>	Weaken the MTF filters for Text mode: <ul style="list-style-type: none"> <li>• SP4903 24, Main Scan: 9</li> <li>• SP4903 25, Sub Scan: 13</li> <li>• SP4903 26, Main Scan: 2</li> <li>• SP4903 27, Sub Scan: 2</li> </ul>
Reduce the occurrence of moiré when reducing the size of the original for copying.	<ul style="list-style-type: none"> <li>• Select "Soft" for Text mode (User Tools).</li> </ul>	Weaken the MTF filters for Text mode reduction: <ul style="list-style-type: none"> <li>• SP4903 20, Main Scan: 14</li> <li>• SP4903 21, Sub Scan: 13</li> <li>• SP4903 22, Main Scan: 1</li> <li>• SP4903 23, Sub Scan: 1</li> </ul>
Reproduce areas of graduated fill in high density originals in Photo mode.	<ul style="list-style-type: none"> <li>• Select "Glossy Photo" for Photo mode (User Tools).</li> </ul>	
Sharpen text in Photo mode.	<ul style="list-style-type: none"> <li>• Select "Normal" or "Glossy Photo" for Photo mode (User Tools).</li> </ul>	Set SP4904 1 to "1" to enable error diffusion. Strengthen the settings for the Photo mode MTF filters coefficients: <ul style="list-style-type: none"> <li>• SP4903 36: Select "3"</li> <li>• SP4903 38: Select "1"</li> </ul>
Improve the appearance of originals handwritten with pencil, or make lighter copies of color originals (invoices and other commonly used business forms)	<ul style="list-style-type: none"> <li>• Select "Sharp" for Pale mode (User Tools).</li> <li>• Select "Sharp" for Text mode (User Tools).</li> </ul>	Strengthen the MTF filters for Pale mode: <ul style="list-style-type: none"> <li>• SP4903 55: Select "3"</li> <li>• SP4903 56: Select "4"</li> </ul> Strengthen the MTF filters for Text mode: <ul style="list-style-type: none"> <li>• SP4903 24: Set to "9".</li> <li>• SP4903 25: Set to "13".</li> <li>• SP4903 26: Set to "3".</li> <li>• SP4903 27: Set to "3".</li> </ul>

**Recommended Settings for MTF Filters**

**Text Mode**

**– Text Mode Filter Setting (25% ~ 64%) –**

MTF Strength	Strong ←				Default				→	Weak
Default Settings:		Sharp			Normal			Soft		
SP4903 20 Main Filter Level: Text	15	14	12	10	9	9	14	10	9	
SP4903 21 Sub Filter Level: Text	13	13	12	12	13	10	13	13	10	
SP4903 22 Main Filter Strength	2	2	2	2	2	2	1	1	1	
SP4903 23 Sub Filter Strength: Text	2	2	2	2	2	2	1	1	1	

**–Text Mode Filter Setting (65% ~ 154%) –**

MTF Strength	Strong ←				Default				→	Weak
Default Settings:		Sharp			Normal			Soft		
SP4903 24 Main Filter Level	9	9	15	14	12	10	9	14	11	
SP4903 25 Sub Filter Level	13	11	13	13	13	13	13	13	13	
SP4903 26 Main Filter Strength	3	3	2	2	2	2	2	1	1	
SP4903 26 Sub Filter Strength	3	3	2	2	2	2	2	1	1	

**–Text Mode (155% ~ 256%) –**

MTF Strength	Strong ←				Default				→	Weak
Default Settings:		Sharp			Normal			Soft		
SP4903 28 Main Filter Level	11	10	9	9	14	12	10	9	9	
SP4903 29 Sub Filter Level	13	13	13	10	13	13	13	13	10	
SP4903 30 Main Filter Strength	3	3	3	3	2	2	2	2	2	
SP4903 31 Sub Filter Strength	3	3	3	3	2	2	2	2	2	

**–Text Mode (257% ~ 400%) –**

MTF Strength	Strong ←				Default				→	Weak
Default Settings:		Sharp			Normal			Soft		
SP4903 32 Main Filter Level	12	11	10	9	15	14	12	10	9	
SP4903 33 Sub Filter Level	13	13	13	13	13	13	13	13	13	
SP4903 34 Main Filter Strength	3	3	3	3	2	2	2	2	2	
SP4903 35 Sub Filter Strength	3	3	3	3	2	2	2	2	2	

***Pale Mode***

MTF Strength	Strong		←		Default			→		Weak
Default Settings:		Sharp			Normal			Soft		
SP4903 55 Filter Level: Light Original	5	4	3	2	6	4	3	2	6	
SP4903 56 Filter Strength: Light Original	4	4	4	4	3	3	3	3	2	

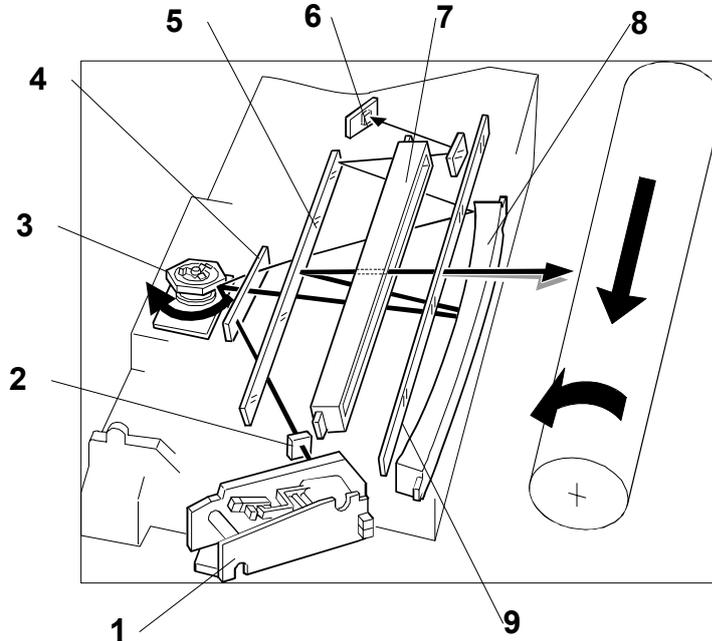
***Generation Copy Mode***

MTF Strength	Strong		←		Default			→		Weak
Default Settings:		Sharp			Normal			Soft		
SP4903 55 Filter Level: Light Original	2	6	5	4	3	2	6	5	4	
SP4903 56 Filter Strength: Light Original	2	2	2	2	2	2	1	1	1	

Detailed Descriptions

## 6.6 LASER EXPOSURE

### 6.6.1 OVERVIEW



- |                    |                              |
|--------------------|------------------------------|
| 1 LD unit          | 6 Synchronization detector   |
| 2 Cylindrical lens | 7 BTL (Barrel Toroidal Lens) |
| 3 Polygonal mirror | 8 F-theta mirror             |
| 4 Shield glass     | 9 Toner shield glass         |
| 5 Mirror           |                              |

This machine uses two laser diodes to produce electrostatic images on an OPC drum. The laser diode unit converts image data from the BICU board into laser pulses, and the optical components direct these pulses to the drum. To produce a high quality copy image, these are 256 gradations for the laser power.

The output path from the laser diode to the drum is shown above. The LD unit outputs two laser beams to the polygon mirror through the cylindrical lens and the shield glass.

Each surface of the polygon mirror reflects two full main scan lines. The laser beams go to the F-theta mirror, mirror, and BTL (barrel toroidal lens). Then these laser beams go to the drum through the toner shield glass. The laser synchronization detector determines the main scan starting position.

**NOTE:** The front door and upper right door (transfer door) are equipped with safety switches that automatically shut down the laser unit when either door is opened.

## 6.6.2 AUTO POWER CONTROL (APC)

The LD driver on the LDDR drives the laser diode. Even if a constant electric current is applied to the laser diode, the intensity of the output light changes with the temperature. The intensity of the output decreases as the temperature increases.

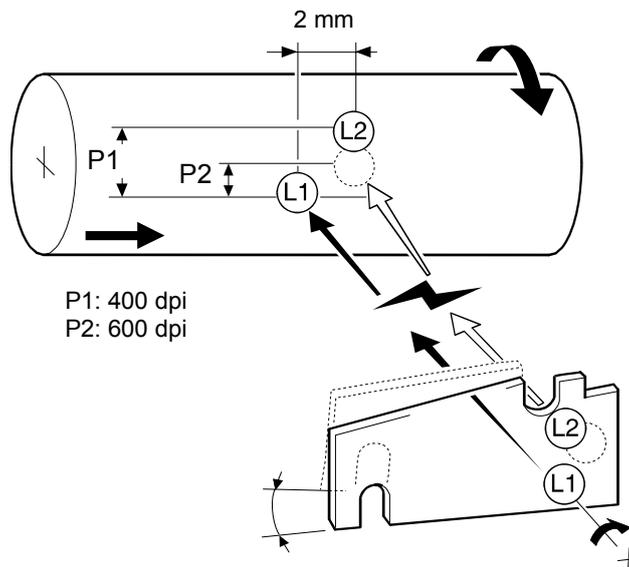
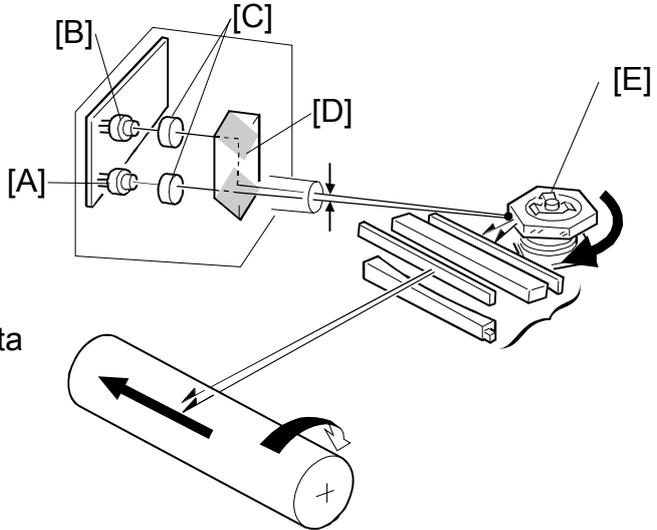
In order to keep the output level constant, the LDDR monitors the electrical current passing through the photodiode (PD). Then it increases or decreases the current to the laser diode as necessary, comparing it with the reference level. This auto power control is done just after the machine is turned on and during printing while the laser diode is active.

The reference levels are adjusted on the production line. Do not touch the variable resistors on the LDDR in the field.

### 6.6.3 DUAL BEAM WRITING

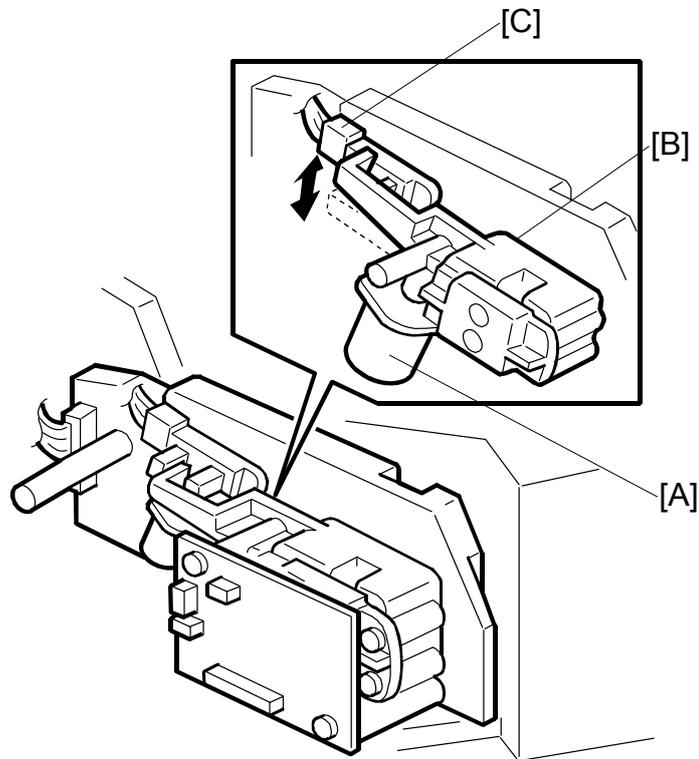
This LD unit employs two laser diodes [A] (L1) and [B] (L2). Each face of the polygon mirror writes two main scan lines, and twelve main scans are produced when the polygon mirror rotates once. This reduces polygon motor rotation speed, reduces noise generated by the polygon motor, and reduces the frequency of the image data clock.

The two laser beams follow the path: collimating lenses [C] → prism [D] → polygon mirror [E]



The two laser beams arrive on the drum surface about 2 mm apart in the main scan direction and about 0.06 mm apart (at 400 dpi) in the sub scan direction. The two-mm difference in the main scan direction allows the machine to detect the laser synchronization signal for each beam.

## 6.6.4 LASER BEAM PITCH CHANGE MECHANISM

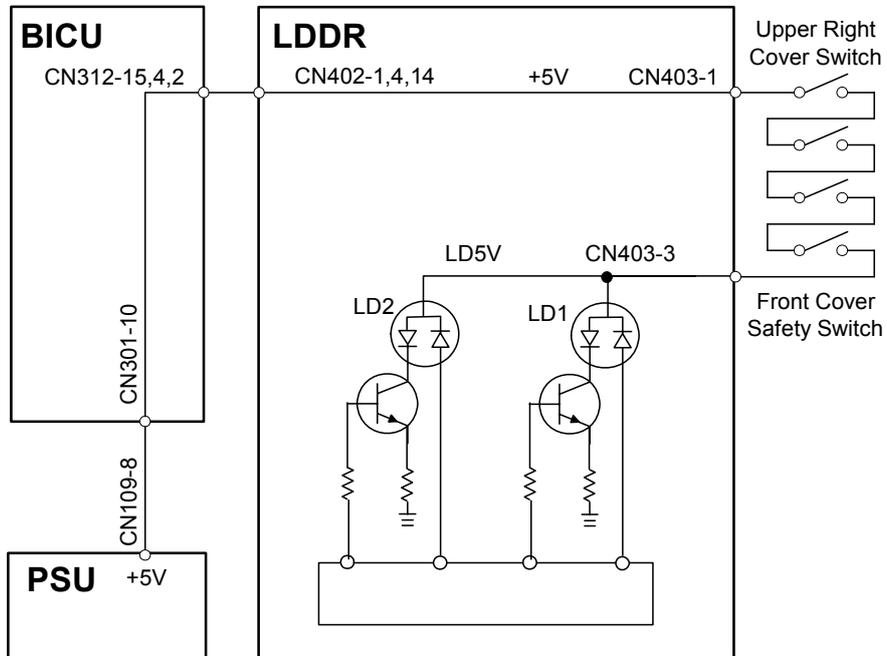


The LD positioning motor [A] moves the LD unit housing [B] up and down and changes the position of L2 (L1 does not move).

Both LD unit positions are at fixed distances from the LD unit home position sensor [C].

Usually, the LD unit moves directly to the proper position. However, when the number of times that the resolution has changed reaches the value of SP2-109-5 (LD Beam Pitch Adjustment), the LD unit moves to the home position, and this re-calibrates the LD unit positioning mechanism.

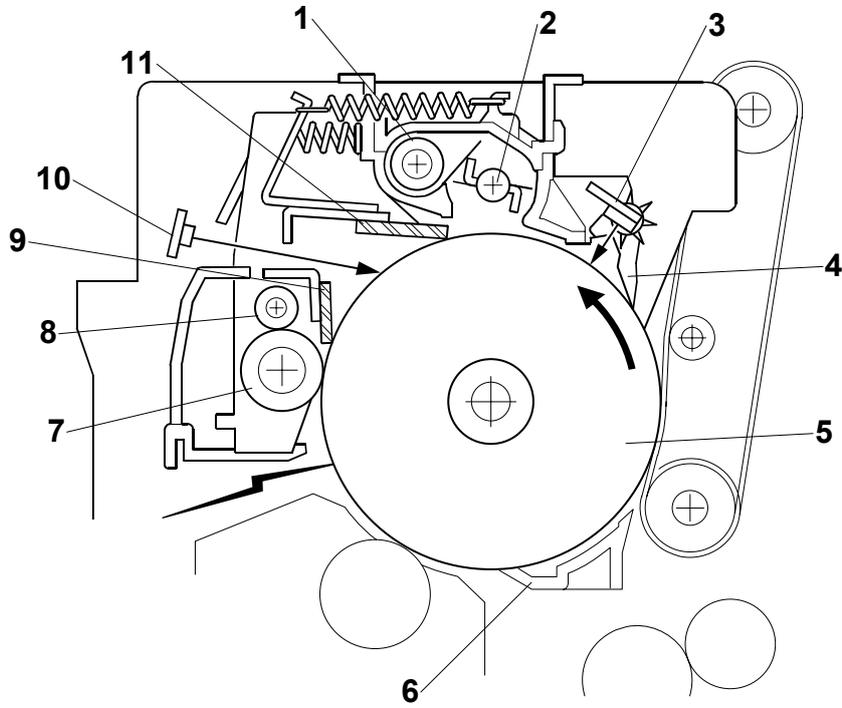
### 6.6.5 LD SAFETY SWITCHES



To ensure personal safety and to prevent the laser beam from inadvertently switching on during servicing, power to the laser diode is switched off when the front cover or upper right cover is opened. Four safety switches are installed in series on the LD5 V line from the power supply unit (PSU) via the BICU board.

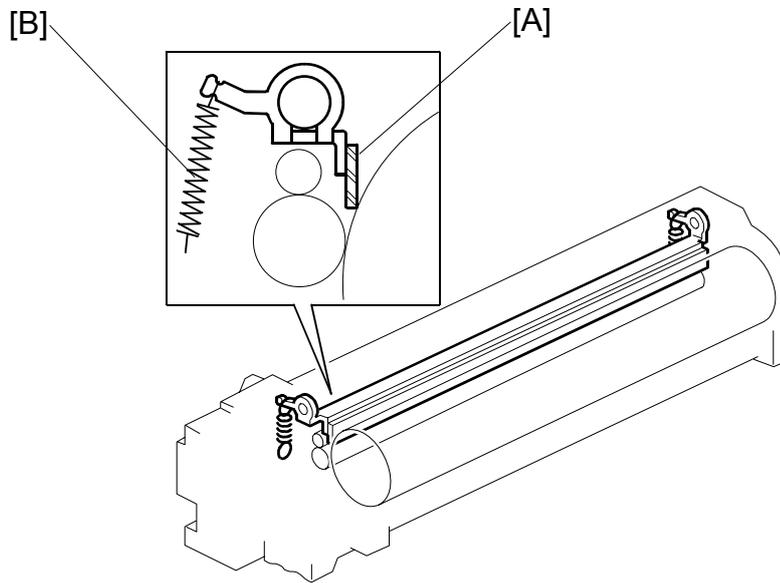
## 6.7 PHOTOCONDUCTOR UNIT (PCU)

### 6.7.1 OVERVIEW



- |                             |                                  |
|-----------------------------|----------------------------------|
| 1. Toner Collection Coil    | 7. Charge Roller                 |
| 2. Toner Collection Plate   | 8. Charge Roller Cleaning Roller |
| 3. Image Density Sensor     | 9. Drum Cleaning Blade 2         |
| 4. Pick off Pawl            | 10. Quenching Lamp               |
| 5. OPC Drum ( $\phi 60$ mm) | 11. Drum Cleaning Blade 1        |
| 6. Transfer Entrance Guide  |                                  |

## 6.7.2 DRUM CLEANING



The PxP (Polyester Polymerization) toner of this machine is of much finer particle size so in addition to the stationary cleaning blade, mounted with two screws at the bottom of the PCU, an additional cleaning blade [A] has been added to increase the efficiency of drum cleaning.

The new cleaning blade is held in contact with the drum by two small springs [B] (one on each end) that keep the cleaning blade in contact with the drum. This cleaning blade is not a counter blade.

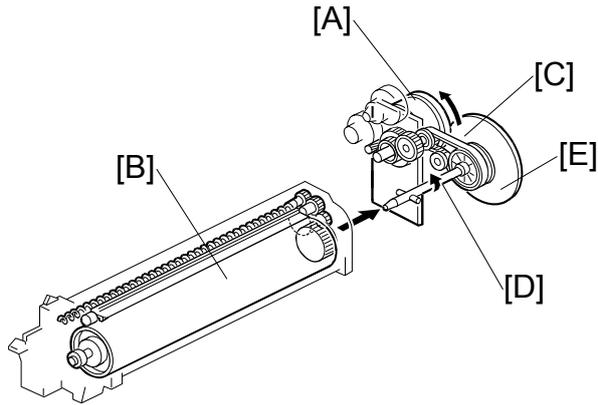
The tension of these springs has been reduced for this model in order to reduce the amount of pressure applied by the blade against the drum.

Every time the PCU is opened for replacement or cleaning, the spring closest to the front of the PCU must move in order to retract the cleaning blade away from the OPC drum. After cleaning or replacement, the spring must be returned to its original position to keep the blade in contact with the OPC drum for normal operation. For details, see Section “3 Replacement and Adjustment”.

### 6.7.3 DRIVE MECHANISM

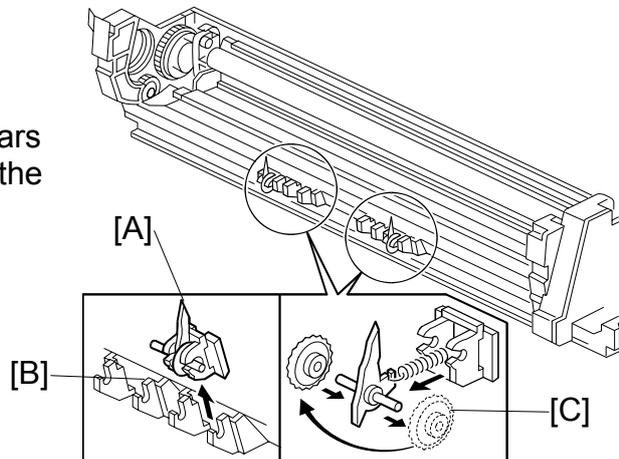
The drive from the main motor [A] is transmitted to the drum [B] through a series of gears, a timing belt [C], and the drum drive shaft [D].

The main motor has a drive controller, which outputs a motor lock signal when the rotation speed is out of the specified range. The flywheel [E] on the end of the drum drive shaft stabilizes the rotation speed (this prevents banding and jitter on copies).



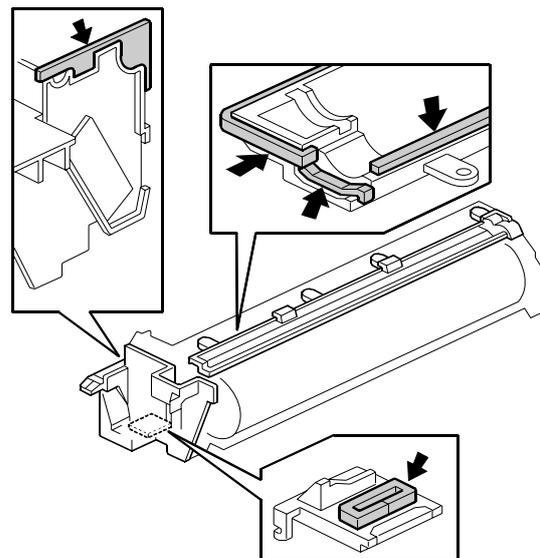
### 6.7.4 DRUM PAWLS

The pick-off pawls [A], mounted in the holders [B] on the drum and in contact with the drum, strip the paper from the drum if it has not yet separated. The gears [C] are removable, and the positions of the holders can be adjusted.



### 6.7.5 DRUM TONER SEALS

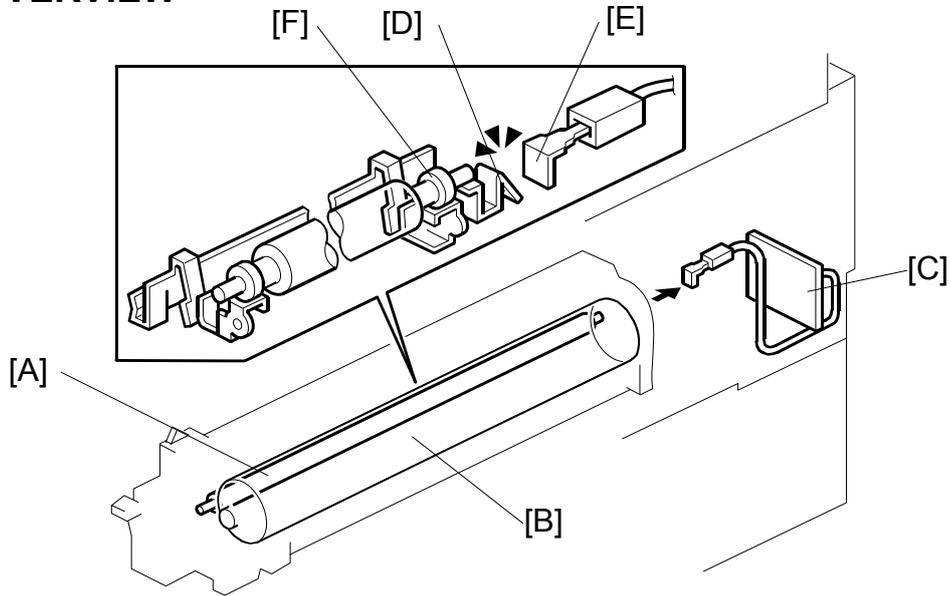
Seals have been added to the structure of the PCU (photoconductor unit) to prevent toner leakage.



Detailed Descriptions

## 6.8 DRUM CHARGE

### 6.8.1 OVERVIEW

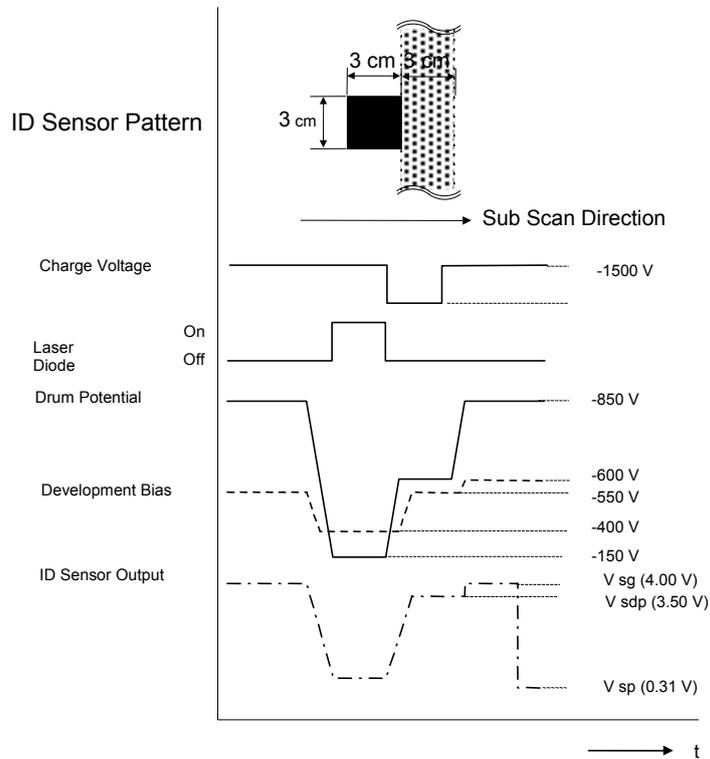


This copier uses a drum charge roller to charge the drum.

The drum charge roller [A] contacts the surface of the drum [B] to give it a negative charge. The high voltage supply board [C] supplies a negative dc voltage to the drum charge roller through the charge roller terminal [D], bias plate [E], and the rear roller bushing [F] to give the drum surface a negative charge of  $-850V$ .

## 6.8.2 CHARGE ROLLER VOLTAGE CORRECTION

### *Correction for Environmental Conditions*



The voltage transferred from roller to drum could vary with the temperature and humidity around the drum charge roller. The lower the temperature or humidity, the higher the applied voltage required.

The ID sensor measures the effects of ambient conditions, and any small change in drum potential caused by changes in temperature/humidity is reflected in the amount of toner transferred to the drum.

This measurement is done immediately after the ID sensor pattern for toner density control. After creating ID sensor pattern another pattern is made. To do this, the LD switches off, the charge roller voltage drops, and the drum potential is reduced to -600V. At the same time, development bias returns to -550V. The drum potential is now slightly higher than the development bias, so only a very small amount of toner transfers to the drum. The ID sensor measures the density of the second pattern and  $V_{sdp}$ , the output voltage, is compared with  $V_{sg}$  which was read from the bare drum at the same time.

Detailed Descriptions

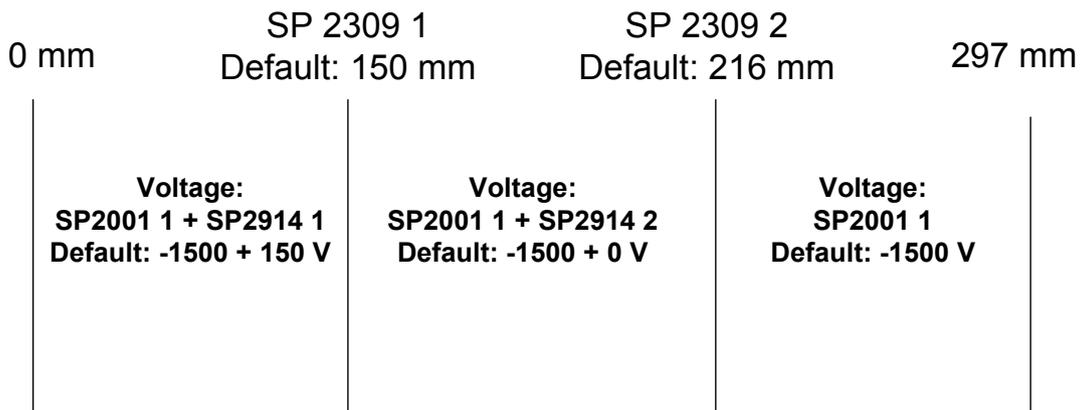
### 6.8.3 CORRECTION FOR PAPER WIDTH AND THICKNESS

**NOTE:** This correction is done for the bypass tray only.

The by-pass tray can be used for non-standard paper narrower than sizes accepted by the paper trays. Thicker paper, OHP sheets, etc. can also be loaded in the by-pass tray but adjustments must be performed with the SP modes listed below in order to avoid jams and copy quality problems.

SP Mode	SP Name	
SP2001 1	Charge Roller Bias Adjustment	Width 216 - 297 mm (Default: -1450 V)
SP2309 1	Paper Lower Width [a]	Width limit (Default: 150 mm)
SP2309 2	Paper Upper Width [b]	Width limit (Default: 216 mm)
SP2914 1	C-alpha	Adjust 10V/step (Default: 150 V)
SP2914 2	C-beta	Adjust 10V/step (Default: 0 V)

The way that these SP modes are used is shown below.

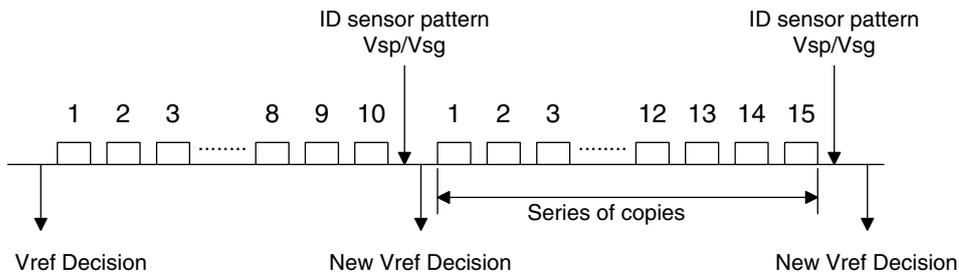


For example, with the default settings, if the paper width fed from the by-pass tray is 200 mm, the charge roller voltage will be  $-1500 + 0$  V.

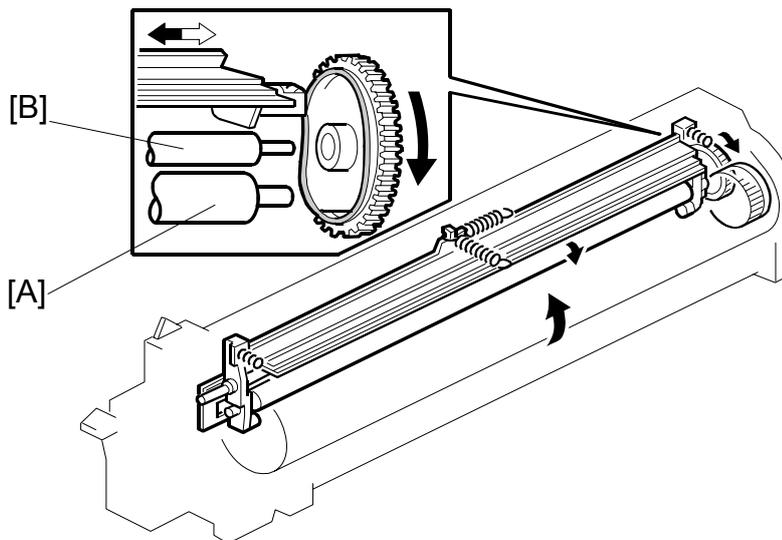
### 6.8.4 ID SENSOR PATTERN PRODUCTION TIMING

An ID sensor pattern is created after the main machine is powered on, and after finishing a job of 10 or more sheets.

The ID sensor pattern production interval can be adjusted with SP2-210 (ID Sensor Pattern Interval).



### 6.8.5 DRUM CHARGE ROLLER CLEANING

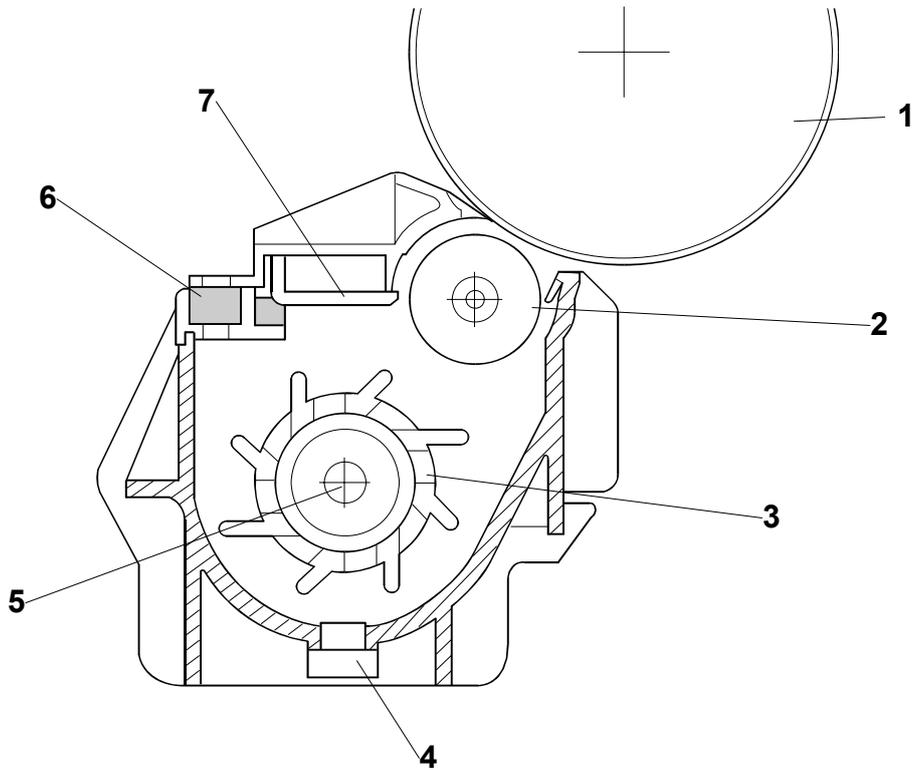


The drum charge roller [A] (always in contact with the drum), gets dirty easily. The brush roller [B] remains in contact with the charger roller to clean the charge roller.

Detailed Descriptions

## 6.9 DEVELOPMENT

### 6.9.1 OVERVIEW



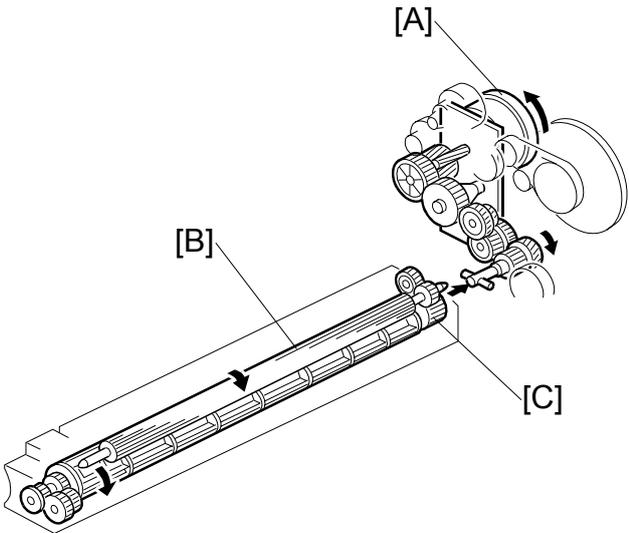
- |                      |                      |
|----------------------|----------------------|
| 1 Drum               | 5 Mixing Auger       |
| 2 Development Roller | 6 Development Filter |
| 3 Paddle Roller      | 7 Doctor Blade       |
| 4 TD Sensor          |                      |

### 6.9.2 DRIVE MECHANISM

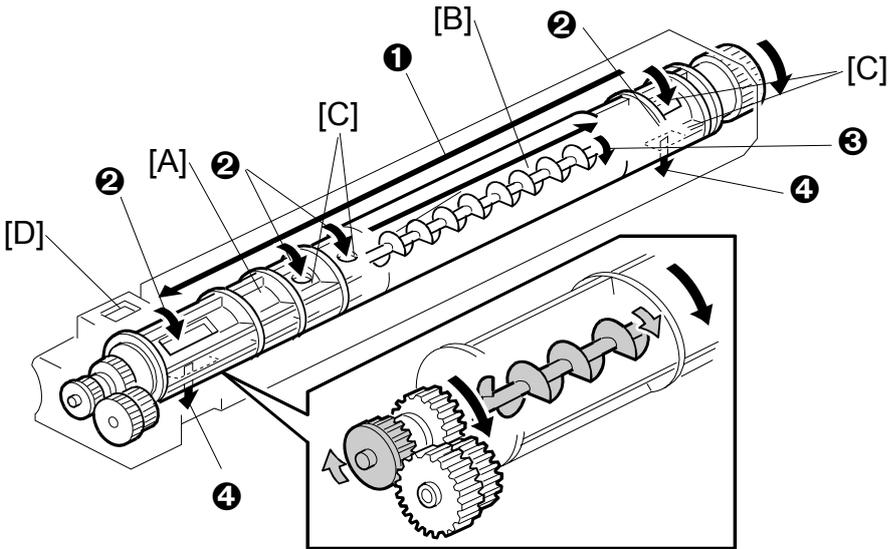
The feed/development motor [A] drives the development roller [B] through the gears and the paddle roller gear [C].

The drive shaft engages and disengages the paddle roller gear when the development unit is inserted into and removed from the machine.

**NOTE:** The development drive gears are helical gears, quieter than normal gears.



### 6.9.3 DEVELOPER MIXING



The dual mixing roller consists of the outer paddle [A] and the inner auger [B].

The outer paddle moves developer to the front ① and supplies it to the development roller. Developer that spills off by the doctor blade ② passes through the holes [C] in the outer paddle, and is transported to the rear ③ by the inner auger.

While the dual mixing roller is moving the developer, some developer also passes back to the development unit through the holes in the bottom of the paddle roller ④. New toner from the toner bottle and recycled toner from the toner collection coil both enter the development unit at [D].

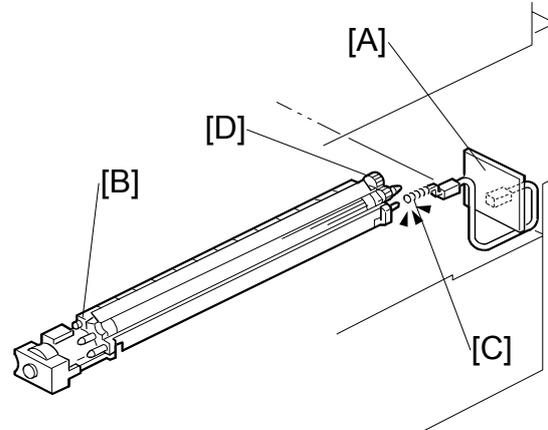
Detailed Descriptions

### 6.9.4 DEVELOPMENT BIAS

#### **Mechanism**

Black areas of the latent image are at a low negative charge (about  $-150\text{ V}$ ) and white areas are at a high negative charge (about  $-950\text{ V}$ ).

To attract negatively charged toner to the black areas of the latent image on the drum, the high voltage supply board [A] applies a bias of  $-560\text{ volts}$  to the development roller throughout the image development process. The bias is applied to the development roller shaft [B] through the bias terminal spring [C] and bias terminal [D].



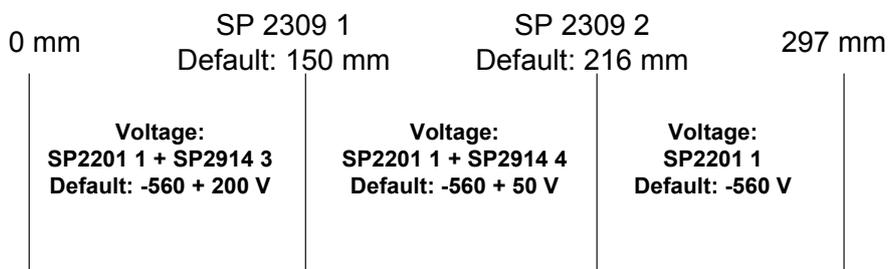
The development bias voltage ( $-560\text{ V}$ ) can be adjusted with SP2-201 (Development Bias).

#### **Correction for paper width and thickness (by-pass tray only)**

The by-pass tray can be used for non-standard paper narrow than sizes accepted by the paper trays. Thicker paper, OHP sheets, etc. can also be loaded in the by-pass tray but adjustments must be performed with the SP modes listed below in order to avoid jams and misfeeds.

SP Mode	SP Name	
SP2201 1	Development Bias	Width 216 - 297 mm (Default: $-560\text{V}$ )
SP2309 1	Paper Lower Width [a]	Width limit (Default: 150 mm)
SP2309 2	Paper Upper Width [b]	Width limit (Default: 216 mm)
SP2914 3	Process Control Setting ( $B\gamma$ )	Adjust 10V/step (Default: 200V)
SP2914 4	Process Control Setting ( $B\delta$ )	Adjust 10V/step (Default: 50V)

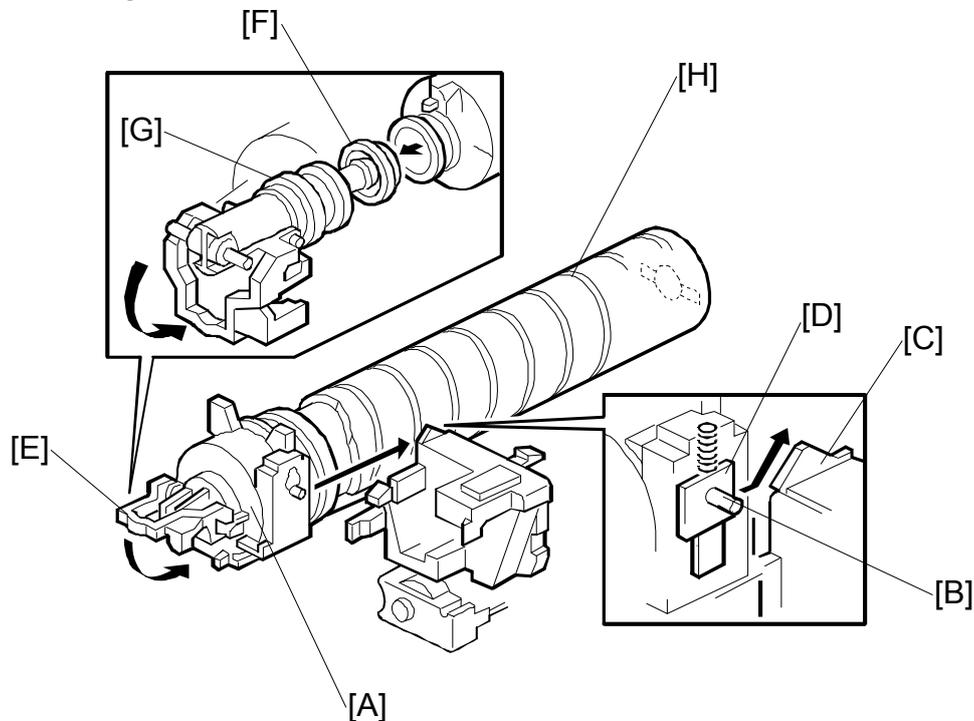
The way that these SP modes are used is shown below.



For example, with the default settings, if the paper width fed from the by-pass tray is 200 mm, the development bias voltage will be  $-560 + 50\text{ V}$ .

## 6.9.5 TONER SUPPLY

### *Toner bottle replenishment mechanism*



When the toner bottle is installed in the bottle holder [A], pin [B] slides up the side of the PCU [C], pulling out the toner shutter [D]. When the toner bottle holder lever [E] is returned to its original position, the cap [F] pulls away and is kept in place by the chuck [G].

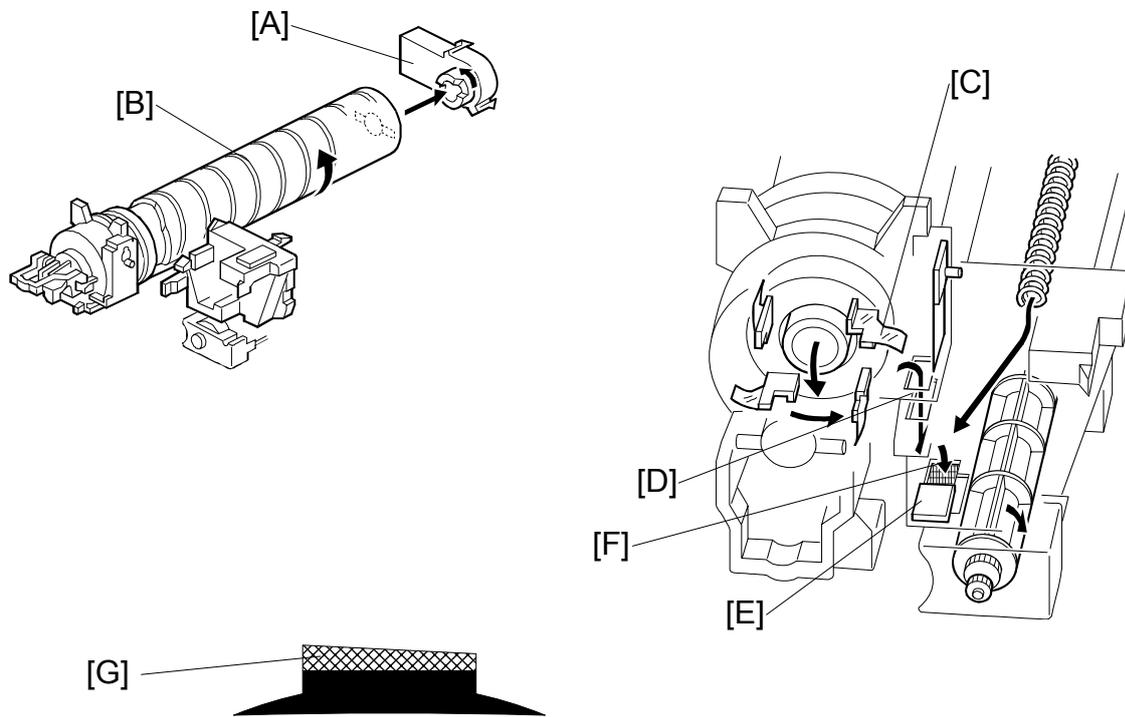
The toner bottle holder lever [E] cannot be lowered:

- Until a toner bottle is installed in the holder. This prevents toner falling out of the holder unit as a result of lowering the handle with no toner bottle installed.
- Until the holder and bottle have been pushed into the machine completely and locked in place. Instruct the customer to always follow the bottle replacement instructions of the new decal attached to the toner bottle.

The toner bottle has a spiral groove [H], which rotates the bottle to move toner to the development unit. When the bottle holder unit is pulled out, the chuck [G] releases the toner bottle cap and the toner shutter [D] closes and blocks the opening.

## DEVELOPMENT

### *Toner supply mechanism*



The toner supply motor [A] rotates the toner bottle [B] and the mylar blades [C].

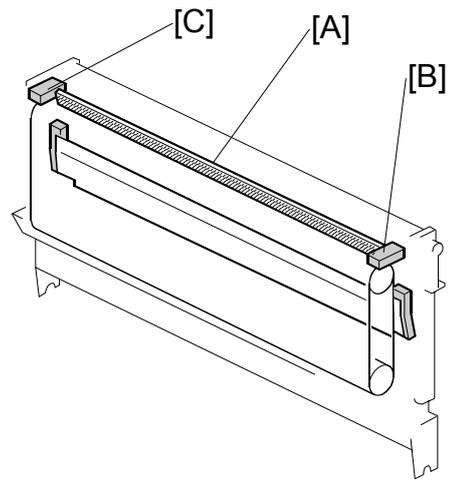
Toner falls into the toner bottle holder, and the toner supply mylar blades [C] transfer the toner to slit [D]. Installing the PCU opens the shutter [E].

The toner falls into the development unit through the port [F].

The left side of the entrance seal [G] is higher than the right. This improves the efficiency of seal on the left side, especially when the PCU is removed.

***Toner Scatter Prevention***

To reduce toner scattering, a velvet strip [A] extends across the length of the fusing unit, Seals are attached at each end of the strip [B] and [C].



### **Toner density control**

There are two modes for controlling and maintaining constant toner supply: sensor control (both direct and indirect) and image pixel count control. The mode can be changed with SP2-208-1 (Toner Supply Mode).

**NOTE:** The factory setting is sensor control mode; image pixel count mode should only be used temporarily until a defective TD or ID sensor can be replaced.

### ***Sensor Control Mode***

In the sensor control mode, the amount of toner required to print the page is calculated by the CPU; it adds up the image data value of each pixel and converts the sum to a value between 0 and 255. (255 would mean a completely black page.)

The machine must vary toner supply for each copy in order to maintain the correct amount of toner in the developer and to account for changes in drum reflectivity due to changes in temperature and humidity. The CPU uses data from the TD sensor and ID sensor to determine whether or not the toner supply motor should be switched on and to calculate how long it should remain on in order to supply more toner to the mixture in the development unit.

**TD Sensor.** When new developer of standard toner concentration is installed, namely 20 g of toner per 500 g of developer (4.0% by weight), the TD sensor must be set to its initial setting of 3.0V with SP2-801. This initial setting is used as the toner supply reference voltage or  $V_{ref}$ . For every copy cycle, the TD sensor directly checks the toner density in the developer mixture, and after 10 copies these 10 readings are averaged and this value becomes TD sensor output voltage  $V_t(10)$ .

The machine compares  $V_t(10)$  with  $V_{ref}$ . If  $V_t(10)$  is greater than  $V_{ref}$ , the toner concentration in the development unit judged to be low. When  $V_t(10)$  is detected to be greater than  $V_{ref}$  20 times, then this indicates that the toner concentration is consistently low,  $V_{ref}$  is incremented by 0.1V, and the conditions are checked again. The result of this check determines the value of K, the toner supply rate coefficient, which is one of the factors that is used in the toner supply motor on-time calculation.

**ID Sensor.** In addition to comparing  $V_t(10)$  from the TD sensor and  $V_{ref}$ , after every 10 copies the ID sensor, located at the lower right area of the drum, checks both the reflectivity ( $V_{sg}$ ) and the pattern on the drum ( $V_{sp}$ ), created by the laser diodes and charge roller. If the reflected light is too strong, this indicates that toner is low and toner is added to the development unit. (The frequency of these checks can be adjusted with SP2-210 (ID Sensor Pattern Interval).

### ***Image Pixel Count Mode***

This mode should only be used only as a temporary measure while waiting for replacement parts, such as a TD sensor. This mode controls the toner supply amount using the same method for determining the toner bottle motor on time. However, the values that were in effect when the toner density control mode was changed over to image pixel count mode with SP2-208-1 (Toner Supply Mode) remain in effect and cannot be changed.

## **6.9.6 TONER NEAR END/END DETECTION**

### ***Toner Near End***

The machine triggers the toner near-end alert and starts to rotate the toner supply bottle when either of the following two conditions occur.

- The machine detects (1) the toner supply rate (amount of toner supplied per second set with SP2209 1) drops to 25, (2) the current output of the TD sensor ( $V_t$ ) has dropped below the target value after 40 samples, and then (3) still fails to detect the target  $V_t$  after an additional 40 samples.
- The machine determines that the toner density is too light after it detects that (1) the difference between  $V_{ref}$  (the TD sensor reference voltage) and the averaged density of the previous 10 copies is more than 0.2V, and (2)  $V_{sp}$  (the reflectivity of the ID sensor pattern) is greater than 0.7V.

### ***Toner End***

After the machine enters the toner near-mode, it will trigger the toner end alert if any of the conditions below continue to exist:

- TD sensor output does not reach the target value within 90 copies after the toner near-end alert ("90" is the default setting for SP2213).
- The ID sensor output from reading the ID sensor pattern ( $V_{sp}$ ) is extremely low (light).
- The averaged TD sensor output  $V_t$  exceeds 0.15V.

### 6.9.7 TONER END RECOVERY

If the front door is opened and then closed while a toner near end/end condition exists, the machine will attempt to recover. When the front door is closed, the toner supply motor turns on to supply toner. The machine checks the TD sensor output 2 seconds after the main motor turns on ( $V_{tp}$ ), and the sensor is checked again every 1 second ( $V_{tp}^1$ )

The machine detects the toner concentration using  $V_{ref}$ ,  $V_t$  (10),  $V_{tp}$ , and  $V_{tp}^1$ . If the toner concentration is still too low, the toner supply motor remains on for another 10 seconds while the machine checks  $V_t$ . If toner concentration is judged to be at the standard level, then the toner near end/end condition is cancelled and  $K$  (toner supply coefficient) is reset. If toner concentration has not reached the standard level, the toner supply motor rotates continuously until it does (maximum motor on time is 16 seconds) and then it will switch off.

### 6.9.8 TONER SUPPLY WITH ABNORMAL SENSORS

The TD sensor is checked every copy. If the readings from the TD sensor become abnormal during a copy job, the machine holds the GAIN factor constant (GAIN is normally calculated from TD sensor readings) to allow toner supply to vary with only pixel count for the rest of the copy job. Then at the end of the copy job, an SC code is generated and the machine must be repaired.

The ID sensor is checked every 10 copies. If readings become abnormal, an SC code is generated and the machine must be repaired. If this happens during a copy job,  $V_{ref}$  is not changed, the copy job is allowed to finish, and then the SC code is generated.

If spare parts are not available, the technician can use SP2-208-1 to temporarily put the machine in image pixel count mode. (☛ Chapter 5 Service Tables)

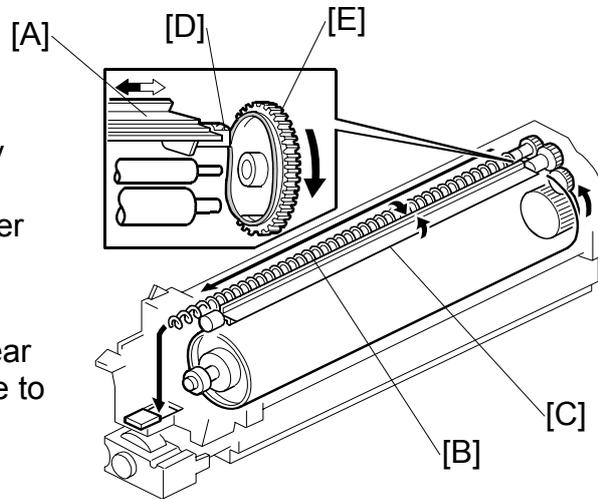
## 6.10 DRUM CLEANING AND TONER RECYCLING

### 6.10.1 DRUM CLEANING

This machine employs a counter blade system. After the image is transferred to paper, a cleaning blade [A] removes any toner remaining on the drum. The toner collection coil [B] carries scraped off toner to the toner collection plate [C].

The collar [D] on the cleaning blade bracket contacts the outer rim of cam gear [E], which moves the cleaning blade side to side. This side-to-side movement disperses accumulated toner to prevent early blade edge wear at one location.

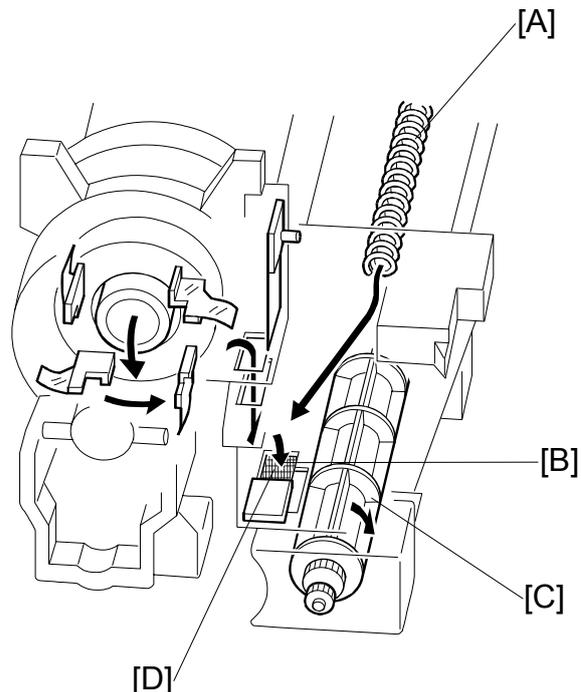
The drum reverses about 5 mm after every print job to remove particles on the edge of the cleaning blade.



### 6.10.2 TONER RECYCLING

Toner collected by the toner collection coil [A] is transported to the opening [B]. This toner falls into the development unit with new toner coming from the toner bottle. The paddle roller [C] mixes the collected toner with the new toner.

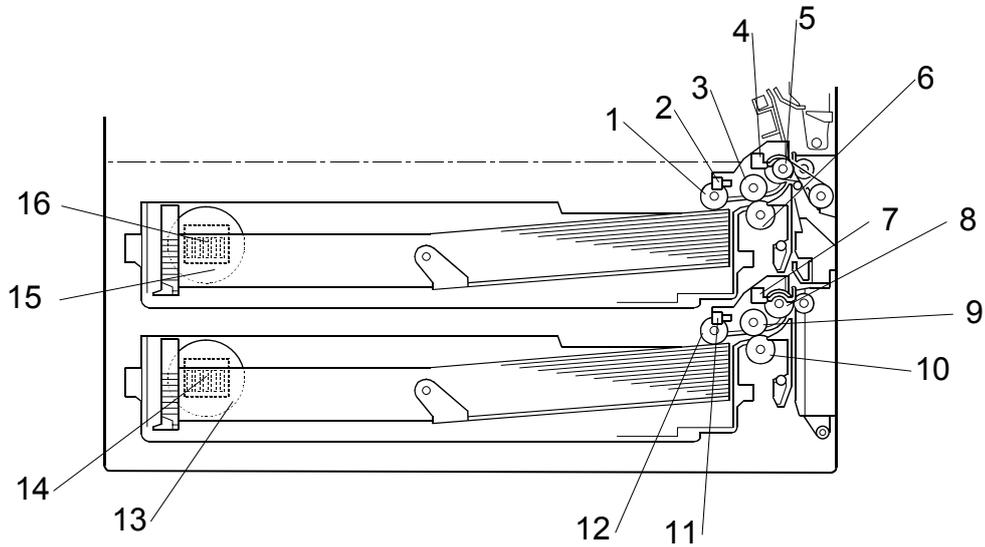
**NOTE:** A screen filter [D] has been added to strain out paper dust and other foreign matter.



Detailed  
Descriptions

## 6.11 PAPER FEED

### 6.11.1 OVERVIEW



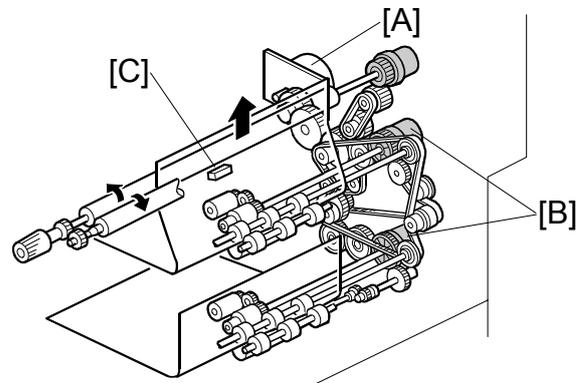
- |                             |                              |
|-----------------------------|------------------------------|
| 1 Upper pick-up roller      | 9 Lower paper feed roller    |
| 2 Upper paper height sensor | 10 Lower separation roller   |
| 3 Upper paper feed roller   | 11 Lower paper height sensor |
| 4 Upper relay sensor        | 12 Lower pick-up roller      |
| 5 Upper relay roller        | 13 Lower paper size dial     |
| 6 Upper separation roller   | 14 Lower paper size switch   |
| 7 Lower relay sensor        | 15 Upper paper size dial     |
| 8 Lower relay roller        | 16 Upper paper size switch   |

Each paper tray, which employs the FRR system, can hold 500 sheets. Two relay sensors, positioned above each set of relay rollers, detect paper jams. A selection dial allows you to select the setting for the size of the paper loaded in the tray.

### 6.11.2 PAPER FEED DRIVE

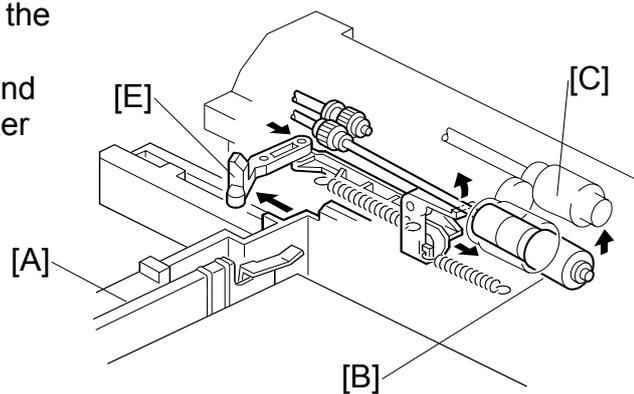
The feed/development motor [A] drives the pick-up and feed mechanism of both the upper and second paper feed stations through gears and the paper feed clutches [B].

When the paper feed clutch turns on, the pick-up roller, paper feed roller, and separation roller start rotating to feed the paper. The paper feed clutch stays on until shortly after the registration sensor [C] actuates.

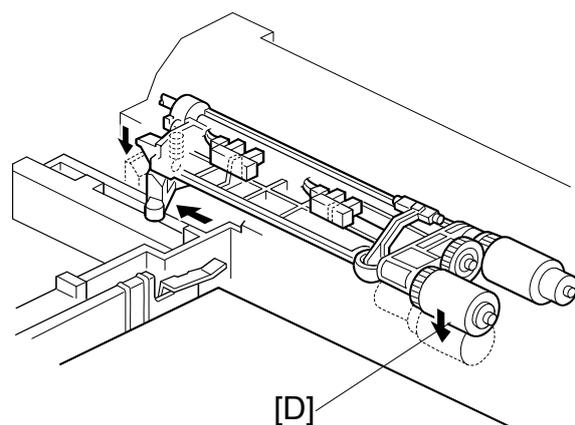


### 6.11.3 PICK-UP AND SEPARATION ROLLER RELEASE MECHANISM

When the paper tray [A] is not inside the machine, the separation roller [B] is away from the paper feed roller [C] and the pick-up roller [D] stays in the upper position.

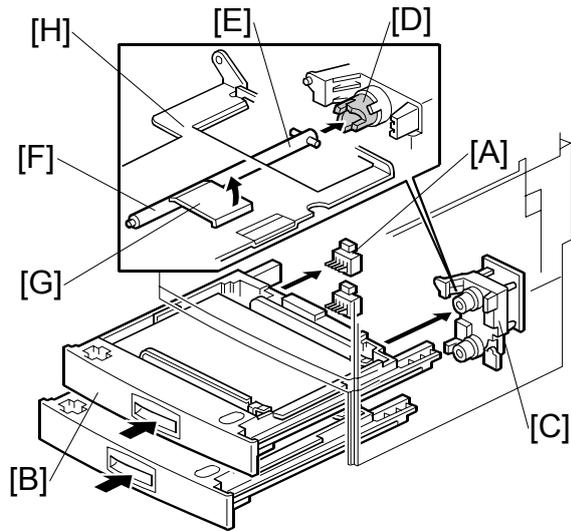


When the paper tray is set into the machine, it pushes the release lever [E]. This causes the pick-up roller [D] to go down and the separation roller [B] to move up and contact the paper feed roller.

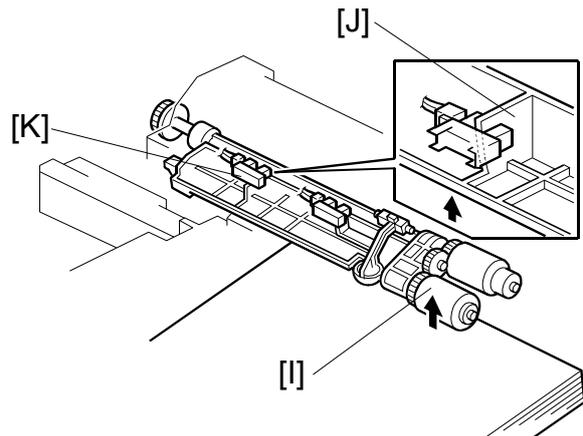


### 6.11.4 PAPER LIFT

The paper size switch [A] detects when the paper tray [B] is set in the machine, and the tray lift motor [C] rotates, and the coupling gear [D] on the tray lift motor engages the pin [E] on the lift arm shaft [F]. Then the tray lift arm [G] lifts the tray bottom plate [H].



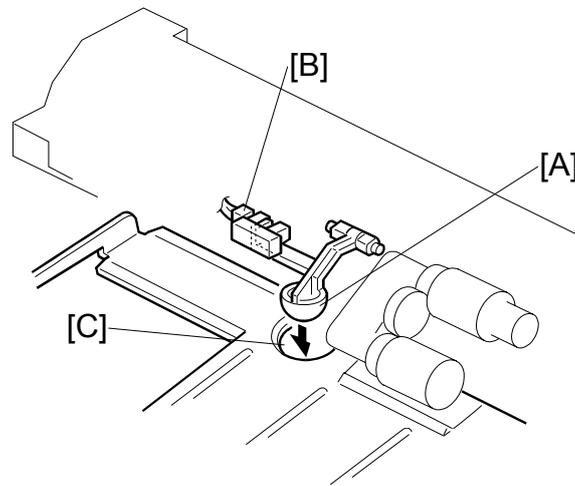
When the paper tray is set in the machine, the pick-up roller [I] lowers. When the top sheet of paper reaches the proper height for paper feed, the paper pushes up the pick-up roller, and the actuator [J] on the pick-up roller supporter activates the paper height sensor [K] to stop the tray lift motor.



After several paper feed cycles, the paper level gradually lowers and the paper height sensor is de-activated. The tray lift motor turns on again until this sensor is activated again.

When the paper tray is removed from the machine, the tray lift motor coupling gear disengages the pin on the lift arm shaft, and the tray bottom plate then drops under its own weight.

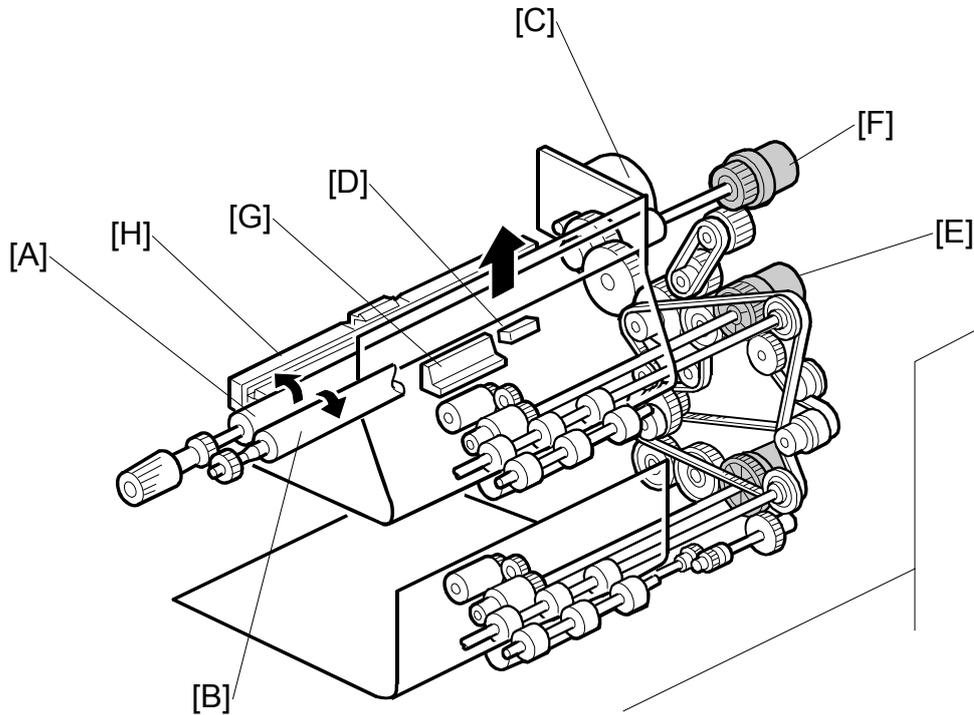
### 6.11.5 PAPER END DETECTION



If there is paper in the paper tray, the paper end feeler [A] is raised by the paper stack, and the paper end sensor [B] is deactivated.

When the paper tray runs out of paper, the paper end feeler drops into the cutout [C] in the tray bottom plate and the paper end sensor is activated.

### 6.11.6 PAPER REGISTRATION



The registration drive roller [A] and idle roller [B] correct the skew of the paper to ensure that the leading edge of the paper is positioned correctly at the drum. The paper feed/development motor [C] drives the registration mechanism.

The registration sensor [D] is positioned just before the registration rollers. When the leading edge activates the registration sensor, the registration clutch is switched off and the registration rollers stop turning. However, the relay clutch [E] remains on slightly longer. This delay allows more time for the paper to press against the registration rollers and buckle slightly to correct any skew. The registration sensor also detects misfeeds.

Next, the registration clutch [F] actuates and the relay clutch at the correct time to align the paper with the image on the drum. The registration rollers then feed the paper to the image transfer section.

Two new dust blades have been added around the registration roller. The idle roller dust blade [G] cleans the registration idle roller. This dust blade has a small dust box that collects paper dust that must be emptied periodically.

The registration roller dust blade [H] cleans the registration roller. For details about how to remove and clean these new parts, see Section “3 Replacement and Adjustment”.

## 6.11.7 PAPER SIZE DETECTION

The paper size switch includes four microswitches. Actuators behind the paper size dial actuate the sensors.

Each paper size has its own actuator, with a unique combination of notches. To determine the paper size, the CPU reads which switches the actuator has turned off.

The CPU disables paper feed from a tray if the paper size cannot be detected. If the paper size actuator is broken, or if there is no tray installed, the printer control board recognizes that the paper tray is not installed.

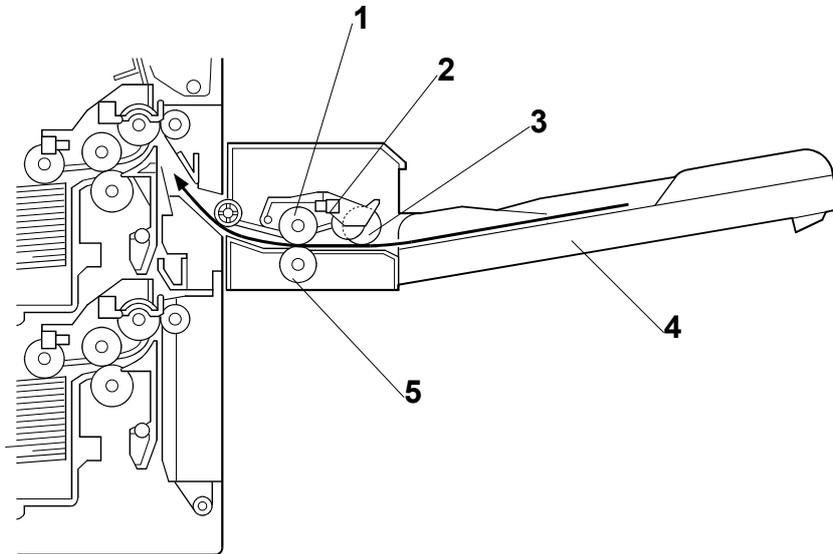
When the paper size actuator is at the “\* ” mark, the paper tray can be set up to accommodate one of a wider range of paper sizes by using one of the user tools on the machine’s operation panel.

Models		Paper Size Switch			
North America	Europe/Asia	1	2	3	4
8 1/2" x 13" Portrait	A3 Portrait	ON	ON	OFF	ON
A4 Landscape	A4 Landscape	ON	ON	ON	ON
A4 Portrait	A4 Portrait	ON	OFF	ON	ON
11" x 17" Portrait	A5 Portrait	OFF	OFF	ON	ON
8 1/2" x 14" Portrait	8" x 13" Portrait	ON	OFF	OFF	OFF
8 1/2" x 11" Portrait	8 1/2" x 11" Portrait	ON	ON	OFF	OFF
8 1/2" x 11" Landscape	8 1/2" x 11" Landscape	ON	OFF	ON	OFF
*	*	ON	ON	ON	OFF

**ON: Pushed    OFF: Not Pushed**

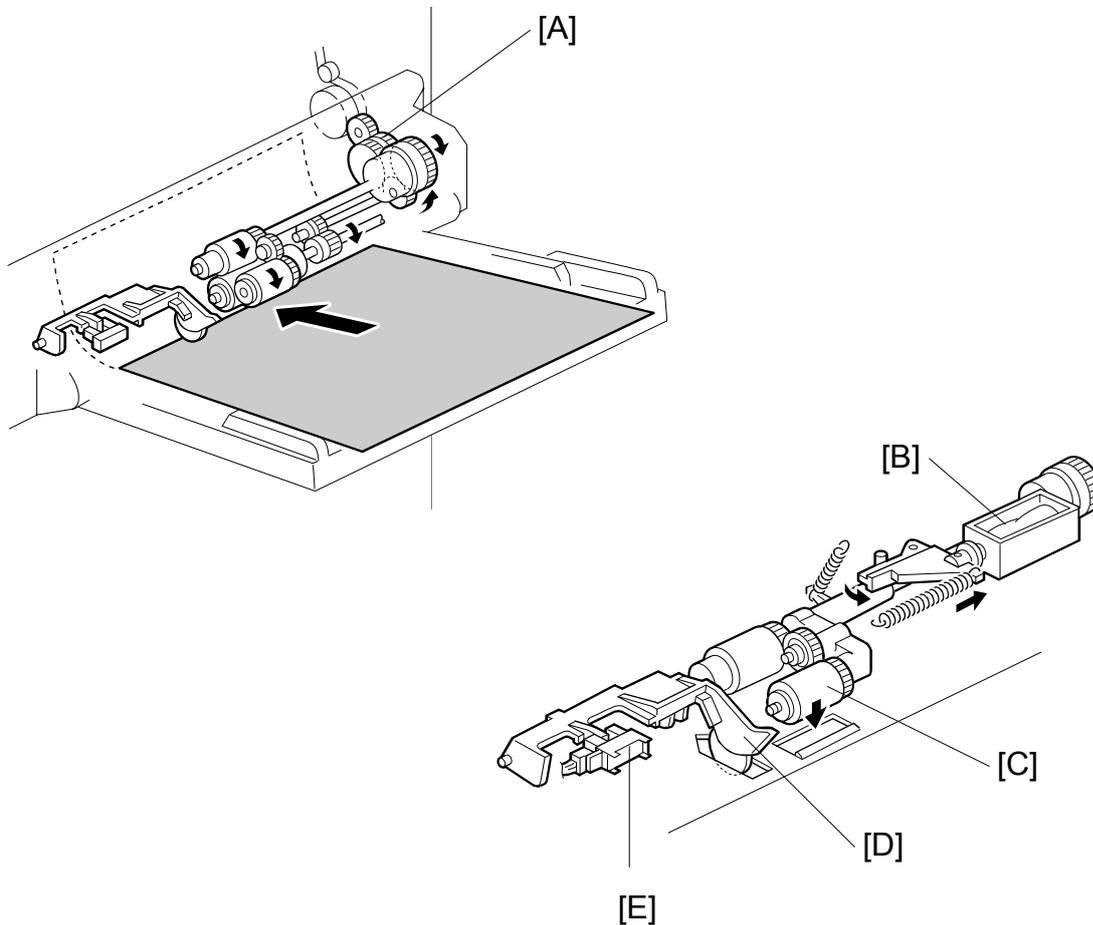
## 6.12 BY-PASS TRAY

### 6.12.1 OVERVIEW



- 1 Paper feed roller
- 2 Paper end sensor
- 3 Pick-up roller
- 4 By-pass tray
- 5 Separation roller

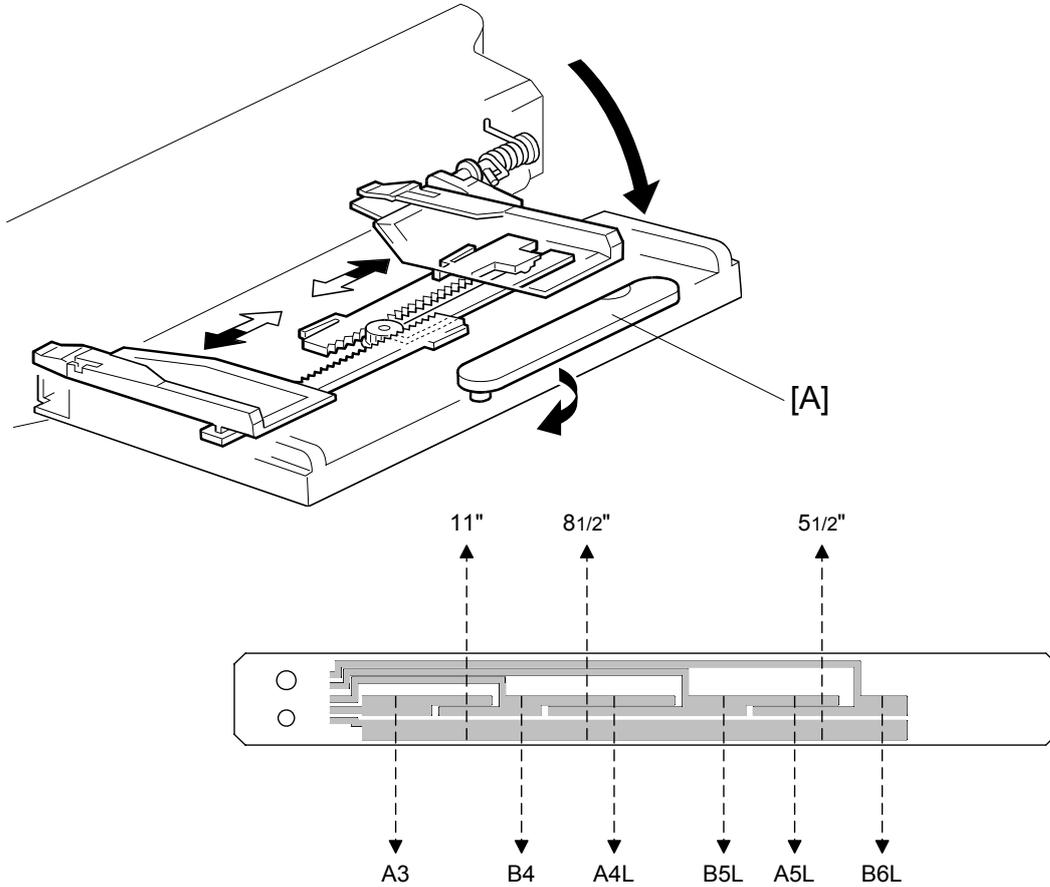
## 6.12.2 BY-PASS TRAY OPERATION



The by-pass unit is directly driven by the copier through gear [A].

When the print key is pressed, the pick-up solenoid [B] turns on and the pick-up roller [C] moves onto the paper. When the by-pass tray runs out of paper, the paper end feeler [D] drops into the cutout in the by-pass tray and the paper end sensor [E] is activated.

### 6.12.3 BY-PASS PAPER SIZE DETECTION

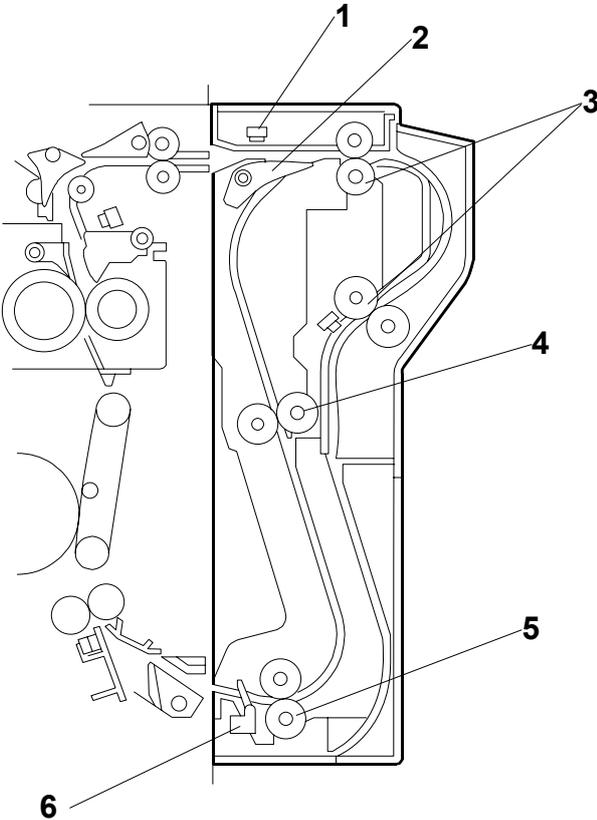


The paper size sensor board [A] monitors the paper width.

The rear side fence is connected to the terminal plate. The pattern for each paper width is unique. Therefore, the copier determines which paper has been placed in the by-pass tray by the signal output from the board. However, the copier does not determine the paper length from the by-pass tray hardware.

# 6.13 DUPLEX UNIT

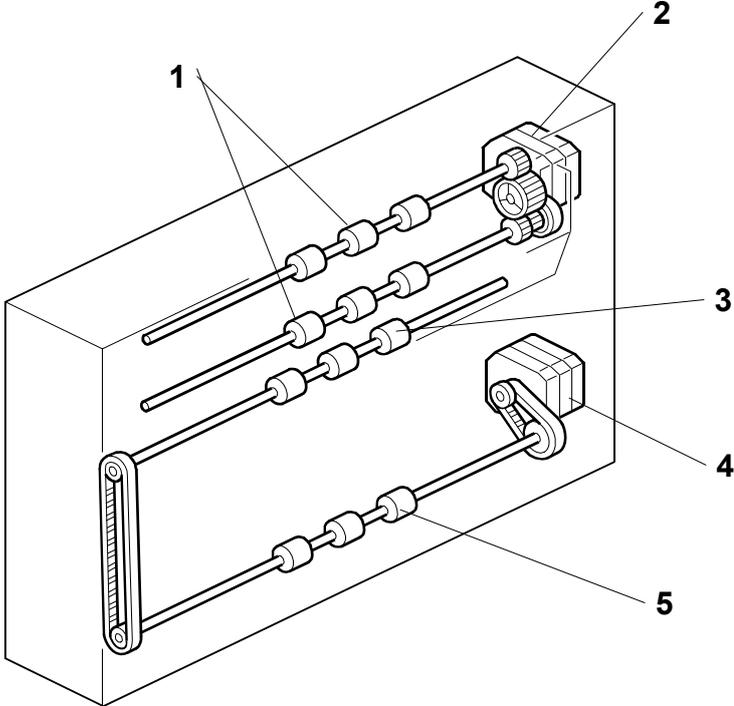
## 6.13.1 OVERVIEW



- |   |                 |   |                        |
|---|-----------------|---|------------------------|
| 1 | Entrance sensor | 4 | Upper transport roller |
| 2 | Inverter gate   | 5 | Lower transport roller |
| 3 | Inverter roller | 6 | Exit sensor            |

Detailed Descriptions

6.13.2 DUPLEX DRIVE LAYOUT



- |   |                        |   |                        |
|---|------------------------|---|------------------------|
| 1 | Inverter roller        | 4 | Transport motor        |
| 2 | Inverter motor         | 5 | Lower transport roller |
| 3 | Upper transport roller |   |                        |

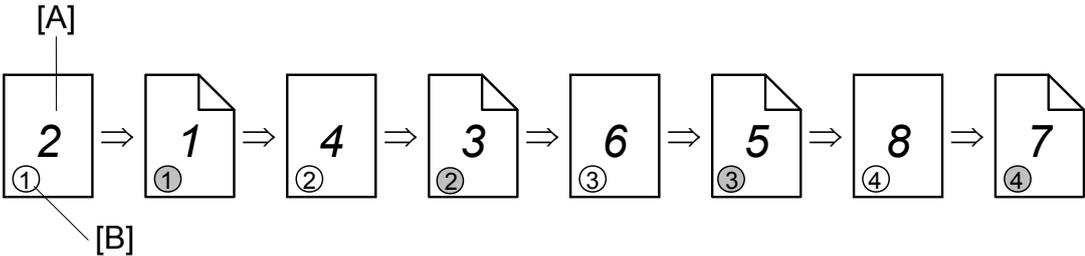
### 6.13.3 DUPLEX BASIC OPERATION

To increase the productivity of the duplex unit, copies are printed as follows.

#### **Longer than A4 lengthwise/LT lengthwise**

The duplex unit can store only one sheet of copy paper.

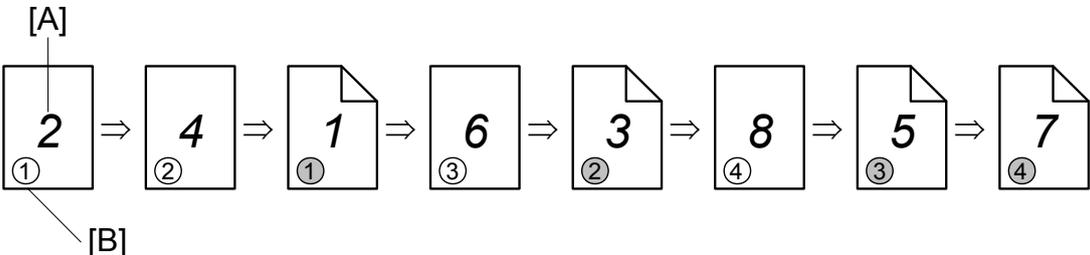
Example: 8 pages. The number [A] in the illustration shows the order of pages. The number [B] in the illustration shows the order of sheets of copy paper (if shaded, this indicates the second side).



#### **Up to A4 lengthwise/LT lengthwise**

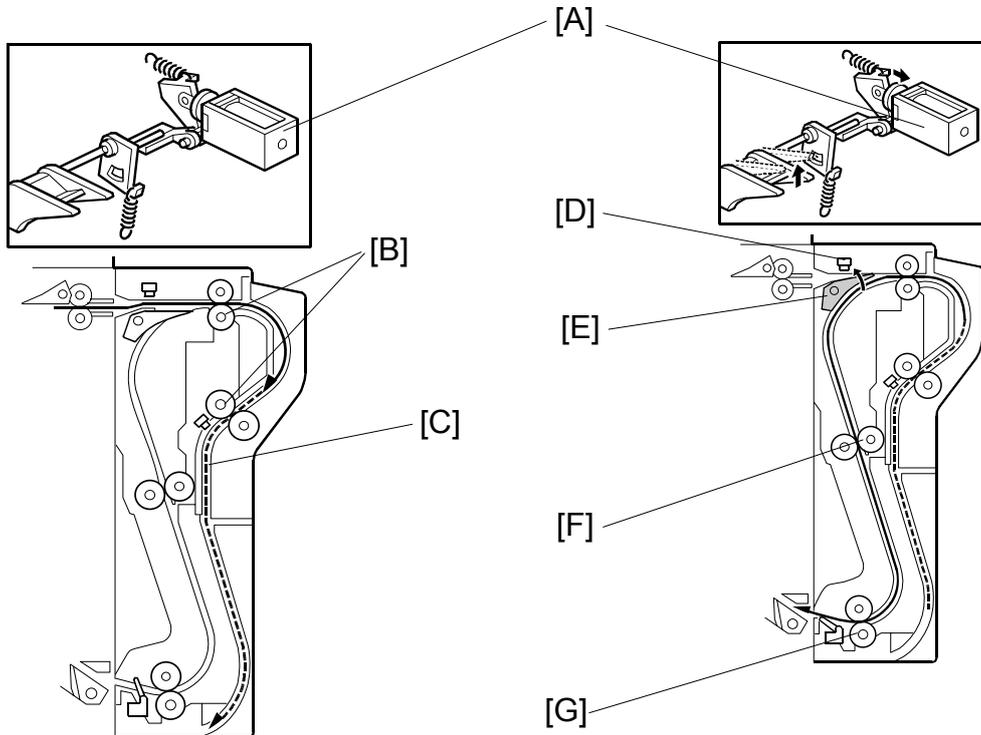
The duplex unit can store two sheets of copy paper

Example: 8 pages. The number [A] in the illustration shows the order of pages. The number [B] in the illustration shows the order of sheets of copy paper (if shaded, this indicates the second side).



Detailed Descriptions

### 6.13.4 DUPLEX UNIT FEED IN AND EXIT MECHANISM



#### ***Feed-in***

The inverter gate solenoid [A] stays off and the inverter rollers [B] rotate clockwise. A sheet of paper is sent to the inverter section [C].

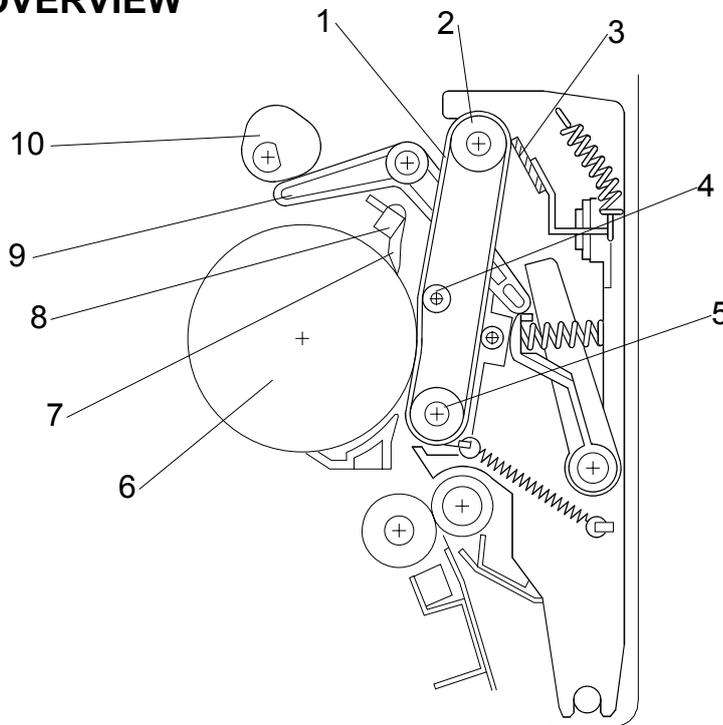
**NOTE:** The cover guide has been eliminated in order to accommodate paper sizes longer than A4/LT in the reverse feed path which has been lengthened in the design of this machine.

#### ***Inversion and Exit***

The inverter gate solenoid turns on and the inverter motor turns on in reverse shortly after the trailing edge of the paper passes through the entrance sensor [D]. As a result, the inverter gate [E] is opened and the inverter roller rotates counterclockwise. The paper is sent to the copier through the upper and lower transport rollers [F, G].

## 6.14 IMAGE TRANSFER AND PAPER SEPARATION

### 6.14.1 OVERVIEW



- |   |                              |    |                                  |
|---|------------------------------|----|----------------------------------|
| 1 | Transfer belt                | 6  | OPC                              |
| 2 | Drive roller                 | 7  | Pick-off pawls                   |
| 3 | Transfer belt cleaning blade | 8  | ID sensor                        |
| 4 | Transfer roller              | 9  | Contact lever                    |
| 5 | Idle roller                  | 10 | Transfer belt contact clutch/cam |

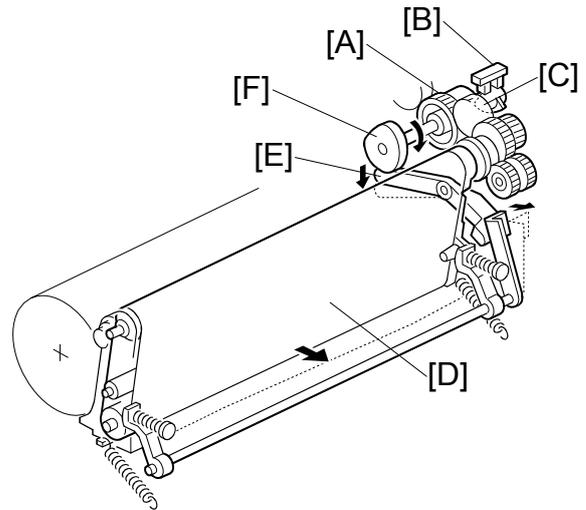
### 6.14.2 BELT DRIVE MECHANISM

After the main motor switches on during copying, the transfer belt contact clutch [A] switches on after a specified interval and the cam [F] makes a half-turn to raise the contact lever [E] and bring the transfer belt [D] into contact with the drum.

The actuator [C], on the same axis as the cam, and the transfer belt position sensor [B] detect whether the drum and transfer belt are in contact.

When the main motor is off, or when the ID sensor pattern is being measured, the transfer belt unit separates from the drum.

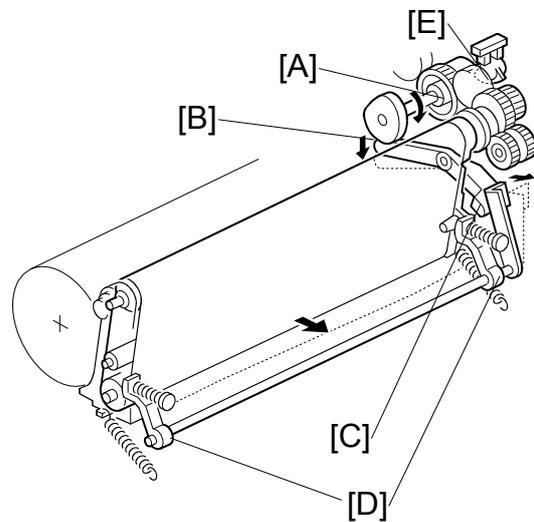
The ID sensor pattern must not be transferred to the belt. Also, the transfer belt and drum must not remain in contact for too long, to prevent contamination of the drum with oil or other foreign material from the transfer belt.



### 6.14.3 TRANSFER BELT UNIT CONTACT MECHANISM

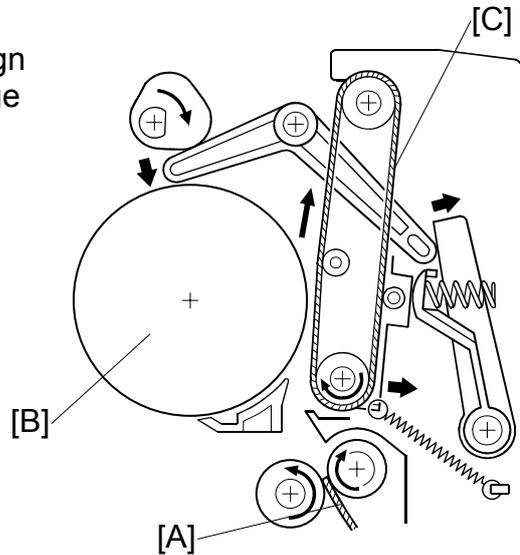
The belt contact and release mechanism consists of the belt contact clutch [A], cam [B], and contact lever [C]. The belt contact clutch turns on and the cam attached to the clutch rotates half a complete rotation. The contact lever, riding on the cam, is lifted up and the springs [D] push the belt into contact with the drum.

The transfer belt position sensor [E] detects the home position of the cam (this is when the belt is away from the drum). The belt must be released from the drum between copy jobs in order to prevent the ID sensor pattern from being rubbed off and to prevent contamination of the drum from the surface of the belt.

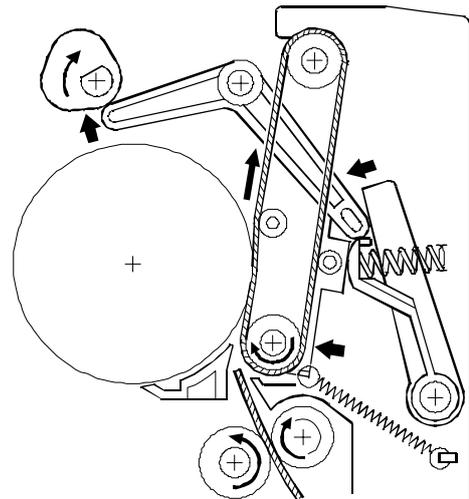


### 6.14.4 IMAGE TRANSFER AND PAPER SEPARATION MECHANISM

When the registration clutch switches on to align the leading edge of the paper [A] with the image on the drum [B], the transfer belt [C] is away from the drum.

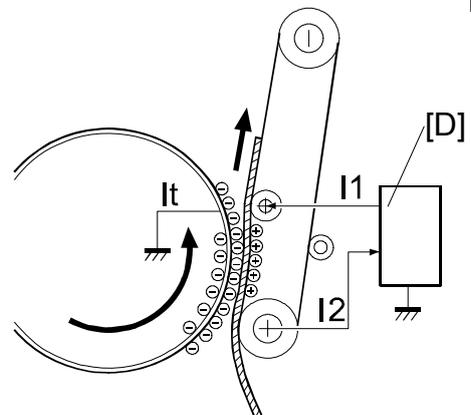


At the designated time after the main motor switches on, the transfer belt contact clutch switches on and the transfer belt touches the drum.



When the paper enters the gap between the belt and the drum, the high voltage supply board [D] applies a high positive current to the belt to transfer the image to the paper.

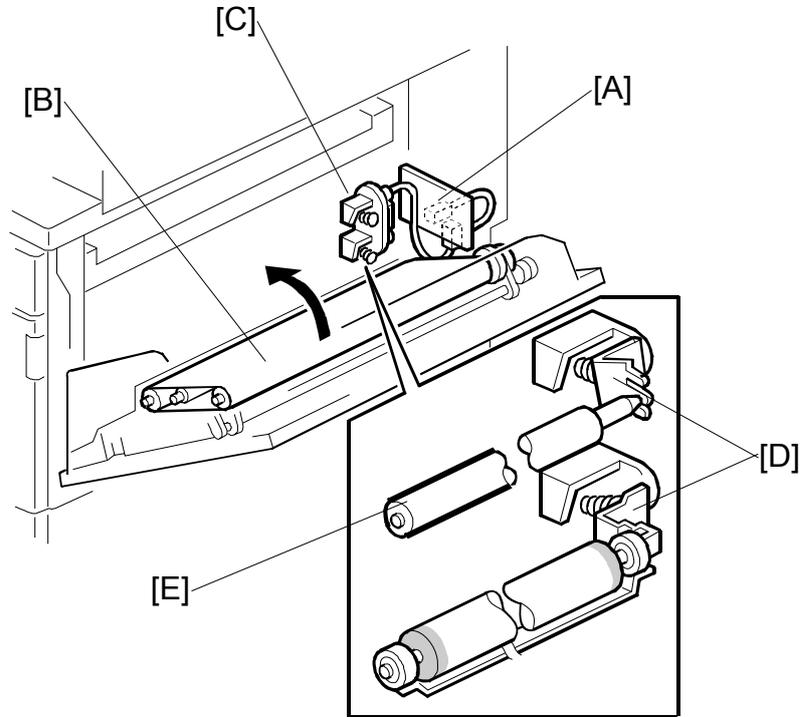
After receiving the image from the drum, the paper is fed by the belt. The paper moves to the end of the transfer belt unit, where it separates from the belt as the belt curves away. Then the paper moves on to the fusing unit.



Detailed Descriptions

### 6.14.5 TRANSFER BELT CHARGE

*Mechanism*



The high voltage supply board [A] applies a positive current to the transfer belt [B] through the terminal block [C], terminal plate [D], and the bias roller [E].

The high voltage supply board adjusts the current to the roller to keep a small but constant current flow to ground through the belt, paper, and drum. If this current is not kept constant, efficiency of toner transfer and paper separation will vary with paper thickness, type, environmental condition, or changes in transfer belt surface resistance.

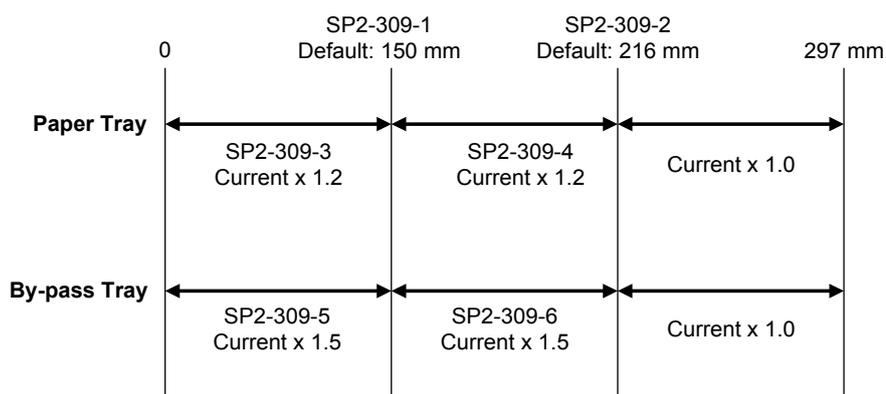
**Correction for paper width and thickness**

A range of SP modes is available in order to adjust the machine so it can handle papers of non-standard size and thickness.

For paper width, there are two thresholds. The factory settings are 150 mm (5.9") and 216 mm (8.5"). Below 216 mm, the transfer current can be increased. By default, the current is multiplied by 1.2 for the main machine paper trays. For paper widths below 150 mm, the transfer current can be set higher, but by default it is kept the same as the current for paper widths below 216 mm. The higher current allows for the tendency of the current to flow directly from the transfer belt to the drum and not through the paper which could cause an insufficient amount of toner to transfer to narrow width paper.

Thick paper must be fed from the by-pass tray because SP modes are available only for the by-pass tray in order to accommodate thick paper. By default, the current for paper narrower than 216 mm is 1.5 times the normal current.

This illustration shows the SP modes, which control these currents. The base transfer current ('current' in the diagram) depends on SP 2-301. This is different for various parts of the image, and is different for the by-pass tray; see the next page for details.



Detailed Descriptions

## IMAGE TRANSFER AND PAPER SEPARATION

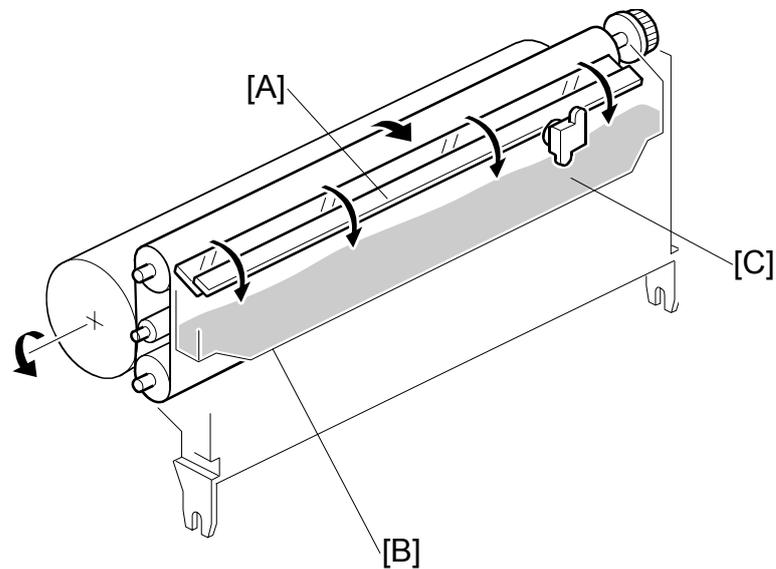
### ***Currents applied to leading edge, image areas - by-pass feed***

Transfer current can also be adjusted for the leading edge and the image area, and for by-pass feed. The timing for starting to apply leading edge current, for the switchover from leading edge current to image area current, and for switching off at the trailing edge can also be changed.

The table below lists the SP modes you can use to adjust these settings.

<b>SP2-301 Transfer Current Adjustment</b>		
<b>Image Areas</b>	SP2-301-1	1st Side of Paper
	SP2-301-2	2nd Side of Paper
	SP2-301-4	By-pass Feed (45 PPM)
	SP2-301-6	By-pass Feed (35 PPM)
<b>Leading Edge Areas</b>	SP2-301-3	Leading Edge
	SP2-301-5	Leading Edge By-pass Feed (35 PPM)
	SP2-301-7	Leading Edge By-pass Feed (45 PPM)
<b>SP2-911 Transfer Current Timing</b>		
<b>Timing</b>	SP2-911-1	On Timing (at leading edge)
	SP2-911-2	Switch Timing (from leading edge to image area current)
	SP2-911-3	Off Timing (at trailing edge)

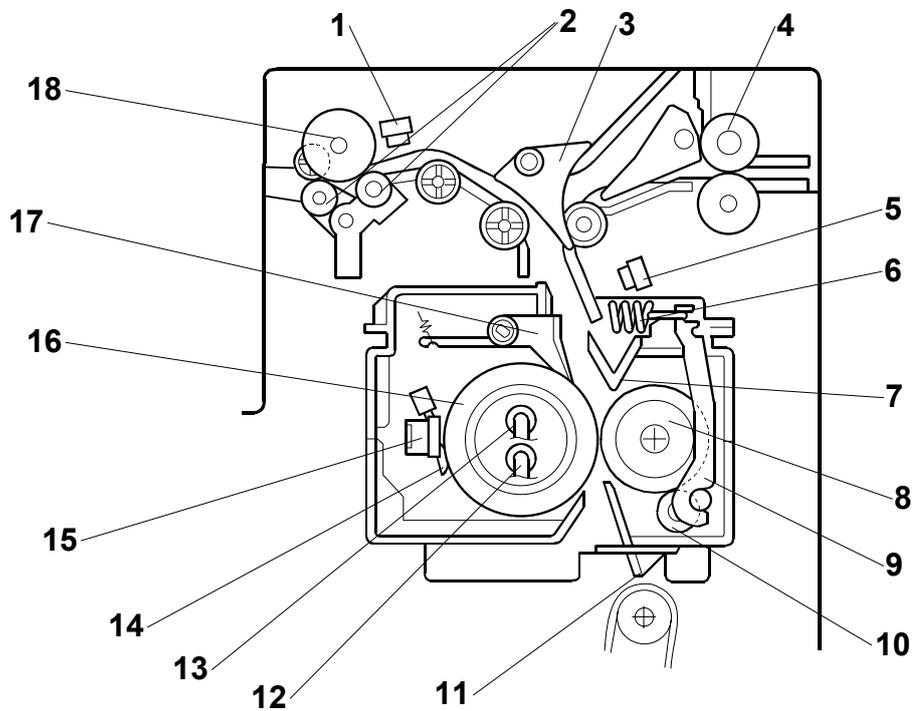
### 6.14.6 TRANSFER BELT CLEANING MECHANISM



The cleaning blade [A], always in contact with the transfer belt, scrapes off toner and paper dust remaining on the transfer belt.

Scraped off toner and paper dust falls into the toner collection tank [B] in the transfer belt unit. This toner is not recycled. When the toner overflow sensor [C] detects toner overflow, the toner overflow indicator lights. Up to 999 copies can be made before the toner overflow condition shuts down the machine.

## 6.15 IMAGE FUSING AND PAPER EXIT

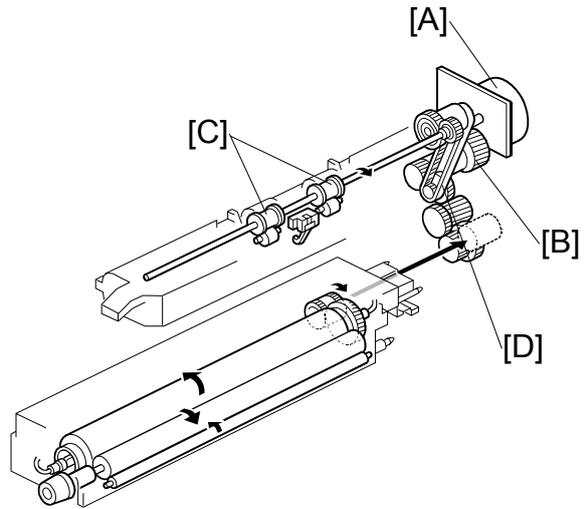


### 6.15.1 OVERVIEW

- |                             |                             |
|-----------------------------|-----------------------------|
| 1 Paper exit sensor         | 10 Cleaning roller          |
| 2 De-curler rollers         | 11 Entrance guide           |
| 3 Junction gate             | 12 Fusing lamp (center)     |
| 4 Idle roller (duplex unit) | 13 Fusing lamp (ends)       |
| 5 Fusing unit exit sensor   | 14 Thermistors (center/end) |
| 6 Spring                    | 15 Thermostats (center/end) |
| 7 Fusing exit guide plate   | 16 Hot roller               |
| 8 Pressure roller           | 17 Hot roller strippers     |
| 9 Pressure arm              | 18 Exit roller              |

### 6.15.2 FUSING DRIVE

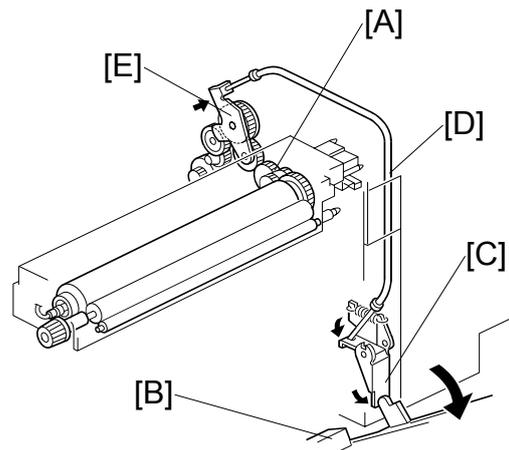
The fusing exit motor [A] drives the fusing unit through the gears [B] and also drives the paper exit rollers [C] through a gear and a timing belt [D].



### 6.15.3 FUSING DRIVE RELEASE MECHANISM

The fusing unit drive release mechanism automatically disengages the fusing unit drive gear [A] when the right door [B] is opened.

When the right cover is opened, the actuator plate [C] pulls release wire [D]. The wire pulls the fusing drive gear bracket [E] and the fusing unit drive is disengaged.

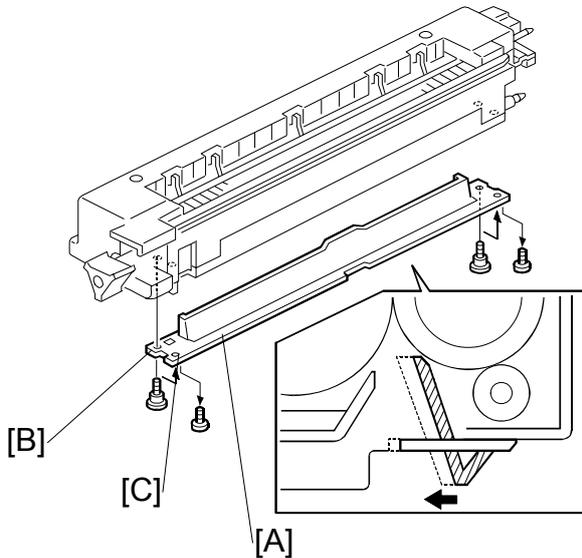


Detailed  
Descriptions

### 6.15.4 FUSING ENTRANCE GUIDE SHIFT MECHANISM

The entrance guide [A] has two holes on each side to adjust for paper thickness to prevent creasing. Normally, the left screw hole [B] on each side is used.

For *thin* paper, use screw holes [C] to move the entrance guide to the left. This setting allows more direct access to the gap between the hot and pressure rollers, and prevents thin paper from buckling against the hot roller which can cause blurring at the leading edge of the copy.

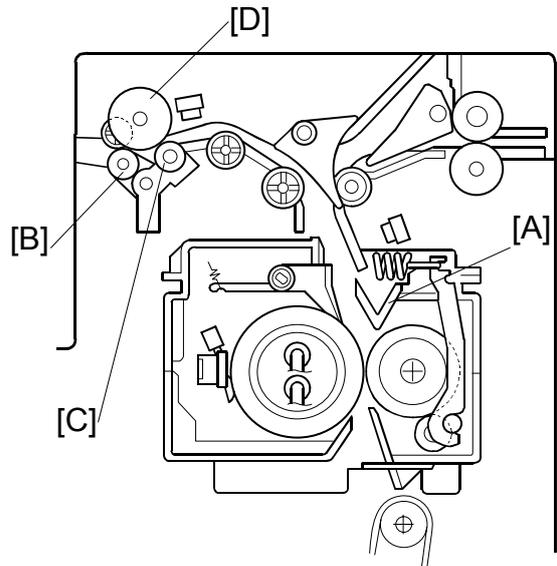


### 6.15.5 EXIT GUIDE PLATE AND DE-CURLER ROLLERS

The exit guide plate [A] also functions as a pressure roller stripper. The exit guide plate can be moved in order to remove jammed paper.

Stacking has been improved by mounting a face-curl correction mechanism at the paper exit roller.

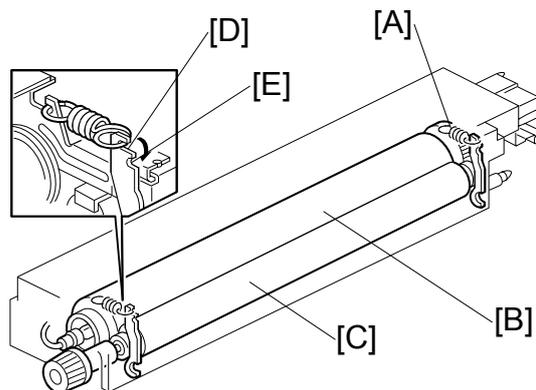
Two de-curler rollers [B] and [C] have been added under the exit roller [D] to correct the curl that paper acquires during transport through the fusing unit.



### 6.15.6 PRESSURE ROLLER

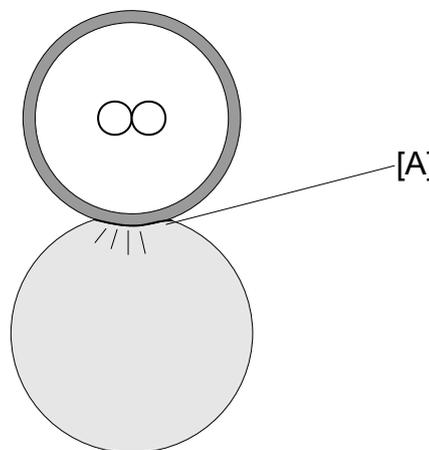
The pressure springs [A] apply constant pressure between the hot roller [B] and the pressure roller [C].

The applied pressure can be changed by adjusting the position of the pressure springs. The left position [D] is the normal setting. The right position [E] increases the pressure to prevent insufficient fusing by the fusing unit.



A stopper counters the tension of the pressure springs to keep the pressure roller pressing against the hot roller with constant pressure.

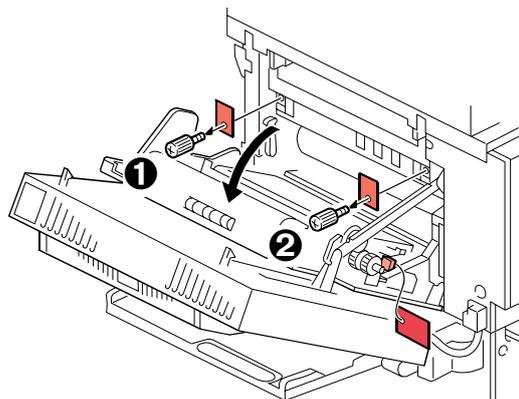
This prevents the pressure roller from flattening and increasing the width of the nip band as shown at [A]. This can lead to paper slippage and paper jams in the fusing unit.



Until the machine is installed, two screws ❶ and ❷ maintain a gap between the pressure roller and hot roller.

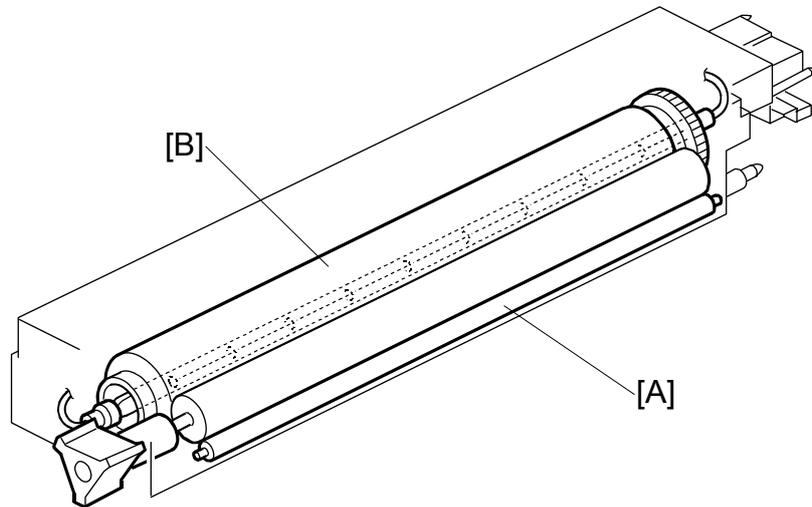
This relieves pressure on the surface of the pressure roller and prevents it from becoming deformed during storage before the machine is shipped.

These screws are removed and discarded when the machine is installed.



Detailed Descriptions

### 6.15.7 CLEANING MECHANISM



The cleaning roller [A], in constant contact with the pressure roller [B], collects toner and paper dust from the surface of the pressure roller.

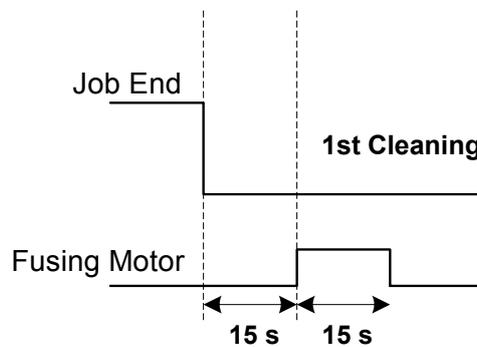
Because the cleaning roller is metal, it can collect adhering matter better than the pressure roller, which is coated with Teflon.

### 6.15.8 HOT ROLLER STRIPPER CLEANING

Toner clinging to the hot roller strippers can cause black dots to appear on the back sides of copies. To ensure that the hot roller strippers are clean and not contaminated by old toner;

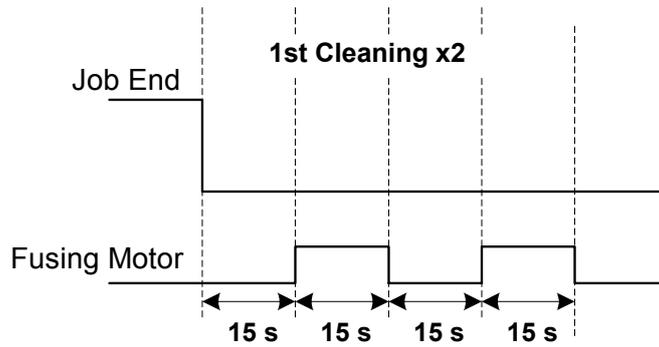
- The widths of the strippers have been reduced from 3 mm to 0.5 mm.
  - The machine can be set so the fusing/exit motor switches on and rotates the drum freely for 5 sec. at the beginning of every job. This feature can be switched on with SP5959. The amount of time for free rotation can be adjusted with this SP code. Make sure that the customer understands that increasing this SP setting slows down the start of the job.
  - The machine switches on the fusing/exit motor and rotates the drum after the job.
- The drum rotation sequence at the end of a job depends on the size of the job.

#### ***Small Jobs***



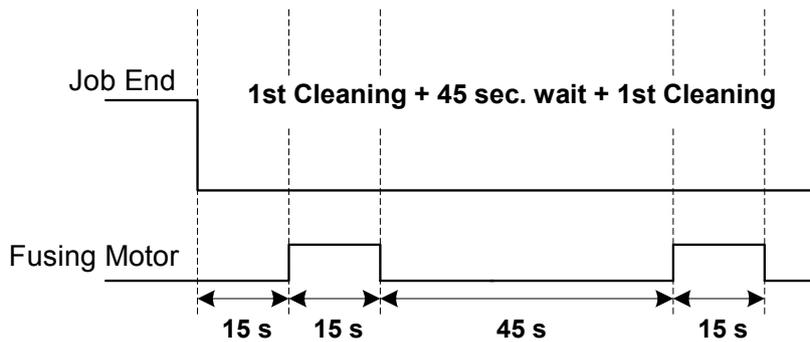
After the machine prints a total of **5 sheets** (five jobs of 1-sheet each for example, or a continues print of up to 29 pages), 15 sec. after the job ends the fusing/exit motor switches on for 15 sec. and then stops. This 15 sec. on/off cycle, called the “1st Cleaning” is done once.

**Medium Jobs**



After the machine prints a job of **30 to 99 continuous pages**, the 1st Cleaning is done twice. (15 sec. after the job ends the fusing/exit motor switches on for 15 sec., pauses for 15 sec. then switches on again for 15 sec.)

**Large Jobs**



After the machine prints a job of over **100 continuous pages**, the 1st Cleaning is done, there is a pause of 45 sec. then the 1st cleaning is done again.

**SP Settings for Post-Job Cleaning**

The previous description of stripper cleaning with drum rotation after small, medium, and large print jobs is based on the default settings of SP3905. These settings can be adjusted.

These are the SP codes that control how cleaning is done at the end of a job.

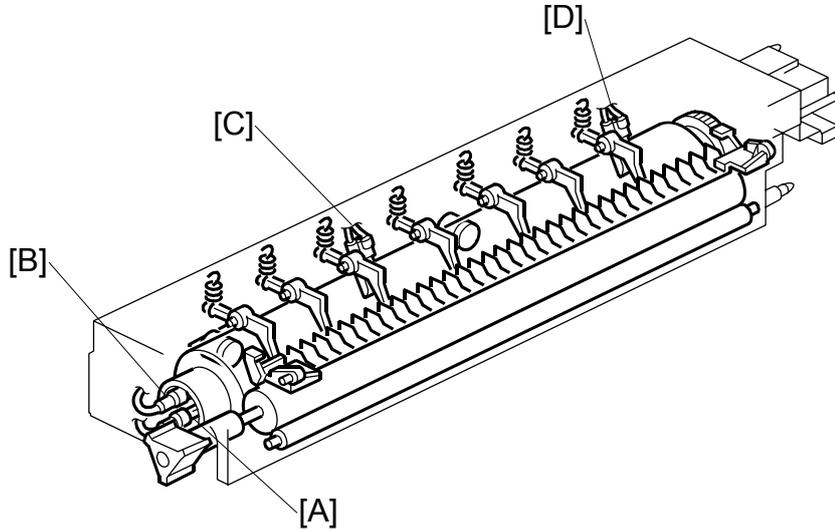
No.	Name	Function
3905 001	Number Rotations	Sets the number of times the 1st Cleaning is done. Default: <b>1</b>
3905 002	Number of Pages	Sets the number of pages (accumulative total) to print before 1st Cleaning is done ("Small Jobs" on previous page. Default: <b>5</b>
3905 003	No. addtnl. sheets for 2nd HR stripper cleaning	Sets the number of pages to print (continuous print job) before 1st Cleaning is done twice ("Medium Jobs" on previous page). Default: <b>30</b>
3905 004	No. addtnl. sheets for 3rd HR stripper cleaning	Sets the number of pages to print (continuous print job) before 1st Cleaning is done once, then done again after a 15 sec. interval ("Large Jobs" on previous page).(Default: <b>100</b>
3905 005	No. addtnl. sheets for 3rd HR stripper cleaning	Sets the number of times that the cycle for SP3905 004 is repeated for "Large Jobs". Default: 0. If set to "1", for example, the cleaning sequence is repeated once.
3905 006	Job/HR stripper cleaning priority setting	This SP determines what happens if a new job starts while cleaning is in progress. Default: 0 (Off): If a new job starts while cleaning is in progress, cleaning is canceled so the new job can start. If you set this SP to "1", a new job cannot start until cleaning has been completed.

Here are some important points to keep in mind about hot roller stripper cleaning:

- If the machine switches to any of the energy saver modes (low power mode, etc.) while cleaning is in progress, the cleaning cycle will not be interrupted.
- The cleaning cycle is not interrupted by free rotation of the hot roller when the machine is getting ready to print.
- Opening the front door, however, while cleaning is in progress will stop a cleaning cycle.

Detailed Descriptions

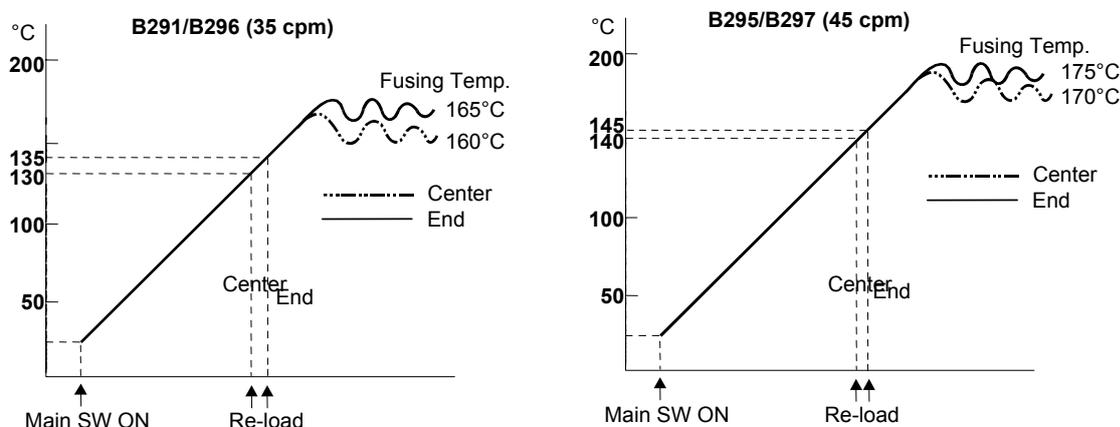
### 6.15.9 FUSING TEMPERATURE CONTROL



The fusing unit has two fusing lamps: the first fusing lamp (center: 650W) [A] heats the center of the fusing roller, and the second fusing lamp (ends: 650W) [B] heats both ends of the hot roller. This arrangement ensures even heat on all surfaces of the roller.

In order to control the temperature of the roller, two high response thermistors are attached to the unit, one near the center [C] and one at the end [D] of the hot roller.

## Temperature Control



There are two types of temperature control:

- On/off control (Default)
- Phase control.

Either mode can be selected with SP1104 (Fusing Temperature Control).

After the machine is powered on, the CPU checks the ac frequency for 500 ms, in case phase control is selected later for the temperature control, and then switches on the fusing lamp.

As soon as both the center and end thermistors detect the print ready temperature (also known as the “re-load” temperature), the machine can operate. The “reload” temperature is 3 °C below the fusing temperature (this depends on the settings of SP1105 1~4, 7, 8). As soon as the thermistors detect the fusing temperature, the CPU switches the lamps off but frequently switches on/off again in order to maintain the fusing temperature.

The default temperatures of SP1105 for these models are set 10 ~ 30 degrees lower than the temperatures for the previous machines. Some new SP codes have been added and others removed. For details, see Section “5. Service Tables”.

***Fusing Idling Temperature***

If copies are not sufficiently fused soon after the main power switch is turned on, fusing idling should be enabled with SP1103 1.

When fusing idling is enabled, it is done when the temperature reaches the print ready (“re-load”) temperature. The re-load temperature can be adjusted with SP1105 5,6.

In the opposite case, even if fusing idling is disabled, it is done when the temperature at power-up  $\leq 15\text{ }^{\circ}\text{C}$

The fusing idling time is as follows.

Temperature at power-on	Fusing Idling Mode		SP1103 1
	0: Disabled	1: Enabled	
15 °C or less	30 s	30 s	SP1103 2
Higher than 15°C	Not done	30 s	

### 6.15.10 CPM DOWN FOR THICK PAPER

When printing on thick paper the machine automatically controls and lowers the line speed to below 45 ppm to ensure sufficient heat to fuse the toner to the thicker paper.

- After switching from Normal to Thick Paper for printing, the machine halts temporarily and re-starts for 35 cpm running.
- If the previous job included stapling or other finisher processing, these settings remain in effect for the next job on thick paper after the line speed is adjusted.
- If the print job on thick paper does not include an image on the page (a cover), then the speed is not adjusted down from 45 cpm to 35 cpm.

**NOTE:** The previous machine automatically reduced line speed 30% (ppm down) for thick paper. In these models, however, the speed is reduced from 45 cpm to 35 cpm for the 45 cpm machine. This adjustment is performed automatically for the B295/B297 (45 cpm) machine only.

Note these other important points regarding cpm down for thick paper on the 45 cpm machine:

- When the line speed switches from 45 cpm to 35 cpm for thick paper, the transfer current changes to the settings specified with SP2301 (Transfer Current Adjustment). (For details, see Section “5. Service Tables”.) Bias voltage, development and other settings are not affected.
- Fusing temperature adjustment switches on, but no operation can start until the machine reaches the temperature specified for the job.
- The ID sensor pattern is created and the line speed remains the same until the end of the job.
- The intensity of the LD unit is lowered evenly, 30 steps from its specified value.

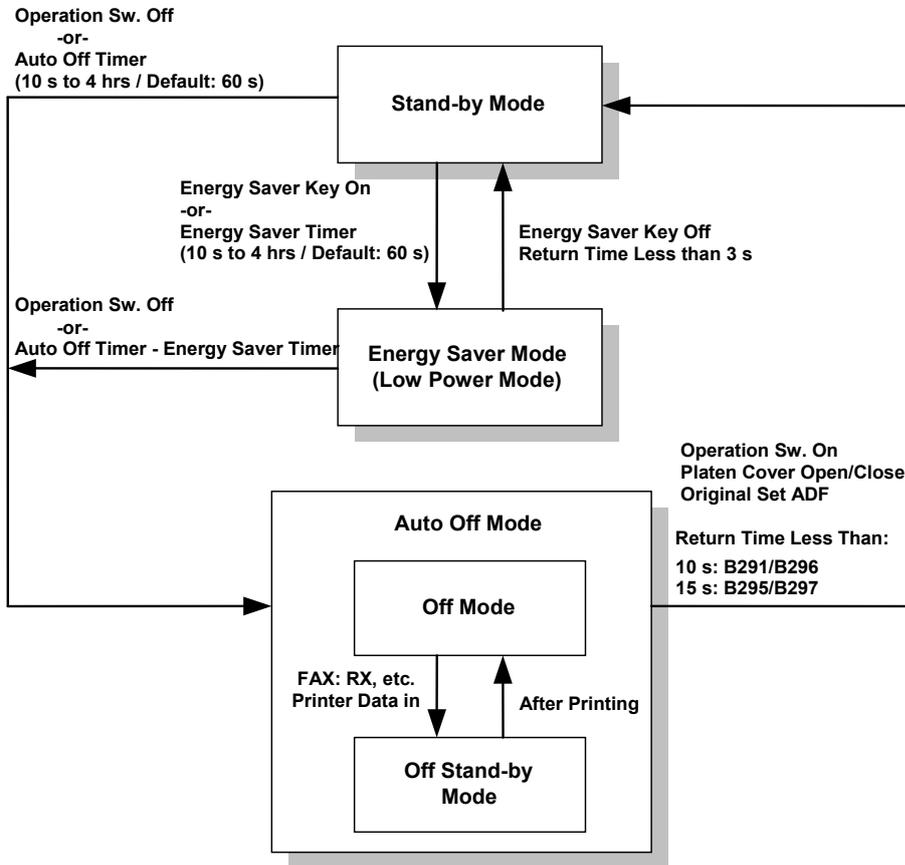
### 6.15.11 OVERHEAT PROTECTION

If the hot roller temperature becomes greater than 250°C, the CPU cuts off the power to the fusing lamp, and SC543 (Fusing Overheat Error) will be displayed.

Even if the thermistor overheat protection fails, there is a thermostat in series with the common ground line of the fusing lamp. If the temperature of the thermostat reaches 199°C, the thermostat opens, removing power from the fusing lamp. At the same time, the copier stops operating. At this time, SC542 (Fusing Temperature Warm-up Error) will be displayed.

## 6.16 ENERGY SAVER MODES

### 6.16.1 OVERVIEW



When the machine is not used, the energy saver function reduces power consumption by decreasing the fusing temperature.

This machine has two types of energy saver mode as follows.

- 1) Energy saver mode
- 2) Auto Off mode

These modes are controlled by the following UP and SP modes.

- Energy timer (UP mode)
- Auto off timer (UP mode)
- Auto off disabling (SP mode)

## 6.16.2 ENERGY SAVER MODE

### *Entering the energy saver mode*

The machine enters energy saver mode when one of the following is done.

- The Clear Mode/Energy Saver Key is held down for a second.
- The energy saver timer runs out after the end of a job.

### *What happens in energy saver mode*

When the machine enters energy saver mode, the fusing lamp drops to a certain temperature, and the operation panel indicators are turned off except for the Energy Saver LED and the Power LED.

If the CPU receives the image print out command from an application (e. g. to print incoming fax data or to print data from a PC), the fusing temperature rises to print the data.

### *Return to stand-by mode*

If one of the following is done, the machine returns to stand-by mode:

- The Clear Mode/Energy Saver Mode key is pressed
- Any key on the operation panel or touch panel screen is pressed
- An original is placed in the ADF
- The ADF is lifted
- A sheet of paper is placed in the by-pass feed table

The recovery time from energy saver mode is about 3 s.

Mode	Operation Switch	Energy Saver LED	Fusing Temp.	+24V	System +5V
Energy Saver	On	On	B291/B296: 130°C B295/B297: 150°C	On	On

### 6.16.3 AUTO OFF MODE

There are two Auto Off modes: Off Stand-by mode and Off mode. The difference between Off Stand-by mode and Off mode is the machine's condition when the machine enters Auto Off mode.

#### ***Entering off stand-by and off modes***

The machine enters the Off Stand-by mode or Off mode when one of the following is done.

- The auto off timer runs out
- The operation switch is pressed to turn the power off

If one or more of the following conditions exists, the machine enters Off Stand-by mode. If none of these conditions exist, the machine enters Off Mode.

- Error or SC condition
- An optional G4 unit is installed
- Image data is stored in the memory
- During memory TX or polling RX
- The handset is off hook
- An original is in the ADF
- The ADF is open

#### ***Off Stand-by mode***

The system +5V is still supplied to all components. When the machine detects a ringing signal or receives a stream of data for a print job, the +24V supply is activated and the machine automatically prints the incoming message or executes the print job.

**Off Mode**

The system +5V supply also turns off. However, +5VE (+5V for energy saver mode) is still activated. When the machine detects a ringing signal, off-hook signal, or receives a print job, the machine returns to the Off Stand-by mode and the system +5V and +24V supplies are activated.

**Returning to stand-by mode**

The machine returns to stand-by mode when the operation switch is pressed. The recovery time is about 10 s (B291/B296) or 15 s for the (B295/B297).

Mode	Operation Switch	Energy Saver Mode	Fusing Lamp	+24V	System +5V	Note
Off Stand-by	Off	Off	Off (On when printing)	On	On	
Off	Off	Off	Off	Off	Off	+5VE is supplied



# SPECIFICATIONS

SPECIFICATIONS REVISION HISTORY		
Page	Date	Added/Updated/New
		None



# 7. SPECIFICATIONS

## 7.1 GENERAL SPECIFICATIONS

Configuration	Desktop	
Copy Process	Dry electrostatic transfer system	
Original	Sheet/Book	
Original Size	Maximum A3/11" x 17"	
Copy Paper Size	Paper tray, Duplex:	A3/11" x 17" - A5 SEF
	By-pass tray:	A3/11" x 17" - A6 SEF
	Non-standard sizes:	Width: 100 - 297 mm (3.9" - 11.7") Length: 148 - 432 mm (5.8" - 17.0")
Copy Paper Weight	Paper Tray/ Duplex:	64 - 105 g/m <sup>2</sup> (20 - 28 lb.)
	By-pass:	52 - 163 g/m <sup>2</sup> (16 - 44 lb.)
Reproduction Ratios	7R5E:	Metric version (%): 400, 200, 141, 122, 115, 93, 82, 75, 71, 65, 50, 25 Inch version (%): 400, 200, 155, 129, 121, 93, 85, 78, 73, 65, 50, 25
	Zoom:	25 ~ 400% in 1% steps
Copying Speed	<b>B291/B296:</b>	35 cpm A4, 8 1/2" x 11" LEF, 1-to-1 (ADF)
	<b>B295/B297:</b>	45 cpm, A4, 8 1/2" x 11" LEF, 1-to-1 (ADF)
First Copy Time	<b>B291/B296:</b>	4.1 s, 1st Tray, A4/8 1/2" x 11" LEF
	<b>B295/B297:</b>	3.5 s, 1st Tray, A4/8 1/2" x 11" LEF
Warm-up Time	<b>B291/B296:</b>	Less than 12.5 s (Basic), 15 s (MFP)
	<b>B295/B297:</b>	Less than 12.5 s (Basic), 15 s (MFP)
Continuous Copy	1~999 (operation panel entry)	
Paper Capacity	1,050 sheets (500 sheets/tray x 2 with 50 sheets in by-pass tray)	
Paper Output	A4, 8 1/2" x 11" and smaller:	500 sheets
	B4 and larger:	250 sheets
Power Source	North America:	120V/60 Hz, More than 12.5 A
	Europe/Asia:	220 - 240 V/50, 60 Hz, More than 6.8 A
Dimensions (w x d x h)	Without ADF	670 mm x 650 mm x 720 mm (26.3" x 25.6" x 28.3")
	With ADF	670 mm x 650 mm x 870 mm (26.3" x 25.6" x 34.3")
Weight	Less than 79 kg (174 lb.)	
Resolution	600 dpi (Scanning and Printing)	
Gradation	256 levels (Scanning and Printing)	
Original Archive	More than 2,500 A4 pages for document server (ITU-T No. 4 Chart)	
Toner Replenishment	Cartridge exchange (630 g)	
Total Counter	Electric counter	

## Power Consumption

### Mainframe only

	B291/B296		B295/B297	
Copying	Less than 1.3 kW		Less than 1.3 kW	
Warm-up	Less than 1.4 kW		Less than 1.4 kW	
Stand-by	NA	Less than 123W	NA	Less than 148W
	EU, Asia	Less than 126W	EU, Asia	Less than 138W
Auto Off Mode	NA	Ave. 1.2W	NA	Ave. 1.2W
	EU, Asia	Ave. 1.2W	EU, Asia	Ave. 1.2W
Maximum	Less than 1.44 kW (NA)		Less than 1.44 kW (NA)	
	Less than 1.5 kW (EU, Asia)		Less than 1.5 kW (EU, Asia)	

### Full system (including options)

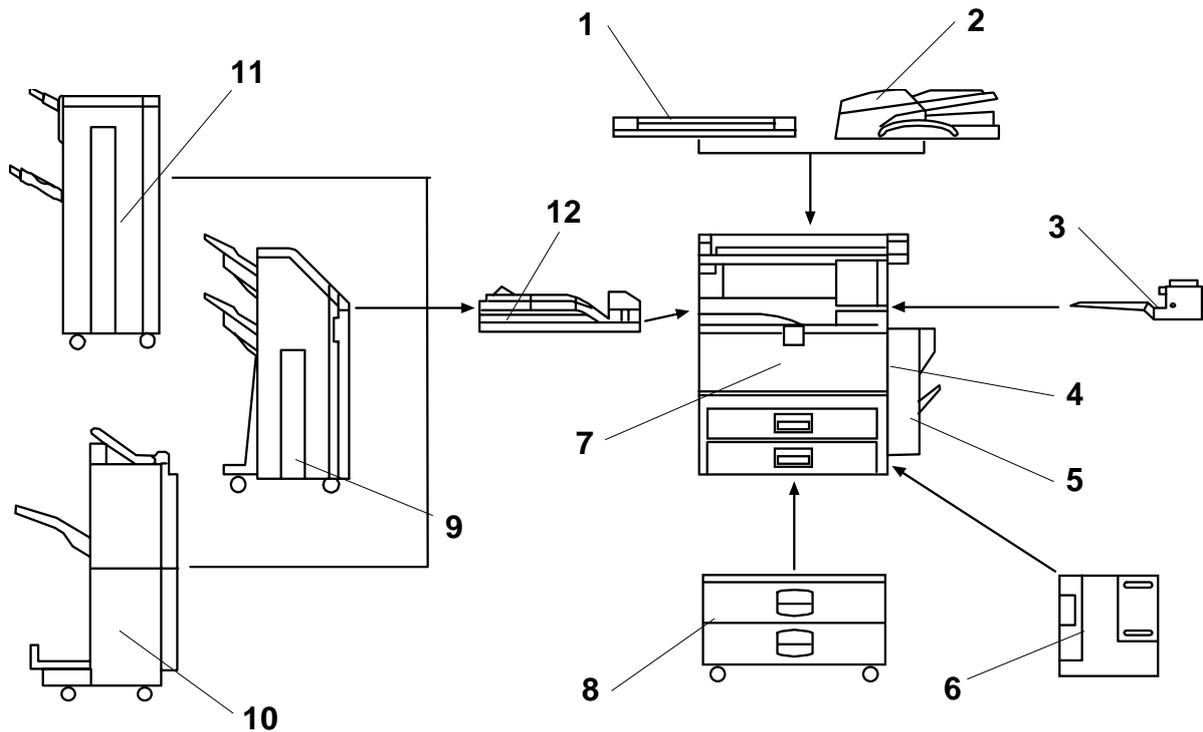
	B291/B296		B295/B297	
Copying	Less than 1.4 kW		Less than 1.4 kW	
Warm-up	Less than 1.3 kW		Less than 1.3 kW	
Stand-by	NA	Less than 125W	NA	Less than 159W
	EU, Asia	Less than 130W	EU, Asia	Less than 149W
Auto Off Mode	NA	Ave. 8.5W	NA	Ave. 8.5
	EU, Asia	Ave. 8.5	EU, Asia	Ave. 8.5
Maximum	Less than 1.44 kW (NA)		Less than 1.44 kW (NA)	
	Less than 1.5 kW (EU, Asia)		Less than 1.5 kW (EU, Asia)	

### Noise Emission:

Mode	Model	Mainframe Only		Full System	
Copying	B291/B296	NA	64.0	NA	69.8
		EU, Asia	65.0	EU, Asia	65.0
	B295/B297	NA	67.0	NA	70.9
		EU, Asia	67.0	EU, Asia	67.0
Stand-by	B291/B296	NA	34.0	NA	37.1
		EU, Asia	34.0	EU, Asia	43.0
	B295/B297	NA	34.0	NA	37.1
		EU, Asia	34.0	EU, Asia	34.0

- NOTE:** 1) The above measurements were made in accordance with ISO 7779.  
 2) Full system measurements include the ARDF, Finisher and LCT unit.  
 3) In the above stand-by condition, the polygonal mirror motor is not rotating.

## 7.2 MACHINE CONFIGURATION



- |                              |  |
|------------------------------|--|
| 1. Platen cover              | 8. Paper tray unit                     |
| 2. ARDF                      | 9. Two-tray finisher (2 shift trays)   |
| 3. One-bin tray              | 10. Booklet Finisher                   |
| 4. Duplex unit               | 11. 1000 Sheet Finisher (1 shift tray) |
| 5. By-pass tray              | 12. Bridge Unit                        |
| 6. LCT (Large Capacity Tray) |  |
| 7. Copier                    |  |

**NOTE:** The Bridge Unit is required for the optional finishers.

**Key:** Symbol: **U:** Unique option, **C:** Option also used with other products

	Item	Key	Machine Code
<b>Copier</b>	B291/B296		B291/B296
	B295/B297		B295/B297
	ARDF (See <b>Note 1.</b> )	C	B714
	Platen Cover (See <b>Note 1.</b> )	C	G329
	Paper Tray Unit	C	B542
	LCT (Large Capacity Tray)	C	B543
	1-Bin Tray	C	B544
	Bridge Unit	C	B538
	1000-sheet Finisher (See <b>Note 2.</b> )	C	B408
	Two-tray Finisher (See <b>Note 2.</b> )	C	B545
	Booklet Finisher	C	B546
	Punch Unit (See <b>Note 3.</b> )	C	B377-11 (2/3-hole) US
	Punch Unit (See <b>Note 3.</b> )	C	B377-12 (2/4-hole) Metric
	Punch Unit (See <b>Note 3.</b> )	C	B377-13 (4-hole) Northern Europe
	Key Counter Bracket	C	A674
	User Account Enhance Unit	C	G395
	PI Board Kit	C	B669
	Data Overwrite Security	C	B735
	Copy Data Security Unit	C	B770
	Scanner Accessibility Option	U	B815
<b>Fax</b>	Fax Option Type 3045	U	B779
	G3 Interface Unit	U	B780
	SAF Memory	C	G578
	Handset (USA model only)	C	A646
<b>Printer/ Scanner</b>	Printer/Scanner Unit Type 4500	U	D315
	Printer Unit	U	D316
	RPCS Printer Unit	U	D317
	Printer Upgrade Unit Type 4500	U	D319-11
	Scanner Upgrade Unit	U	D319-21
	PostScript3 Unit Type 4500	U	D319-00
	IEEE 802.11b Wireless LAN	C	G813
	Bluetooth	C	D826
	Memory Unit 256 MB	C	G818
	File Format Converter	C	B609

**NOTE:** 1) The ARDF and platen cover cannot be installed together.  
 2) The finishers require the paper tray unit and bridge unit.  
 3) The punch unit requires the two-tray finisher.

## 7.3 OPTIONAL EQUIPMENT

### ARDF (B714)

Original Size:	Normal Original Mode: A3 to B6, DLT to HLT Duplex Original Mode: A3 to B5, DLT to HLT
Original Weight:	Normal Original Mode: 40 ~ 128 g/m <sup>2</sup> (11 ~ 34 lb.) Duplex Original Mode: 52 ~ 105 g/m <sup>2</sup> (14 ~ 28 lb.)
Table Capacity:	80 sheets (80 g/m <sup>2</sup> , 20 lb.)
Original Standard Position:	Rear left corner
Separation:	Feed belt and separation roller
Original Transport:	Roller transport
Original Feed Order:	From the top original
Reproduction Range:	30 ~ 200% (Sub scan direction only)
Power Source:	DC 24V, 5V from the copier
Power Consumption:	Less than 60 W
Dimensions (W × D × H):	570 mm x 518 mm x 150 mm (22.4" x 20.4" x 5.9")
Weight:	12 kg

### PAPER TRAY UNIT (B542)

Paper Size:	A5 SEF to A3 SEF 5 1/2" x 8 1/2" SEF to 11" x 17" SEF
Paper Weight:	64 g/m <sup>2</sup> ~ 105 g/m <sup>2</sup> (20 lb. ~ 28 lb.)
Tray Capacity:	500 sheets (80 g/m <sup>2</sup> , 20 lb. )
Paper Feed System:	FRR
Paper Height Detection:	4 steps (100%, 70%, 30%, Near end)
Power Source:	24 Vdc, 5 Vdc (from the copier) 120 Vac: 115 V version (from the copier) 220 ~ 240 Vac: 224/240 V version (from the copier)
Power Consumption:	50 W
Weight:	Less than 25 kg (55.1 lb.)
Size (W x D x H):	540 mm x 600 mm x 270 mm (21.3" x 23.6" x 10.6")

## ONE-BIN TRAY (B544)

Paper Size:	A5 SEF to A3 SEF 5 1/2"x8 1/2" SEF to 11"x17" SEF
Paper Weight:	60 g/m <sup>2</sup> ~ 105 g/m <sup>2</sup> (16 lb. ~ 28 lb.)
Tray Capacity:	125 sheets (80 g/m <sup>2</sup> , 20 lb.)
Power Source:	5 Vdc, 24 Vdc (from copier)
Power Consumption:	15 W
Weight:	Less than 4 kg (8.8 lb.)
Size (W x D x H):	470 mm x 565 mm x 140 mm (18.5" x 22.2" x 5.5")

## 1000 Sheet Finisher (B408)

<b>Upper Tray</b>			
Paper Size	A3 to A6 11" x 17" to 5 1/2" x 8 1/2"		
Paper Weight	60 to 157 g/m <sup>2</sup> (16 to 42 lb.)		
Paper Capacity	250 sheets, A4, 8 1/2" x 11" or smaller, 80 g/m <sup>2</sup> (20 lb.)		
<b>Lower Tray</b>			
Paper Size	Staple Mode Off: A3 to B5, 11" x 17" to 5 1/2" x 8 1/2" Staple Mode On: A3, B4, A4, B5, 11" x 17" to 8 1/2" x 11"		
Paper Weight	Staple Mode Off: 60 to 157 g/m <sup>2</sup> (16 ~ 43 lb.) Staple Mode On: 64 to 90 g/m <sup>2</sup> (17 ~ 24 lb.)		
Stapler Capacity	30 sheets (A3, B4, 11" x 17", 8 1/2" x 14") 50 sheets (A4, B5, 8 1/2" x 11")		
Paper Capacity	Staple Mode Off: 1,000 sheets, A4, 8 1/2" x 11" or smaller, 80 g/m <sup>2</sup> (20 lb.) 500 sheets, A3, B4, 11" x 17", 8 1/2" x 14", 80 g/m <sup>2</sup> (20 lb.) Staple Mode On: 80 g/m <sup>2</sup> (20 lb.)		
	<b>Number of Sets</b>		
	<b>Set Size</b>	<b>2 to 9</b>	<b>10 to 50</b>
	Size		10 to 30    31 to 50
	A4, 8 1/2"x14" LEF	100	100 to 20    100 to 20
	A4, 8 1/2"x11" SEF, B5	100	50 to 10    50 to 10
	A3, B4, 11"x17", 8 1/2"x14"	50	50 to 10    ---
Staple Positions	1 Staple: 2 positions (Front, Rear) 2 Staples: 2 positions (Upper, Left)		
Staple Replenishment	Cartridge (5,000 staples/cartridge)		
Power Source	DC 24 V, 5V (from copier)		
Power Consumption	50 W		
Weight	25 kg (55.2 lb.)		
Dimensions	527 x 520 x 790 mm 20.8" x 20.5" x 31.1"		

## TWO-TRAY FINISHER (B545)

**NOTE:** The punch unit is an option for this machine.

Paper Size	<p>Normal/Shift Mode: A3 to A5/DLT to HLT (A6L in no shift mode and no staple mode)</p> <p>Staple Mode: A3 to B5/DLT to LT</p> <p>Punch Mode: 2 Holes: A3 to A5/DLT to HLT 3 Holes: A3 to B5/DLT to LT 4 Holes (Europe/Asia) : A3 to A5/ DLT to HLT 4 Holes (North Europe): A3 to B5/DLT to LT</p>
Paper Weight	<p>Normal/Shift Mode: 52 g/m<sup>2</sup> ~ 163 g/m<sup>2</sup> (14 ~ 43 lb.)</p> <p>Staple Mode: 64 g/m<sup>2</sup> ~ 90 g/m<sup>2</sup> (17 ~ 23 lb.)</p> <p>Punch mode (All types): 52 g/m<sup>2</sup> ~ 163 g/m<sup>2</sup> (14 ~ 43 lb.)</p>
Tray Paper Capacity	<p>Upper Tray: 500 sheets (A4S ~ A5S/LTS, 80 g/m<sup>2</sup>, 20 lb.) 250 sheets (A3 ~ A4L/DLT ~ LTL, 80 g/m<sup>2</sup>, 20 lb.) 100 sheets (A5L/HLT, 80 g/m<sup>2</sup>, 20 lb.)</p> <p>Lower Tray (Multi-tray Staple Mode): 1500 sheets (A4S/LTS, 80 g/m<sup>2</sup>, 20 lb.) 750 sheets (A3 ~ B5/DLT ~ LTL, 80 g/m<sup>2</sup>, 20 lb.) 500 sheets (A5S, 80 g/m<sup>2</sup>, 20 lb.) 100 sheets (A5L/HLT, 80 g/m<sup>2</sup>, 20 lb.)</p> <p>Lower Tray (Normal Mode): 2000 sheets (A4S/LTS, 80 g/m<sup>2</sup>, 20 lb.) 750 sheets (A3 ~ B5/DLT ~ LTL, 80 g/m<sup>2</sup>, 20 lb.) 500 sheets (A5S, 80 g/m<sup>2</sup>, 20 lb.) 100 sheets (A5L/HLT, 80 g/m<sup>2</sup>, 20 lb.)</p>
Stapler Tray Capacity	<p>No Mixed Original Mode: 50 sheets (A4 ~ B5/LT, 80 g/m<sup>2</sup>, 20 lb.) 30 sheets (A3 ~ B4/DLT ~ LG, 80 g/m<sup>2</sup>, 20 lb.)</p> <p>Mixed Original Mode: 30 sheets (A4S/A3, B5S/B4, LTS/DLT, 80 g/m<sup>2</sup>, 20 lb.)</p>
Staple Position	<p>4 positions 1 staple: 3 positions (Front, Rear, Rear-Slant) 2 staple: 1 position</p>
Staple Replenishment	Cartridge (5,000 staples)
Power Source	24 Vdc (from copier)
Power Consumption	60 W
Weight	<p>Less than 53 kg (116.8 lb.) (without punch unit) Less than 55 kg (121.3 lb.) (with punch unit)</p>
Size (W x D x H)	680 mm x 620 mm x 1030 mm (26.8" x 24.4" x 40.6")

## Booklet Finisher (B546)

Paper Size	Tray	Modes	Sizes		
	Proof tray		A3 to A5, DLT to HLT		
	Shift tray	No staple mode		A3 to A5, DLT to HLT	
		Staple Mode	Rear	A4 SEF, LG SEF, LT SEF	
			Front/Slant	A3 SEF, A4 LEF/SEF, B4 SEF, B5 LEF, DLT SEF, LG SEF, LT LEF/SEF	
			Rear/Slant	A3 SEF, A4 LEF, B4 SEF, B5 LEF, DLT SEF, LT LEF	
	2 Staple		A3 SEF, A4, LEF, B4 SEF, B5 LEF, DLT SEF, LT LEF		
Booklet tray	Staple Mode		A3 SEF, A4 SEF, B4 SEF, DLT SEF, LT SEF		
Paper Weight	Tray		Weight		
	Stack mode		52 g/m <sup>2</sup> to 163 g/m <sup>2</sup> , 14 to 42 lb		
	Staple mode		64 g/m <sup>2</sup> to 80 g/m <sup>2</sup> , 17 to 21 lb		
	Saddle stitch mode		64 g/m <sup>2</sup> to 80 g/m <sup>2</sup> , 17 to 21 lb 64 g/m <sup>2</sup> to 128 g/m <sup>2</sup> , 17 to 34 lb (Cover sheet only)		
Paper Capacity <sup>*1</sup>	Tray	Modes	Paper size	Capacity	
	Proof tray		A4 LEF, LT LEF or shorter	150 sheets	
			A4 SEF, LT SEF or longer	75 sheets	
	Shift tray	No staple	A4 LEF, LT LEF or shorter	1000 sheets	
			A4 SEF, LT SEF or longer	500 sheet	
		Staple	A4 LEF, LT LEF or shorter	750 sheets, or 30 sets <sup>*2</sup>	
			A4 SEF, LT SEF or longer	500 sheets, or 30 sets <sup>*2</sup>	
	Booklet tray	1-5 sheets		25 sets	
		6-10 sheets		15 sets	
		11-15 sheets		10 sets	

<sup>\*1</sup>: 80 g/m<sup>2</sup>, 20 lb

<sup>\*2</sup>: Setting DIP SW 3 No. 5 to ON releases the 30 set limit.

Staple Capacity	Modes	Paper size	Total capacity
	Staple	A4 LEF, LT LEF or shorter	50 sheets
		A4 SEF, LT SEF or longer	30 sheets
Saddle stitch		15 sheets	
Staple Position	Staple mode: 4 positions 1 staple: 3 positions (Rear, Front/Slant, Rear/Slant) 2 staples: 1 position Saddle stitch mode: 2 positions, 2 staples (center), fixed position		
Staple Replenishment	Cartridge Staple: 5000 staples Saddle stitch: 2000 staples		
Power Source	24 Vdc (from copier)		
Power Consumption	Less than 170 W		
Dimensions (w x d x h)	689 x 603 x 1055 mm 27.1 x 23.7 x 41.5 in.		
Weight:	49 kg (107.8 lb.)		

\*1: 80 g/m<sup>2</sup>, 20 lb

## BRIDGE UNIT (B538)

Paper Size	Standard sizes A6 lengthwise to A3 HLT to DLT Non-standard sizes Width: 100 to 305 mm Length: 148 to 432 mm
Paper Weight	52 g/m <sup>2</sup> ~ 135 g/m <sup>2</sup> , 16 lb. ~ 42 lb.

## LCT (B543)

Paper Size	A4 (S)/LT (S)
Paper Weight	60 g/m <sup>2</sup> ~ 105 g/m <sup>2</sup> , 16 lb. ~ 28 lb.
Tray Capacity	1500 sheets (80 g/m <sup>2</sup> , 20lb.)
Remaining Paper Detection	5 steps (100%, 75%, 50%, 25%, Near end)
Power Source	24 Vdc, 5 Vdc (from copier)
Power Consumption	40 W
Weight	Less than 17 kg (37.5 lb.)
Size (W x D x H)	390 mm x 500 mm x 390 mm (15.4" x 19.7" x 15.4")

