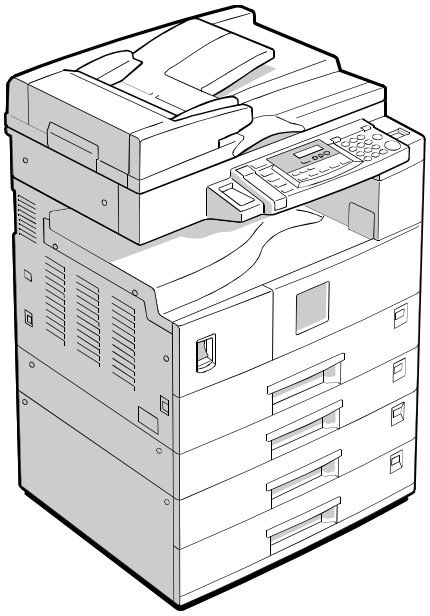
Model K-C1
(Machine Code: B039/B040/B043)

SERVICE MANUAL



February 20th, 2001
Subject to change

⚠IMPORTANT SAFETY NOTICES

PREVENTION OF PHYSICAL INJURY

1. Before disassembling or assembling parts of the copier and peripherals, make sure that the 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 a job has started before the copier completes the warm-up or initializing period, keep hands away from the mechanical and electrical components because the starts making copies as soon as the warm-up period is completed.
5. 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.

HEALTH SAFETY CONDITIONS

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

OBSERVANCE OF ELECTRICAL SAFETY STANDARDS

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

SAFETY AND ECOLOGICAL NOTES FOR DISPOSAL

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

LASER SAFETY

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

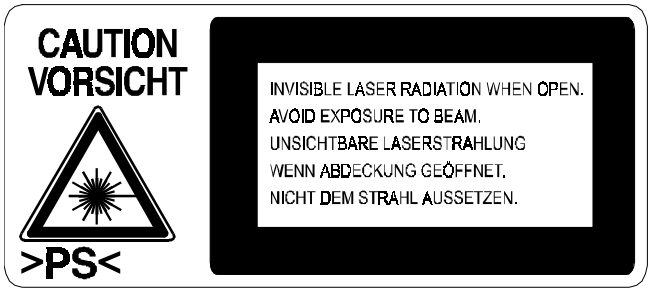
⚠WARNING

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

⚠WARNING FOR LASER UNIT

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:



Symbols and Abbreviations

This manual uses several symbols and abbreviations. The meaning of those symbols and abbreviations are as follows:

☛	See or Refer to
	Clip ring
	Screw
	Connector
SEF	Short Edge Feed
LEF	Long Edge Feed

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2 DETAILED DESCRIPTIONS B385-4
2.1 PAPER FEED AND SEPARATION B385-4
2.2 PAPER LIFT MECHANISM B385-5
2.3 PAPER END DETECTION B385-7
2.4 PAPER HEIGHT DETECTION B385-8
2.5 PAPER SIZE DETECTION B385-9
2.6 SIDE AND END FENCES B385-10
Side Fences B385-10
End Fence B385-10

3 REPLACEMENT AND ADJUSTMENT B385-11
3.1 FEED ROLLER REPLACEMENT B385-11
3.2 TRAY MAIN BOARD REPLACEMENT B385-12
3.3 TRAY MOTOR REPLACEMENT B385-13
3.4 LIFT MOTOR REPLACEMENT B385-14
3.5 PAPER END SENSOR REPLACEMENT B385-15
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SPECIFICATIONS SPEC-1
1. GENERAL SPECIFICATIONS SPEC-1
Duplex Unit (B043 only) SPEC-4
2. MACHINE CONFIGURATION SPEC-5
3. OPTIONAL EQUIPMENT SPEC-6
ARDF SPEC-6
ADF SPEC-7
ONE-TRAY PAPER TRAY UNIT SPEC-8
TWO-TRAY PAPER TRAY UNIT SPEC-9
16MB IMB (Copier Memory Unit)* SPEC-9

1. INSTALLATION

⚠CAUTION

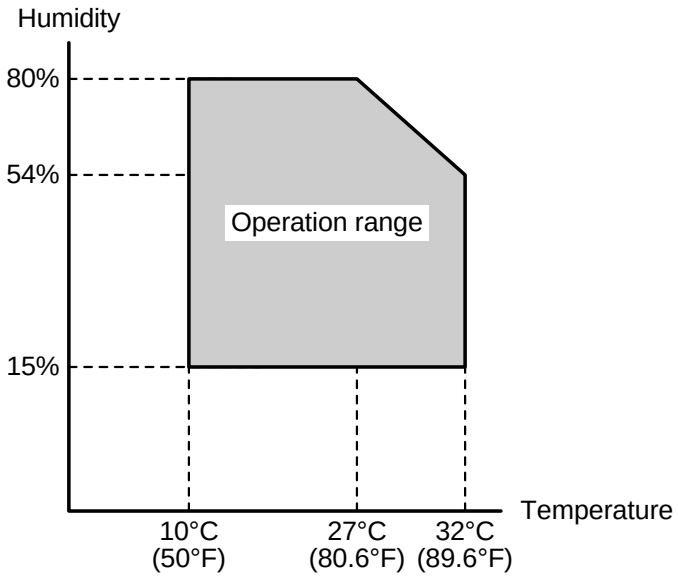
Before installing options, please do the following:

1. **If there is a fax unit in the machine, print out all messages stored in the memory, the lists of user programmed items, and the system parameter list.**
2. **If there is a printer option in the machine, print out all data in the printer buffer.**
3. **Turn off the main switch and disconnect the power cord, the telephone line, and the network cable.**

1.1 INSTALLATION REQUIREMENTS

1.1.1 ENVIRONMENT

–Temperature and Humidity Chart–



B039I502.WMF

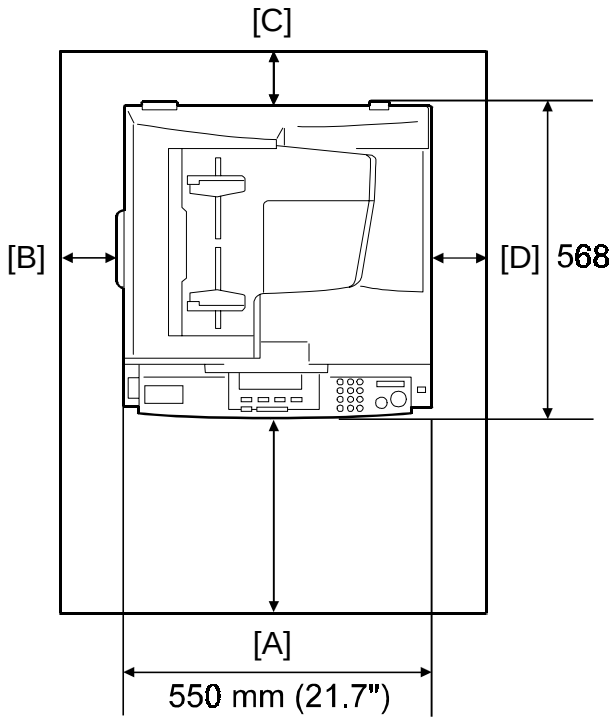
1. Temperature Range: 10°C to 32°C (50°F to 89.6°F)
2. Humidity Range: 15% to 80% RH
3. Ambient Illumination: Less than 1,500 lux (do not expose to direct sunlight).
4. Ventilation: Room air should turn over at least 30 m^3/hr/person
5. Ambient Dust: Less than 0.075 mg/m^3 (2.0 x 10^{-6} oz/yd^3)
6. 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 copier on a strong and level base. (Inclination on any side should be no more than 5 mm.)
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 copier near the power source, providing clearance as shown:



A: Front > 750 mm (29.6")
B: Left > 10 mm (0.4")
C: Rear > 10 mm (0.4")
D: Right > 10 mm (0.4")

B039I145.WMF

NOTE: 1) The recommended 750 mm front space is sufficient to allow the paper tray to be pulled out. Additional front space is required to allow operators to stand at the front of the machine.
2) The recommended 10 mm right space is for installation only. Additional right space is required to allow operators to fix paper jams and use the by-pass tray.

1.1.4 POWER REQUIREMENTS

⚠CAUTION

1. **Make sure that the wall outlet is near the copier and easily accessible. After completing installation, make sure the plug fits firmly into the outlet.**
2. **Avoid multi-wiring.**
3. **Be sure to ground the machine.**

1. Input voltage:
   America, Taiwan: 110 – 120 V, 50/60 Hz, 12 A
   Europe, Asia: 220 – 240 V, 50/60 Hz, 7 A

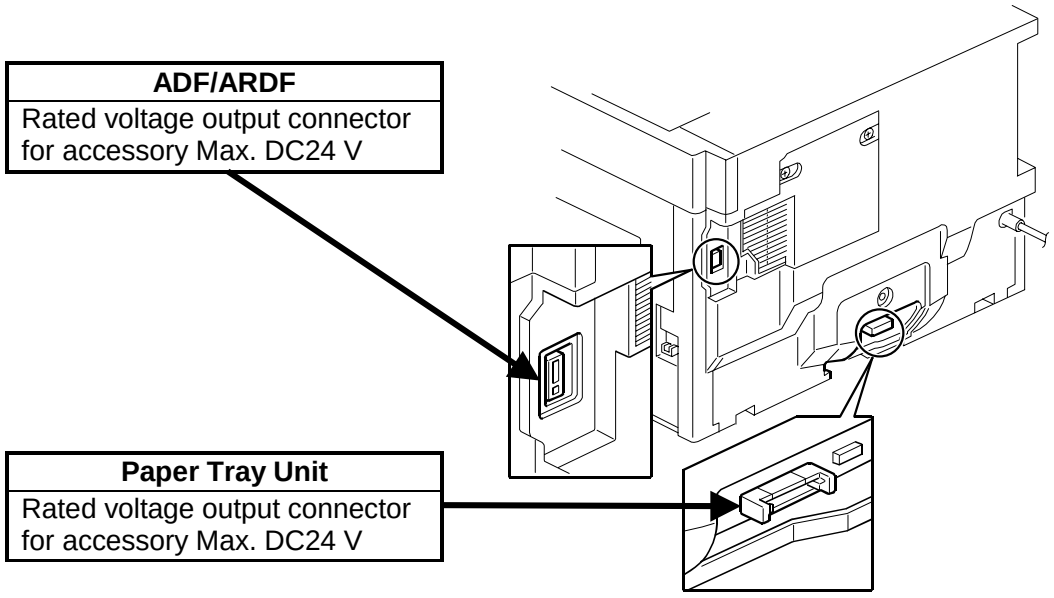
1.2 COPIER INSTALLATION

1.2.1 POWER SOCKETS FOR PERIPHERALS

⚠CAUTION

Rated voltage for peripherals

Make sure to plug the cables into the correct sockets.



B039I119.WMF

1.2.2 ACCESSORY CHECK

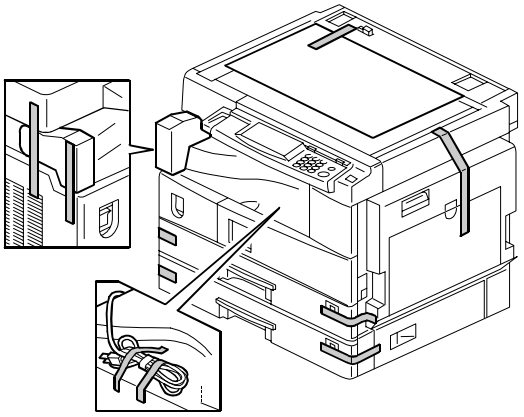
Check that you have the accessories indicated below.

No.	Description	Q'ty
1	Operation Instructions - System Settings	1
2	Operation Instructions - Copy Reference	1
3	NECR - English (-10, -17)	1
4	NECR - Multi Language (-19, -27, -29, -69)	1
5	Model Nameplate (-10, -17, -22)	1
6	Model Name Decal (-22)	1

1.2.3 INSTALLATION PROCEDURE

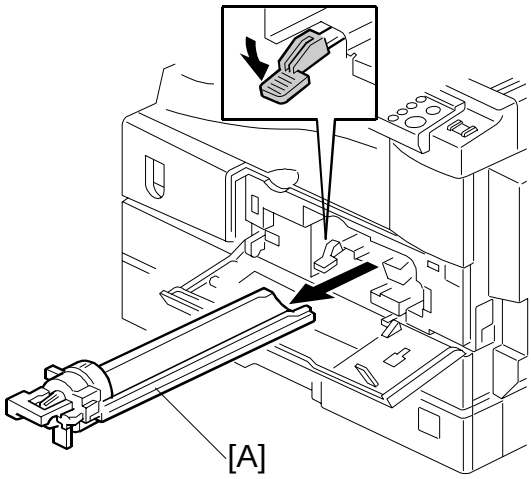
⚠CAUTION
When installing the copier, make sure that the copier is unplugged.

1. Remove the strips of tape.



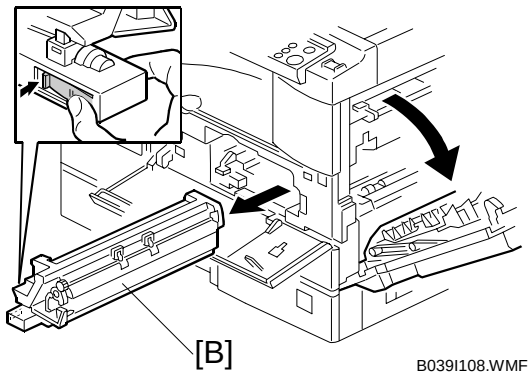
B039I102.WMF

2. Open the front door and remove the toner bottle holder [A].



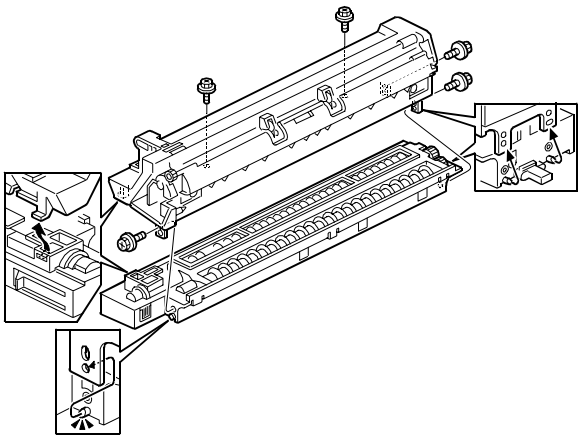
B039I107.WMF

3. Open the right door, and remove the PCU (Photoconductor Unit) [B].



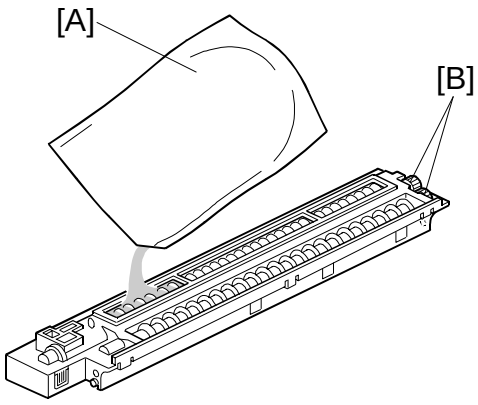
B039I108.WMF

4. Separate the PCU into two sections as shown (5 screws).



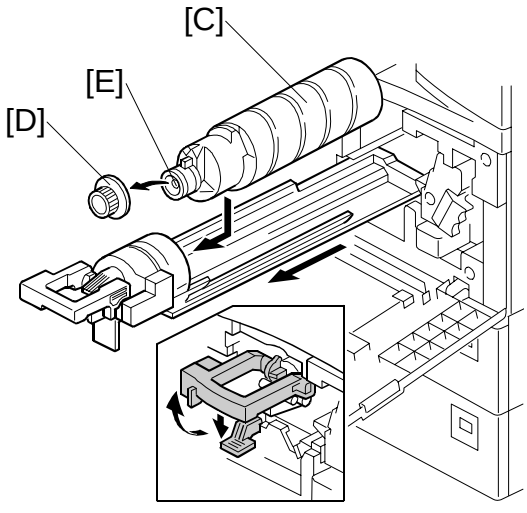
B039I114.WMF

5. Distribute one pack of developer [A] evenly across the width of the development unit, into all openings.
   NOTE: 1) To prevent foreign material from getting on the sleeve rollers, place a sheet of paper under the development unit.
   2) Make sure not to spill the developer on the gears [B].
   3) If it is necessary to turn the gear [B] to distribute the developer, make sure to do so very minimally, otherwise the developer may spill.



B039I115.WMF

6. Reassemble and reinstall the PCU.
7. Shake the toner bottle [C] several times.
   NOTE: Be sure not to remove the toner bottle cap [D] until after shaking.
8. Unscrew the bottle cap [D] and insert the bottle into the holder.
   NOTE: Do not touch the inner bottle cap [E].
9. Reposition the holder and press down the holder lever to secure the bottle.
10. Pull out the paper tray and turn the paper size dial to the appropriate size. Adjust the end and side guides to match the paper size.
    NOTE: To move the side guides, first release the green lock on the rear side guide.



B039I504.WMF

11. Install the optional ARDF, ADF, or platen cover (☛ 1.3/1.4/1.5).
12. Plug in the main power cord and turn on the main switch. Perform TD Sensor Initialization (SP2-214).
13. Select the correct display language using UP Mode (Language).
14. Load the paper in the paper tray and make a full size copy, and check if the side-to-side and leading edge registrations are correct. If they are not, adjust the registrations (☛ 3.13 Copy Adjustments: Printing/Scanning).
15. Initialize the electric total counter using SP7-825 in accordance with the type of service contract.
    NOTE: Select 1, then press the Original Type and OK keys at the same time. If the reset is successful, “Action completed” will appear on the LCD.

1.3 PLATEN COVER INSTALLATION

1.3.1 ACCESSORY CHECK

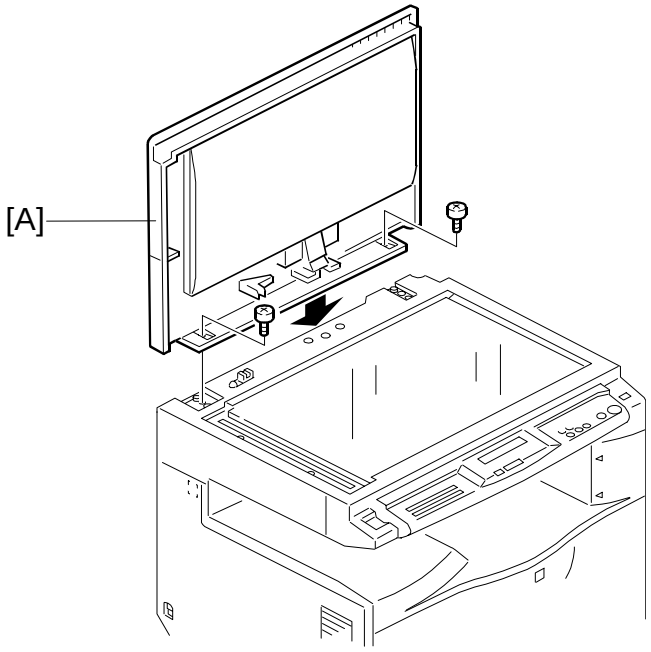
Check that you have the accessories indicated below.

No.	Description	Q'ty
1	Stepped Screw	2

1.3.2 INSTALLATION PROCEDURE

⚠CAUTION
Unplug the machine power cord before starting the following procedure.

1. Install the platen cover [A] (2 screws).



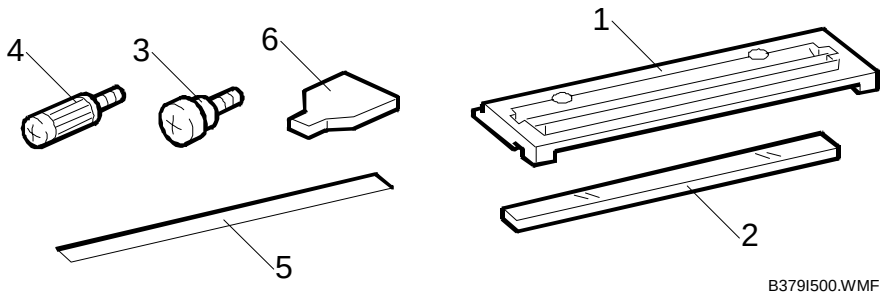
B039I120.WMF

1.4 ARDF INSTALLATION

1.4.1 ACCESSORY CHECK

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

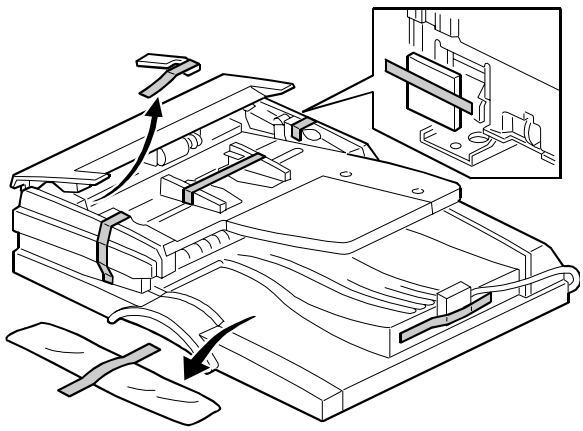
No.	Description	Q'ty
1	Scale Guide	1
2	DF Exposure Glass	1
3	Stud Screw	2
4	Knob Screw	2
5	Original Size Decal	2
6	Screwdriver Tool	1



B379I500.WMF

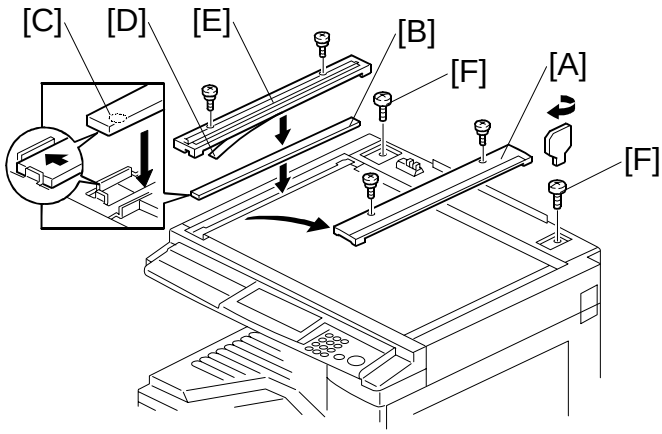
1.4.2 INSTALLATION PROCEDURE

1. Remove the strips of tape.

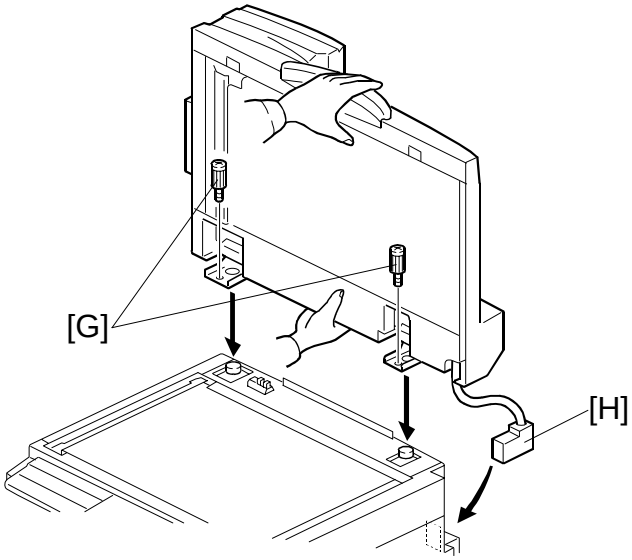


B379I101.WMF

2. Remove the left scale [A] (2 screws).
3. Place the DF exposure glass [B] on the glass holder.
   NOTE: When installing the DF exposure glass, make sure that the white point [C] is face down.
4. Peel off the backing [D] of the double-sided tape attached to the rear side of the scale guide [E], then install it (2 screws removed in step 2).
5. Install the two stud screws [F].
6. Mount the DF on the copier, then slide the DF to the front.
7. Secure the DF unit with two screws [G].
8. Connect the cable [H] to the copier.

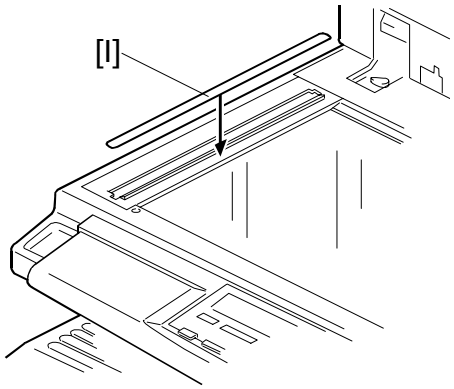


B379I103.WMF



B379I104.WMF

9. Attach the appropriate scale decal [I] as shown.
10. Turn the main power switch on. Then check if the document feeder works properly.
11. Make a full size copy, and check that the side-to-side and leading edge registrations are correct. If they are not, adjust the side-to-side and leading edge registrations. (☛ 3.13.3 ADF Image Adjustment)



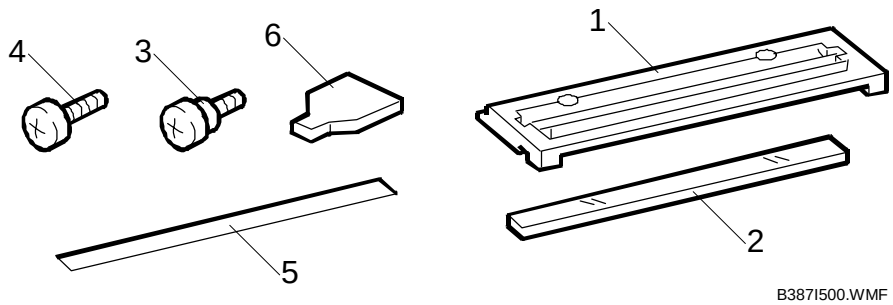
B379I501.WMF

1.5 ADF INSTALLATION

1.5.1 ACCESSORY CHECK

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

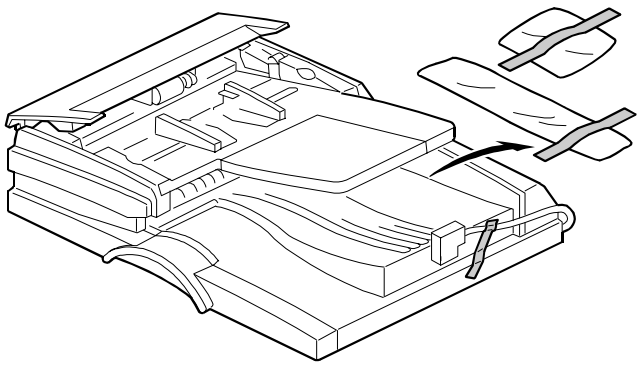
No.	Description	Q'ty
1	Scale Guide	1
2	DF Exposure Glass	1
3	Stud Screw	2
4	Fixing Screw	2
5	Original Size Decal	2
6	Screwdriver Tool	1



B387I500.WMF

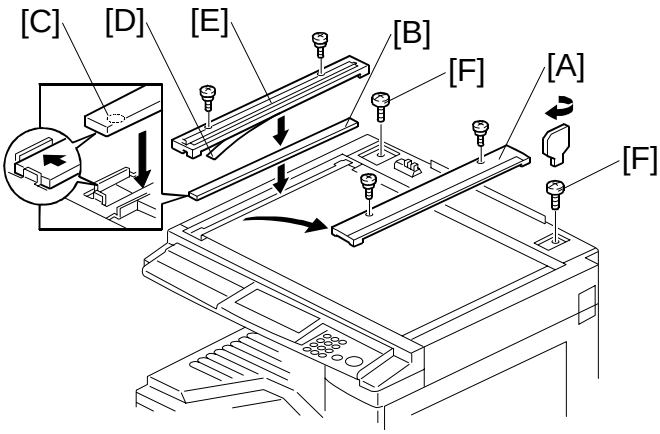
1.5.2 INSTALLATION PROCEDURE

1. Remove the strips of tape.

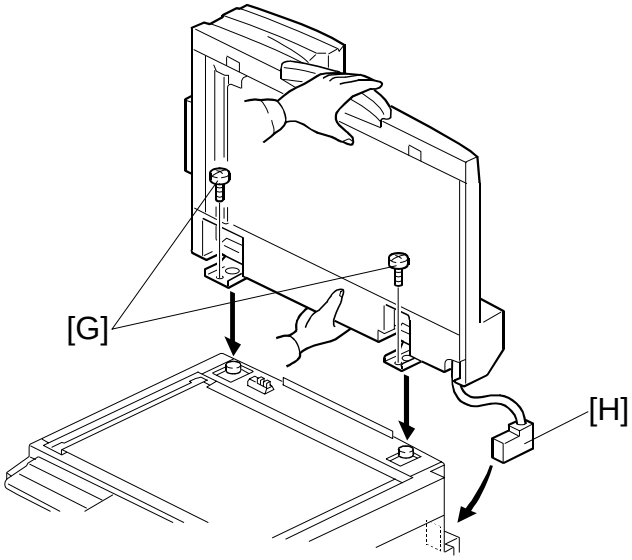


B387I151.WMF

2. Remove the left scale [A] (2 screws).
3. Place the DF exposure glass [B] on the glass holder.
   NOTE: When installing the DF exposure glass, make sure that the white point [C] is face down.
4. Peel off the backing [D] of the double-sided tape attached to the rear side of the scale guide [E], then install it (2 screws removed in step 2).
5. Install the two stud screws [F].
6. Mount the DF on the copier, then slide the DF to the front.
7. Secure the DF unit with two screws [G].
8. Connect the cable [H] to the copier.

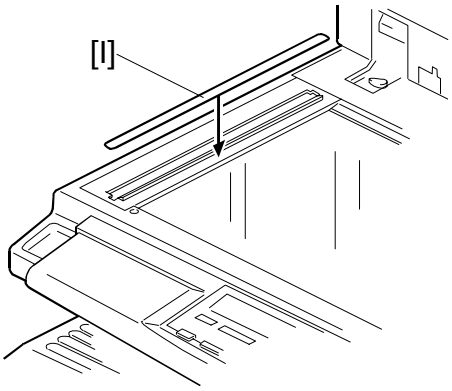


B387I103.WMF



B387I104.WMF

9. Attach the appropriate scale decal [I] as shown.
10. Turn the main power switch on. Then check if the document feeder works properly.
11. Make a full size copy, and check that the side-to-side and leading edge registrations are correct. If they are not, adjust the side-to-side and leading edge registrations. (☛ 3.13.3 ADF Image Adjustment).



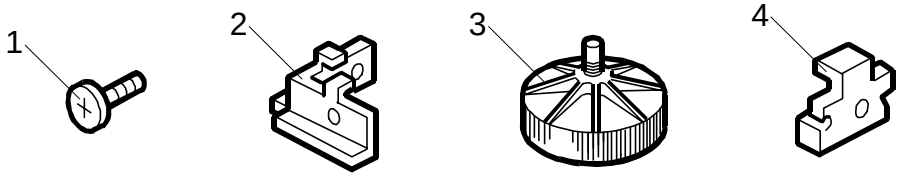
B387I501.WMF

1.6 TWO-TRAY PAPER TRAY UNIT INSTALLATION

1.6.1 ACCESSORY CHECK

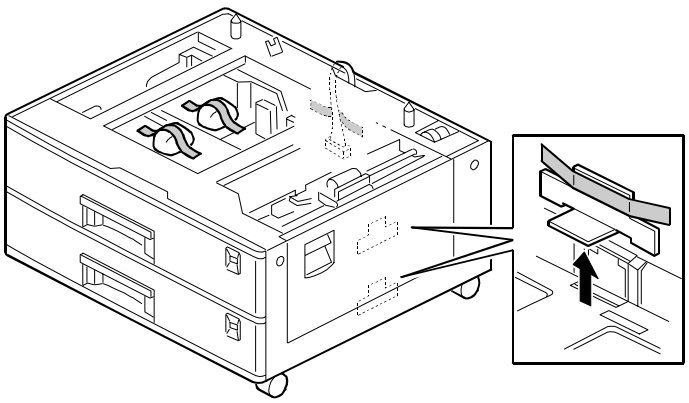
Check the quantity and condition of the accessories against the following list.

No.	Description	Q'ty
1	Screw – M4x10	10
2	Unit Holder	4
3	Adjuster	1
4	Unit Holder	2

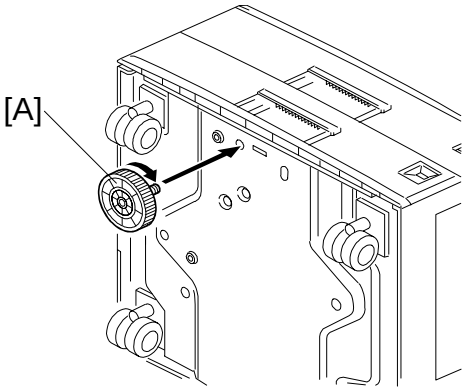


B384I500.WMF

1.6.2 INSTALLATION PROCEDURE



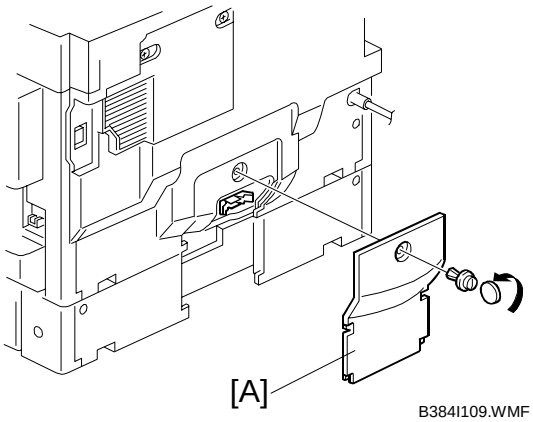
B384I158.WMF



B384I001.WMF

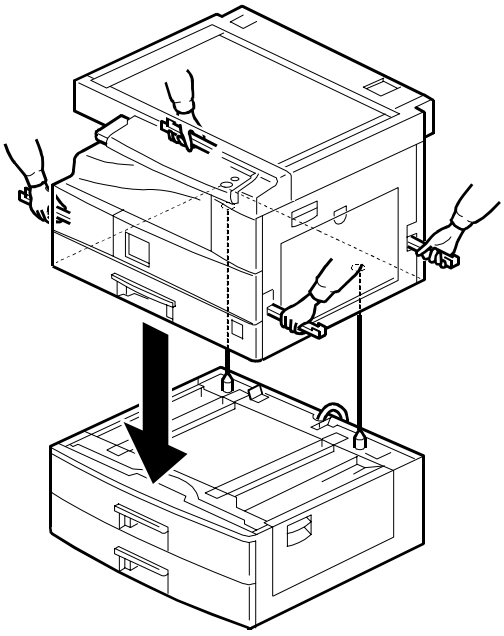
1. Remove the strips of tape.
   NOTE: After removing the tape that secures the peripheral components and cardboard to the paper tray, make sure that there is no tape and/or tape residue remaining on the tray.
2. Attach the adjuster [A] to the base plate, as shown.
   NOTE: If a table is installed, this step is unnecessary.

3. Remove the cover [A] (1 rivet).



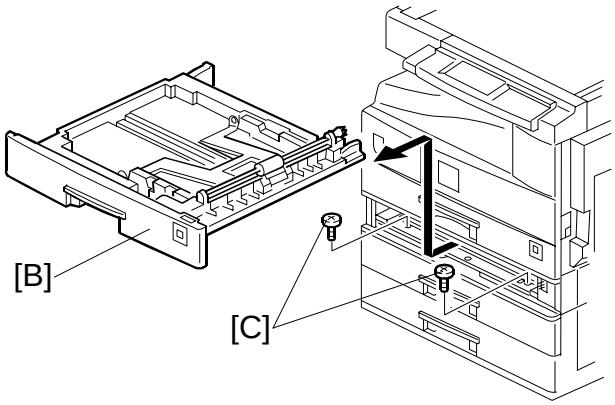
B384I109.WMF

4. Set the copier on the paper tray unit.
   NOTE: When installing the copier, be careful not to pinch the connecting harness.



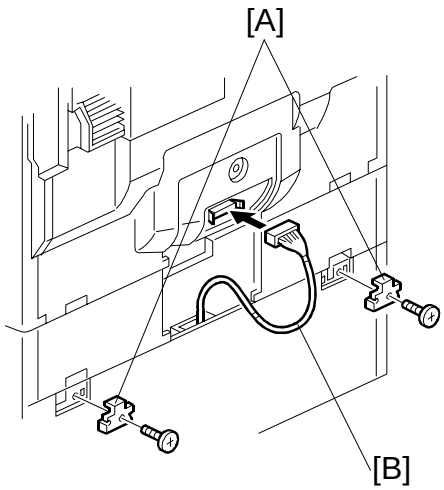
B384I117.WMF

5. **One-tray copier model (B039):**
   Remove the 1st tray cassette [B].
   Two-tray copier models (B040/B043):
   Remove the 2nd tray cassette [B].
6. Install the two screws [C].
7. Reinstall the tray cassette.



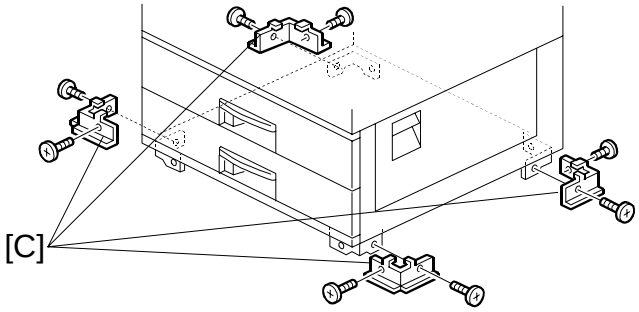
B384I106.WMF

8. Install the two brackets [A] (1 stepped screw each).
9. Connect the connecting harness [B] to the copier.
   NOTE: There are cutouts in the plug on both sides. The left side has one cutout, and the right side has two.
10. Reinstall the cover removed in step 3 (1 rivet).



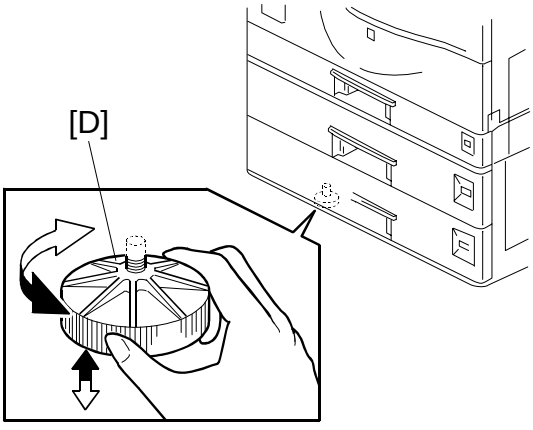
B384I105.WMF

11. Install the four brackets [C] (2 screws each).
    NOTE: If a table is installed, this step is unnecessary.



B384I007.WMF

12. Rotate the adjuster [D] to fix the machine in place.
    NOTE: If a table is installed, this step is unnecessary.
13. Load the paper in the paper trays and make full size copies from each tray. Check if the side-to-side and leading edge registrations are correct. If they are not, adjust the registrations (☛ 3.13 Copy Adjustments: Printing/ Scanning).



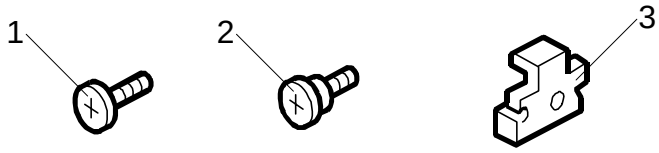
B384I002.WMF

1.7 ONE-TRAY PAPER TRAY UNIT INSTALLATION

1.7.1 ACCESSORY CHECK

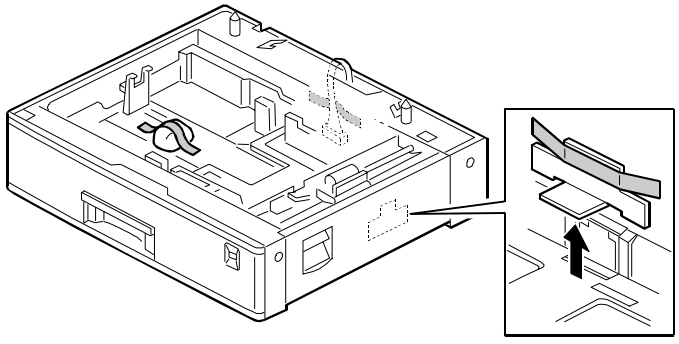
Check the quantity and condition of the accessories against the following list.

No.	Description	Q'ty
1	Screw – M4x10	2
2	Stepped Screw – M4x10	2
3	Unit Holder	2



B385I500.WMF

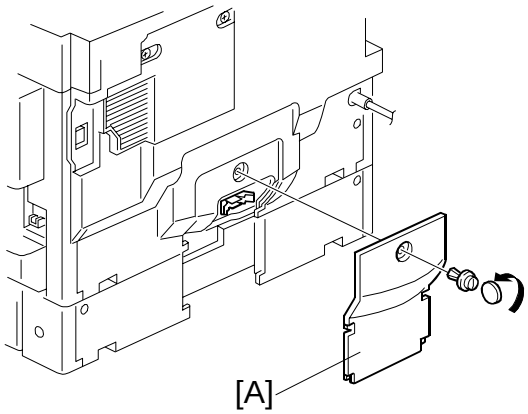
1.7.2 INSTALLATION PROCEDURE



B385I159.WMF

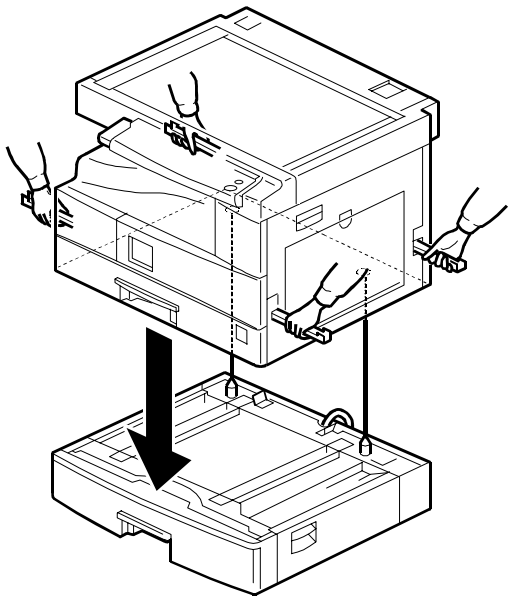
1. Remove the strips of tape.
   NOTE: After removing the tape that secures the peripheral components and cardboard to the paper tray, make sure that there is no tape and/or tape residue remaining on the tray.

2. Remove the cover [A] (1 rivet).



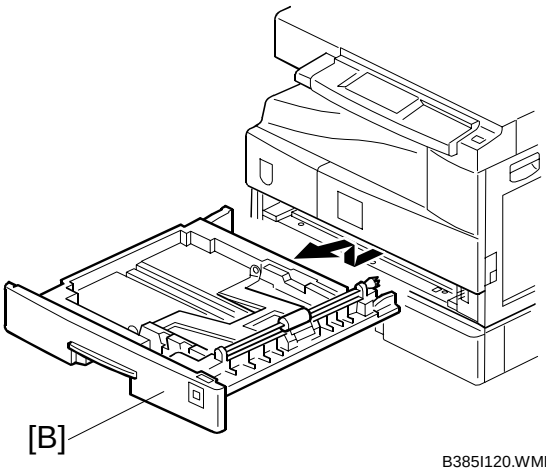
B385I109.WMF

3. Set the copier on the paper tray unit.
   NOTE: When installing the copier, be careful not to pinch the connecting harness.



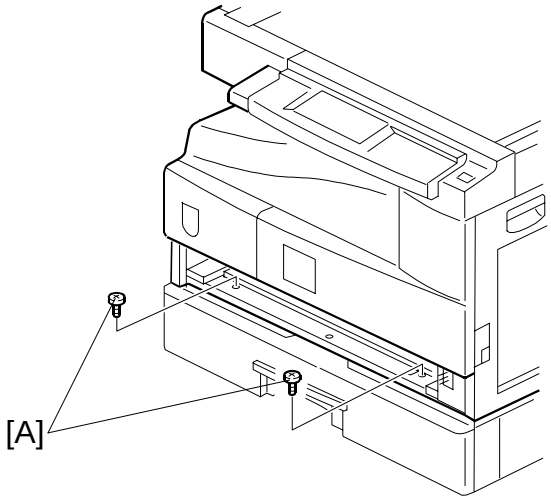
B385I112.WMF

4. **One-tray copier model (B039):**
   Remove the 1st tray cassette [B].
   Two-tray copier models (B040/B043):
   Remove the 2nd tray cassette [B].



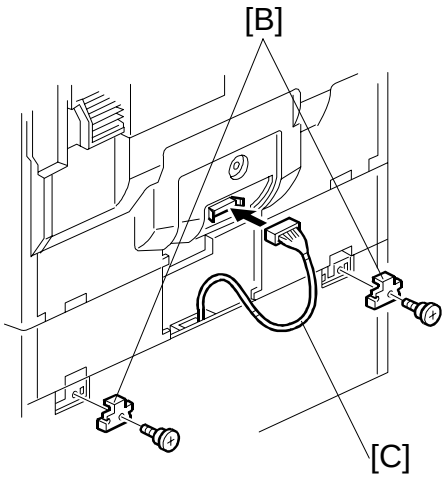
B385I120.WMF

5. Install the two screws [A].
6. Reinstall the tray cassette.



B385I118.WMF

7. Install the two brackets [B]. (1 stepped screw each).
8. Connect the connecting harness [C] to the copier.
   NOTE: There are cutouts in the plug on both sides. The left side has one cutout, and the right side has two.
9. Reinstall the cover removed in step 2.
10. Load the paper in the paper tray and make full size copies from tray. Check if the side-to-side and leading edge registrations are correct. If they are not, adjust the registrations (☛ 3.13 Copy Adjustments: Printing/Scanning).



B385I105.WMF

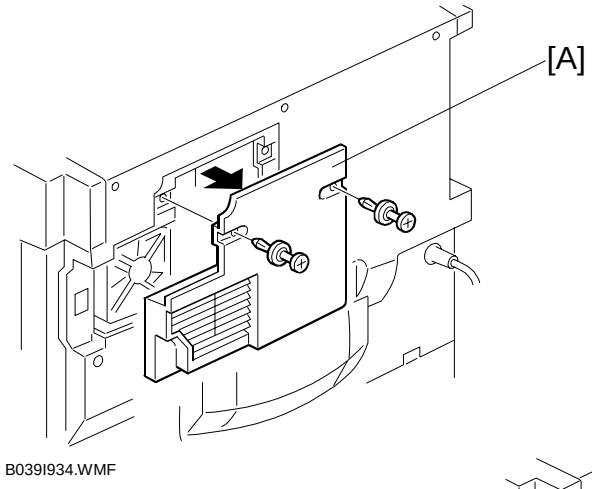
1.8 IMB INSTALLATION

1.8.1 ACCESSORY CHECK

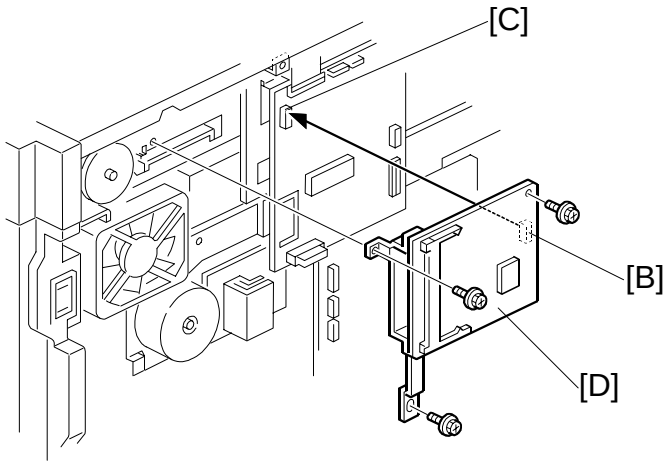
Click the quantity and condition of the accessory against the following list:

No.	Description	Q'ty
1	Screw – M3x6	3

1.8.2 INSTALLATION PROCEDURE



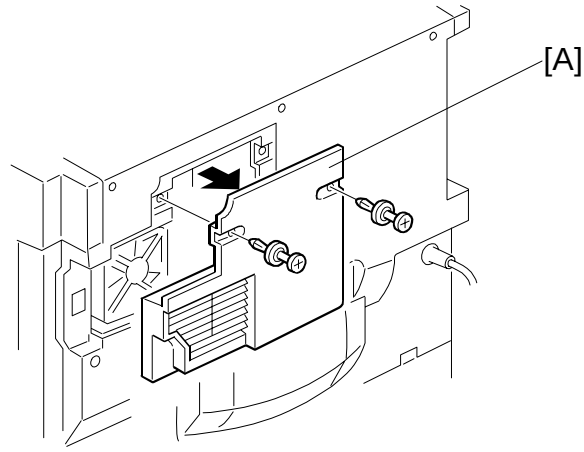
B039I934.WMF



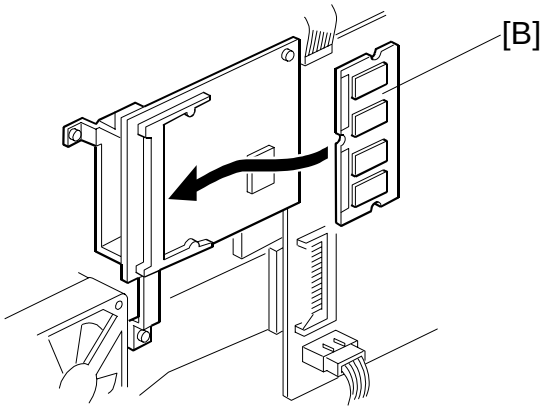
B039I928.WMF

1. Remove the rear middle cover [A] (2 rivets).
2. Connect the connectors [B, C] and install the IMB [D] (3 screws).
3. Reinstall the rear middle cover.

1.9 DRAM INSTALLATION



B039I934.WMF

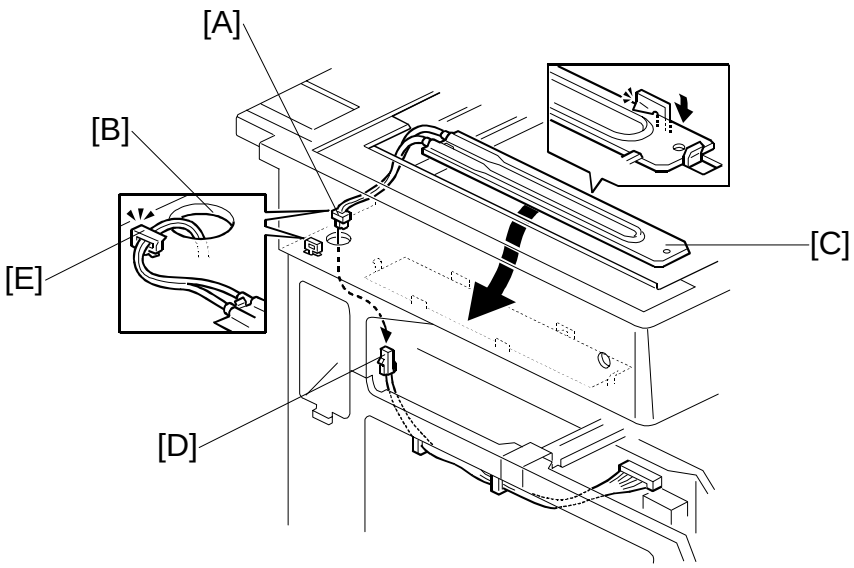


B039R942.WMF

NOTE: The IMB must be installed before installing the DRAM.

1. Remove the rear middle cover [A] (2 rivets).
2. Install the DRAM [B].
3. Reinstall the rear middle cover.

1.10 ANTI-CONDENSATION HEATER INSTALLATION

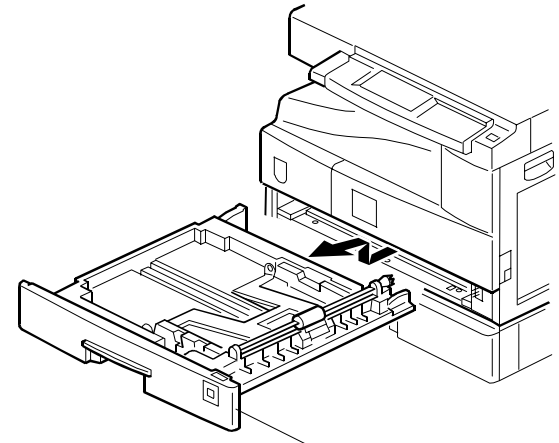


B039I127.WMF

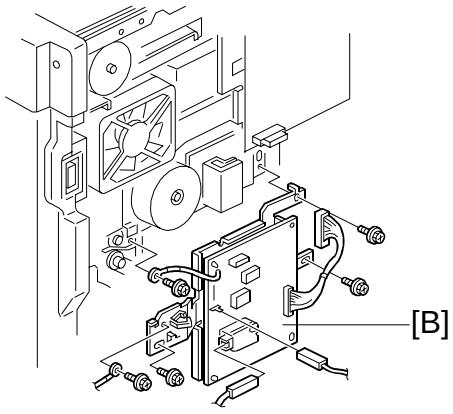
1. Remove the exposure glass (☛ 3.4.1).
2. Remove the left cover (☛ 3.3.8).
3. Pass the connector [A] through the opening [B].
4. Install the anti-condensation heater [C], as shown.
5. Join the connectors [A, D].
6. Clamp the harness with the clamp [E].
7. Reinstall the left cover and exposure glass.

1.11 TRAY HEATERS

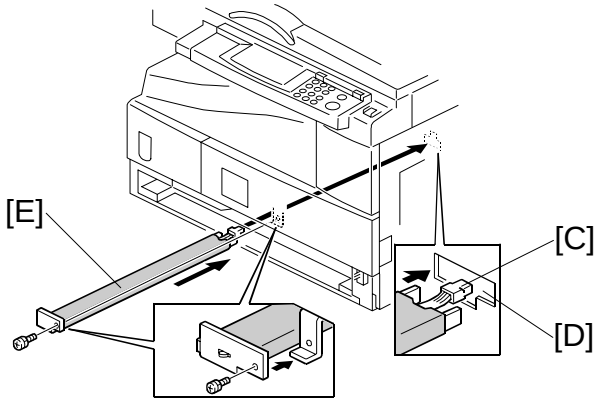
1.11.1 UPPER TRAY HEATER



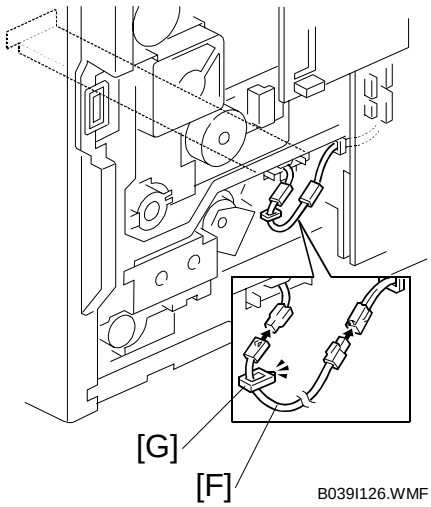
B039I020.WMF



B039I909.WMF



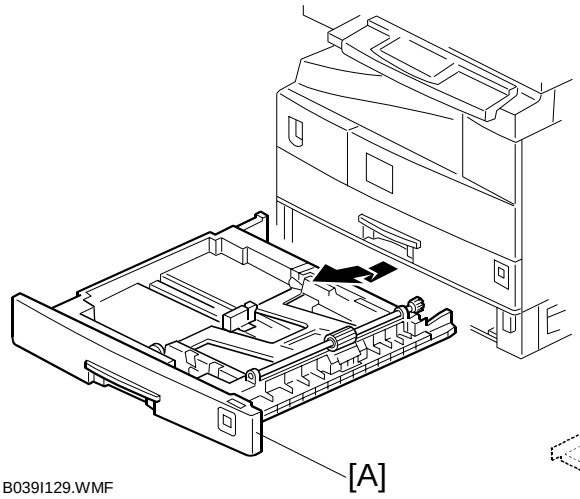
B039I121.WMF



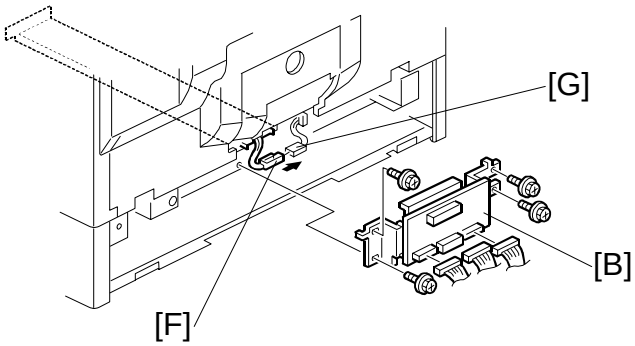
B039I126.WMF

1. Remove the 1st tray cassette [A].
2. Remove the rear cover (☛ 3.3.1).
3. Remove the high voltage power supply board [B] with bracket (5 screws and 3 connectors).
4. Pass the connector [C] through the opening [D] and install the tray heater [E] (1 screw).
5. Install the relay cable [F], as shown.
6. Clamp the cable with the clamp [G].
7. Reinstall the 1st tray cassette, power pack, and rear cover.

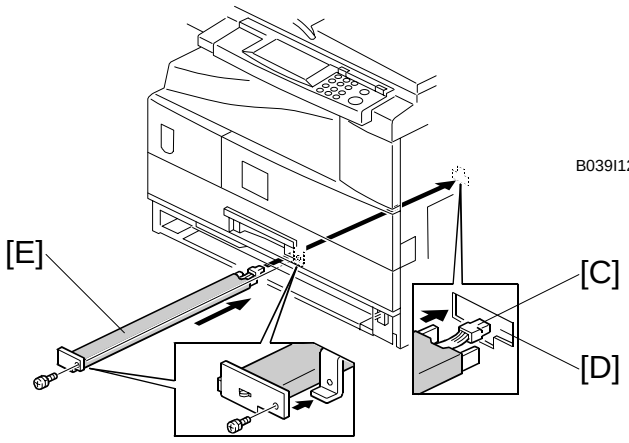
1.11.2 LOWER TRAY HEATER (TWO-TRAY MODEL ONLY)



B039I129.WMF



B039I125.WMF

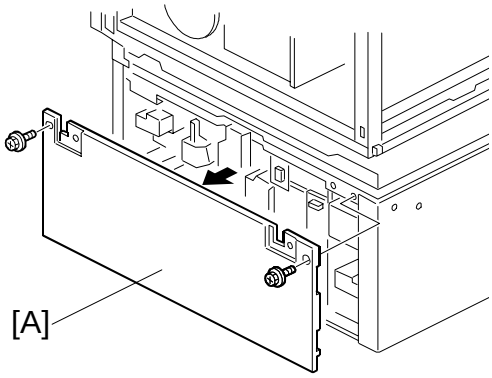


B039I122.WMF

1. Remove the 2nd tray cassette [A].
2. Remove the rear lower cover (☛ 3.3.2).
3. **B043 model only:**
   Remove the DCB [B] with bracket (4 screws and 3 connectors).
4. Pass the connector [C] through the opening [D] and install the tray heater [E] (1 screw).
5. Join the connectors [F, G].
6. Reinstall the 2nd tray cassette, DCB, and rear lower cover.

1.11.3 TRAY HEATERS FOR THE OPTIONAL PAPER FEED UNITS

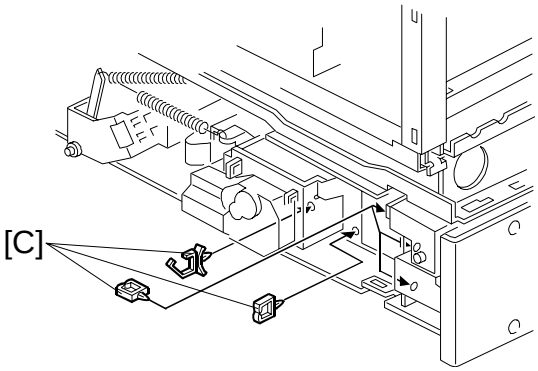
1. Remove the rear cover for the paper tray unit [A] (2 screws).



B039I202.WMF

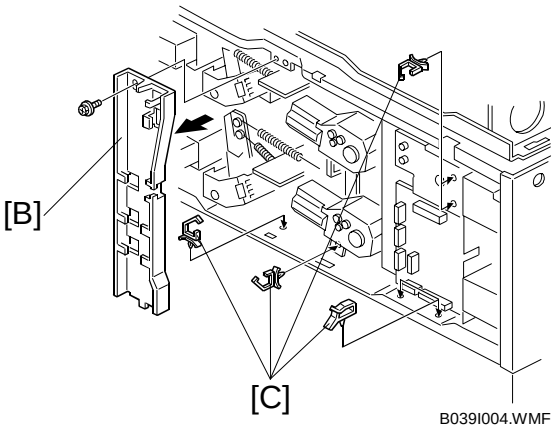
2. Two-tray unit only: Remove the cable guide [B] (1 screw).
3. Install the clamps [C].

- One-tray paper feed unit -



B039I007.WMF

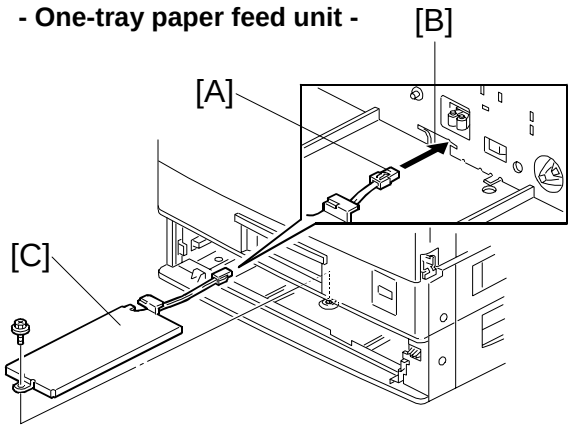
- Two-tray paper feed unit -



B039I004.WMF

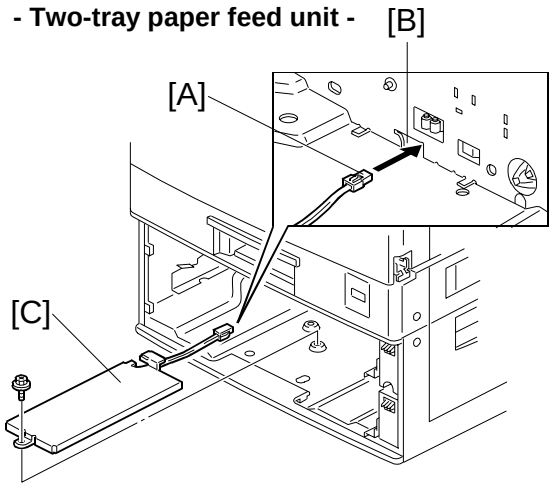
4. Pass the connector [A] through the opening [B].
5. Install the tray heater [C] (1 screw).

- One-tray paper feed unit -



B039I009.WMF

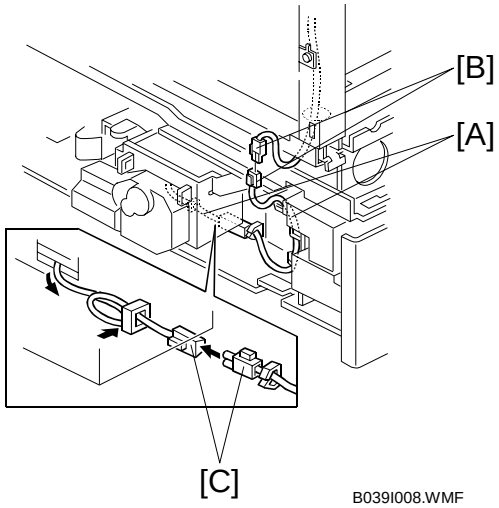
- Two-tray paper feed unit -



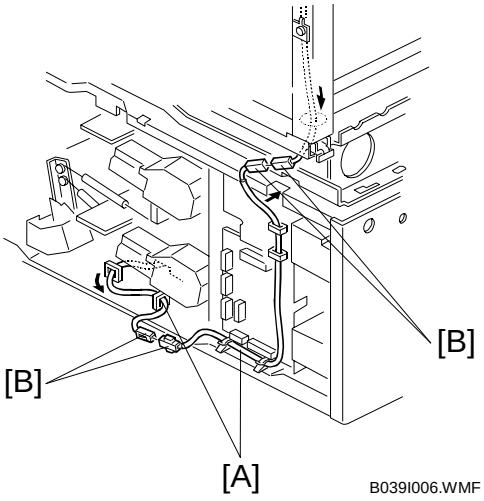
B039I005.WMF

6. Clamp the cables [A], as shown.
7. Join the connectors [B].
8. Two-tray unit only: Reinstall the cable guide.
9. **One-tray copier model (B039):**
   Remove the 1st tray cassette.
   Two-tray copier models (B040/B043):
   Remove the 2nd tray cassette.

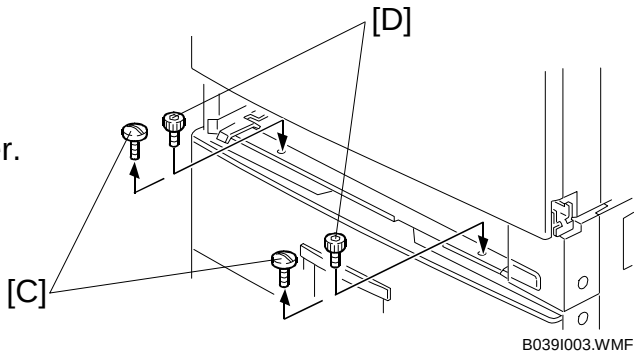
- One-tray paper feed unit -



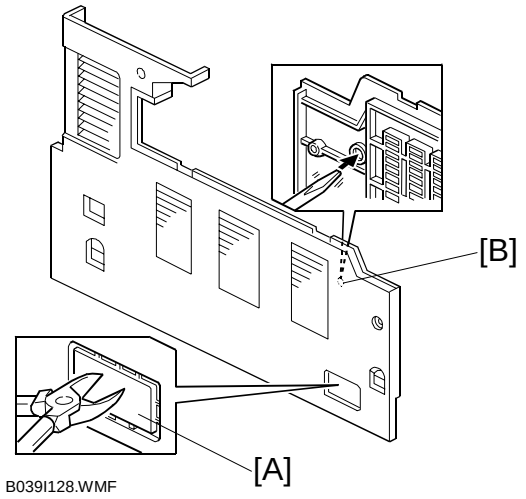
- Two-tray paper feed unit -



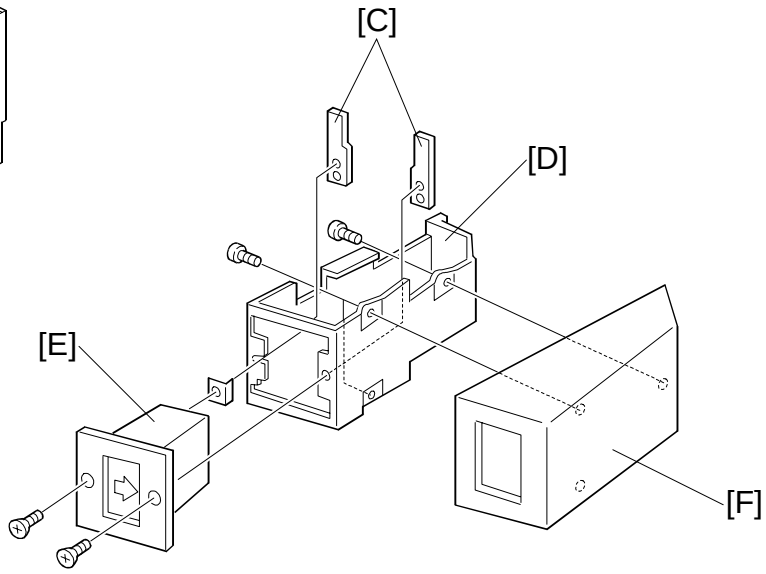
10. Remove the two screws [C] and install the two hexagonal socket screws [D].
11. Reinstall the 1st tray and rear cover.



1.12 KEY COUNTER INSTALLATION

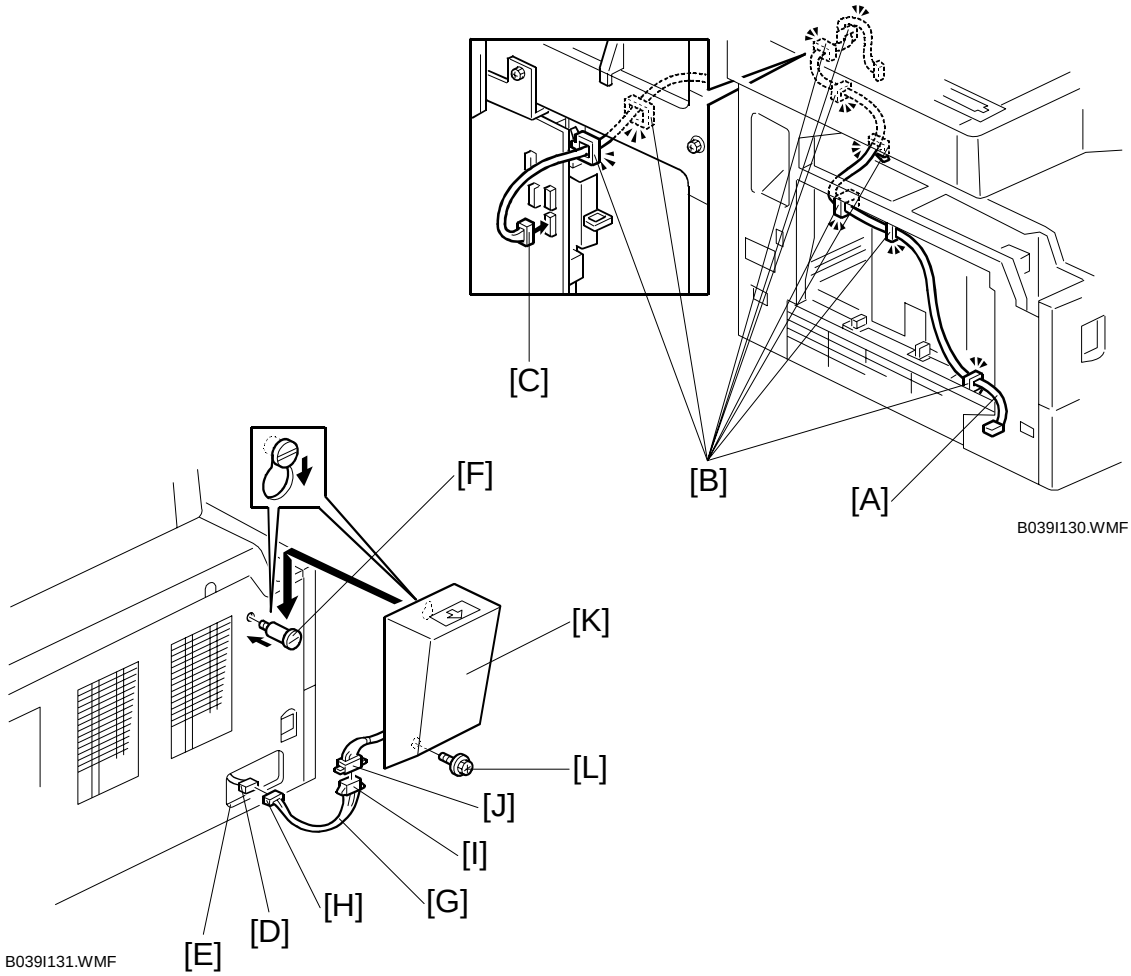


B039I128.WMF



B039I100.WMF

1. Remove the left cover (☛ 3.3.8).
2. Remove the rear cover (☛ 3.3.1).
3. Remove the cap [A] with nippers.
4. Punch out the small hole [B] using a screwdriver.
5. Hold the key counter plate nuts [C] on the inside of the key counter bracket [D] and insert the key counter holder [E].
6. Secure the key counter holder to the bracket (2 screws).
7. Install the key counter cover [F] (2 screws).



8. Clamp the relay cable [A] with the clamps [B], as shown.
   NOTE: The relay cable [A] is not included in the key counter bracket accessories.
9. Connect the connector [C] to CN306 on the IOB.
10. Reinstall the rear and left cover.
    NOTE: When reinstalling the left cover, pass the relay cable connector [D] through the opening [E].
11. Install the stepped screw [F].
12. Install the relay cable [G] and join the connectors [D, H].
13. Join the connectors [I, J].
14. Hook the key counter holder assembly [K] onto the stepped screw [F].
15. Secure the key counter holder assembly with a screw [L].
16. Change the value of SP5-113 to “1”.

2. PREVENTIVE MAINTENANCE SCHEDULES

2.1 PM TABLES

NOTE: 1) After carrying out PM, clear the PM counter (SP7-804).
2) PM intervals (60k, 80k, and 120K) indicate the number of prints.

Key: AN: As necessary C: Clean R: Replace L: Lubricate I: Inspect

	EM	60k	120k	AN	NOTE
OPTICS					
Reflector	C				Optics cloth
1st mirror	C			C	Optics cloth
2nd mirror	C			C	Optics cloth
3rd mirror	C			C	Optics cloth
Scanner guide rails	C				Do not use alcohol.
Platen cover	I			C	Replace the platen sheet, if necessary. Blower brush or alcohol
Exposure glass	C			C	Blower brush or alcohol
Toner shield glass	C				Blower brush
APS sensors	C				Blower brush
DRUM AREA					
PCU		I			
Drum		R			
Developer		R			
Charge roller		R			
Cleaning brush (for charge roller)		R			
Cleaning blade (for OPC drum)		R			
Separation pawls		R			
Transfer roller			R		
ID sensor	C			C	Blower brush
PAPER FEED					
Paper feed roller (in each feed tray)		C	R	C	Clean with water or alcohol.
Friction pad (in each feed tray)		C	R	C	Clean with water or alcohol.
Bottom-plate pad (in each feed tray)		C		C	Clean with water or alcohol.
Paper feed roller (bypass tray)		C		C	Clean with water or alcohol.
Friction pad (bypass tray)		C		C	Clean with water or alcohol.
Bottom-plate pad (by-pass tray)		C		C	Clean with water or alcohol.
Registration rollers		C		C	Clean with water or alcohol.
Relay rollers		C		C	Clean with water or alcohol.

	EM	60k	120k	AN	NOTE
Paper feed guides		C		C	Clean with water or alcohol.
Paper-dust Mylar		C		C	Clean with water or alcohol.
FUSING UNIT					
Hot roller		R			
Pressure roller			R		
Hot roller bushings			I		
Pressure-roller bushing			R		
Hot roller stripper pawls			R	C	Dry cloth
Thermistor		C		C	Dry cloth

	80k	AN	NOTE
ADF, ARDF			
Feed belt	R	C	Clean with water or alcohol.
Separation roller	R	C	Clean with water or alcohol.
Pick-up roller	R	C	Clean with water or alcohol.
Stamp		R	Replace when necessary.
White plate		C	Clean with water or alcohol.
DF exposure glass		C	Clean with water or alcohol.
Platen cover		C	Clean with water or alcohol.

	60k	120k	AN	NOTE
PAPER TRAY UNIT (ONE-TRAY AND TWO-TRAY MODELS)				
Paper feed rollers		R	C	Dry or damp cloth
Bottom-plate pads	C		C	Dry cloth
Paper-feed guides	C		C	Clean with water or alcohol.
Friction pads		R	C	Dry or damp cloth
PAPER TRAY UNIT (TWO-TRAY MODEL ONLY)				
Relay clutch		I		
Feed clutches		I		
Relay roller		C	C	Dry cloth

2.2 HOW TO CLEAR THE PM COUNTER

After PM, clear the PM counter (SP7-804).

1. Access SP mode 7-804.
2. Press the *Original Type* key and the *OK* or ⓡ/# key at the same time to reset the counter. If the reset is successful, the display shows “Action completed.” If the reset fails, the display shows “Error!!!”

3. REPLACEMENT AND ADJUSTMENT

3.1 GENERAL CAUTIONS

Do not turn off the main switch while any of the electrical components are active. Doing so may result in damage to units (such as the PCU) as they are pulled out or replaced.

3.1.1 PCU (PHOTOCONDUCTOR UNIT)

The PCU consists of the OPC drum, charge roller, development unit, and cleaning components. Observe the following precautions when handling the PCU.

1. Never touch the drum surface with bare hands. If the drum surface is dirty or if you have accidentally touched it, wipe it with a dry cloth, or clean it with wet cotton and then wipe it dry with a cloth.
2. Never use alcohol to clean the drum. Alcohol will dissolve the drum surface.
3. Store the PCU in a cool dry place.
4. Do not expose the drum to corrosive gases (ammonia, etc.).
5. Do not shake a used PCU, as this may cause toner and developer to spill out.
6. Dispose of used PCU components in accordance with local regulations.

3.1.2 TRANSFER ROLLER

1. Never touch the surface of the transfer roller with bare hands.
2. Be careful not to scratch the transfer roller, as the surface is easily damaged.

3.1.3 SCANNER UNIT

1. Use alcohol or glass cleaner to clean the exposure and scanning glass. This will reduce the static charge on the glass.
2. Use a blower brush or a water-moistened cotton pad to clean the mirrors and lenses.
3. Take care not to bend or crease the exposure lamp’s ribbon cable.
4. Do not disassemble the lens unit. Doing so will throw the lens and copy image out of focus.
5. Do not turn any of the CCD positioning screws. Doing so will throw the CCD out of position.

3.1.4 LASER UNIT

1. Do not loosen or adjust the screws securing the LD drive board on the LD unit. Doing so will throw the LD unit out of adjustment.
2. Do not adjust the variable resistors on the LD unit. These are adjusted at the factory.
3. The polygonal mirror and F-theta lens are very sensitive to dust.
4. Do not touch the toner shield glass or the surface of the polygonal mirror with bare hands.

3.1.5 FUSING UNIT

1. After installing the fusing thermistor, make sure that it is in contact with the hot roller and that the roller can rotate freely.
2. Be careful to avoid damage to the hot roller stripper pawls and their tension springs.
3. Do not touch the fusing lamp and rollers with bare hands.
4. Make sure that the fusing lamp is positioned correctly and that it does not touch the inner surface of the hot roller.

3.1.6 PAPER FEED

1. Do not touch the surface of the paper feed rollers.
2. To avoid misfeeds, the side and end fences in each paper tray must be positioned correctly so as to align with the actual paper size.

3.1.7 IMPORTANT

1. After installing a new PCU, you must run SP2-214 to initialize the TD sensor. After starting initialization, be sure to wait for it to reach completion (wait for the motor to stop) before re-opening the front cover or turning off the main switch.
2. If the optional tray heater or optics anti-condensation heater is installed, keep the copier's power cord plugged in even while the main switch is off, so that the heater(s) remain energized.

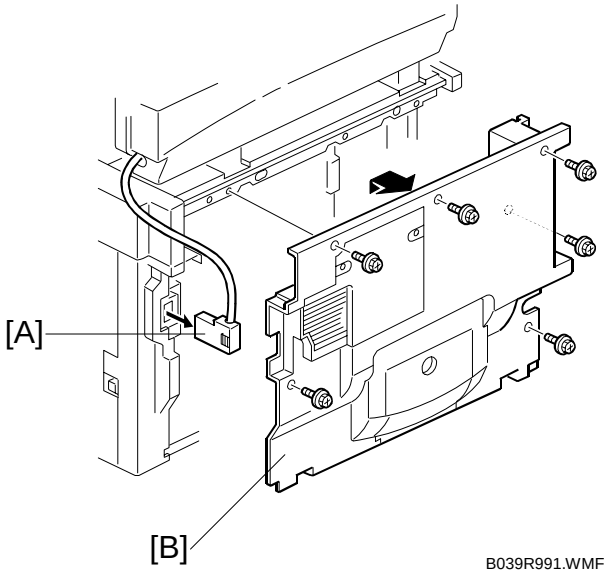
3.2 SPECIAL TOOLS AND LUBRICANTS

Part Number	Description	Q'ty
A0069104	Scanner Positioning Pins (4 pins/set)	1 set
A2929500	Test Chart S5S (10 pcs/set)	1 set
A0299387	FLUKE 87 Digital Multimeter	1
A2309352	4MB Flash Memory Card	1
A2579300	Grease Barrierta S552R	1
52039502	Grease G-501	1
B0399099	NVRAM – Minus Counter	1
G0219350	Loop-back Connector	1

3.3 EXTERIOR COVERS & OPERATION PANEL

3.3.1 REAR COVER

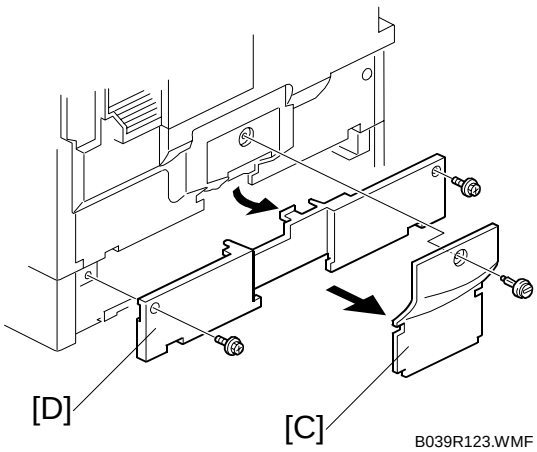
1. Unplug the DF cable [A].
2. Rear cover [B] (🖉 x 6)



B039R991.WMF

3.3.2 REAR LOWER COVER (TWO-TRAY MODELS ONLY)

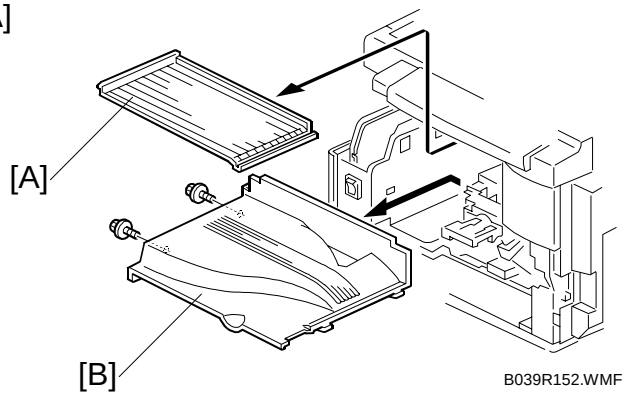
1. Rear cover (☛ 3.3.1) or tray harness cover [C] (1 rivet).
2. Rear lower cover [D] (🖉 x 2)



B039R123.WMF

3.3.3 COPY TRAY

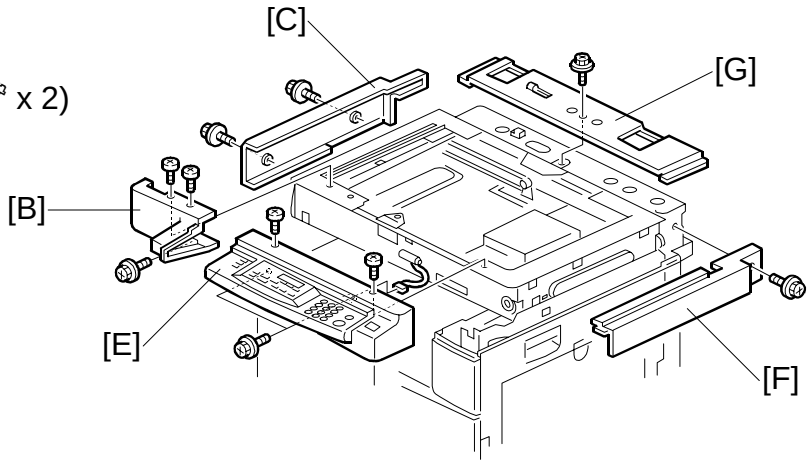
1. *Duplex models only*: Inverter tray [A]
2. Copy tray [B] (☞ x 2)



B039R152.WMF

3.3.4 LEFT UPPER COVER

1. Rear cover (☛ 3.3.1)
2. Left upper cover [C] (☞ x 2)



B039R002.WMF

3.3.5 FRONT UPPER LEFT COVER AND OPERATION PANEL

1. Front upper left cover [D] (☞ x 3)
2. Operation panel [E] (☞ x 3, ☞ x 1)

3.3.6 RIGHT UPPER COVER

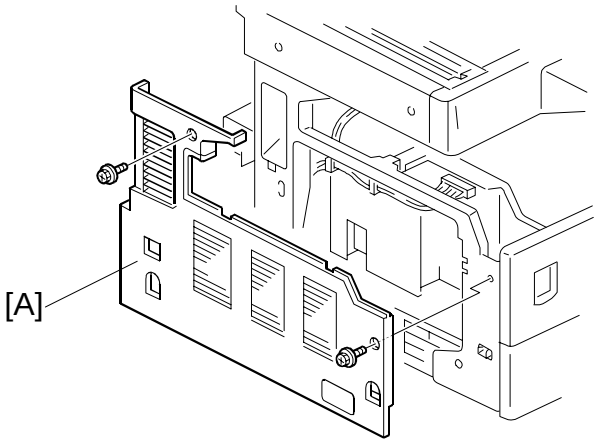
1. Right upper cover [F] (☞ x 1)

3.3.7 TOP REAR COVER

1. Platen cover *or* ARDF *or* ADF (☛ 1.2, 1.3, or 1.4)
2. Top rear cover [G] (☞ x 1)

3.3.8 LEFT COVER

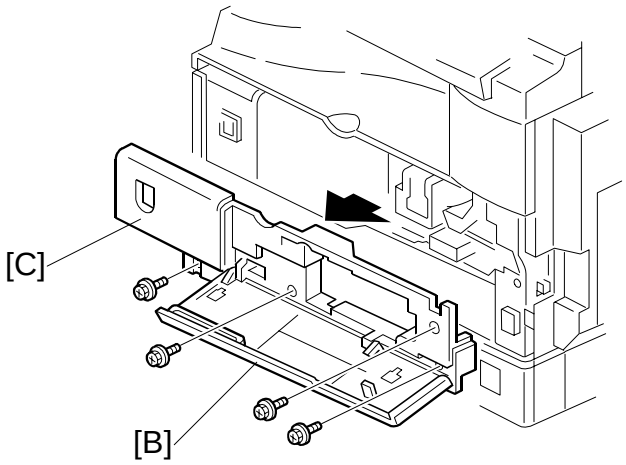
1. Copy tray (☛ 3.3.3)
2. Rear cover (☛ 3.3.1)
3. Left cover [A] (🔩 x 2)



B039R924.WMF

3.3.9 FRONT LONG COVER

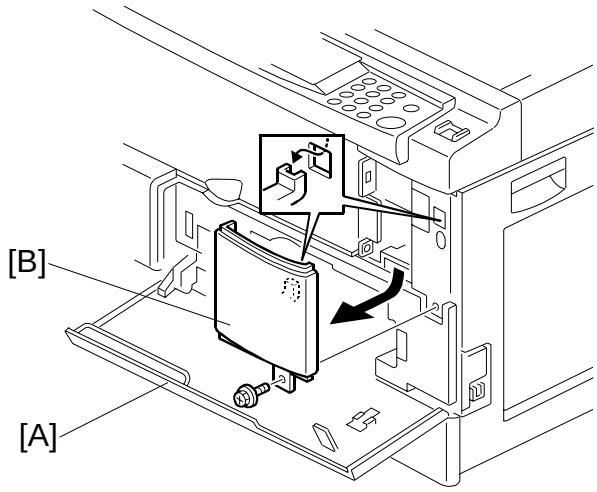
1. Open the front door [B].
2. Pull out the (top) paper tray.
3. Front long cover [C] (🔩 x 4)



B039R929.WMF

3.3.10 FRONT RIGHT COVER

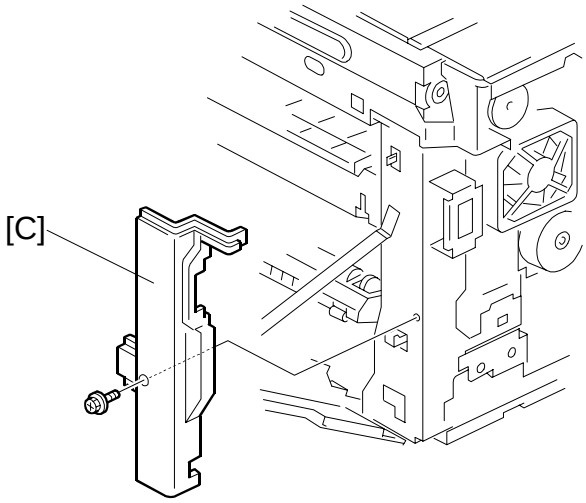
1. Open the front door [A].
2. Front right cover [B] (🔩 x 1)



B039R905.WMF

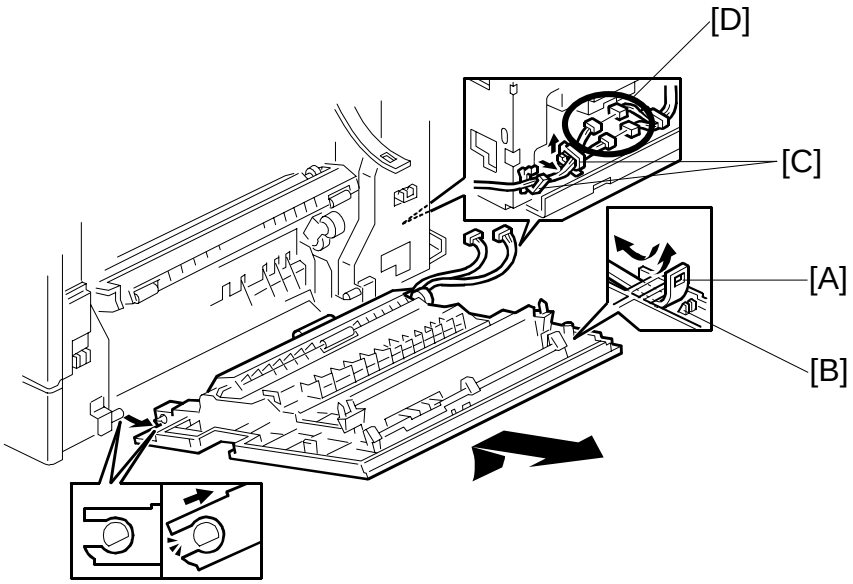
3.3.11 RIGHT REAR COVER

1. Right upper cover (☛ 3.3.6)
2. Right rear cover [C] (🔩 x 1)



B039R914.WMF

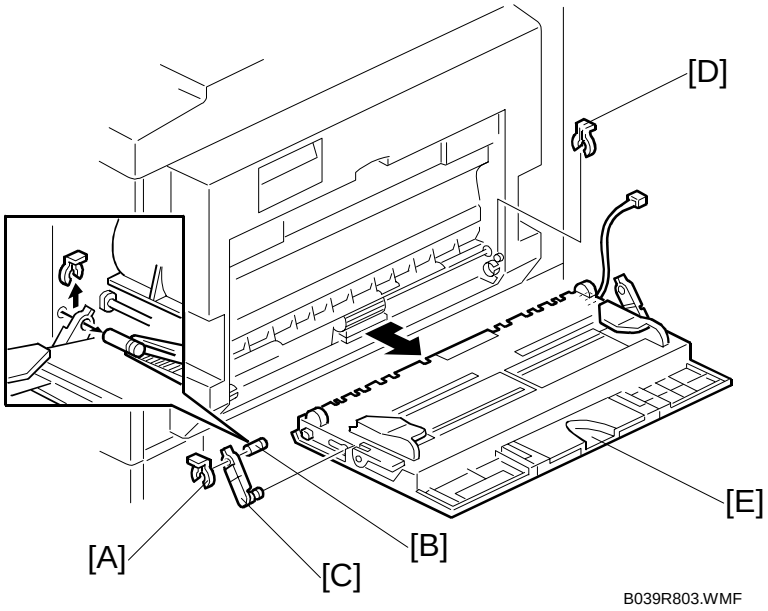
3.3.12 RIGHT DOOR



B039R915.WMF

1. Undo the strap [A] and lower the right door.
   NOTE: On non-duplex models (shown in the drawing above), hold the door open part way and push the strap toward the door so that it comes loose from the peg [B] on the door. On duplex models (not shown), unscrew the strap (🔩 x 1) from the main unit.
2. Rear cover (☛ 3.3.1)
3. Right rear cover (☛ 3.3.11)
4. Open the 2 clamps [C] and disconnect the connectors [D].
   NOTE: On non-duplex models (shown in the drawing above), disconnect 2 connectors. On duplex models, disconnect 3 connectors.
5. Pull the door off at an angle, so that it comes free of the hinges.

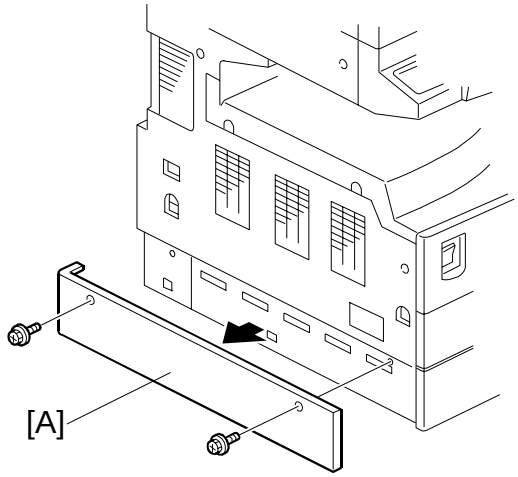
3.3.13 BY-PASS TRAY



1. Rear cover (☛ 3.3.1)
2. Right rear cover (☛ 3.3.11)
3. Open the two clamps (see [C] on preceding page) and disconnect the connector coming from the by-pass tray (5-pin connector with colored wires). Move the connector clear of the other wires, so that it will come out without snagging when you take off the by-pass tray.
4. Lower the right door. (☛ 3.3.12)
5. Open the wire harness on the inside of the right door (B043 model only).
6. Close the right door again temporarily (you do not need to refasten the strap).
7. Front-side clip ring [A], front-side pin [B], front-side tray holder arm [C], and rear-side clip ring [D]
8. By-pass tray [E]

3.3.14 LEFT LOWER COVER (TWO-TRAY MODELS ONLY)

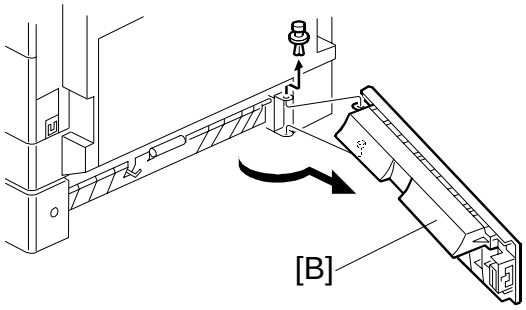
1. Left lower cover [A] (☞ x 2)



B039R936.WMF

3.3.15 RIGHT LOWER COVER (TWO-TRAY MODELS ONLY)

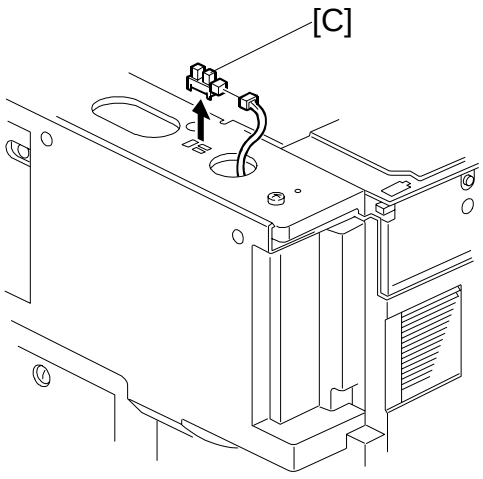
1. Open the right lower cover [B].
2. Right lower cover (1 rivet)



B039R937.WMF

3.3.16 PLATEN COVER SENSOR

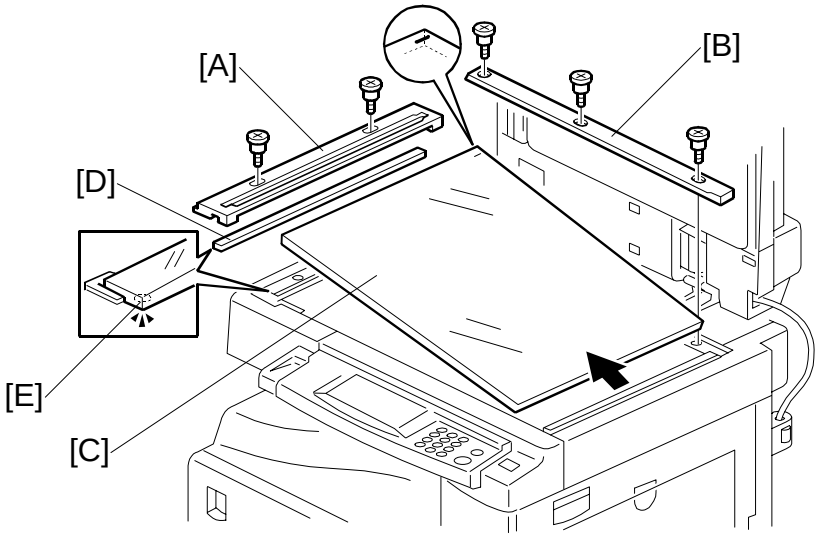
1. Top rear cover (☛ 3.3.7)
2. Platen cover sensor [C] (☞ x 1)



B039R013.WMF

3.4 SCANNER SECTION

3.4.1 EXPOSURE GLASS/DF EXPOSURE GLASS



B039R001.WMF

Exposure Glass

1. Left scale [A] (🔩 x 2)
2. Rear scale [B] (🔩 x 3)
3. Exposure glass [C]
   NOTE: When reinstalling, be sure that the mark is at the rear left corner, and be sure to set the exposure glass so that its left edge is aligned flush against the small support ridge on the frame.

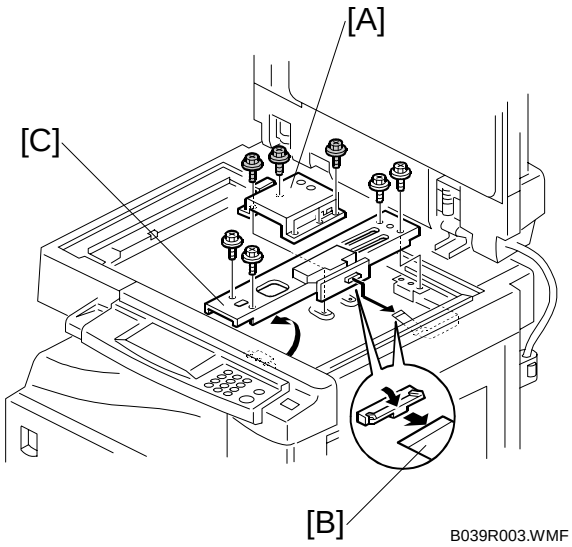
DF Exposure Glass

1. Left scale [A]
2. DF exposure glass [D]
   NOTE: When reinstalling, be sure that the mark [E] is facing down

3.4.2 LENS BLOCK

1. Exposure glass (☛ 3.4.1)
2. Lens cover [A] (🔩 x 5)
3. Disconnect the flat cable [B].
4. Lens block [C] (🔩 x 4).
   NOTE: Do not loosen the paint-locked screws holding the lens unit in place.

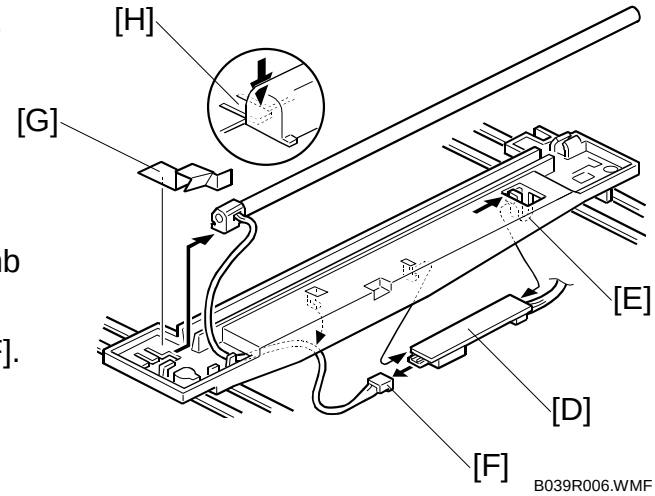
After installing the new lens block, do the copy adjustments (☛ 3.13).



B039R003.WMF

3.4.3 EXPOSURE LAMP, LAMP STABILIZER BOARD

1. Exposure glass (☛ 3.4.1)
2. Operation panel (☛ 3.3.5)
3. Slide the 1st scanner to a position where the front end of the lamp is clear of the metal lids.
4. Place your right hand under the lamp stabilizer board [D] on the underside of the 1st scanner, to support the board when it drops. Press hook [E] with your left thumb to release the board.
5. Disconnect the lamp connector [F]. If you wish, you can now remove the lamp stabilizer board (by disconnecting the flat cable).

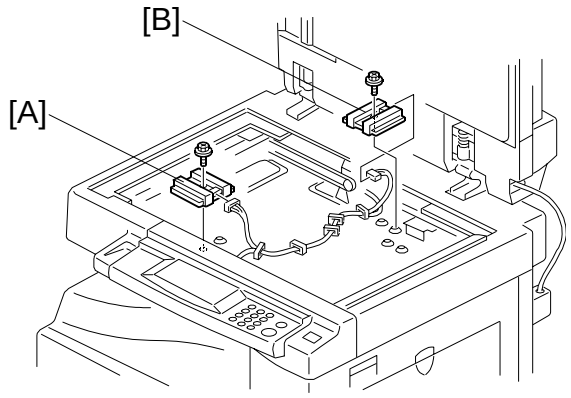


B039R006.WMF

6. Remove the front reflector [G].
7. Press on the plastic latch [H] and at the same time push the plastic end of the lamp toward the rear, so that the lamp snaps free. Remove the lamp together with the lamp cable.

3.4.4 ORIGINAL WIDTH SENSOR

1. Exposure glass (☛ 3.4.1)
2. Original width sensor [A] (🔩 x 1, 🖐 x 1)

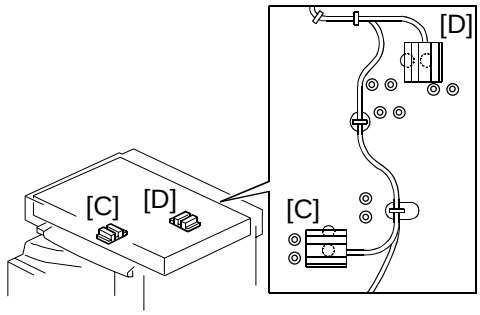


B039R004.WMF

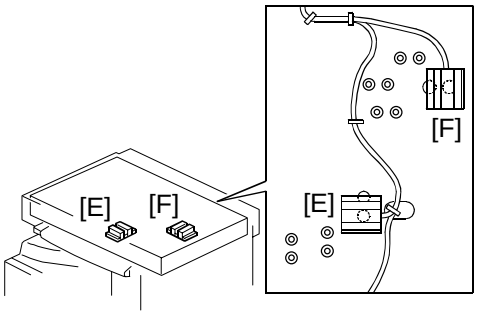
3.4.5 ORIGINAL LENGTH SENSOR

1. Exposure glass (☛ 3.4.1)
2. Lens block (☛3.4.2)
3. Original length sensor [B] (🔩 x 1, 🖐 x 1)

Sensor Positions



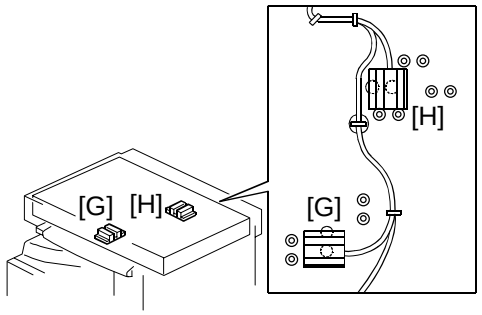
B039R303.WMF



B039R304.WMF

Sensor positions vary according to region, as indicated below.

[C], [D]: Europe, Asia, Taiwan
[E], [F]: America
[G], [H]: China



B039R305.WMF

3.4.6 CHANGING THE ORIGINAL SENSOR POSITIONS (8K/16K)

This procedure is for China models only. To enable detection of the following original sizes, the original sensors must be moved from their factory-set positions to the locations indicated in the drawing below right.

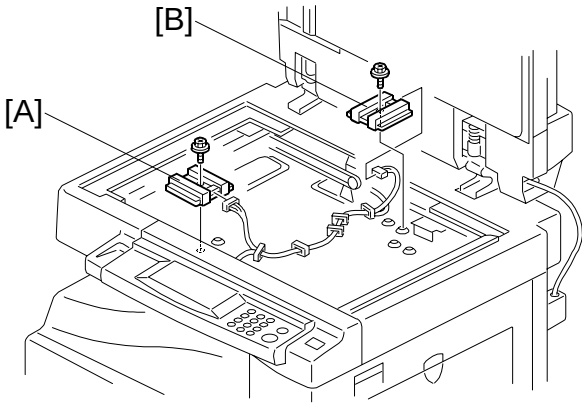
- 8K SEF (270 x 390 mm)
- 16K SEF (195 x 270 mm)
- 16K LEF (270 x 195 mm)

Once the sensors have been moved, they will detect paper sizes as follows.

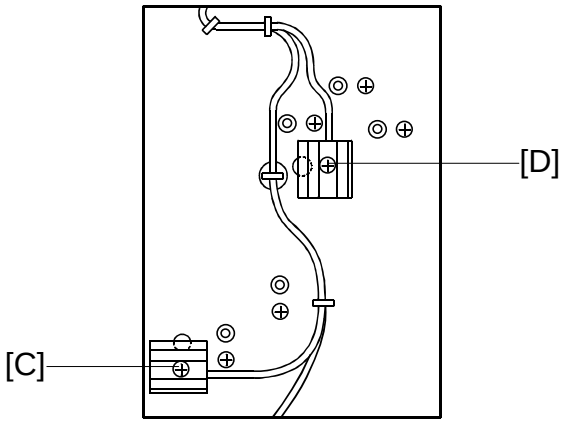
Original Size	Length Sensors		Width Sensors	
	L1	L2	W1	W2
8K-SEF	❍	❍	❍	✗
16K-SEF	❍	✗	✗	✗
16K-LEF	✗	✗	❍	✗

❍: Original present ✗: Original not present

Procedure



B039R004.WMF

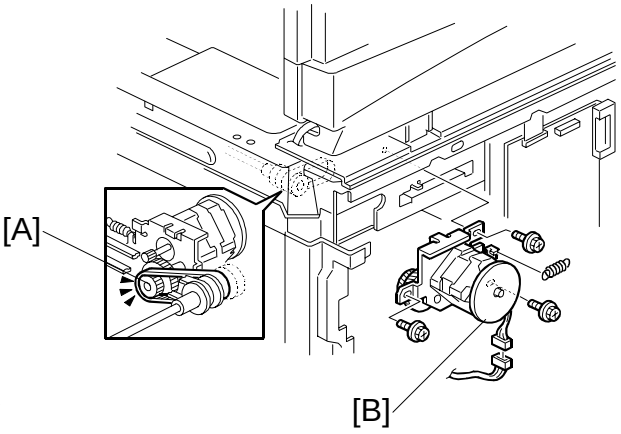


B039R012.WMF

1. Set the machine to detect 8K/16K originals as follows.
   - *If the machine is equipped with the platen cover*: Access SP mode 5-955-1, and set the setting to 1 (=Yes). The machine will now detect 8K/16K rather than B4/B5. (B4-SEF → 8K-SEF; B5-SEF → 16K-SEF; B5-LEF → 16K-LEF)
   - *If the machine is equipped with the ADF or ARDF*: Access SP mode 5-955-2, and set the setting to 1 (=Yes). The machine will now detect 8K/16K rather than A3/A4/B4/B5. (A3-SEF/B4-SEF → 8K-SEF; B5-SEF/A4-SEF → 16K-SEF; B5-LEF/A4-LEF → 16K-LEF)
   - Note that making either of the above settings will disable use of SP mode 5-911.
2. Turn off the power, and remove the exposure glass (☛ 3.4.1).
3. Remove APS senosrs [A, B].
4. Remove screws [C, D] at the new mount positions.
5. Mount the original width sensor into the new position (from where you removed screw [C]), and screw.
6. Mount the original length sensor into the new position (from where you removed screw [D]), and screw it.
7. Screw screws back into their original holes.

3.4.7 SCANNER MOTOR

1. Rear cover (☛ 3.3.1)
2. Right upper cover (☛ 3.3.6)
3. Rear scale and exposure glass (☛ 3.4.1)
4. Operation panel (☛ 3.3.5)
5. Top rear cover (☛ 3.3.7)
6. Detach the belt [A].
7. Scanner motor [B] (x 3, 1 spring, x 1)
   NOTE: *When reinstalling the motor:* Fit the belt on first, then set the spring in place, and then screw in evenly, rotating from screw to screw so that the spring tension is correctly distributed.

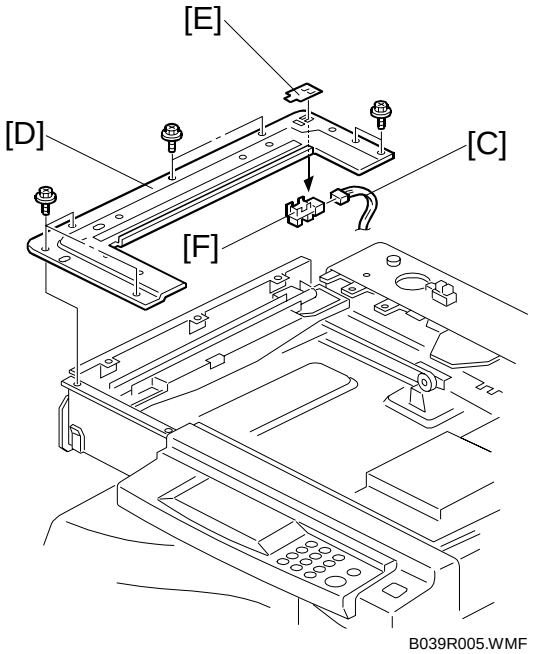


B039R008.WMF

After installing the motor, do the copy adjustments (☛ 3.13).

3.4.8 SCANNER H.P. SENSOR

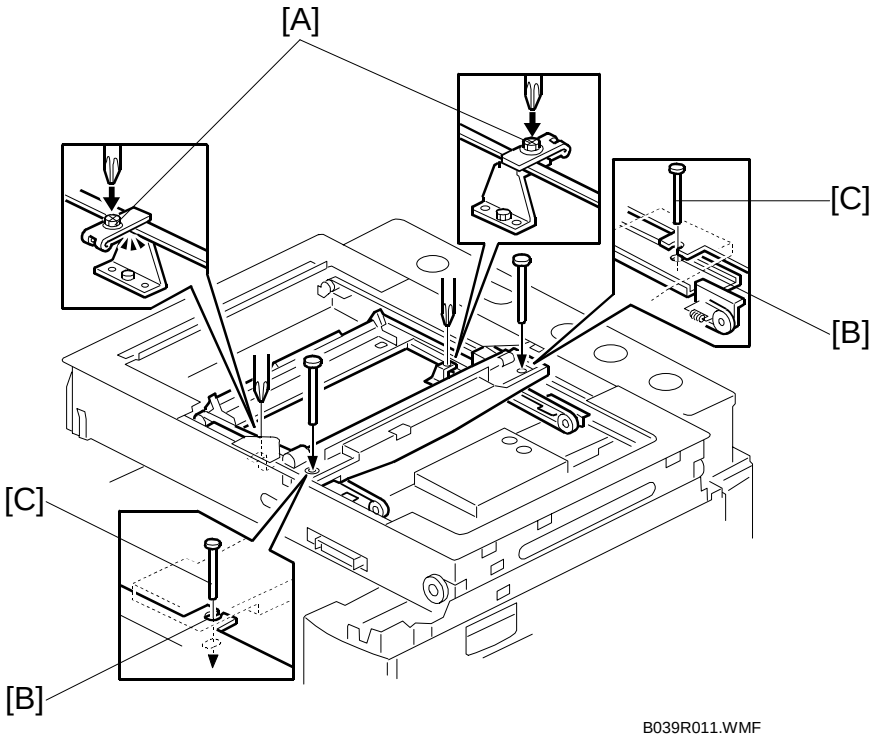
1. Left upper cover (☛ 3.3.4)
2. Top rear cover (☛ 3.3.7)
3. Exposure glass (☛ 3.4.1)
   NOTE: If the machine is an A(R)DF model, remove both the DF exposure glass and the exposure glass.
4. Disconnect the scanner H.P. sensor connector [C].
5. Scanner left lid [D] (x 7)
6. Remove the sensor tape [E].
7. Scanner H.P. sensor [F]



B039R005.WMF

3.4.9 ADJUSTMENT OF 2ND SCANNER POSITION

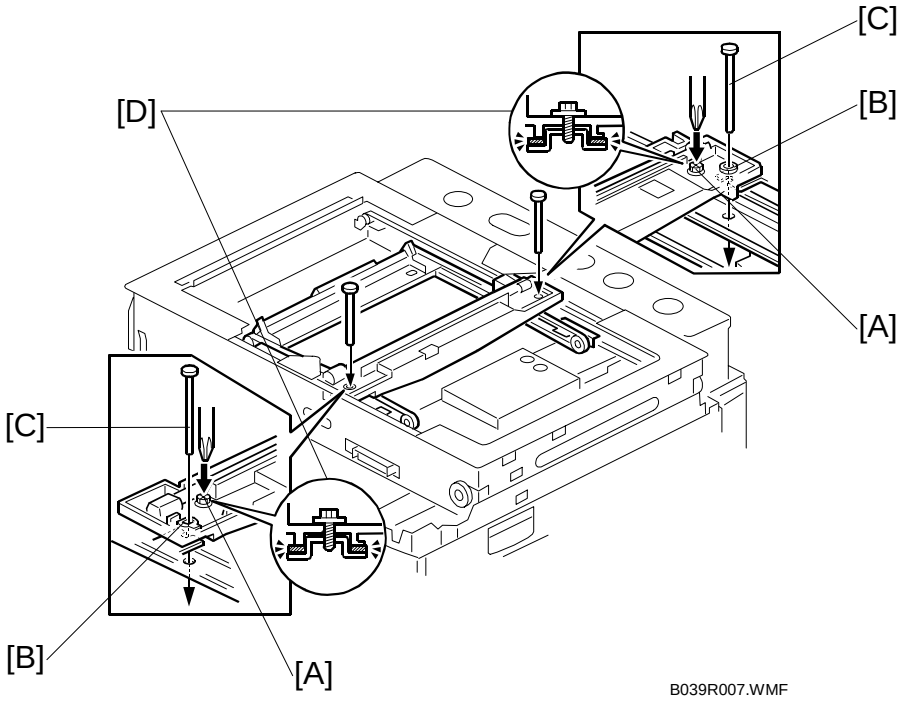
Do this procedure after replacing a scanner belt. If you replaced the second scanner belts, go onto the next section (‘Adjustment of 1st and 2nd Scanner Alignment’.)



1. Remove the A(R)DF or platen cover.
2. Remove the operation panel (☛ 3.3.5).
3. Remove the top rear cover (☛ 3.3.7).
4. Loosen the 2 screws [A] holding the 2nd scanner belt in place.
5. Slide the 2nd scanner so that the second hole from the right on each scanner arm is roughly aligned with the position guide holes [B] on the upper and lower mainframe rims.
6. Insert the positioning tools [C] into both sets of holes.
   NOTE: If the 1st scanner is preventing the pins from fitting in smoothly, loosen the 1st scanner securing screws and slide the 1st scanner out of the way (☛ 3.4.10, step 1).
7. Re-tighten the screws loosened in step 1 [A] and remove the positioning tools.
8. Go on to the next section, ‘Adjustment of 1st and 2nd Scanner Alignment’.

3.4.10 ADJUSTMENT OF 1ST AND 2ND SCANNER ALIGNMENT

For how to use this procedure, see the previous section, ‘Adjustment of 2nd Scanner Position’.



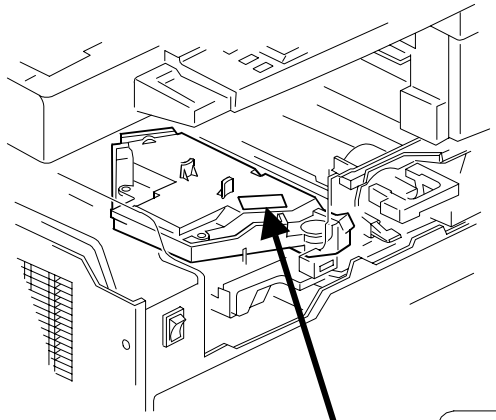
1. Remove the A(R)DF or platen cover.
2. Remove the operation panel (☛ 3.3.5).
3. Remove the top rear cover (☛ 3.3.7).
4. Loosen the 2 screws [A] holding the 1st and 2nd scanner belts in place.
5. Slide the 1st and 2nd scanners so that all three of the following are aligned on both sides:
   - The second hole from the right on each 2nd scanner arm
   - The position guide holes on the upper and lower mainframe rims
   - The 1st scanner position guide hole [B]
6. Insert the positioning tools [C] into both sets of holes.
7. Make sure that both the 1st and 2nd scanner belts are properly set in place on both sides [D].
8. Re-tighten the screws loosened in step 1 [A] to clamp the scanner belts in place, then remove the positioning tools.

3.5 LASER UNIT

⚠WARNING

Laser beam can seriously damage your eyes. Be absolutely sure that the main power switch is off and that the machine is unplugged before accessing the laser unit.

3.5.1 LOCATION OF “CAUTION” DECAL

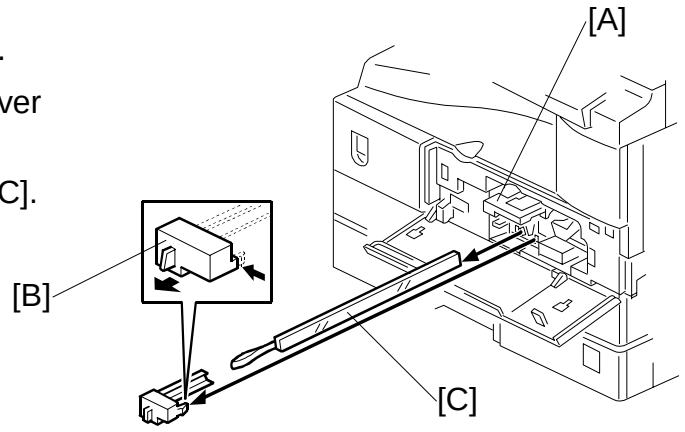


B039R110.WMF

B039RLW.WMF

3.5.2 TONER SHIELD GLASS

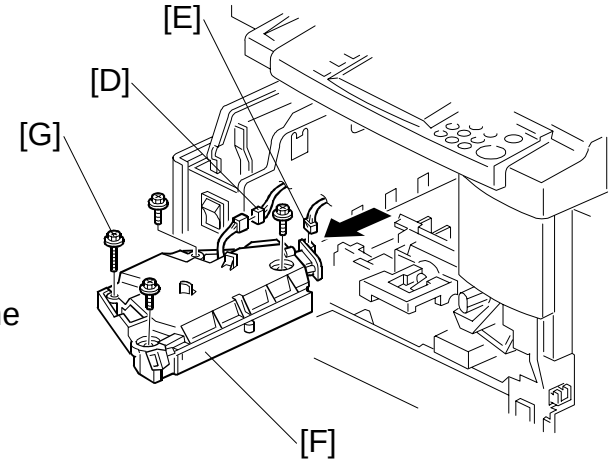
1. Open the front door.
2. Lift the toner cartridge latch [A].
3. Press the toner shield glass cover [B] to the left and pull it out.
4. Pull out the toner shield glass [C].



B039R151.WMF

3.5.3 LASER UNIT

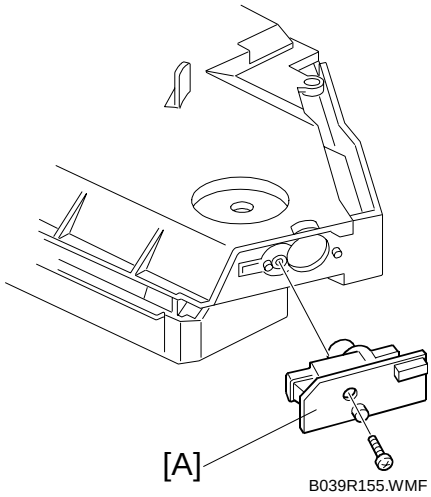
1. Toner shield glass. (☛ 3.5.2)
2. Copy tray (☛ 3.3.3)
3. Pull out the (upper) paper tray.
4. Front long cover (☛ 3.3.9)
5. Disconnect the harness [D, E].
6. Laser unit [F] (🔩 x 4)
   NOTE: The screw at the left front position [G] is longer than the others.



B039R153.WMF

3.5.4 LD UNIT

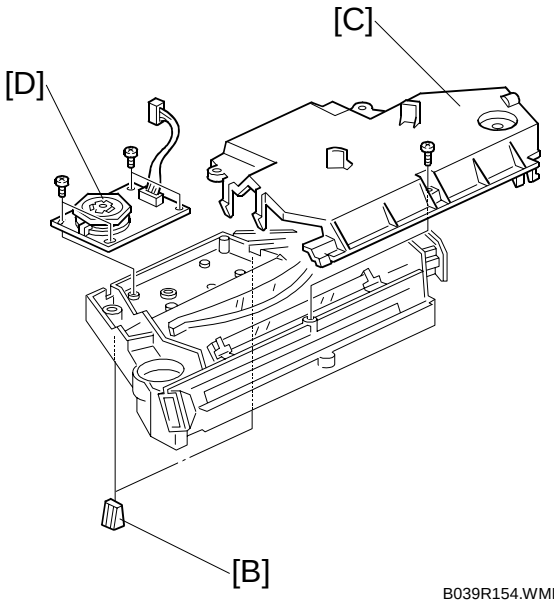
1. Laser unit (☛ 3.5.3)
2. LD unit [A] (☞ x 1)
   NOTE: Do not screw the LD unit in too tightly when installing it.



B039R155.WMF

3.5.5 POLYGONAL MIRROR MOTOR

1. Laser unit (☛ 3.5.3)
2. Two rubber bushings [B]
3. Laser unit cover [C] (☞ x 1)
4. Polygonal mirror motor [D] (☞ x 4)
5. Do the copy adjustments (☛ 3.13).

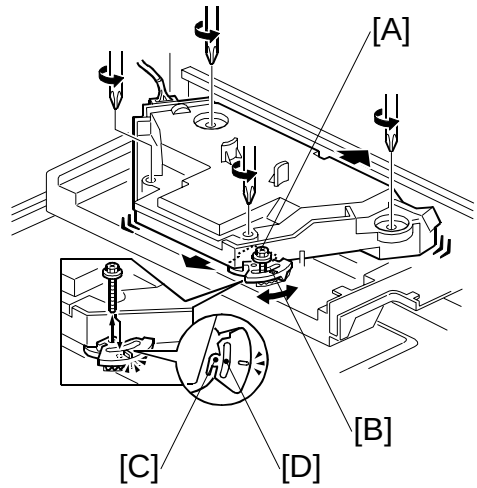


B039R154.WMF

3.5.6 LASER UNIT ALIGNMENT ADJUSTMENT

⚠WARNING

Be absolutely sure to reinstall the copy exit tray before making printouts. The laser beam can seriously damage your eyes.



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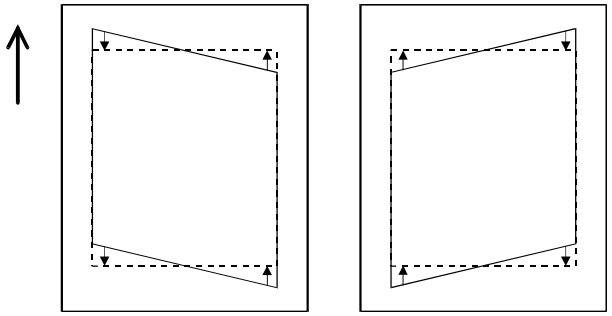


Turning the lever counter-clockwise alters the trim pattern as shown above

Turning clockwise alters the trim pattern as shown above

B039R890.WMF

1. Use SP5-902 to output a trim pattern (pattern 10). If the pattern is not even, adjust the alignment as follows.
2. Copy tray (☛ 3.3.3)
3. Loosen the four screws securing the laser unit (☛ 3.5.3).
4. *If this is the first time this adjustment is being made:* Remove the adjustment-lever screw [A] (securing the adjustment lever [B]) from its factory set position at [C], and loosely screw it in at the center of the long hole [D].
   NOTE: If you have already adjusted the alignment at least once, the screw will already be in the long hole. If readjustment is necessary, just loosen the screw and continue as follows.
5. Rotate the lever clockwise or counterclockwise. This allows you to shift the corners of the pattern ±0.4 mm with respect to the leading and trailing edges of the paper. Using trial and error, adjust until the trim pattern is even.
6. Tighten screw [A] at its new position.
7. Tighten the other three screws.
8. Reinstall the copy tray.
9. Print the trim pattern and check the result. If further adjustment is required, repeat this procedure.

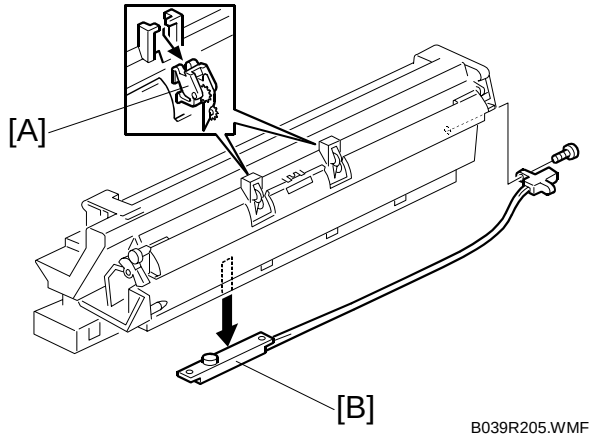
3.6 PCU SECTION

3.6.1 PCU

1. Toner bottle holder (☛ 1.2.3, step 2)
2. Open the right door.
3. Press in on the latch, and pull out the PCU. (☛ 1.2.3, step 3)
   NOTE: Do not touch the OPC drum surface with bare hands.
4. Load new developer. (☛ 3.6.7)
5. After reinstalling, run SP2-214 to reinitialize the TD sensor.
6. Do steps 1 to 6 of the procedure in section 3.6.8.

3.6.2 PICK-OFF PAWLS

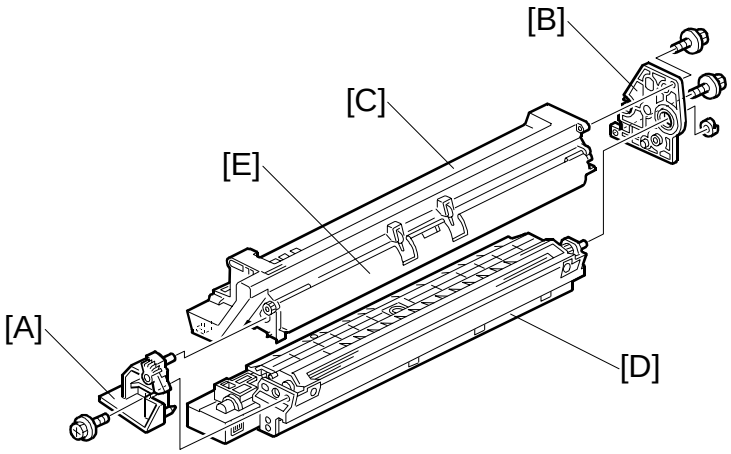
1. Take out the PCU (☛ 3.6.1) or open the right door.
2. Pull each pawl [A] out from the bottom.
3. Do the procedure in section 3.6.8.



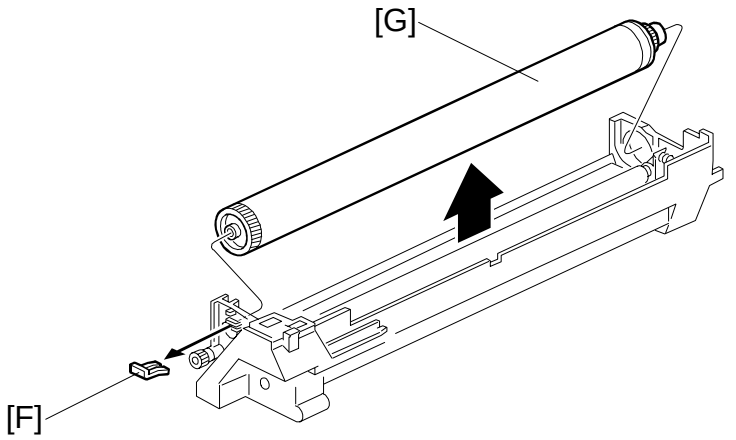
3.6.3 TONER DENSITY SENSOR

1. PCU (☛ 3.6.1)
2. The toner density sensor [B] is taped to the bottom of the PCU. Pry it off with a regular screwdriver (x 1).
   NOTE: Do not turn the PCU upside down, as doing so will cause toner and developer to spill out.
3. Do the procedure in section 3.6.8.

3.6.4 OPC DRUM



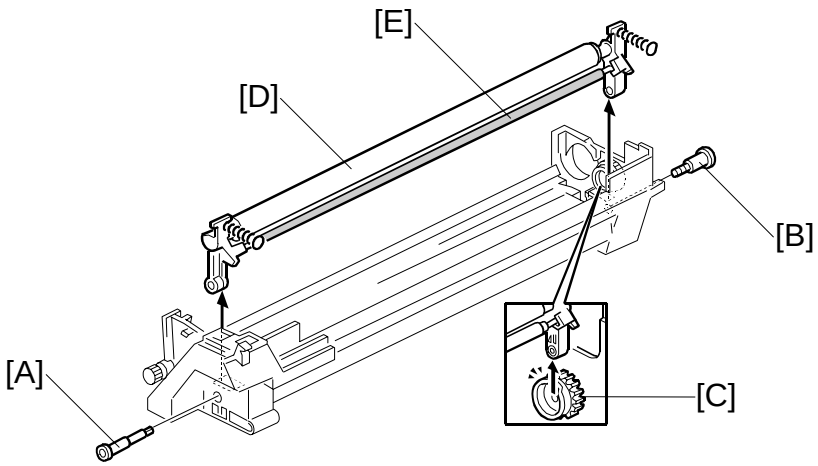
B039R201.WMF



B039R206.WMF

1. PCU (☛ 3.6.1)
2. Remove the front side piece [A] (☞ x 1) and rear side piece [B] (☞ x 2, 1 coupling), and separate the PCU top part (drum section) [C] from its bottom part (developer section) [D]. Carry out the remaining steps on the drum section.
   NOTE: To ensure that the left-side gears line up, be sure that the drum cover [E] is closed when reinserting the front side piece.
3. Pry out the drum retaining clip [F].
   NOTE: Be sure to reinstall the clip in the same orientation (with the lip facing away from the drum shaft).
4. Pull out the front end of the OPC drum [G], and remove.
5. Do the procedure in section 3.6.8.

3.6.5 CHARGE ROLLER AND CLEANING BRUSH

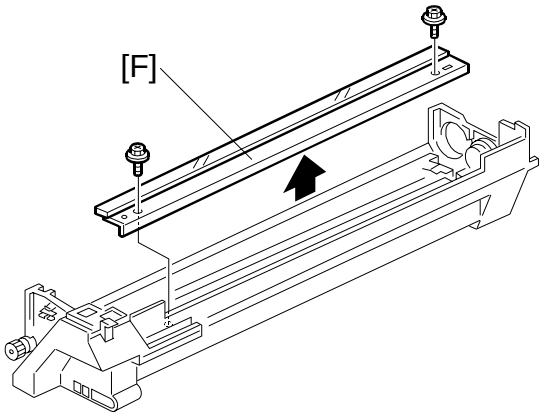


B039R204.WMF

1. OPC Drum (☛ 3.6.4)
2. Remove holding pin [A] and 1 stepped screw [B].
3. Turn the gear [C] as necessary so that the rear end piece can come out.
4. Pull out the charge roller [D] and cleaning brush [E] as a single assembly (together with the plastic end pieces and springs).
5. Do the procedure in section 3.6.8.

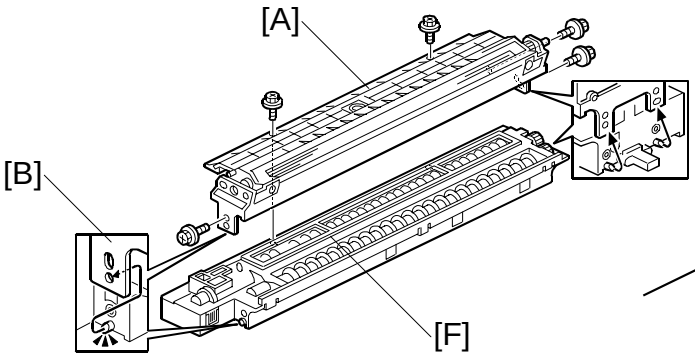
3.6.6 CLEANING BLADE

1. Drum charge roller (☛ 3.6.5)
2. Cleaning blade [F] (🔩 x 2)
3. Do the procedure in section 3.6.8.

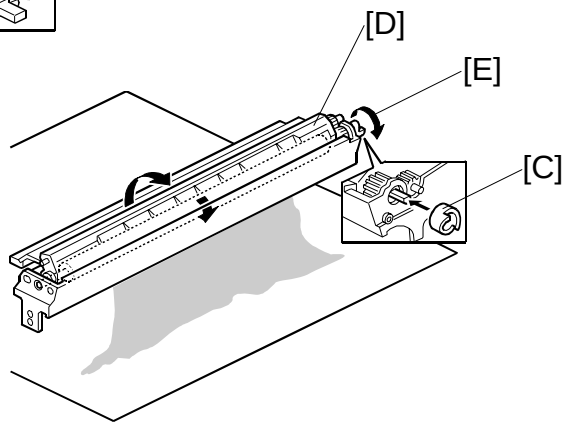


B039R207.WMF

3.6.7 DEVELOPER



B039R202.WMF



B039R203.WMF

1. PCU (☛ 3.6.1)
2. Tap the top of the PCU with a screwdriver at eight evenly spaced locations (two or three taps at each spot) so as knock the recycled toner down into the development section.
3. Set the PCU back into the mainframe.
4. Turn the main power on. Then open and close the door and wait for the machine to rotate the development roller for 10 seconds. Then open and close the door two more times, so that total rotation time is 30 seconds.
5. Remove the PCU again.
6. Separate the developer section from the OPC drum section (☛ 3.6.4, step 2).
7. Remove the top part [A] of the development unit (🔩 x 5), then place your finger under the front-side flap [B] and push out so that the flap pops off the peg.
8. Set the coupling [C] back onto the shaft, tilt the development roller [D] upward as shown, and turn the coupling (and shaft) in the direction of the arrow [E] to remove developer from the roller.
9. Turn the bottom part [F] of the developer unit over and rotate the gears to remove the developer.
10. Load new developer. (☛ 1.2.3, step 5)
11. After reinstalling, run SP2-214 to reinitialize the TD sensor.

NOTE: 1) Be sure that there is no toner or developer stuck on any of the gears. (Clean as necessary with a blower brush, etc.)
2) Be sure to replace the Mylar at the rear side in the correct position. (The Mylar protects the gears at the rear side from falling toner).

3.6.8 AFTER REPLACEMENT OR ADJUSTMENT

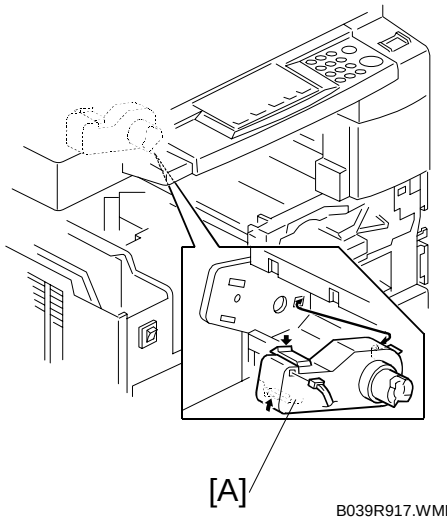
IMPORTANT: After replacing or adjusting any of the PCU components, please do the following procedure. It is not needed after replacing the PCU with a new one.

1. Take 5 sample copies.
2. If black dots (dropped toner) appear on any of the copies, continue as follows. (If all copies are clean, you don't need to carry out the following steps.)
3. Remove the PCU from the mainframe.
4. Tap the top of the PCU with a screwdriver at eight evenly spaced locations (two or three taps at each spot), to knock the recycled toner down into the development section.
5. Put the PCU back into the mainframe.
6. Turn the main power on. Then open and close the door and wait for the machine to rotate the development roller for 10 seconds. Then open and close the door two more times, so that total rotation time is 30 seconds.
7. Make some sky-shot copies (or solid black prints).
   - If using A4/8 1/2" x 11" paper, make 4 copies/prints.
   - If using A3/11" x 17" paper, make 2 copies/prints.
   - To make solid black prints, use SP5-902 pattern 8.

   NOTE: Step 7 is required only after parts replacement or adjustment. There is no need to make sky-shot (or solid black) copies after replacing the developer.

3.7 TONER SUPPLY MOTOR

1. Copy tray (☛ 3.3.3)
2. Open the front door.
3. Toner bottle holder (☛ 1.1.3, step 2)
4. Toner supply motor [A] (✍ x 1)

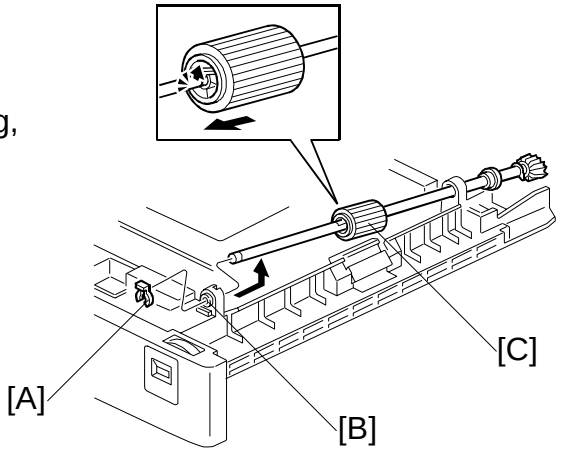


B039R917.WMF

3.8 PAPER FEED SECTION

3.8.1 PAPER FEED ROLLER

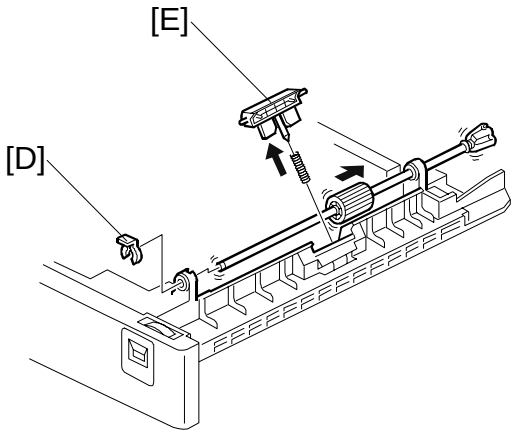
1. Pull out the appropriate paper tray.
2. Clip [A]
3. Push the shaft back through the opening, and tilt it up.
   NOTE: If the black plastic bushing [B] comes off, be sure to remount it when reinstalling the shaft.
4. Paper feed roller [C]



B039R702.WMF

3.8.2 FRICTION PAD

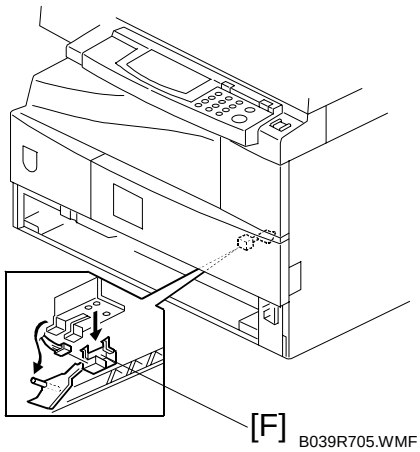
1. Pull the appropriate paper cassette out.
2. Clip [D]
3. Push the shaft back through the opening, so that the roller moves clear of the friction pad.
4. Friction pad [E]



B039R703.WMF

3.8.3 PAPER END SENSOR

1. Pull the appropriate paper cassette out.
2. Paper end sensor [F] (☞ x 1)

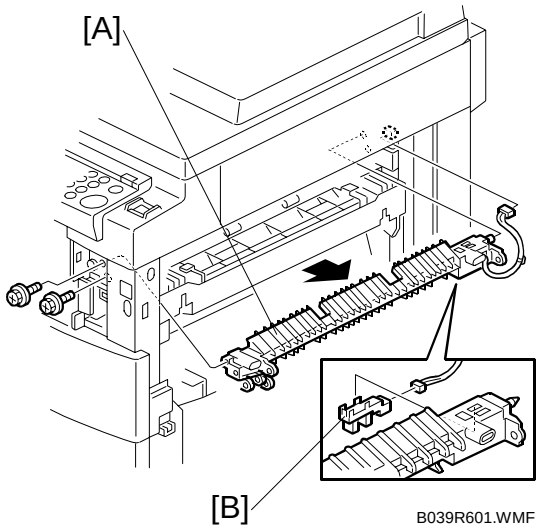


B039R705.WMF

3.8.4 EXIT SENSOR

Non-duplex Models

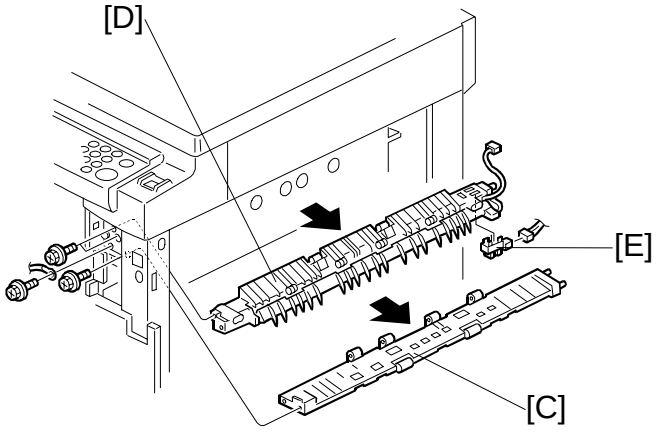
1. Open the right door.
2. Front right cover (☛ 3.3.10)
3. Guide [A] (🔩 x 2)
4. Exit sensor [B] (✋ x 1)



B039R601.WMF

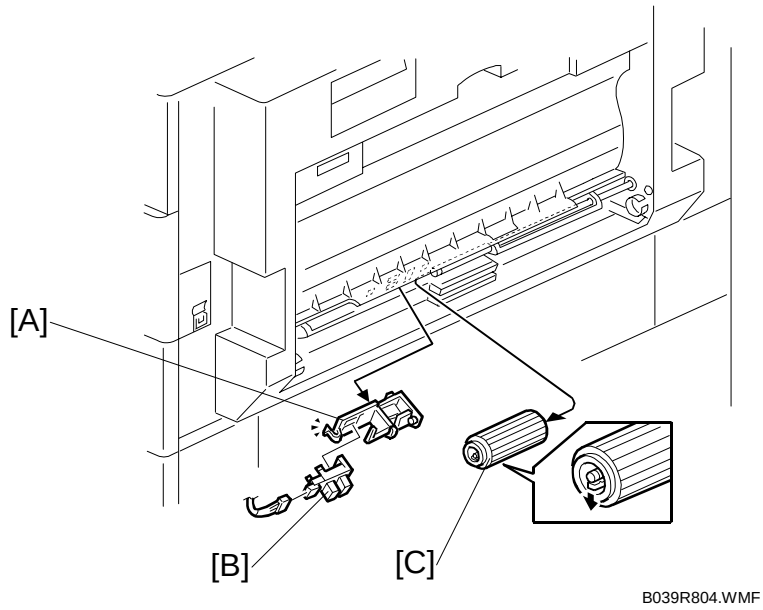
Duplex Models

1. Open the right door.
2. Front right cover (☛ 3.3.10)
3. Lower guide [C] (🔩 x 2)
4. Upper guide [D] (🔩 x 2)
5. Exit sensor [E] (✋ x 1)



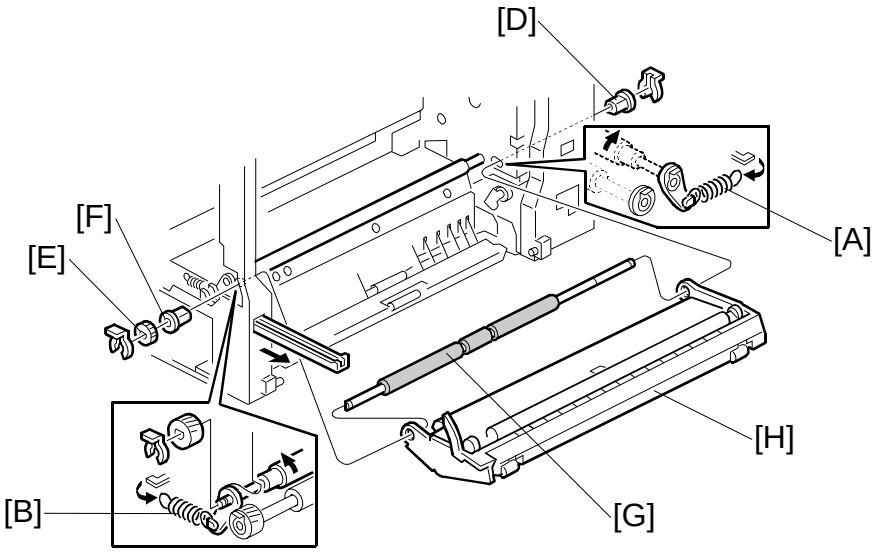
B039R945.WMF

3.8.5 BY-PASS FEED ROLLER AND BY-PASS PAPER END SENSOR

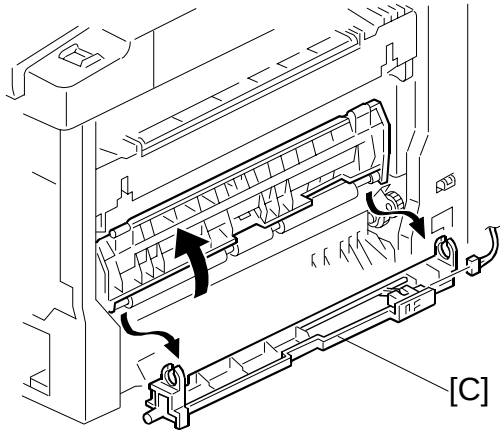


1. By-pass tray (☛ 3.3.13)
   NOTE: If you wish, you can just detach the tray and rest it on the ground without disconnecting the connector (but be careful to avoid placing too much load on the wires).
2. Sensor holder [A].
3. By-pass paper end sensor [B] (✋ x 1)
4. By-pass feed roller [C]

3.8.6 REGISTRATION ROLLER



B039R951.WMF

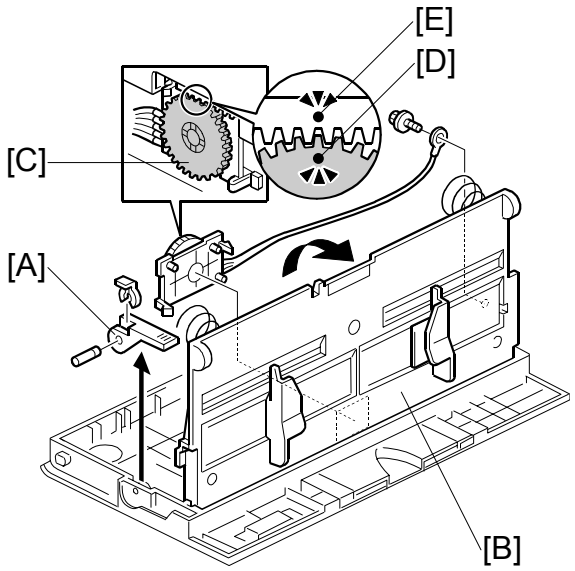


B039R950.WMF

1. PCU (☛ 3.6.1)
2. Front long cover (☛ 3.3.9)
3. Right door (☛ 3.3.12)
4. Rear cover (☛ 3.3.1)
5. High-voltage power supply (☛ 3.12.2)
6. Registration clutch (☛ 3.8.8)
7. Unhook the springs [A] and [B] at the rear and front sides.
8. Guide [C] (x 1, x 1)
9. Bushing [D] (x 1)
10. Gear [E] and bushing [F] (x 1)
11. Registration roller [G] with the image transfer unit [H]

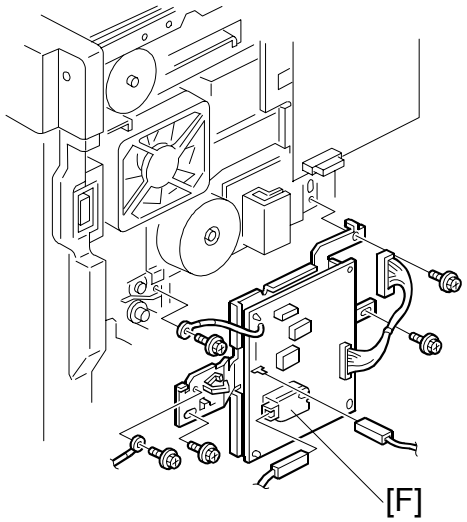
3.8.7 BY-PASS PAPER SIZE SWITCH

1. By-pass tray (☛ 3.3.13)
2. Tray lever [A] (⌀ x 1, 1 pin)
3. Lift the upper tray [B]
4. By-pass paper size switch [C] (☞ x 1)
   NOTE: *When reinstalling the switch:* Move the paper guides to their middle position (about halfway between fully open and fully closed), and install the round gear so that the hole in the gear [D] aligns with the peg [E] on the sliding gear.



B039R704.WMF

3.8.8 REGISTRATION CLUTCH



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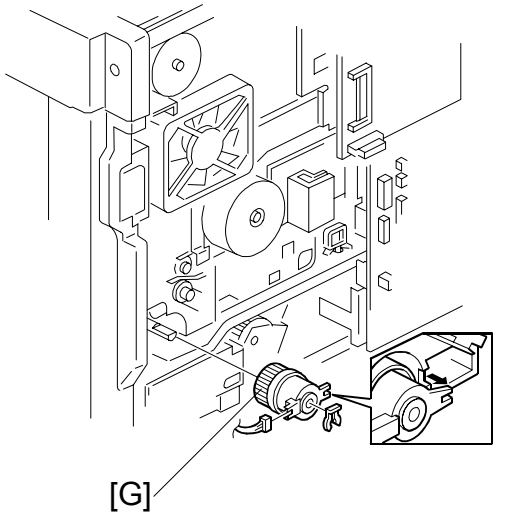
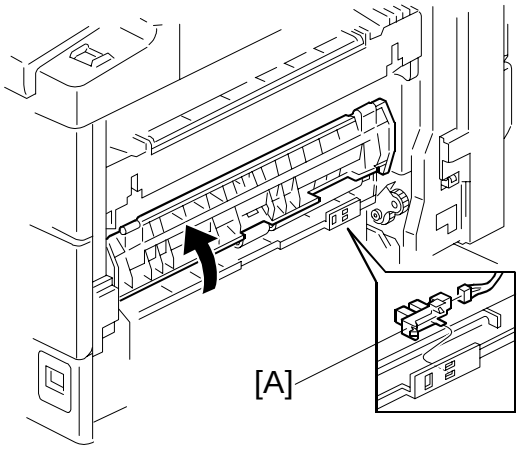


B039R911.WMF

1. Bracket holding the high-voltage power supply board [F] (☞ x 5, all connectors)
2. Registration clutch [G] (⌀ x 1, ⌀ x 1)

3.8.9 REGISTRATION SENSOR

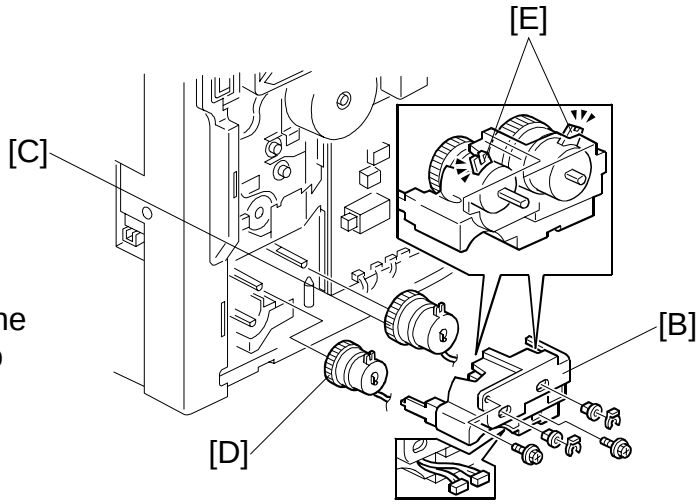
1. Open the right door.
2. Registration sensor [A] (☞ x 1)



B039R920.WMF

3.8.10 UPPER PAPER FEED CLUTCH AND BY-PASS FEED CLUTCH

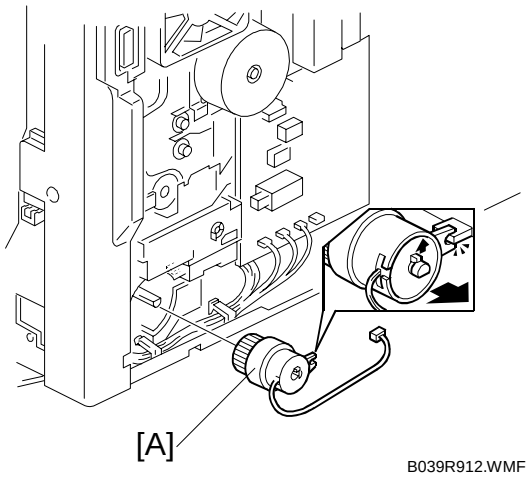
1. Rear cover (☛ 3.3.1)
2. Clutch cover [B] (☞ x 2, 2 bushings, ☞ x 2)
3. Paper feed clutch [C] and by-pass feed clutch [D]
   NOTE: When reinstalling, be sure that the rotation-prevention tabs [E] on the clutches fit correctly into the corresponding openings on the clutch cover.



B039R922.WMF

3.8.11 RELAY CLUTCH

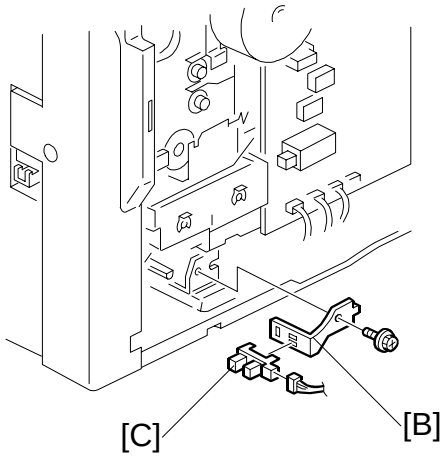
1. Rear cover (☛ 3.3.1)
2. Relay clutch [A]



B039R912.WMF

3.8.12 RELAY SENSOR

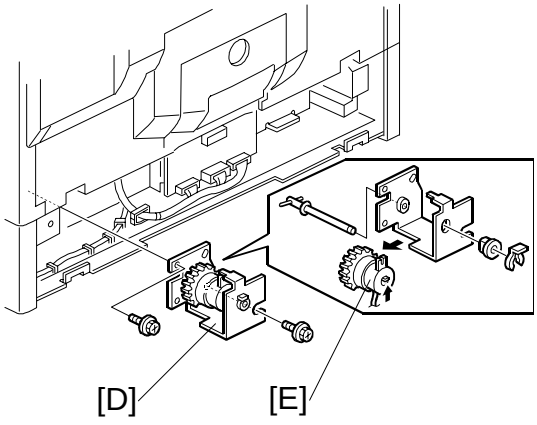
1. Relay clutch (☛ 3.8.11)
2. Sensor bracket [B] (☞ x 1)
3. Relay sensor [C] (☜ x 1)



B039R923.WMF

3.8.13 LOWER PAPER FEED CLUTCH (TWO-TRAY MODELS ONLY)

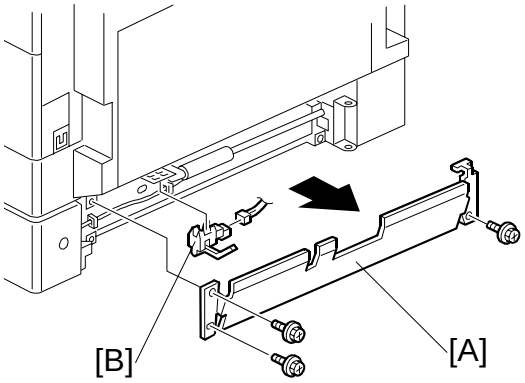
1. Rear lower cover (☛ 3.3.2)
2. Clutch bracket [D] (☞ x 2)
3. Lower paper feed clutch [E] (☟ x 1, 1 bushing)



B039R940.WMF

3.8.14 VERTICAL TRANSPORT SENSOR (TWO-TRAY MODELS ONLY)

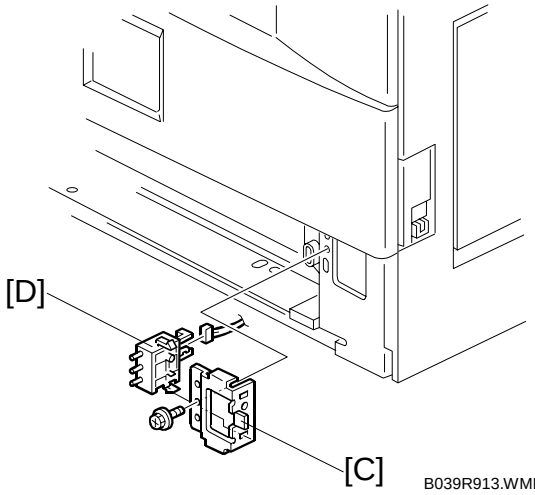
1. Open the right lower cover.
2. Metal plate [A] (☞ x 3)
3. Vertical transport sensor [B] (☞ x 1)



B039R938.WMF

3.8.15 PAPER SIZE SWITCH

1. Open the appropriate paper tray.
2. Switch cover [C] (☞ x 1)
3. Paper size switch [D] (☞ x 1)

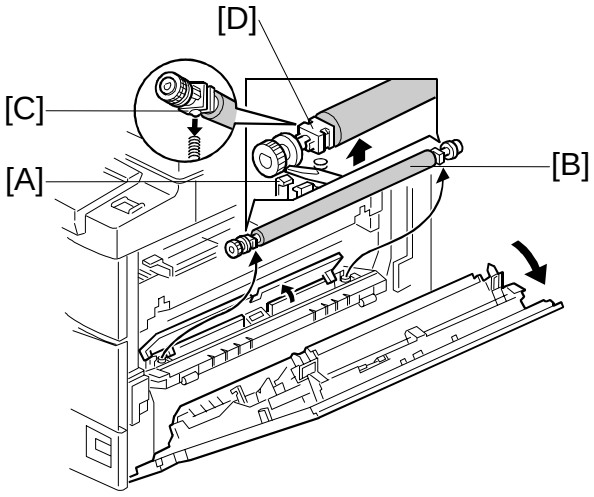


B039R913.WMF

3.9 IMAGE TRANSFER

3.9.1 IMAGE TRANSFER ROLLER

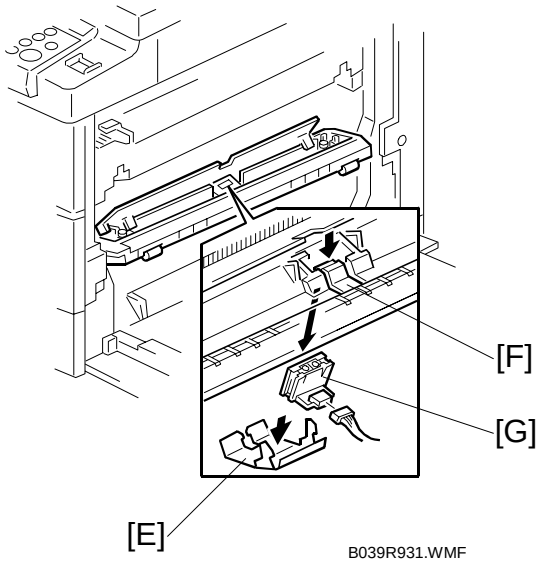
1. Open the right door.
2. Pry open the plastic holders [A] at each end of the roller, and lift off the image transfer roller [B].
   NOTE: 1) Leave the springs under the roller in their original position. When replacing the roller, be sure that the pegs [C] on the two square black pieces [D] are facing down into the springs.
   2) Do not touch the transfer roller surface with bare hands.



B039R902.WMF

3.9.2 IMAGE DENSITY SENSOR

1. Open the right door.
2. Plastic cover [E]
3. Image transfer roller (☛ 3.9.1)
4. Push down on the notch [F] to free the sensor.
5. Image density sensor [G] (☞ x 1)



B039R931.WMF

3.10 FUSING

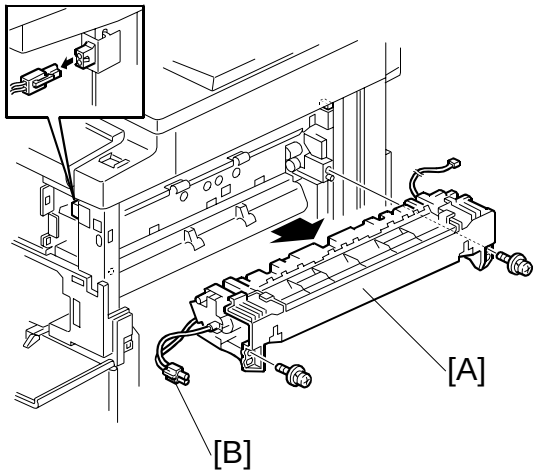
3.10.1 FUSING UNIT

⚠CAUTION

The fusing unit can become very hot. Be sure that it has cooled down sufficiently before handling it.

1. Turn off the main switch, and unplug the machine.
2. Front right cover (☛ 3.3.10)
3. Open the right door.
4. Fusing unit [A] (x 2, x 2)
   NOTE: If you forget to connect the small connector when reinstalling, the copier will issue service call SC541.

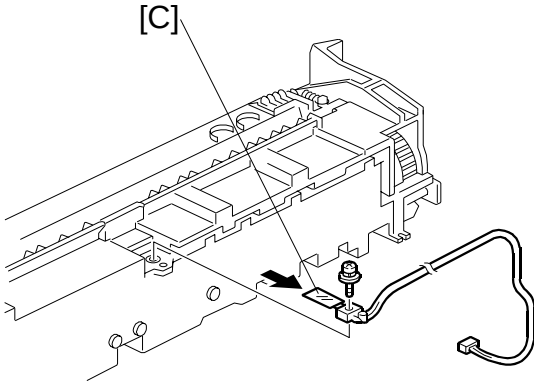
The color of connector [B]
Blue: For 120 V machine
Red: For 230 V machine



B039R501.WMF

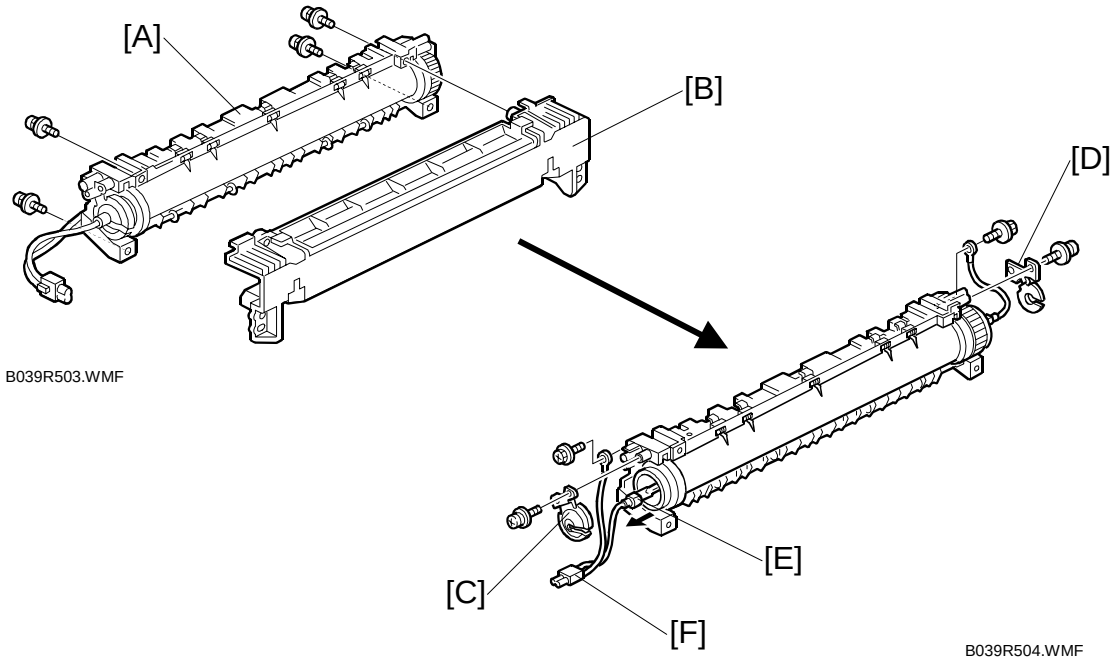
3.10.2 THERMISTOR

1. Fusing unit (☛ 3.10.1)
2. Thermistor [C] (x 1)



B039R502.WMF

3.10.3 FUSING LAMP

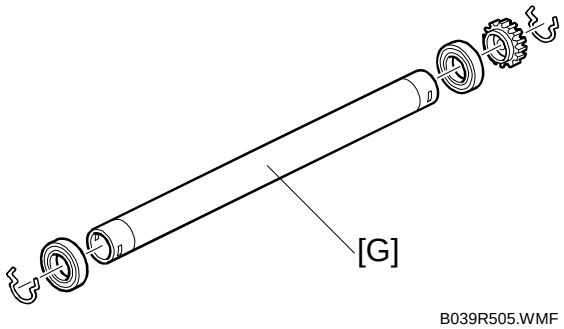


1. Fusing unit (☛ 3.10.1)
2. Separate the fusing unit (☞ x 4) into two sections: the hot roller section [A], and the pressure roller section [B].
3. Front metal holding plate [C] (☞ x 1)
4. Rear metal holding plate [D] (☞ x 1)
5. Remove the fusing lamp [E] from the hot roller section (☞ x 2).

The color of connector [F]
Blue: For 120 V machine
Red: For 230 V machine

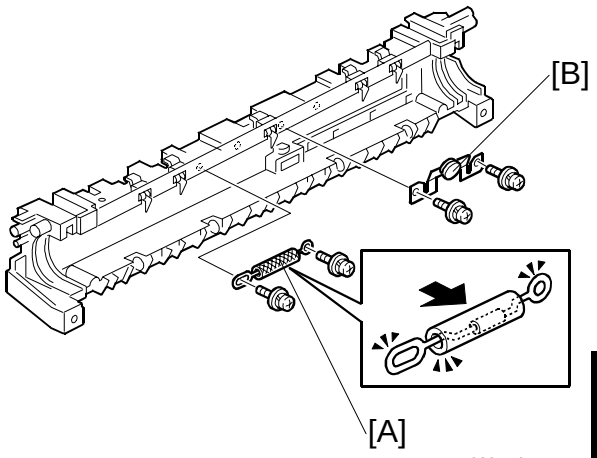
3.10.4 HOT ROLLER

1. Fusing lamp (☛ 3.10.3)
2. Hot roller [G] (2 C-rings, 1 gear, 2 bearings)



3.10.5 THERMOFUSE AND THERMOSTAT

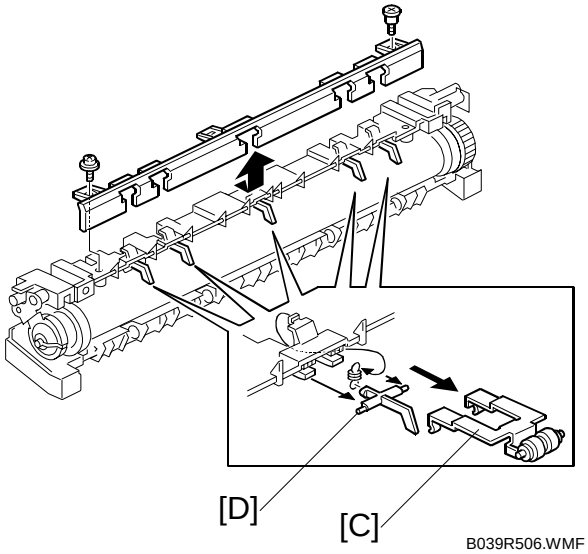
1. Hot roller (☛ 3.10.4)
2. Thermofuse [A] (🔩 x 2)
3. Thermostat [B] (🔩 x 2)



B039R507.WMF

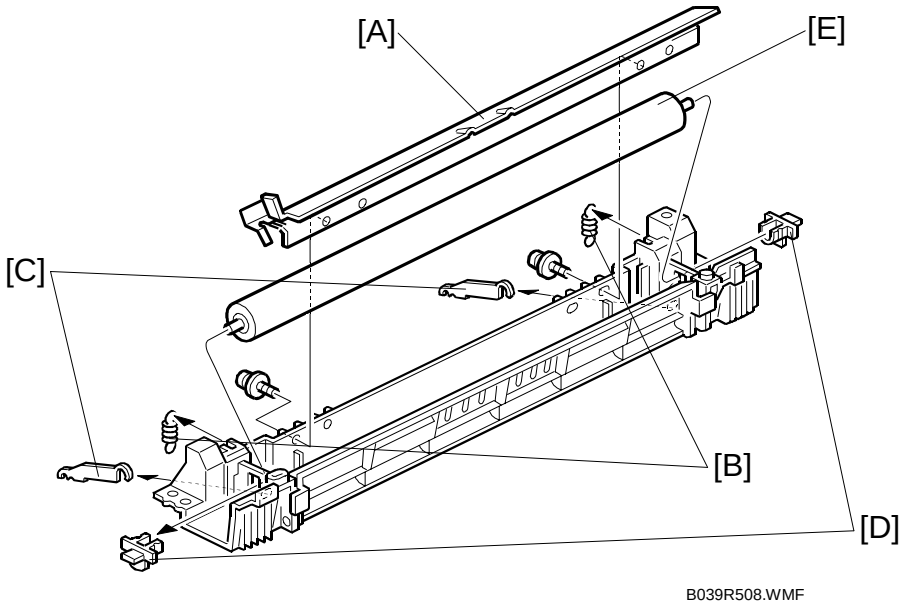
3.10.6 HOT ROLLER STRIPPER PAWLS

1. Hot roller (☛ 3.10.4)
2. Metal holders [C] (1 holder for each pawl)
3. Hot roller stripper pawls [D] (1 spring for each pawl)



B039R506.WMF

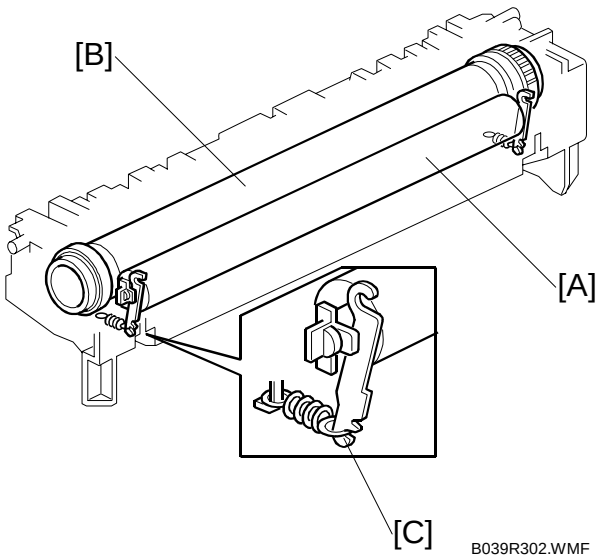
3.10.7 PRESSURE ROLLER AND BUSHINGS



1. Fusing unit (☛ 3.10.1)
2. Separate the fusing unit into two sections: the hot roller section and the pressure roller section (☛ 3.10.3, Step 2). Carry out the remaining steps on the pressure roller section.
3. Fusing entrance guide [A] (☞ x 2)
4. 2 springs [B]
5. 2 pressure arms [C]
   NOTE: Manipulate each arm so that it comes out through the slit in the casing.
6. 2 Bushings [D]
7. Pressure roller [E]

3.10.8 NIP BAND WIDTH ADJUSTMENT

NOTE: 1) The fusing unit must be at operating temperature when this adjustment is carried out.
2) Place an OHP sheet on the by-pass feed table before starting this procedure.
3) Use only A4/LT LEF. (Other OHP sheet sizes may cause a paper jam.)



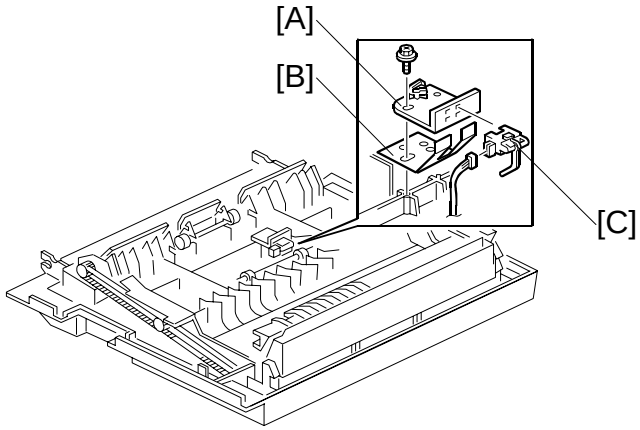
[A]: Pressure roller
[B]: Hot roller

1. Enter SP mode, and run SP1-109.
2. Press ⓞ. The machine feeds the OHP sheet into the fusing section, stops it there for 20 seconds, then ejects it to the copy tray.
3. Check that the nip band (the opaque stripe) across the ejected OHP sheet is symmetrical, with both ends slightly thicker than the center.
   NOTE: There is no standard value for the nip band on this machine. Make the adjustment based on the band's appearance.
4. If the band is not as described above, change the position of the spring hooks [C] (one on each side), and then check the band again.
   NOTE: The higher hook position produces greater tension.

3.11 DUPLEX UNIT (DUPLEX MODELS ONLY)

3.11.1 DUPLEX EXIT SENSOR

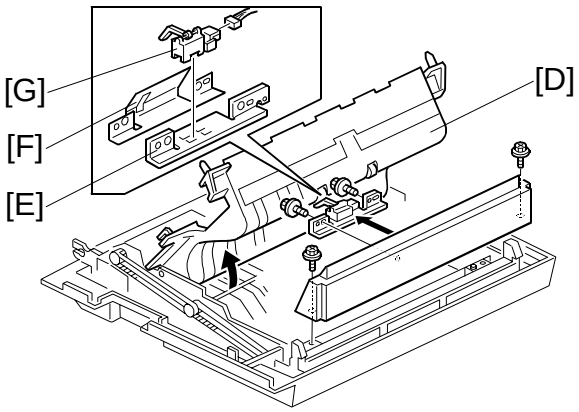
1. Open the right door.
2. Sensor bracket [A] and bracket [B] (x 1)
3. Duplex exit sensor [C] (x 1)



B039R801.WMF

3.11.2 DUPLEX ENTRANCE SENSOR

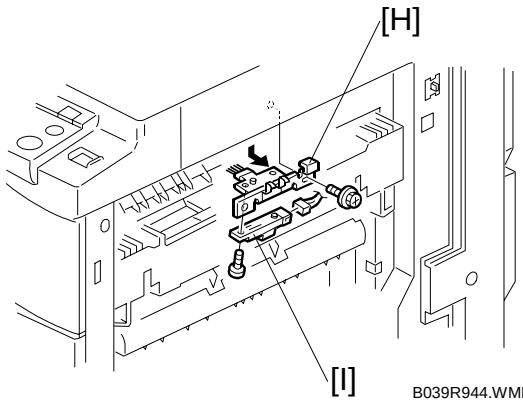
1. Open the right door.
2. Lift the duplex guide [D].
3. Entrance sensor bracket [E] and bracket cover [F] (x 2)
4. Duplex entrance sensor [G]



B039R802.WMF

3.11.3 DUPLEX INVERTER SENSOR

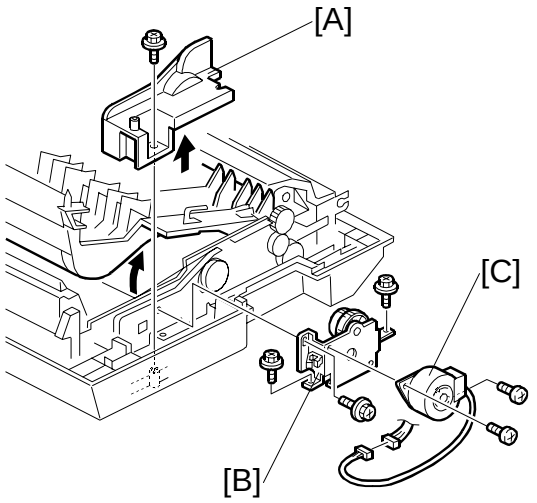
1. Open the right door.
2. Sensor bracket [H] (x 1, x 1)
3. Duplex inverter sensor [I] (x 1)



B039R944.WMF

3.11.4 DUPLEX TRANSPORT MOTOR

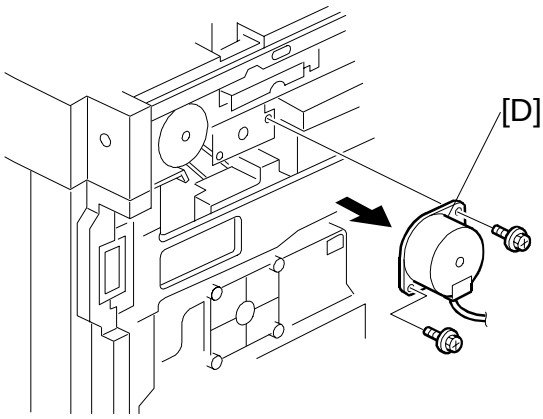
1. Open the right door, detach the strap from the main body (x 1), and lower the door.
2. Cover [A] (x 1)
3. Open the two clamps securing the motor cable, and remove the motor bracket [B] (x 3, x 1).
4. Remove the duplex transport motor [C] (x 2).



B039R946.WMF

3.11.5 DUPLEX INVERTER MOTOR

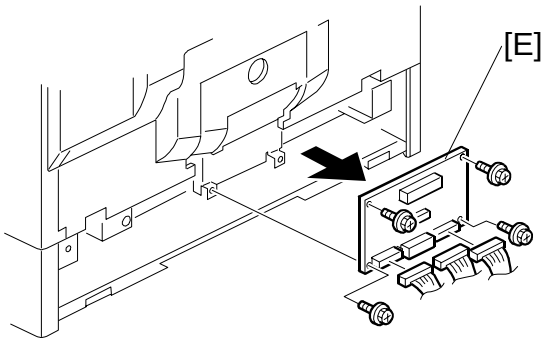
1. Rear cover
2. Exhaust fan (☛ 3.12.7)
3. Duplex inverter motor [D] (x 2, x 1)



B039R941.WMF

3.11.6 DUPLEX CONTROL BOARD

1. Rear lower cover (☛3.3.2)
2. Duplex control board [E] (x 4 , all connectors)

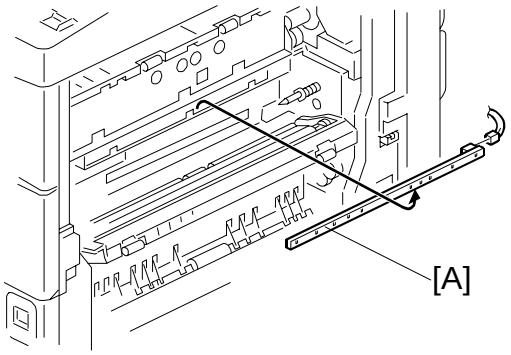


B039R132.WMF

3.12 OTHER REPLACEMENTS

3.12.1 QUENCHING LAMP

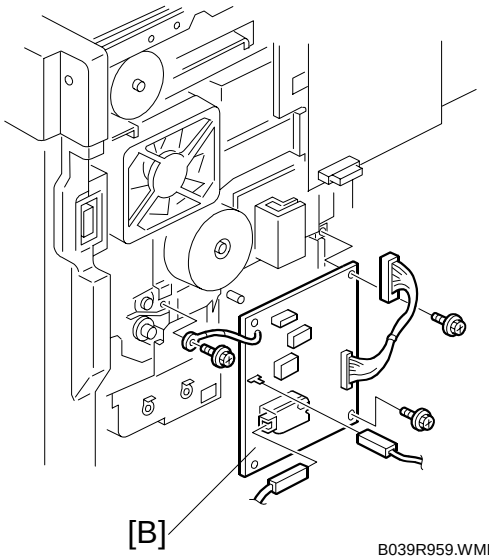
1. PCU (☛ 3.6.1)
2. Quenching lamp [A] (✋ x 1)



B039R921.WMF

3.12.2 HIGH-VOLTAGE POWER SUPPLY BOARD

1. Rear cover (☛ 3.3.1)
2. High-voltage power supply board [B] (🔩 x 3, 2 standoffs, all connectors)

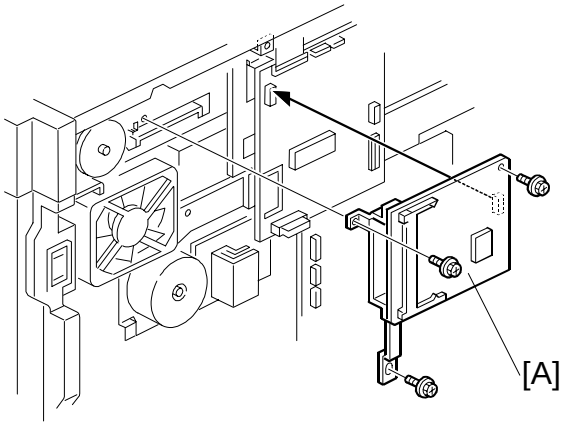


B039R959.WMF

3.12.3 IMB (MEMORY BOARD)

NOTE: The IMB is optional on B039 machines outside North America. It is included as standard equipment on all other models.

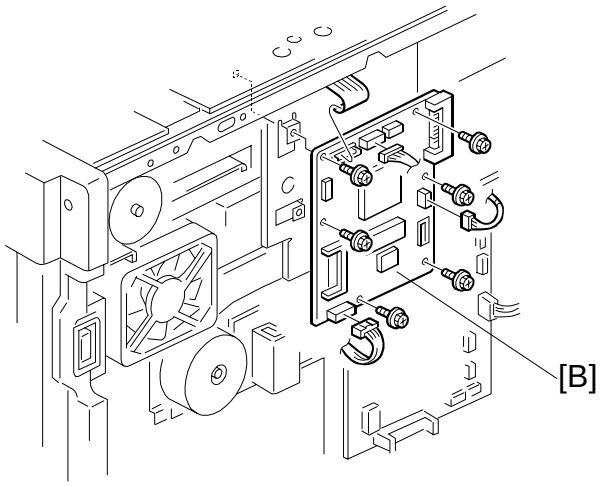
1. IMB (together with bracket) [A] (☞ x 3)
   NOTE: Be sure to remove the bracket together with the IMB. The IMB should never be taken off the bracket. (The IMB and bracket comprise a single service part.)



B039R928.WMF

3.12.4 BiCU (BASE-ENGINE IMAGE CONTROL UNIT)

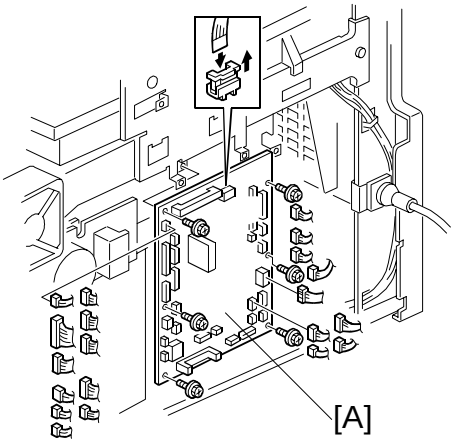
1. Rear cover (☛ 3.3.1)
2. IMB (☛ 3.12.3)
3. BiCU [B] (☞ x 6, all connectors, 1 ribbon cable)
   NOTE: Reinstall the NVRAM from the old board into the socket on the new board.



B039R907.WMF

3.12.5 IOB (I/O BOARD)

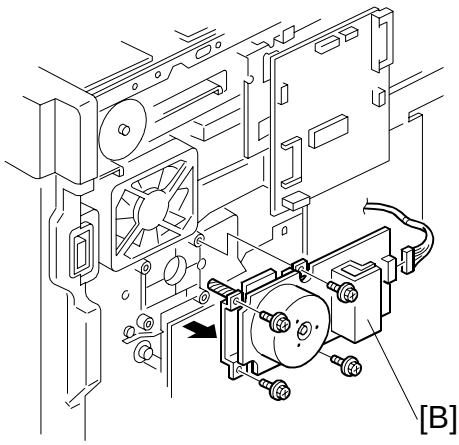
1. BiCU (☛3.12.4)
2. IOB [A] (all connectors, 🔩 x 6, 1 ribbon cable)



B039R910.WMF

3.12.6 MAIN MOTOR

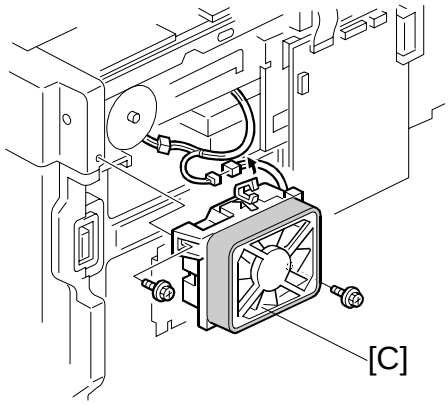
1. Rear cover (☛ 3.3.1)
2. Main motor [B] (🔩 x 4, 🖑 x 1)



B039R908.WMF

3.12.7 REAR EXHAUST FAN

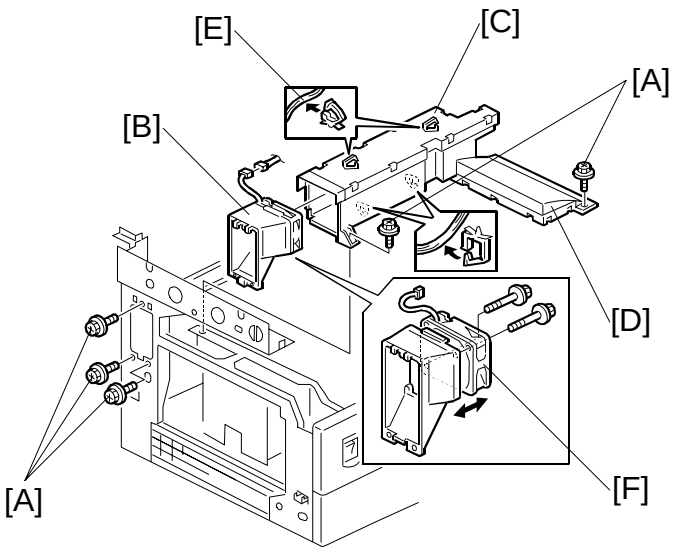
1. Rear cover (☛ 3.3.1)
2. Rear exhaust fan [C] (🔩 x 2 , 🖑 x 1)



B039R918.WMF

3.12.8 LEFT EXHAUST FAN

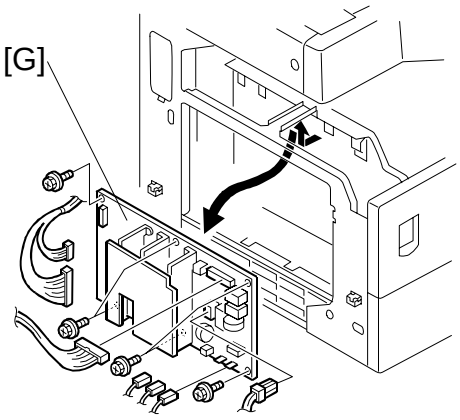
1. Rear cover (☛ 3.3.1)
2. Copy tray (☛ 3.3.3)
3. Left cover (☛ 3.3.8)
4. 5 screws [A]
5. Lift up [B], [C] and [D] together and pull the assembly toward the front side of the machine until the hooked harnesses [E] are accessible.
6. Harnesses [E]
7. Remove the [B] from the assembly.
8. Left exhaust fan [F] (🔩 x 2)



B039R949.WMF

3.12.9 PSU (POWER SUPPLY UNIT)

1. Left cover (☛ 3.3.8)
2. PSU [G] (all connectors, 🔩 x 6)

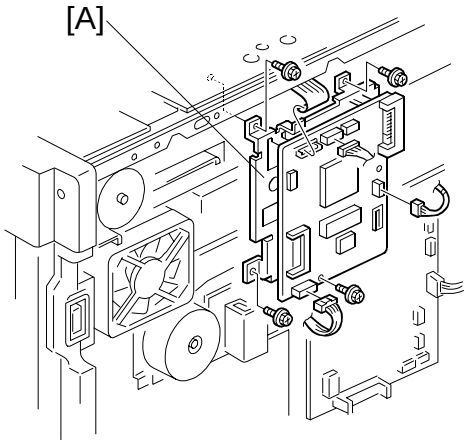


B039R925.WMF

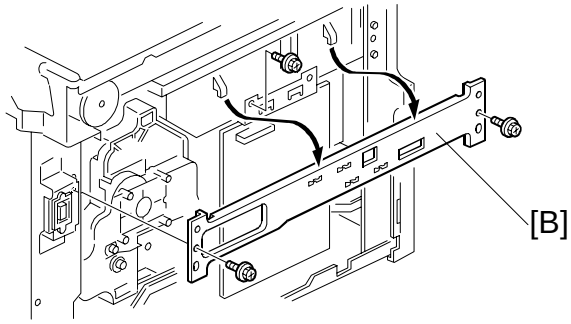
3.12.10 GEARBOX

Replacement Procedure

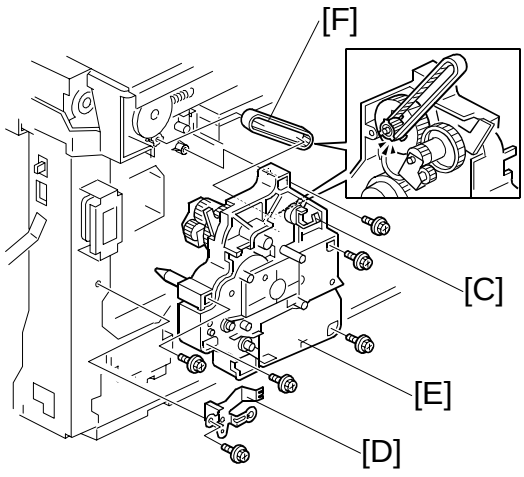
1. BiCU (☛ 3.12.4)
2. BiCU bracket [A] (🔩 x 3)
3. Main motor (☛ 3.12.6)
4. Exhaust fan (☛ 3.12.7)
5. Remove the IOB with bracket (☛ 3.12.5)
6. Crosspiece [B] (🔩 x 4)
7. Registration clutch (☛ 3.8.8)
8. Open the clamp [C] on the gearbox, and take out the wires.
9. Gearbox [E] (🔩 x 5, 1 belt)
   NOTE: When reinstalling, set the belt onto the gearbox side first (at [F]), hold it taut, and fit the gearbox into place so that the belt fits over the corresponding gear on the main unit. Handle the gearbox carefully so that the gears don't fall out.



B039R932.WMF



B039R919.WMF



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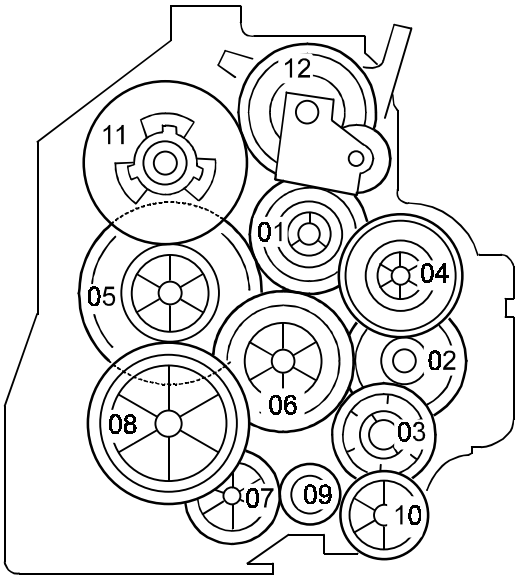
Gear Arrangement Within the Gearbox



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The gears are numbered 1 to 12 in the order in which they are to be installed in the gear box. These numbers appear both on the gearbox and on the front (exposed) surface of each gear. If the gears fall out, start by finding gear number 1 and installing it onto location number 1 (setting it into place so that the side with the printed number remains visible). Then install the remaining gears (2 to 12) in the same way.

3.13 COPY ADJUSTMENTS: PRINTING/SCANNING

NOTE: 1) You need to perform these adjustment after executing a Memory All Clear, and after replacing or adjusting any of the following parts.
- First or second scanner
- Lens Block
- Scanner Motor
- Polygonal Mirror Motor
- Paper Tray
- Paper Side Fence

2) For detailed explanations about how to access and use the SP modes, see Section 5.

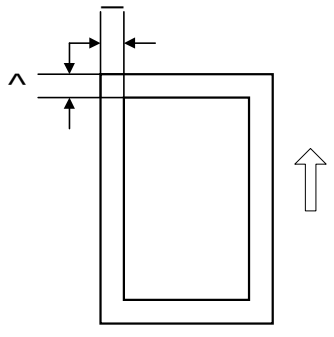
3.13.1 PRINTING

NOTE: 1) Make sure the paper is installed correctly in each paper tray before you start these adjustments.
2) Use the Trimming Area Pattern (SP5-902, No.10) to print the test pattern for the printing adjustments below.
3) Set SP 5-902 to 0 again after completing these printing adjustments.

Registration - Leading Edge/Side-to-Side

1. Check the leading edge registration for each paper feed station, and adjust each of these registrations using SP1-001.
2. Check the side-to-side registration for each paper feed station, and adjust these registrations using SP1-002. (Adjust the trays in order: the 1st tray first, then the 2nd tray, etc.)

Tray	SP mode	Specification
Any paper tray	SP1-001-1	2 ± 1.5 mm
By-pass feed	SP1-001-2	
Duplex	SP1-001-3	
1st tray	SP1-002-1	2 ± 1.5 mm
2nd tray	SP1-002-2	
3rd tray (Optional PFU tray 1)	SP1-002-3	
4th tray (Optional PFU tray 2)	SP1-002-4	
By-pass feed	SP1-002-5	
Duplex	SP1-002-6	



B039R558.WMF

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

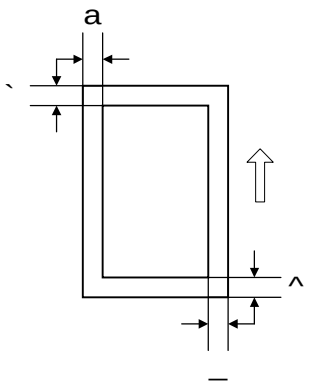
Blank Margin

NOTE: If the leading edge or side-to-side registration cannot be adjusted to within the specification, then adjust the leading-edge blank margin or the left-side blank margin.

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

	SP mode	Specification
Trailing edge	SP2-101-2	2 +2.5/–1.5 mm
Right edge	SP2-101-4	2 +2.5/–1.5 mm
Leading edge	SP2-101-1	2 ± 1.5 mm
Left edge	SP2-101-3	2 ± 1.5 mm

A: Trailing Edge Blank Margin
B: Right Edge Blank Margin
C: Leading Edge Blank Margin
D: Left Edge Blank Margin



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Main Scan Magnification

1. Print the single-dot grid pattern (SP5-902-5).
2. Check the magnification (the grid size should be 2.7 x 2.7 mm), and if necessary use SP2-998 to adjust it. The specification is 100 ± 1%.

3.13.2 SCANNING

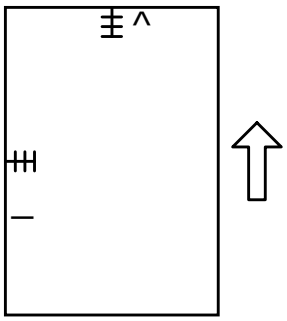
NOTE: 1) Before doing the following scanner adjustments, check and adjust the printing leading-edge and side-to-side registrations and the printing blank margins (as described above).
2) Use an A3 test chart to perform the following adjustments.

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 as necessary using the following SP modes.

	SP mode	Specification
Leading edge	SP4-010	2 ± 1.5 mm
Side-to-side	SP4-011	2 ± 1.5 mm

A: Leading edge registration
B: Side-to-side registration



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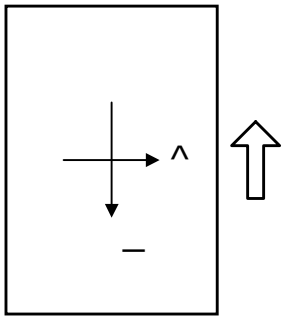
Magnification



A: Main scan magnification
B: Sub-scan magnification

B039R517.WMF

Main Scan Magnification

1. Place the A3 test chart on the exposure glass and make a copy from one of the feed stations.
2. Check the magnification ratio. If necessary, adjust the magnification using the following SP mode.

	SP mode	Specification
Main Scan Magnification	SP4-008	± 1.0%

Sub-scan Magnification

1. Place the OS-A3 test chart on the exposure glass and make a copy from one of the feed stations.
3. Check the magnification ratio. If necessary, adjust the magnification using the following SP mode.

	SP mode	Specification
Sub-scan magnification	SP4-101	± 1.0%

Standard White Density Adjustment

This procedure adjusts the standard white density level. Carry out this adjustment after doing any of the following:

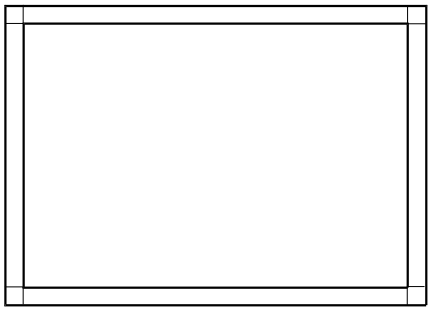
- After replacing the standard white plate.
- After replacing the NVRAM on the BiCU. (But note that you do not need to carry out this adjustment if you have replaced the BiCU itself but retained the previous NVRAM board [by moving it over onto the new BiCU].)
- After performing a memory all clear (SP5-801).

Procedure:

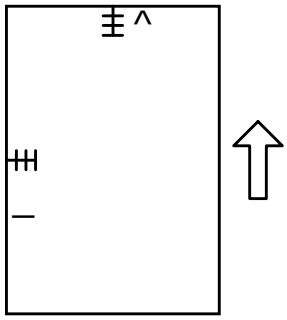
1. Place 10 sheets of new A4 paper (sideways) or new A3 paper on the exposure glass, and close the platen cover or the ADF.
2. Enter SP4-908 and select “1: YES”. The machine automatically adjusts the standard white density.

3.13.3 ADF IMAGE ADJUSTMENT

Registration and Blank Margin



B039R516.WMF



B039R515.WMF

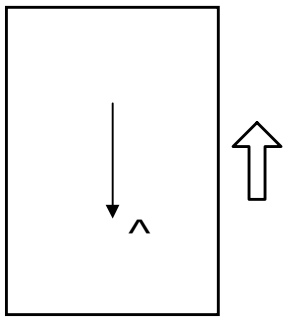
A: Leading edge registration
B: Side-to-side registration

NOTE: Make a temporary test chart as shown above, using A3/11" x 17" paper.

1. Place the temporary test chart on the ADF and make a copy from one of the feed stations.
2. Check the registrations, and adjust as necessary using the appropriate SP modes, as follows.

	SP mode
Side-to-side registration	SP6-006-1
Leading edge registration	SP6-006-2
Blank margin for the trailing edge	SP6-006-3
Side-to-side registration (Duplex: rear)	SP6-006-4

Sub-scan Magnification



A: Sub-scan magnification

B039R526.WMF

NOTE: Make a temporary test chart as shown above, using A3/11" x 17" paper.

1. Place the temporary test chart on the ADF and make a copy from one of the feed stations.
2. Check the registration, and if necessary adjust it using SP6-007. The specification is ±1.0%.

4. TROUBLESHOOTING

4.1 SERVICE CALL CONDITIONS

4.1.1 SUMMARY

There are 2 levels of service call conditions.

Level	Definition	Reset Procedure
A	To prevent the machine from being damaged, the SC can only be reset by a service representative. The copier cannot be operated at all.	Enter SP 5-810 (SC code reset) and select "1". Then hold down the *Original type* key and the *OK* or ⓇⓈ key at the same time (this does not require the main switch to be turned off and on).
B	The SC can be reset by turning the main power switch off and on.	Turn the main power switch off and on.

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

4.1.2 SC CODE DESCRIPTIONS

No.	Definition	Symptom	Possible Cause
101	B	Exposure Lamp Error	
		The standard while level was not detected properly when scanning the white plate.	• Exposure lamp defective • Exposure lamp stabilizer defective • Exposure lamp connector defective • Dirty scanner mirror or scanner mirror out of position • SBU board defective • SBU connector defective • Lens block out of position • Incorrect position or width of white plate scanning (☛ SP4-015)
120	B	Scanner home position error 1	
		The scanner home position sensor does not detect the off condition during initialization or copying.	• Scanner home position sensor defective • Scanner drive motor defective • Scanner home position sensor connector defective • Scanner drive motor connector defective • IOB board defective
121	B	Scanner home position error 2	
		The scanner home position sensor does not detect the on condition during initialization or copying.	• Scanner home position sensor defective • Scanner drive motor defective • Scanner home position sensor connector defective • Scanner drive motor connector defective • IOB board defective
122	B	Scanner home position error 3	
		The scanner home position sensor detects the on condition while the scanner is returning to the home position.	• Scanner home position sensor defective • Scanner drive motor defective • Scanner home position sensor connector defective • Scanner drive motor connector defective • IOB board defective
123	B	Scanner home position error 4	
		The scanner home position sensor does not detect the on condition after the scanner returns to the home position.	• Scanner home position sensor defective • Scanner drive motor defective • Scanner home position sensor connector defective • Scanner drive motor connector defective • IOB board defective

No.	Definition	Symptom	Possible Cause
130	B	Communication Error between BiCU and SBU	
		The BiCU board cannot detect the SBU connect signal.	• The flat cable between the BiCU board and the SBU has a poor connection • The flat cable between the BiCU board and the SBU damaged • BiCU board defective • SBU defective
192	B	Automatic SBU adjustment error	
		During the automatic SBU adjustment, the machine detects that the white level read from the white plate or paper is out of range. (☛ SP4-908)	• Exposure lamp defective • SBU auto adjustment was not done correctly (☛ 3.13 Copy adjustment printing/scanning – Standard white density adjustment) • SBU defective • BiCU board defective • Exposure lamp stabilizer defective
194	B	SBU White Level Detection Error	
		The automatic SBU adjustment failed twenty times consecutively.	• Exposure lamp defective • Dirty white plate • Incorrect position or width of white plate scanning (☛ SP4-015) • BiCU board defective • SBU board defective
302	B	Charge roller current leak	
		A current leak signal for the charge roller is detected.	• Charge roller damaged • High voltage supply board defective • Poor connection of the PCU
320	B	Polygonal mirror motor error	
		The polygon mirror motor does not reach operating speed within 10 seconds after the motor ON signal is sent, or does not turn on within one of the 200 ms check intervals during operation.	• Polygon mirror motor defective • Poor connection between the polygonal mirror motor driver and the BiCU board • Damaged cable between BiCU/IOB and polygonal mirror motor driver • BiCU board defective
321	B	No laser writing signal (F-GATE) error	
		The laser writing signal (F-GATE) fails to turn Low after the laser crosses 5 mm on the drum surface from the laser writing start position.	• BiCU board defective • IMB board defective • The fax controller or printer controller has a poor connection • Fax controller or printer controller defective

No.	Definition	Symptom	Possible Cause
322	B	Laser synchronization error	
		The main scan synchronization detector board cannot detect the laser synchronization signal for more than 5 consecutive 100 ms intervals.	• Poor connection between the LD unit and the BICU board • Damaged cable between BiCU and LD unit • LD unit out of position • LD unit defective • BiCU board defective
390	B	TD sensor error	
		The TD sensor outputs less than 0.2 V or more than 4.0 V 10 times consecutively during copying.	• TD sensor abnormal • Poor connection of the PCU
391	B	Development bias leak	
		A development bias leak signal is detected.	• Poor connection of the PCU • High voltage supply board defective
392	B	TD sensor initial setting error	
		TD sensor initial setting is not performed correctly.	• ID sensor defective • No developer • Drum does not turn • Development roller does not turn • Poor connection of the PCU • The voltage is not applied to charge roller
401	B	Transfer roller leak error 1	
		A current leak signal for the transfer roller is detected. A current feedback signal for the transfer roller is not detected.	• High voltage supply board defective • Poor connection of the PCU • Transfer/separation unit set incorrectly • Transfer roller damaged
402	B	Transfer roller leak error 2	
		A current leak signal for the transfer roller is detected. A current feedback signal for the transfer roller is not detected.	• High voltage supply board defective • Poor connection of the PCU • Transfer/separation unit set incorrectly • Transfer roller damaged
500	B	Main motor lock	
		A main motor lock signal is not detected for more than 7 consecutive checks (700 ms) after the main motor starts to rotate, or the lock signal is not detected for more than 7 consecutive checks during rotation after the last signal.	• Too much load on the drive mechanism • Main motor defective
503	C	Upper paper tray lift motor malfunction (optional paper tray units)	
		The paper lift sensor fails to activate twice continuously after the tray lift motor has been on for 18 seconds.	• Paper lift sensor defective • Tray lift motor defective • Too much load on the drive mechanism • Poor tray lift motor connection

No.	Definition	Symptom	Possible Cause
504	B	Lower paper tray lift motor malfunction (optional two-tray paper tray unit)	
		The paper lift sensor fails to activate twice continuously after the tray lift motor has been on for 18 seconds.	• Paper lift sensor defective • Tray lift motor defective • Too much load on the drive mechanism • Poor tray lift motor connection
506	B	Paper feed motor lock (optional paper tray units)	
		A motor lock signal is not detected for more than 1.5 s or the lock signal is not detected for more than 1.0 s during rotation.	• Paper feed motor defective • Too much load on the drive mechanism
541	A	Fusing thermostat/thermistor open	
		The fusing temperature detected by the thermistor is below 10°C for 5 seconds after the main power switch is turned on.	• Fusing thermostat defective or out of position • Fusing thermistor defective or out of position • Power supply board defective
542	A	Fusing temperature warm-up error	
		The fusing temperature does not reach 80°C within 30 seconds after the main switch is turned on.	• Fusing thermistor defective or out of position • Fusing lamp open • Fusing thermostat open • Fusing thermofuse open • Power supply board defective
543	A	Fusing overheat error	
		A fusing temperature of over 230°C is detected for 1 second by the fusing thermistor.	• Fusing thermistor defective • Power supply board defective
544	A	Fusing low temperature error	
		A fusing temperature of lower than 100°C is detected for 1 second by the fusing thermistor during operation or stand-by mode.	• Fusing lamp open • Fusing thermistor defective • Power supply board defective • Fusing thermistor open • Fusing thermostat open
546	A	Unstable fusing temperature	
		The fusing temperature does not rise 3 °C or more within 5 seconds after the fusing lamp has been on over 8 seconds.	• Thermistor defective • Power supply unit defective
547	B	Zero cross signal malfunction	
		Zero cross signals are not detected within 5 seconds after the main power switch is turned on, or are not detected within 1 second after operation begins.	• Power supply board defective • IOB defective • BiCU defective
620	B	Communication error between IOB and ADF	
		The IOB does not receive a response from the ADF main board for 4 seconds or more.	• Poor connection between the IOB and ADF main board (DF connector) • ADF main board defective • IOB defective

No.	Definition	Symptom	Possible Cause
691	B	Communication error between BiCU and fax controller	
		The BiCU board cannot communicate with the fax controller.	• Poor connection between the BiCU board and the fax controller • BiCU board defective • Fax controller defective
692	B	Communication error between BiCU and printer controller	
		The BiCU board cannot communicate with the printer controller.	• Poor connection between the BiCU board and the printer controller. • BiCU board defective • Printer controller defective
695	B	Fax firmware error	
		The fax program cannot be started. (☛ Fax Service Manual)	• The fax firmware download has not been completed correctly. Try again.
760	B	ADF gate abnormal	
		The ADF Gate signal line between the ADF main board and the IOB is disconnected.	• ADF main board defective • Input/output board defective • Poor connection (ADF Gate line) between the ADF main board and the IOB.
900	B	Electrical total counter error	
		The electrical total counter does not work properly.	• NVRAM defective
901	B	Mechanical total counter	
		The mechanical total counter does not work properly.	• Mechanical total counter defective • IOB defective • Disconnected mechanical total counter
921	B	IMB memory controller error	
		A memory control job is not completed within a certain period.	• IMB defective • BiCU defective • Poor connection between IMB and BiCU
922	B	IMB DRAM error	
		The machine detects a discrepancy in the IMB DRAM write/read data during its write/read test (done at power off/on and at recovery from low power or night/off mode).	• IMB defective • BiCU defective • Poor connection between BiCU and IMB
924	B	Optional DRAM error	
		The machine detects a discrepancy in the Optional DRAM write/read data during its write/read test (done at power off/on and at recovery from low power or night/off mode).	• Non-supported DRAM connected • Poor connection between IMB and optional DRAM • Optional DRAM defective • IMB defective • BiCU defective

No.	Definition	Symptom	Possible Cause
925	B	IMB non-connected error	
		IMB is not connected. This SC only appears with B040 and B043 version machines.	• IMB is not connected • Poor connection between BiCU and IMB • IMB defective • BiCU defective
926	B	Memory capacity error	
		The machine detects a discrepancy between the memory capacity detected during the memory check at power on and the check at recovery from low power or night/off mode.	• Poor connection between optional DRAM and IMB • Optional DRAM defective • IMB defective • BiCU defective
981	B	NVRAM error	
		The machine detects a discrepancy in the NVRAM write/read data when attempting to save actual data to the NVRAM (i.e. during actual use).	• NVRAM defective • Poor connection between BiCU and NVRAM • NVRAM is not connected • BiCU defective
990	B	Communication error between BICU and IOB	
		The BiCU board cannot communicate with the IOB.	• The connection between the BiCU board and the IOB is poor. • BiCU board defective • IOB defective
999	B	Program version error	
		An incorrect type of main software was downloaded.	• The main software for another machine was downloaded to this machine. Switch the machine off. Connect an IC card that has the correct firmware to the machine. Switch the machine on, and download the firmware.

4.2 ELECTRICAL COMPONENT DEFECTS

4.2.1 SENSORS

Component	CN	Condition	Symptom
Registration	312-2 (IOB)	Open	The Paper Jam message will appear whenever a copy is made (paper hasn't reached the sensor).
		Shorted	The Paper Jam message appears even if there is no paper at the sensor.
Relay	312-5 (IOB)	Open	The Paper Jam message will appear whenever a copy is made except for 1st and by-pass tray feeding.
		Shorted	The Paper Jam message appears even if there is no paper at the sensor.
Upper Paper End	314-2 (IOB)	Open	The Paper End indicator lights when the 1st paper tray is selected, even if there is paper in the tray.
		Shorted	The Paper End indicator does not light when the 1st paper tray is selected, even if there is no paper in the tray. The Paper Jam message will appear whenever a copy is made from the 1st paper tray.
Vertical Transport	316-2 (IOB)	Open	The Paper Jam message will appear whenever a copy is made from an optional paper tray unit.
		Shorted	The Paper Jam message appears even if there is no paper at the sensor.
Lower Paper End	317-6 (IOB)	Open	The Paper End indicator lights when the 2nd paper tray is selected, even if there is paper in the tray (B040/B043 models only).
		Shorted	The Paper End indicator does not light when the 2nd paper tray is selected, even if there is no paper in the tray. The Paper Jam message will appear whenever a copy is made from the 2nd paper tray (B040/B043 models only).
		Shorted	
By-pass Paper End	311-7 (IOB)	Open	The Paper End indicator lights when the bypass tray is selected, even if there is paper in the tray.
		Shorted	The Paper End indicator does not light when the bypass tray is selected, even if there is no paper in the tray. The Paper Jam message will appear whenever a copy is made from the bypass tray.
Exit	331-2 (IOB)	Open	The Paper Jam message will appear whenever a copy is made (paper hasn't reached the sensor).
		Shorted	The Paper Jam message appears even if there is no paper at the sensor.
Toner Density	325-3 (IOB)	Open	SC390 is displayed.
		Shorted	
Image Density	326-2 (IOB)	Open	The toner density control process is changed (see the note below the table).
		Shorted	

Component	CN	Condition	Symptom
Scanner H.P.	304-2 (IOB)	Open	SC120 is displayed.
		Shorted	
Platen Cover	304-5 (IOB)	Open	APS and Auto Reduce/Enlarge do not function correctly.
		Shorted	If the Start button is pressed with the platen cover or A(R)DF closed, “Cannot detect original size” is displayed.
Original Width	305-3,4 (IOB)	Open	The CPU cannot detect the original size properly. APS and Auto Reduce/Enlarge do not function correctly.
		Shorted	
Original Length	305-8,9 (IOB)	Open	The CPU cannot detect the original size properly. APS and Auto Reduce/Enlarge do not function correctly.
		Shorted	
Duplex Entrance	222-2 (DCB)	Open	The Paper Jam message will appear whenever a duplex copy is made (paper hasn't reached the sensor).
		Shorted	The Paper Jam message appears even if there is no paper at the sensor.
Duplex Exit	222-5 (DCB)	Open	The Paper Jam message will appear whenever a duplex copy is made (paper hasn't reached the sensor).
		Shorted	The Paper Jam message appears even if there is no paper at the sensor.
Duplex Inverter	220-6 (DCB)	Open	The Paper Jam message will appear whenever a duplex copy is made (paper hasn't reached the sensor).
		Shorted	The Paper Jam message appears even if there is no paper at the sensor.

NOTE: SC392 is activated when the CPU detects an ID sensor error during developer initialization (SP2-214). However, SC392 is not displayed on the LCD but simply logged in the SC log (SMC printout), unless the technician exits SP Mode as soon as the "Error!!!" message is displayed.

4.2.2 SWITCHES

Component	CN	Condition	Symptom
Upper Paper Size	315 1,2,4 (IOB)	Open	The CPU cannot detect the proper paper size, and misfeeds may occur when a copy is made from the 1st paper tray.
		Shorted	
Vertical Transport Door	316-5 (IOB)	Open	The Cover Open indicator is lit even if the vertical transport door is closed.
		Shorted	The Cover Open indicator is not lit even if the vertical transport door is opened.
Lower Paper Size	317-1,2,4 (IOB)	Open	The CPU cannot detect the proper paper size, and misfeeds may occur when a copy is made from the 2nd paper tray.
		Shorted	
By-pass Paper Size	311-1,2,4,5 (IOB)	Open	The CPU misdetects or is not able to detect the size of the paper set in the bypass tray, causing possible misfeeds when feeding from this tray.

Component	CN	Condition	Symptom
Right Door	331-5 (IOB)	Open	The Cover Open indicator is lit even if the right door is closed.
		Shorted	The Cover Open indicator is not lit even if the right door is open.
Front/Right Cover	328-1 (IOB)	Open	The Cover Open indicator is lit even if doors are closed.
		Shorted	The Cover Open indicator is not lit even if doors are open.
Main	281-3,4 (PSU)	Open	The machine does not turn on.
		Shorted	The machine does not turn off.

4.3 BLOWN FUSE CONDITIONS

Fuse	Rating		Symptom when turning on the main switch
	120 V	220 – 240 V	
Power Supply Board			
FU1	15 A/125 V	—	No response.
FU2	6.3 A/250 V	3.15 A/250 V	No response.
FU3	2 A/125 V	2 A/250 V	Anti-condensation/Tray Heater does not turn on.
FU4	4 A/125 V	4 A/250 V	Optional peripheral(s) are detected but do not function.
FU5	4 A/125 V	4 A/250 V	The Cover Open indicator is lit then SC901 is displayed.
FU6	3.15 A/125 V	3.15 A/250 V	LEDs are not lit and the LCD display does not function (backlight only).

4.4 LED DISPLAY

4.4.1 BiCU

Number	Function
LED 1	Monitors the +5 V line for the CPU and the surrounding circuit. Usually, this LED is blinking.
LED 2	Monitors the +5 V line. Usually, this LED is lit.

4.4.2 IOB

Number	Function
LED301	Monitors the connection between the IOB and the BiCU. Usually, this LED is blinking.

5. SERVICE TABLES

5.1 USING SERVICE PROGRAM MODES

Use the service program modes (SP modes) to check electrical data, change operating modes, and adjust values.

Accessing SP Modes

How to Enter SP Mode

1. Key in the following sequence.
   [ ] → (1) → (0) → (7) → (C/⊘)
   - Hold the (C/⊘) key down for longer than 3 seconds.
2. The LCD displays a menu of the SP modes.

```
[Service P-Mode] No._
1 Copy 2 Fax 3 Printer
```

B039M001.WMF

NOTE: Installed applications appear on the menu as follows: “1.Copy”, “2. Fax”, “3. Printer”, If an application is not installed, the corresponding item does not appear.

3. Press the number for the application mode you need. (For example, press “1” to select the copier application mode.) The selected SP mode display appears on the LCD, as shown.

```
SP B0395533A EU Class1
No.1 Feed
```

B039M002.WMF

How to Exit SP Mode

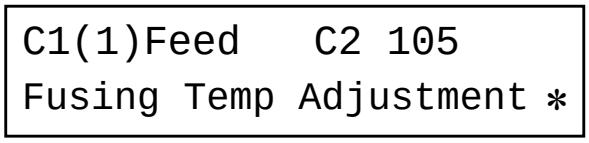
Press [ ] or *Cancel* key one or more times to return to the standby-mode display.

Accessing Copy Mode from within an SP Mode

1. Press the (◊) key.
2. Select the appropriate copy mode and make trial copies.
   NOTE: The *User Tools* key LED is blinking at this time.
3. To return to SP mode, press the [ ] key.

Service Tables

How to Select a Program Number

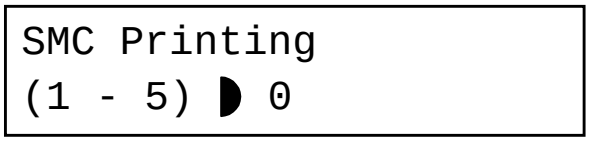


B039M003.WMF

Each program number consists of two or three levels (“classes”). To select a program, you need to enter each class number in sequence.

1. Enter the first-class program number with the numeric keypad (or change the number using the *Right* or *Left* cursor key), and then press the # key or the *OK* key.
2. Select the second-class program number with the numeric keypad (or *Right* or *Left* cursor key), and press # or *OK*.
3. To select a third-class program (if there are any): select the second-class number and then use the *Right* or *Left* cursor key.
4. To return to the next higher class, press ⌫.

NOTE: 1) If the screen is not large enough to display information about all of the available selections, the screen displays a solid semicircle mark as shown below. The mark means that you can press the *Darker* key to view the contents for each selection.
2) An asterisk (*) to the right of mode name indicates that its value has been changed from the default.



B039M004.WMF

To Input a Value or Setting for an SP Mode

1. Enter the required program mode as explained above.
2. Enter the required setting using the numeric keys, and then press # or the *OK* key.

NOTE: 1) If you forget to press # or *OK*, the previous value remains in effect.
2) If necessary, use the */* key to select “+” or “–” before entering the value.

5.1.1 SP MODE TABLES

NOTE: In the Function/[Setting] column:

- The related pop-up screen name and function name (if any) appear in parenthesis following the function description.
- Comments are in *italics*.
- The setting range is enclosed in brackets, with the default setting written in **bold**.
- An asterisk (*) after the mode number means that this mode's value is stored in the NVRAM. If you do a RAM reset, all these SP modes will be returned to their factory settings.
- **DFU** stands for **D**esign/**F**actory **U**se only. Values marked **DFU** should not be changed.
- **IAJ** means that you should refer to "Replacement and Adjustment – Copy Image Adjustments" for more information.

SP1-XXX (Feed)

1	Mode Number/Name		Function/[Setting]
001*	Leading Edge Registration		
	1	Paper tray	Adjusts the printing leading-edge registration from each paper feed station, using the Trimming Area Pattern (SP5-902, No.10). [–9.0 ~ 9.0 / **0.0** / 0.1 mm/step] **IAJ** • *Specification: 2 ± 1.5 mm* • *Use the # key to select "+" or "–" before entering the value.*
	2	By-pass	
	3	Duplex	
002*	Side-to-Side Registration		
	1	1st tray	Adjusts the printing side-to-side registration from each paper feed station, using the Trimming Area Pattern (SP5-902, No.10). Adjustments are supported for all 4 possible feed trays (including optional trays). [–9.0 ~ 9.0 / **0.0** / 0.1 mm/step] **IAJ** • *Specification: 2 ± 1.5 mm* • *The SP1-002-1 setting is applied to all trays, not just the 1st Tray. Settings for trays 2 to 4 are offsets relative to the SP1-002-1 setting.* • *For duplex copies, the value for the front side is determined by SP1-002-1 to -4, and the value for the rear side is determined by SP1-002-6.* • *Use the # key to select "+" or "–" before entering the value.*
	2	2nd tray	
	3	3rd tray	
	4	4th tray	
	5	By-pass feed	
	6	Duplex	
003*	Paper Feed Timing		
	1	1st tray	Adjusts the amount of buckle the paper feed clutch applies to the paper after the registration sensor is activated. A higher setting applies greater buckling. [0 ~ 10 / **5** / 1 mm/step]
	2	2nd, 3rd, 4th trays	
	3	By-pass feed	
	4	Duplex	[0 ~ 20 / **6** / 1 mm/step]

Service Tables

1	Mode Number/Name		Function/[Setting]
007	By-pass Paper Size Display		
			Displays the by-pass paper width sensor output. *Press ⎋ to exit the display.*
103*	Fusing Idling		
			Selects whether or not fusing idling is performed. [**0 = No** / 1 = Yes] *Normally disabled in this machine. However, enable this mode if fusing is incomplete on the 1st and 2nd copies, which may occur if the room is cold.* ☛ *6.13.5 Fusing Temperature Control*
105*	Fusing Temperature Adjustment		
	1	Stand-by	Adjusts the fusing temperature for standby mode. [160 ~ 190 / **175** / 1°C/step]
	2	Low power level 2	Adjusts the fusing temperature for low power level 2. [0 ~ 100 / **60** / 1°C/step] *Lower values cause the machine to take a longer time to reach the ready condition.*
106	Fusing Temperature Display		
			Displays the fusing temperature. *Press ⎋ to exit the display.*
107*	Fusing Soft Start Adjustment		
	1	Stand-by	Adjusts the number of zero-cross cycles of the fusing lamp AC supply needed to bring the fusing lamp power to 100% while bringing the lamp up to the standby temperature. Increase this value if the machine is experiencing sudden power dropouts. [North Am.: **0 = 3 cycles** / 1 = 10 cycles / 2 = 20 cycles] [EU/Asia: 0 = 3 cycles / 1 = 10 cycles / **2 = 20 cycles**] ☛ *6.13.5 Fusing Temperature Control*
	2	Copying	Adjusts the number of zero-cross cycles for the fusing lamp AC supply needed to gradually raise the fusing lamp power to 100% during printing. Increase this value if the machine is experiencing sudden power dropouts. [North Am.: **0 = 3 cycles** / 1 = 10 cycles / 2 = 20 cycles] [EU/Asia: 0 = 3 cycles / **1 = 10 cycles** / 2 = 20 cycles] ☛ *6.13.5 Fusing Temperature Control*
108*	Fusing Soft Start Setting		
			Selects whether the fusing temperature control cycle is 1 second or 3 seconds. [**0 = 1** / 1= 3 s] *Setting this item to "1" (3 s) reduces the power supply fluctuation that occurs when the fusing lamp switches on.* ☛ *6.13.5 Fusing Temperature Control*
109	Fusing Nip Band Check		
			Checks the fusing nip band. [1 = Start / 0= Stop] **IAJ**
902	AC Frequency Display		
			Displays the fusing lamp power control frequency (as detected by the zero cross signal generator). *The displayed value is 1/5 the actual frequency: 10 = 50 Hz, 12 = 60 Hz.*

1	Mode Number/Name		Function/[Setting]
903*	Feed Clutch Boost		
	1	By-pass tray	Adjusts the amount of extra push that the feed clutch gives to the paper after the skew has been corrected at registration. [0 ~ 10 / **6** / 1 mm/step] *This feature helps the registration roller feed certain types of paper (such as thick paper). Increase the value if thick paper is jamming after feeding from the registration roller.*
	2	2nd, 3rd, 4th tray	[0 ~ 10 / **3** / 1 mm/step]
908*	Paper Tray Adjustment		
	1	1st optional	Adjusts the reverse time for the upper and lower paper lift motors. [–2 ~ +2 / **0** / 1/step] ☛ *Detailed Descriptions – Optional Paper Tray Unit*
	2	2nd optional	

Service Tables

SP2-XXX (Drum)

2	Mode Number/Name		Function/[Setting]
001*	Charge Roller Bias Adjustment		
	1	Printing	Adjusts the voltage applied to the charge roller when printing. [–2100 ~ –1500 / **–1700** / 1 V/step] *The actually applied voltage changes automatically as charge roller voltage correction is carried out. The value you set here becomes the base value on which this correction is carried out.*
	2	ID sensor pattern	Adjusts the voltage applied to the charge roller when generating the Vsdp ID sensor pattern (as part of charge roller voltage correction). [0 ~ 400 / **300** / 1 V/step] *The actual charge-roller voltage is obtained by adding this value to the value of SP2-001-1.*
101*	Erase Margin Adjustment		
	1	Leading edge	Adjusts the leading edge erase margin. [0.0 ~ 9.0 / **3.0** / 0.1 mm/step] **IAJ** *Specification: 2 ± 1.5 mm*
	2	Trailing	Adjusts the trailing edge erase margin. The rear trailing edge is this value plus 1.2 mm. [0.0 ~ 9.0 / **4.0** / 0.1 mm/step] **IAJ** *Specification: 2 +2.5/–1.5 mm*
	3	Left side	Adjusts the left edge erase margin. The rear left edge is this value plus 0.3 mm. [0.0 ~ 9.0 / **2.0** / 0.1 mm/step] **IAJ** *Specification: 2 ± 1.5 mm*
	4	Right side	Adjusts the right edge erase margin. The rear right edge is this value plus 0.3 mm. [0.0 ~ 9.0 / **2.0** / 0.1 mm/step] **IAJ** *Specification: 2 +2.5/–1.5 mm*
201*	Development Bias Adjustment		
	1	Printing	Adjusts the voltage applied to the development roller when printing. [–1500 ~ –200 / **–650** / 1 V/step] *This can be adjusted as a temporary measure if faint copies are being produced due to an aging drum.*
	2	ID sensor pattern	Adjusts the voltage applied to the development roller when generating the ID sensor pattern. [–2 = LL (220 V) / -1 = L (260 V) / **0 = N (300 V)** / 1 = H (340 V) / 2 = HH (380 V)] *The actual voltage applied is this setting plus the value of SP2-201-1. The setting affects ID sensor pattern density, which in turn affects the toner supply.*

2	Mode Number/Name		Function/[Setting]
213*	Outputs after Near End		
			Sets the number of copy/print/fax pages that can be made after toner near-end has been detected. [**0 = 50 pages** / 1 = 20 pages] *Reduce the number of pages if the user normally makes copies with a high image ratio.*
214	Developer Initialization		
			Initializes both the TD sensor toner supply target voltage and the TD sensor gain value. [**0 = No** / 1 = Yes] *Carry this out after replacing the developer or the TD sensor.*
220	TD Sensor Output Value Display		
			Displays: a) Vt: the current TD sensor output value and b) Vref: the target TD output value Vts (SP2-926) + correction for ID sensor output. *The TD sensor output value changes every copy. If a > b, toner is supplied to the development unit.* *Press [⎆] to exit the display.*
221	ID Sensor Error Analysis		
			Displays Vsg, Vsp, Vsdp, Vt, and ID sensor input value. Use these values to check the operational status of the ID sensor. [**0 = No** / 1 = Yes] • *This machine has no SC code for ID sensor errors. If imaging problems occur (such as dirty background), use this SP to determine whether the problem is with toner density control.* • *You can use SP7-911 to check the number of ID sensor errors that have occurred.* ☛ *5.1.15 ID Sensor Error Analysis*
301*	Transfer Current		
	1	Normal paper	Adjusts the current applied to the transfer roller when feeding from a paper tray. [–2 = –4 μA / –1 = –2 μA / 0 = 0 μA / 1 = 2 μA / 2 = +4 μA] *Use a high setting if the user normally feeds relatively thick paper (within spec) from a paper tray.* ☛ *6.12.2 Image Transfer Current Timing*
	2	Thick/Special paper	Adjusts the current applied to the transfer roller when feeding from the by-pass tray. [–2 = –4 μA / –1 = –2 μA / 0 = 0 μA / 1 = 2 μA / 2 = +4 μA] *Use a high setting (a) if the user normally feeds relatively thick paper from the by-pass tray, or (b) if waste toner is re-attracted from the drum (which can occur when using transparencies).* ☛ *6.12.2 Image Transfer Current Timing*

2	Mode Number/Name		Function/[Setting]
301*	3	Duplex	Adjusts the current applied to the transfer roller when carrying out a duplex job. [–2 = –4 μA / –1 = –2 μA / 0 = 0 μA / 1 = 2 μA / 2 = +4 μA] *Use this SP if there is poor image transfer on the rear side of duplex copies.* ☛ *6.12.2 Image Transfer Current Timing*
	4	Cleaning	Adjusts the current applied to the transfer roller for roller cleaning. [–10 ~ 0 / –1 / 1 μA/step] *Increase the current if toner remains on the roller after cleaning. (Remaining toner may cause dirty background on the rear side.)* ☛ *6.12.2 Image Transfer Current Timing*
802	Forced Developer Churning		
			Initializes the developer and checks the TD sensor output (Vt). The machine mixes the developer for 2 minutes while reading and displaying the Vt value. The machine does not initialize the TD sensor output. [**0 = No** / 1 = Yes] *If the machine has not been used for a long period of time, prints may have a dirty background. In this case, use this SP mode to mix the developer. After finishing, press the* ⎚ *key to clear the Vt value from the screen.*
906*	Tailing Correction		
	1	Shift value	Shifts the image writing position in intervals specified by SP2-906-2. [0.0 ~ 1.0 / **0.0** / 0.1 mm/step] *When making many copies of an original that contains vertical lines (such as in tables), the paper may not separate correctly. This can cause tailing images (ghosts of the vertical lines continuing past the bottom of the table). This SP can be used to prevent this.*
	2	Interval	Changes the interval for the image shift specified by SP2-906-1. [1 ~ 10 / **1** / 1 page/step]
908	Forced Toner Supply		
			Forces the toner bottle to supply toner to the toner supply unit. Press "1" to start. [**0 = No** / 1 = Yes] *The machine continues to supply toner until the toner concentration in the development unit reaches the standard level, or for up to 2 minutes (whichever comes first).*
915*	Polygon Mirror Motor Idling Time		
			Selects the polygon mirror motor idling time. [0 = None / **1 = 15 s** / 2 = 25 s] *To increase the speed of the first copy, the mirror motor begins idling when the user sets an original, touches a key, or opens the platen cover or DF. If this setting is left at the default (15 s), the motor will stop if the user does nothing for 15s. If the setting is "0", the motor will not switch off during standby. (But note that regardless of the setting, the motor will switch off when the machine enters energy saver mode.)*

2	Mode Number/Name	Function/[Setting]
921*	Toner Supply Mode	
		Selects the toner supply mode. [**0 = Sensor 1** / 1 = Sensor 2 **(DFU)** / 2 = Fixed 1 **(DFU)** / 3 = Fixed 2] *Under normal conditions this should be set to "0".* *You can temporarily change this to "3" if the TD sensor is defective. Do not set to "1" or "2", as these are for design use only.* ☛ *6.9.6 Toner Density Control*
922*	Toner Supply Time	
		Adjusts the toner supply motor ON time for Sensor 1 and Sensor 2 toner supply mode. Accordingly, this setting is effective only if SP2-921 is set to "0" or "1" [0.1 ~ 5.0 / **0.4** / 0.1 s/step] *Raising this value increases the toner supply motor ON time. Set to a high value if the user tends to make many copies having high proportions of solid black image areas.* ☛ *6.9.6 Toner Density Control*
923*	Toner Recovery Time	
		Adjusts the toner supply motor ON time used during toner recovery from Toner Near End or Toner End. This setting is effective only if SP2-921 is set to "0" [3 ~ 60 / **30** / 1 s/step] *Since toner recovery is carried out in 3-second cycles, the input value should be a multiple of 3 (3, 6, 9...).* ☛ *6.9.6 Toner Density Control*
925*	Toner Supply Rate	
		Adjusts the toner supply time for fixed toner supply mode. This setting is effective only if SP2-921 is set to "2" or "3". [0 ~ 7 / **0**] *t = 200ms, and settings are as follows* ***0 = t*** *4 = 12t* *1 = 2t* *5 = 16t* *2 = 4t* *6 = on continuously* *3 = 8t* *7 = 0 s* *Raising this value increases the toner supply motor ON time. Set to a high value if the user tends to make many copies having high proportions of solid black image areas.* ☛ *6.9.6 Toner Density Control*
926*	Standard Vt	
		Adjusts Vts (the Vt value for new developer). The TD sensor output is adjusted to this value during the TD sensor initial setting process]. [0.00 ~ 5.00 / **2.40** / 0.01 V/step] **DFU** *This SP is effective only when SP2-921 is "0", "1", or "2".*
927*	ID Sensor Control	
		Selects whether the ID sensor is or is not used for toner density control. [0 = No / **1 = Yes**] *This value should normally be left at "1". If the value is "0", dirty background may occur after long periods of non-use.*

2	Mode Number/Name		Function/[Setting]
928	Toner End Clear		
			Clears the toner end condition without adding new toner. Select "1" then press the # key to clear the condition. [**0 = No** / 1 = Yes] *Setting this to "1" will clear the following:* • *Toner end indicator (goes out)* • *Toner near-end counter* • *Toner near-end level* *This function should generally not be used. If you clear the toner end condition without adding new toner, there is a risk that the drum may eventually begin to attract carrier after many more copies are made and toner runs out. This attracted carrier may damage the drum.*
929*	Vref Limits		
	1	Upper	Adjust the upper Vref limit. [0.50 ~ 3.50 / **3.20** / 0.01V/step] **DFU**
	2	Lower	Adjust the lower Vref limit. [0.00 ~ 3.50 / **1.10** / 0.01V/step] **DFU**
995*	ID Sensor Detection Interval		
			If the machine starts warm-up after this amount of time has passed since entering night/off mode (for example, to print an incoming fax), the machine makes an ID sensor pattern. [0 ~ 999 / **90** / 1 minute/step] *Higher values increase the chance of dirty background. Lower values increase the frequency at which the machine makes ID sensor patterns, increasing the chance that the transfer roller (rear side of paper) will become dirty.*
996*	Transfer Roller Cleaning		
			Selects whether the transfer roller is cleaned before each copy job. [**0 = No** / 1 = Yes] *Set this to "1" if dirty background is appearing on the reverse side of the first page of copy jobs. Note that this will increase the time required to generate the first copy. If the setting is "0", the transfer roller is never cleaned.* ☛ *6.12.3 Transfer Roller Cleaning*
998*	Main Scan Magnification		
			Adjusts the magnification along the main scan direction, for all print modes (copy, fax, printing). [–0.5 ~ +0.5 / **0.0** / 0.1%/step] IAJ • *Use the * key to select "+" or "–" before entering the value.* • *The specification is 100 ± 1.0%.*

SP4-XXX (Scanner)

4	Mode Number/Name		Function/[Setting]
008*	Main Scan Magnification (Scanner)		
			Adjusts the magnification along the main scan direction, for scanning. [–1.0 ~ +1.0 / **0.0** / 0.1%/step] **IAJ** • *Use the # key to select "+" or "–" before entering the value* • *The specification is 100 ± 1.0%* • *Main scan magnification is implemented in steps of 0.5. Accordingly, your input value should be a multiple of 0.5 (–1.0, –0.5, 0, +0.5, or +1.0)*
010*	Leading Edge Registration (Scanner)		
			Adjusts the leading edge registration for scanning in platen mode. [–5.0 ~ +5.0 / **0.0** / 0.1 mm/step] **IAJ** • *(–): The image moves toward the leading edge.* • *(+): The image moves toward the trailing edge* • *Use the # key to select "+" or "–" before entering the value* *The specification is 2 ± 1.5 mm.*
011*	Side-to-side Registration (Scanner)		
			Adjusts the side-to-side registration for scanning in platen mode. [–10.0 ~ +6.0 / **0.0** / 0.1 mm/step] **IAJ** • *Increasing the value shifts the image to the right* • *Use the # key to select "+" or "–" before entering the value* • *The specification is 2 ± 1.5 mm.*
012*	Erase Margin		
	1	Leading edge	Adjusts the scanning margin individually for each of the four edges. [0 ~ 9.0 / **1.0** / 0.1 mm/step] **IAJ** *It is generally best to adjust the scanning margin as little as possible, and use the printing margin for image adjustments.*
	2	Trailing edge	
	3	Left	
	4	Right	
013	Scanner Free Run		
			Performs a scanner free run with the exposure lamp on. [0 = No / 1 = Yes] *After selecting "1", press OK or # twice to start the run. Press C/E to stop.*

Service Tables

4	Mode Number/Name		Function/[Setting]
015*	White Plate Scanning		
	1	Start position	Adjusts the scanning start position on the white plate for auto shading. [–3.0 ~ +6.0 / **0.0** / 0.1 mm/step] *The base value stored in the machine is 15.2 mm toward the white plate from the scanner H.P.. This SP setting specifies the offset from this base value.*
	2	Scanning length	Adjusts the length of the white plate scan, in the main scan direction. The scan begins at the start position set above [in SP4-015-1] and extends for the specified length. [–3.0 ~ +6.0 / **0.0** / 0.1 mm/step] *The base value stored in the machine is 4.76 mm. This SP setting specifies the offset from this base value.*
101*	Sub-Scan Magnification (Scanning)		
			Adjusts the actual sub-scan direction scanning magnification. The higher the setting, the lower the scanner motor speed. [-0.9 ~ +0.9 / **0.0** / 0.1%/step]
301	APS Data Display		
			Displays the status of the APS sensors and platen/DF cover sensor. ☛ *5.1.12 APS and Platen/ADF Cover Sensor Output Display*
303*	APS Small Size Original		
			Selects whether or not the copier will consider the original to be A5 LEF when the APS sensors cannot detect its size. [0 = **No (not detected)** / 1 = Yes (A5 LEF)] *If "Yes" is selected, paper sizes that cannot be detected by the APS sensors are regarded as A5 LEF. If "No" is selected, "Cannot detect original size" will be displayed.*
902*	Exposure Lamp ON		
			Turns on the exposure lamp. [**0 = No (Off)** / 1 = Yes (On)] *To turn off the exposure lamp, select "0". (The exposure lamp shuts off automatically after 30 seconds.)*
903	SBU Black Feedback Display		
	1	EVEN	Displays the black level feedback data in the SBU. **DFU**
	2	ODD	
904	SBU Black Level Adjustment		
	1*	EVEN target	This is the reference value for the EVEN channel black level used for black level adjustment at power-up. [0 ~ 255 / **0** / 1/step] **DFU** *Use this mode to re-input the previous value after performing memory all clear (SP5-801).*
	2*	ODD target	This is the reference value for the ODD channel black level used for black level adjustment at power-up. [0 ~ 255 / **0** / 1/step] **DFU** *Use this mode to re-input the previous value after performing memory all clear (SP5-801).*
	3	EVEN result	Displays the value from the most recent EVEN channel black level adjustment. [0 ~ 255 / **0** / 1/step] **DFU**

4	Mode Number/Name		Function/[Setting]
904	4	ODD result	Displays the value from the most recent ODD channel black level adjustment. [0 ~ 255 / **0** / 1/step] **DFU**
	5	Number of attempts	Displays the number of times SBU black level adjustment was performed before the target values in 4-904-1 and 2 were reached. **DFU**
	6*	Factory setting - EVEN	Displays the value of the black level for the EVEN channel set at the factory. [0 ~ 255 / **0** / 1/step] **DFU**
	7*	Factory setting - ODD	Displays the value of the black level for the ODD channel set at the factory. [0 ~ 255 / **0** / 1/step] **DFU**
905	SBU White Level Adjustment		
	1*	EVEN target	This is the reference value for the EVEN channel white level used for white level adjustment at power-up. [0 ~ 255 / **0** / 1/step] **DFU** *Use this mode to re-input the previous value after performing memory all clear (SP5-801).*
	2*	ODD target	This is the reference value for the ODD channel white level used for white level adjustment at power-up (set at the factory). [0 ~ 255 / **0** / 1/step] **DFU** *Use this mode to re-input the previous value after performing memory all clear (SP5-801).*
	3	EVEN result	Displays the value from the most recent EVEN channel white level adjustment. [0 ~ 255 / **0** / 1/step] **DFU**
	4	ODD result	Displays the value from the most recent ODD channel white level adjustment. [0 ~ 255 / **0** / 1/step] **DFU**
	5	Number of attempts	Displays the number of times SBU white level adjustment was performed before the target values in 4-904-1 and 2 were reached. **DFU**
	6*	Factory setting - EVEN	Displays the value of the white level for the EVEN channel set at the factory. [0 ~ 255 / **0** / 1/step] **DFU**
	7*	Factory setting - ODD	Displays the value of the white level for the ODD channel set at the factory. [0 ~ 255 / **0** / 1/step] **DFU**
906	SBU White Level (EVEN/ODD)		
	1*	Set value	This is the reference value for the White Level EVEN/ODD adjustment carried out at power-up. [0 ~ 600 / **0** / 1/step] **DFU** *Use this mode to re-input the previous value after performing memory all clear (SP5-801).*
	2	Result	Displays the value from the most recent EVEN/ODD SBU White Level adjustment. **DFU**
	3*	Factory setting	Displays the factory-set White Level EVEN/ODD setting. **DFU**

4	Mode Number/Name		Function/[Setting]
907	SBU Auto Adjustment Display		
	1*	Set value	This is the reference value for SBU Auto-Adjustment (white plate scanning). **DFU** *Use this mode to re-input the previous value after performing memory all clear (SP5-801).*
	2	Result	Displays the value from the most recent SBU Auto-Adjustment. **DFU**
	3*	Factory setting	Displays the factory-set SBU Auto adjustment value.
908	SBU Auto-Adjustment		
			Performs auto scanner adjustment. [**0 = No (normal operation)** / 1 = Yes (start adjustment)] *Use this SP mode after replacing the white plate.* ☛ ***IAJ** 3.13.2 "Standard White Density Adjustment".*
913*	DF Shading Interval		
			Adjusts the interval used for shading processing in DF mode. [0 ~ 60 / **20** / 1s/step] *Light and heat may affect the scanner response. Reduce this setting if copy quality indicates that the white level is drifting during DF copy jobs.*
921*	Image Adjustment Selection		
			Selects which mode the settings from SP4-922 to SP4-928 will be applied to. [0~ 9 / **0**] 0 = None, 1 = Text 1, 2 =Text 2, 3= Photo 1, 4 = Photo 2, 5 = Photo 3, 6 = Special 1, 7 = Special 2, 8 = Special 3, 9 = Special 4, 10 = Special 5 ☛ *6.5.4 IPU*
922*	Scanner Gamma Selection		
			Selects "text" or "photo" as the priority output mode [**0 = Text** / 1 = Photo] *This setting is applied to all image processing modes of SP4-921.* ☛ *6.5.4 IPU*
923*	Notch Selection		
			Selects the value of the center ID adjustment notch for the ID adjustment LEDs. [–1 = Light / **0 = Normal** / +1 = Dark] • *Normally the center notch is 3 (range 1-5). If –1 is selected, each notch shifts down (becomes lighter). If +1 is selected, each notch shifts up (becomes darker).* • *This setting is applied to all image processing modes of SP4-921.* ☛ *6.5.4 IPU*

4	Mode Number/Name		Function/[Setting]
925*	Sharpness Adjustment		
	1	Edge	Adjusts the clarity of line images and of solid-image edges. Higher settings provide greater clarity. [–2 ~ 2 / **0** / 1/step] • *This setting is applied to all image processing modes of SP4-921.* • *It is used for both MTF filtering and smoothing.* ☛ *6.5.4 IPU*
	2	Solid image	Adjusts the clarity of solid image areas. Higher settings provide greater clarity. [–2 ~ 2 / **0** / 1/step] *This setting is only applied to Text 2 and Special 1 of SP4-921.* ☛ *6.5.4 IPU*
	3	Low ID line	Adjusts the clarity of lines with low image density. Higher settings provide greater clarity. [–2 ~ 2 / **0** / 1/step] *This setting is only applied to Text 1, Text 2, Photo 2, Special 1, Special 2, and Special 5 of SP4-921.* ☛ *6.5.4 IPU*
926*	Texture Removal		
			Adjusts the texture removal level. 0: The default value for each mode is used. Text 1, Special 2, and Special 5 have a default of 3 and Photo 1-3 have a default of 1. 1: No removal applied. 2 – 5: Removal applied at the level specified here. The higher the setting (level), the less clear the image will become (more texture removal). [0 ~ 5 / **0** / 1/step] *This setting is only applied to Text 1, Photo 1–3, Special 2, and Special 5 of SP4-921.* ☛ *6.5.4 IPU*
927*	Line Width Correction		
			Adjusts the line width correction algorithm. Positive settings produce thicker lines; negative settings produce thinner lines. [–2 ~ 2 / **0** / 1/step] *This setting is only applied to Text 1, Text 2, Photo 2, Special 1, Special 2, and Special 5 of SP4-921.* ☛ *6.5.4 IPU*
928*	Independent Dot Erase		
			Selects the dot erase level. Higher settings provide greater erasure. [–2 ~ 2 / **0** / 1/step] *This setting is only applied to Text 1, Text 2, Photo 2, Special 1, Special 2, and Special 5 of SP4-921.* ☛ *6.5.4 IPU*

Service Tables

4	Mode Number/Name		Function/[Setting]
941*	White Line Erase		
			Selects the white line erase level. [0 ~ 5 / **2** / 1/step] *None Weak Strong* *0 1 – 2 – 3 – 4 –5* • *This setting is effective only Photo 1, Photo 3, Special 3 or Special 4 mode.* • *0: White line erase is not used, and white level correction is used instead* • *This setting is applied regardless of what mode has been selected in SP4-921.* ☛ *6.5.4 IPU*
942*	Black Line Erase		
			Selects the black line erase level. This setting is effective only when originals are scanned by the A(R)DF. [0 = No / **1 = Weak** / 2 = Strong] *This setting is applied regardless of what mode has been selected in SP4-921.* ☛ *6.5.4 IPU*
943*	Positive/Negative		
	1	Text	[**0 = No** / 1 = Yes] **DFU**
	2	Photo	

SP5-XXX (Mode)

5	Mode Number/Name	Function/[Setting]
001	All Indicators On	
		Blinks all indicators on the operation panel. *Press OK or # to cause all LEDs to begin blinking at a 3-second cycle. After checking that LEDs are all blinking, press ⌧ or Cancel to exit.*
104*	A3/DLT Double Count	
		Selects whether the machine counts twice for each sheet of A3/11"x 17". [**0 = No** / 1 = Yes] *If this is set to "Yes" is selected, the total (mechanical) counter and the current user counter will both increment by two for each A3/11" x 17" sheet.*
113*	Optional Key Counter	
		Enables/disables the optional key counter. [**0: = None** / 1 = Key Counter] *You must set this value to 1 after installing the optional key counter.*
116*	Key Counter Timing	
		Selects whether the key counter increments at time of paper feed-in or at time of paper exit. [**0 = Feed In** / 1 = Exit]
120*	Key Counter Removal Reset	
		Determines under which conditions the copy job settings are reset when the key counter is removed. With 0, the settings are cleared if the counter is removed at the end of a job or midway through a job. With 1, they are only cleared if the counter is removed at the end of a job. With 2, they are not cleared at all, under either condition. [**0=Yes** / 1=Standby only / 2=No] *With duplex copies, the job settings are always preserved, regardless of the setting of this SP mode.*
143*	DF 180° Image Rotation	
		Selects whether images copied in DF mode are turned upside down (rotated 180 degrees). [0 = No / 1 = Yes] *Select "Yes" when you want the image trailing edge at the paper's leading edge (e.g., letter-headed copy paper).*
401*	User Code Mode	
		Enables/disables the User Code feature for copy mode. [**0 = No** / 1 = Yes] • *Changing this value causes the following User Tool setting to change accordingly: [3. Copier Features] → [12. Key Operator Tools] → [1. User Code Access].* • *If the customer forgets a user code, you can retrieve it as follows.* *1) Change this SP value from 1 to 0.* *2) Use [3. Copier Features] → [12. Key Operator Tools] → [3. Print Counter List] to print out the counter list.* 3) *The list will show all the user codes.*

5	Mode Number/Name		Function/[Setting]
501*	PM Alarm Mode		
	1	Interval	Sets the base PM interval. [1 ~ 255 / **60** / 1K copies/step] *The value stored in this SP is used when the value of SP5-501-2 is "1".*
	2	On/Off	Enables/disables the PM alarm for the total number of prints, copies, and faxes. [**0 = No** / 1 = Yes]
801	Memory All Clear		
			Resets all software counters and returns all modes and adjustments to their defaults settings (except for some settings, such as SP5-811, SP5-907, SP5-916, and SP7-003 – ☛ 5.1.9 Memory All Clear for a full list). [**0 = No** / 1 = Yes] • *After selecting "1", press the Original Type key and the # key at the same time to execute the clear. If the clear is successful, the display shows "Action completed". If the clear fails, the display shows "Error!!!".* • *This SP mode should be used only after replacing the NVRAM or when the copier has malfunctioned due to damaged NVRAM.* ☛ *5.1.9 Memory All Clear*
802	Scanner/Printer Free Run		
			Starts a free run of both the scanner and the printer. [**0: = No** / 1 = Yes] *After selecting "1", press the OK key or # key twice to start the run. Press C to stop the free run.*
803	Input Check		
			Displays the signals being received from sensors and switches. *Press ⏎ to exit the program.* ☛ *5.1.4 Input Check*
804	Output Check		
			Turns on electrical components individually for test purposes. ☛ *5.1.5 Output Check*
807*	Display Language Group		
			Selects the display language group. [**0 = Standard** / 1 = Option 1 / 2 = Option 2] *The actual display language can be selected using User Tools: [6. Language]*
809*	mm/inch Selection		
			Selects whether the display shows values in mm or inches. [North Am.: **0 = inch** / 1 = mm] [EU/Asia: **0 = mm** / 1 = inch]

5	Mode Number/Name		Function/[Setting]
810	SC Code Reset		
			Resets all level-A service call conditions, such as fusing errors. (To reset SC 547, switch the machine off/on.) [**0 = No** / 1 = Yes] • *After selecting "1", press the Original Type key and the # key (or OK key) at the same time to execute the reset. If the reset is successful, the display shows "Action completed." If the reset fails, the display shows "Error!!!".* ☛ *4.1 Service Call Conditions*
811*	Serial Number Input		
			Used to input the machine serial number (normally done at the factory). This is the serial number printed on SMC reports. ☛ *5.1.14 Serial Number Input*
812*	Service Telephone Number		
	1	Telephone	Use this to input the telephone number of the service representative. (The number is displayed when a service call condition occurs.) • *To input a dash, press .* • *To delete the current telephone number, press C.*
	2	Facsimile	Use this to input the fax number printed on user counter reports. • *To input a dash, press .* • *To delete the current fax number, press C.*
824	NVRAM Data Upload		
			Uploads SP and UP mode data (except for some items such as counters and the serial number) from the flash memory on the BiCU board to a flash memory card. [**0 = No** / 1 = Yes] *This SP can be used when a flash memory card has been plugged into the machine's card slot.* ☛ *5.1.11 NVRAM Data Upload/Download*
825	NVRAM Data Download		
			Downloads SP mode data from a flash memory card to the flash memory on the BiCU board. [**0 = No** / 1 = Yes] *This SP can be used when a flash memory card has been plugged into the machine's card slot.* ☛ *5.1.11 NVRAM Data Upload/Download*
826	Program Upload		
			Uploads the system program from the flash memory on the BICU board to a flash memory card. [**0 = No** / 1 = Yes] *This SP can be used when a flash memory card has been plugged into the machine's card slot.* ☛ *5.1.10 Program Upload/Download*

Service Tables

5	Mode Number/Name		Function/[Setting]
827	Program Download		
			Downloads the system program from a flash memory card to the flash memory on the BICU board. [**0 = No** / 1 = Yes] *This SP can be used when a flash memory card has been plugged into the machine's card slot.* ☛ *5.1.10 Program Upload/Download*
901	Printer Free Run		
			Performs a printer free run. [**0 = No** / 1 = Yes] *After selecting "1", press OK or # twice to start the run. Press C to stop.*
902	Test Pattern Print		
			Prints a test pattern *Press ◇ to enter copy-mode display, then print out the pattern.* ☛ *5.1.3 Test Pattern Printing*
906*	Exhaust-Fan Control Timer		
			Inputs the fan control time. [30 ~ 120 / **30** / 1 s/step] *The fan maintains normal speed for the specified time after occurrence of an SC or following entry into Warm-up mode, Low Power mode, or Night/Off mode.*
907*	Plug & Play Setting		
			Selects the brand name and production name for the Plug and Play function (for Windows 95 and up). These names are registered in the NVRAM. If the NVRAM becomes defective, these names should be re-registered. • *Use the Right or Left cursor key to scroll through the list of brand names. To select a brand name, press the Original Type key and the OK (or #) key at the same time. The LCD displays an asterisk (*) next to the number of the currently selected brand name.* • *After displaying any of the brand names, you can view the corresponding production name by pressing the Darker key. (If the production name is longer than 43 characters, hold down both the Darker and Lighter keys together to view the rest of the name).*
908	Fax Download/Upload		
	1	Program download	Download the fax system program from a flash memory card to the flash memory on the FCU board. ☛ *Fax Service Manual*
	2	SRAM data download	Download fax setting data from a flash memory card to the SRAM on the FCU board. ☛ *Fax Service Manual*
	3	SRAM data upload	Download fax setting data from the SRAM on the FCU to a flash memory card. ☛ *Fax Service Manual*

5	Mode Number/Name	Function/[Setting]
909*	NV-RAM Auto Backup	
		Selects whether or not to back up the data written to the NV-RAM at power off (see conditions below). [**0 = Disabled** / 1 = Enabled] *When enabled, this function creates a back up of the data if it has been 24 hours since the power was turned on or since the machine last wrote to the NV-RAM. The backup goes to a special back-up area inside the NVRAM.*
911*	APS A4/LT LEF Priority	
		Specifies whether the machine selects 8 1/2" x 11" LEF paper for A4 LEF originals (or vice versa for metric-based machines). [**0 = No** / 1 = Yes] *On inch-based models: If this setting is "Yes," the machine automatically selects* 8 1/2" x 11" *LEF if the APS sensors detect an A4 LEF original. On metric (mm) based models: If this setting is "Yes," the machine automatically selects A4 LEF if the APS sensors detect an* 8 1/2" x 11" *LEF original.* *This SP is ineffective if the machine has been set up to detect Chinese paper sizes (SP5-955).*
913	UP Mode Data Reset	
		Resets the user tool settings. [**0 = No** / 1 = Yes] • *Note that the user codes, key operator code, and key operator printer counter value are not reset.* • *After selecting "1", press the Original Type key and the OK key (or # key) at the same time to execute the reset. If the reset is successful, the display shows "Action completed." If the reset fails, the display shows "Error!!!"*
914*	Printer Counter Display	
		Selects whether the printer counter is displayed on the LCD ([1. Counter] in the user tools) and in the counter list printout. [**0 = No** / 1 = Yes] *To display the printer counter on the LCD, press the Right cursor key once. To display the total counter, press it again.*
916*	Language UK/TW Priority	
		Selects the default display language. [0 = UK (Asia version) / 1 = TW (Taiwan version)] • *Asia and Taiwan versions only.* • *This setting is not reset by Memory All Clear (SP5-801).*

Service Tables

5	Mode Number/Name	Function/[Setting]
930	Fax Forwarding Mode	
		Selects whether the machine will accept changeover to fax mode following occurrence of an SC error. [**0 = No** / 1 = Yes] *When an SC occurs while there are received fax messages in the SAF memory, change the value to "1". Then access facsimile mode. Then forward the incoming data to another fax machine using the fax mode bit switches.*
940*	Image Rotation	
		Enables/disables image rotation. [**0 = Enabled** / 1 = Disabled] *This function is used for both rotate sort and rotate copy.*
941*	Duplex Blank Page	
		Selects whether the blank page is made on the front side or back side when using duplex copy mode. [**0 = Back Side** / 1 = Front Side]
944*	APS Mode Setting	
		Enables/disables APS mode as the power-up default. [0: Disabled / **1 = Enabled**]
950*	By-pass LG Size Detection	
		Selects whether the machine can detect LG paper in the by-pass tray. [0 = No / **1 = Yes**] *If "No" is selected, the machine detects LT instead of LG.*
951*	Interleave Count Setting	
		Selects the interleave count used when interleave mode has been selected from User Tools [2. System Settings] → [11. Print Priority]. [1 ~ 20 / **5** / 1 page/step] *This determines what happens if there are jobs of different types waiting. If the setting is 5 (for example), interleave mode will print 5 pages of one job, then 5 pages of the next job, and so on.*
952*	By-pass Paper Type Reset	
		Selects the operational default paper type for the by-pass tray. The machine returns to the value set here at power up and whenever ⎆ is pressed. [**0 = Thick** / 1 = Plain / 2 = Selected] *If the setting is "2", the paper type selected in the User Tools will be used.*

5	Mode Number/Name		Function/[Setting]
955*	8K/16K Detection		
	1	Platen cover	Selects whether the machine will detect 8K/16K instead of B4/B5 in platen cover mode. [**0 = No** / 1 = Yes] • *For China models only* • *To allow the machine to detect 8K/16K, first set this mode to "Yes", then change the APS sensor positions as explained in Replacement & Adjustment – Changing the Original Sensor Position".* • *Note that SP5-911 (APS A4/LT LEF Priority) is not effective if this setting is "Yes".* • *If this setting is "No" (the default), the machine detects B4/B5 and not 8K/16K.* ☛ *3.4.6 Changing the Original Sensor Position*
	2	ADF/ARDF	Selects whether or not the machine will detect 8K/16K instead of A3/A4/B4/B5 in ADF/ARDF mode. [**0 = No** / 1 = Yes] • *For China models only* • *In this case, selecting "Yes" is sufficient to allow the machine to detect 8K/16K* • *Note that SP5-911 (APS A4/LT LEF Priority) is not effective if this setting is "Yes".* • *If this setting is "No" (the default), the machine detects A3/A4/B4/B5 and not 8K/16K.* ☛ *3.4.6 Changing the Original Sensor Position*
992	SMC Printing		
			Selects the machine status list to be printed. See the "SMC Printing" section for details about how to print the list. [1 = SP / 2 = UP / 3 = Log / 4 = All / 5 = Big Font] • *Selection "5" is for printing reports to be sent by fax.* • *B039 machines (outside North America) require optional 16MB memory to support this feature*

SP6-XXX (Peripherals)

6	Mode Number/Name		Function/[Setting]
006*	ADF Registration		
	1	Side-to-Side/Front	Adjusts the side-to-side registration for the front side of the original, for ADF mode. [–7.0 ~ +9.5 / **0.0** / 0.1 mm/step] **IAJ** *Use the ⊙ key to select "+" or "–" before entering the value.*
	2	Leading edge	Adjusts the leading edge registration for ADF mode. [–5.0 ~ +5.0 / **0.0** / 0.1 mm/step] **IAJ** 0.1 mm/step *Use the ⊙ key to select "+" or "–" before entering the value.*
	3	Trailing edge erase	Adjusts the trailing edge erase margin for ADF mode. [–3.0 ~ +3.0 / **–1.0** / 0.1 mm/step] **IAJ** *Use the ⊙ key to select "+" or "–" before entering the value.*
	4	Side-to-Side/Rear	Adjusts the side-to-side registration for the rear side of duplex originals, for ADF mode. [–7.0 ~ +9.5 / **0.0** / 0.5 mm/step] **IAJ** *Use the ⊙ key to select "+" or "–" before entering the value.*
007*	ADF Sub-scan Magnification		
			Adjusts the actual magnification ratio in the sub-scan direction, for ADF mode. [–0.9 ~ +0.9 / **0.0** / 0.1%/step] **IAJ** *Use the ⊙ key to select "+" or "–" before entering the value.*
009	ADF Free Run		
			Performs an ADF free run . [**0 = No** / 1 = Yes] *After selecting "1", press OK or ⊙ twice to start the run. Press ⊙ to stop.*
010*	Stamp Position Adjustment		
			Adjusts the stamp position in the sub-scan direction, for fax mode. [–10 ~ +10 / **0** / 1mm/step]
901	ADF APS Data Display		
			Displays the status of the ADF original size sensors. ☛ *5.1.13 ADF APS Original Sensor Output Display*
905*	ARDF Skew Correction		
			Enables/disables use of skew correction when the ARDF feeds the rear side of an original. [**0 = No** / 1 = Yes]
906*	ARDF Original Curl Adjustment		
			Adjusts the amount of original buckle at the ARDF registration roller when the ARDF feeds the rear side of an original. [–20 ~ +20 / **0** / 1 mm/step] *This SP mode is effective only if SP6-905 is set to "1".*

6	Mode Number/Name	Function/[Setting]
910	ADF/Printer Free Run	
		Performs a free run for the ADF and printer using a special ROM. [**0 = No** / 1 = Yes] **DFU**
911*	Binding Hole Range	
		Selects the diameter of the binding holes in the original that the sensors will ignore. If set at "0", this function is disabled. [0 ~ 20 / **12** / 1 mm/step] *Original jams may occur when feeding originals with binding holes, because these holes may be detected by the sensors. Use this SP to avoid this problem. For example, setting this value to 12 mm will cause the sensors to ignore binding holes up to 12 mm in diameter.*

SP7-XXX (Data Log)

7	Mode Number/Name		Function/[Setting]
001*	Total Operation Time		
			Displays the total operation time (total drum rotation time).
002*	Counter – Original		
	1	Total	Displays the total number of scanned originals (total).
	2	Copier	Displays total number of scanned originals (copy mode only).
	3	Fax	Displays total number of scanned originals (fax mode only).
003*	Counter – Print		
	1	Total	Displays the total number of prints (total).
	2	Copier	Displays the total number of prints (copier mode).
	3	Fax	Displays the total number of prints (fax mode).
	4	Printer	Displays the total number of prints (printer mode).
	5	A3/DLT	Displays the total number of prints (A3/DLT).
101*	Counter – Paper Size		
	1	A3	Displays the total number of copies by paper size.
	2	B4	
	3	A4	
	4	B5	
	5	DLT	
	6	LG	
	7	LT	
	8	HLT	
	9	Others	
102*	Counter – By-pass Print		
	1	Special	Displays the total number of special paper prints fed from the by-pass tray.
	2	Thick	Displays the total number of thick paper prints fed from the by-pass tray.
201*	Counter - Total Scan (Non DF)		
			Displays the total number of scanned originals (not from the DF).
204*	Counter - Printouts by Paper Tray		
	1	1st	Displays the total number of sheets fed from each paper feed station.
	2	2nd	
	3	3rd	
	4	4th	
	5	By-pass	
	6	Duplex	
205*	Counter – ADF		
			Displays the total number of originals fed by the ADF.
211*	Display – APS Working Time (Cumm.)		
			Displays the accumulated APS working time.
212*	Display – ID Sensor Working Time (Cumm.)		
			Displays the accumulated ID sensor working time.

7	Mode Number/Name		Function/[Setting]
301*	Counter – Magnification		
	1	50% ~ 99%	Displays the total number of copies by reproduction ratio or magnification mode.
	2	Full size	
	3	101% ~ 200%	
	4	Auto reduce/enlarge	
	5	Fixed magnification	
304*	Counter – Mode		
	1	Text	Displays the total number of copies by copy mode.
	2	Photo	
	3	Duplex - Printing	
	4	Duplex - Original	
	5	Combined	
	6	Series	
	7	Sort	
	8	ADF	
305*	Counter – Copy Q'ty		
	1	1 to 1	Displays the total number of series copies.
	2	1 to 2 ~ 5	
	3	1 to 6 ~ 10	
	4	1 to 11 ~ 20	
	5	1 to 21 ~ 99	
401*	Counter – SC Total		
			Displays the total number of logged SC codes.
402*	Counter – by each SC		
			Displays the total number of each type of logged SC code. [**0 = No** / 1 = Yes]
501*	Counter – Total Jams		
			Displays the total number of jams (copy paper + original).
502*	Counter – Total Paper Jams		
			Displays the total number of copy paper jams.
503*	Counter – Total Original Jams		
			Displays the total number of original jams,
504*	Total Jams by Location		
	1	"A" jams	Displays the total number of copy paper jams by location.
	2	"B" jams	
	3	"Y" jams	
	4	"Z" jams	
	5	1st	
	6	2nd	
	7	3rd	
	8	4th	
	9	By-pass	
	10	Duplex unit	

7	Mode Number/Name		Function/[Setting]
801	Memory/Version/PN		
	1	Main P/N	Displays the P/N and suffix of the copier firmware.
	2	Main version	Displays the version of the BiCU board
	3	Fax P/N	Displays the P/N and suffix of the fax firmware.
	4	Printer P/N	Displays the P/N and suffix of printer firmware.
	5	ADF ROM	Displays the P/N and suffix of the ADF ROM.
	6	Copier memory	Displays the total amount of copier memory installed.
	7	# optional trays	Displays the number of optional paper trays currently installed.
803*	Display – PM Counter		
			Displays the PM counter value (since the last PM).
804	Reset – PM Counter		
			Resets the PM counter. [**0 = No** / 1 = Yes] *After selecting "1", press the Original Type key and the OK key (or # key) at the same time to execute the reset. If the reset is successful, the display shows "Action completed." If the reset fails, the display shows "Error!!!".*
807	Reset – SC/Jam Counters		
			Resets the SC, paper, original, and total jam counter values. [**0 = No** / 1 = Yes] *After selecting "1", press the Original Type key and the OK key (or # key) at the same time to execute the reset. If the reset is successful, the display shows "Action completed." If the reset fails, the display shows "Error!!!".*
808	Reset – Counters		
			Resets all counters except for the total print counters (SP7-003) and timer counter (SP7-991). [**0 = No** / 1 = Yes] *After selecting "1", press the Original Type key and the OK key (or # key) at the same time to execute the reset. If the reset is successful, the display shows "Action completed." If the reset fails, the display shows "Error!!!".*
810	Reset – Key Operator Code		
			Resets the key operator code. [**0 = No** / 1=Yes] • *After selecting "1", press the Original Type key and the OK key (or # key) at the same time to execute the reset. If the reset is successful, the display shows "Action completed." If the reset fails, the display shows "Error!!!".* • *If the customer forgets the key operator code, clear it by using this SP mode and re-input the code using: [2. System Settings] → [13. Key Operator Tools] → [14. Program Key Operator Code].*

7	Mode Number/Name	Function/[Setting]
825	Reset – Total Counter	
		Resets the electrical total counter. [**0 = No** / 1 = Yes] • *Usually, this is performed at installation. This SP mode is effective only once, while the counter still has a negative value. This SP mode cannot be used once the counter takes a positive value.* • *After selecting "1", press the Original Type key and the OK key (or # key) at the same time to execute the reset. If the reset Is successful, the display shows "Action completed." If the reset fails, the display shows "Error!!!".*
901*	Display – SC History	
		Displays the last twenty SC codes that have occurred. [**0 = No** / 1 = Yes]
902	Clear – SC History	
		Clears the SC history. [**0 = No** / 1 = Yes] *After selecting "1", press the Original Type key and the OK key (or # key) at the same time to execute the reset. If the reset is successful, the display shows "Action completed." If the reset fails, the display shows "Error!!!".*
903*	Display – Paper Jam History	
		Displays the paper jam history. [**0 = No** / 1 = Yes]
904	Clear - Copy Jam History	
		Clears the copy jam history. [**0 = No** / 1 = Yes] *After selecting "1", press the Original Type key and the OK key (or # key) at the same time to execute the reset. If the reset is successful, the display shows "Action completed." If the reset fails, the display shows "Error!!!".*
905*	Display - Original Jam History	
		Displays the original jam history. [**0 = No** / 1 = Yes]
906	Clear - Original Jam History	
		Clears the original jam history. [**0 = No** / 1 = Yes] *After selecting "1", press the Original Type key and the OK key (or # key) at the same time to execute the reset. If the reset is successful, the display shows "Action completed." If the reset fails, the display shows "Error!!!".*
907	Reset - Timer Counter	
		Resets the timer counter (SP7-991). [**0 = No** / 1 = Yes] *After selecting "1", press the Original Type key and the OK key (or # key) at the same time to execute the reset. If the reset is successful, the display shows "Action completed." If the reset fails, the display shows "Error!!!".*

7	Mode Number/Name	Function/[Setting]
908*	Display – Developer Counter	
		Display the total number of prints made since the last Developer Initialization (SP2-214). *Note that this counter does not double count, even for A3 and 11" x 17". Developments are counted up at paper exit.*
911*	Display - ID Sensor Error Counter	
		Displays the total number of logged ID sensor errors. *For the error analysis procedure, ☛ 5.1.15 ID Sensor Error Analysis.*
912	Reset - ID Sensor Error Counter	
		Resets the ID sensor error counter. [**0 = No** / 1 = Yes] *After selecting "1", press the Original Type key and the OK key (or ⓡ# key) at the same time to execute the reset. If the reset is successful, the display shows "Action completed." If the reset fails, the display shows "Error!!!".*
991*	Display - Timer Counter	
		Displays the total ON time for the machine.

5.1.2 TEST PATTERN PRINTING (SP5-902)

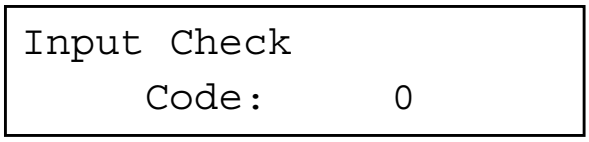
1. Input the class-3 number for the test pattern you need.
2. Press ⓐ to access the copy mode display.
3. Select the required copy features such as paper size, image density, and reproduction ratio.
4. Press ⓐ again to print the test pattern.
5. After checking the test pattern, press ⌧ key to exit from copy mode.
6. Exit SP mode.

No.	Test Pattern using VCU
0	No Print
1	Vertical Lines (single dot)
2	Horizontal Lines (single dot)
3	Vertical Lines (double dot)
4	Horizontal Lines (double dot)
5	Grid Pattern (single dot)
6	Grid Pattern (double dot)
7	Alternating Dot Pattern
8	Solid Black
9	Black Band
10	Trimming Area
11	Argyle Pattern
12	Grayscales (Horizontal)
13	Grayscales (Vertical)
14	Grayscales (Vertical/Horizontal)
15	Grayscales (Vertical/Horizontal Overlay)
16	Grayscales with white lines (Horizontal)
17	Grayscales with white lines (Vertical)
18	Grayscales with white lines (Vertical/Horizontal)

No.	Test Pattern using IPU
31	Vertical Lines (single dot)
32	Horizontal Lines (single dot)
33	Vertical Lines (double dot)
34	Horizontal Lines (double dot)
35	Alternating Dot Pattern
36	Grid Pattern (single dot)
37	Vertical Stripes
38	Grayscales (Horizontal)
39	Grayscales (Vertical)
40	ID Patch
41	Cross Pattern
42	Argyle Pattern
43	Trimming Area

No.	Test Pattern using SBU
51	Vertical Lines (double dot)
52	Grid Pattern (single dot)
53	16 Grayscales

5.1.3 INPUT CHECK (SP5-803)



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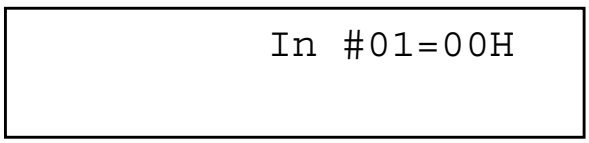
1. Access SP mode 5-803.
2. Select the number that will access the switch or sensor you wish to check (see the table below).
3. Check the status of the sensor or switch.
4. If you wish to check the signal during a copy cycle, select the required copy modes, then press ⓐ.
5. The LCD panel will display “00H” or “01H”, as shown below.



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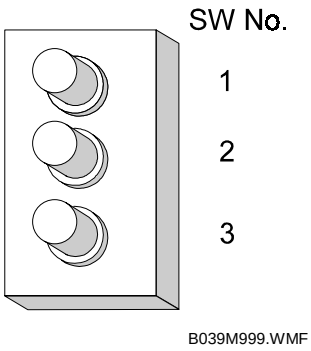
The following table shows the meaning of each of the displayed values.

Number	Description	Reading	
		00H	01H
0	Not used		
1	Front/right cover safety switch	Closed	Opened
2	Front/right cover safety switch - LD5V	Closed	Opened
3	Right door switch	Closed	Opened
4	Vertical transport door switch	Closed	Opened
5	Tray cover switch (Optional paper tray unit)	Closed	Opened
6 – 15	Not used		
16	Relay sensor	Paper not detected.	Paper detected.
17	Vertical transport sensor	Paper not detected.	Paper detected.
18	Vertical transport sensor (Optional paper tray unit)	Paper not detected.	Paper detected.
19	Registration sensor	Paper not detected.	Paper detected.
20	Exit sensor	Paper not detected.	Paper detected.
21	Duplex inverter sensor	Paper not detected.	Paper detected.
22	Duplex entrance sensor	Paper not detected.	Paper detected.
23	Duplex exit sensor	Paper not detected.	Paper detected.
24, 25	Not used		
26	By-pass paper end sensor	Paper not detected.	Paper detected.
27	By-pass paper size switch	See Table 3.	
28 – 30	Not used		
31	Upper paper end sensor	Paper not detected.	Paper detected.

Number	Description	Reading	
		00H	01H
32	Lower paper end sensor	Paper not detected.	Paper detected.
33	Upper paper size switch	See Table 1.	
34	Lower paper size switch	See Table 1.	
35, 36	Not used		
37	Upper paper end sensor (Optional paper tray unit)	Paper not detected.	Paper detected.
38	Lower paper end sensor (Optional paper tray unit)	Paper not detected.	Paper detected.
39	Upper paper size switch (Optional paper tray unit)	See Table 2.	
40	Lower paper size switch (Optional paper tray unit)	See Table 2.	
41	Upper paper height sensor (Optional paper tray unit)	See Table 4.	
42	Lower paper height sensor (Optional paper tray unit)	See Table 4.	
43	Upper lift sensor (Optional paper tray unit)	Paper not at upper limit	Paper at upper limit
44 – 52	Not used		
53	PCU set signal (a shorted connection in the TD sensor cable)	Not set	Set
54	Not used		
55	Paper tray unit type (Optional paper tray unit)	See Table 5.	
56, 57	Not used		
58	BiCU installed	Not installed	Installed
59 – 61	Not used		
62	Duplex unit installed	Not installed	Installed
63—68	Not used		
69	Lower lift sensor (Optional paper tray unit)	Paper not at upper limit	Paper at upper limit
70	Not used		
71	Main motor lock	Off	On
72	Polygonal mirror motor lock	Off	On
73	Paper feed motor lock (Optional paper tray unit)	Off	On
74, 75	Not used		
76	Total (mech) counter installed	Not installed	Installed
77	Not used		
78	Key counter installed (Optional key counter)	Not installed	Installed
79, 80	Not used		
81	Laser synchronization signal	Not detected	Detected
82 – 89	Not used		
90	DF position sensor (Optional ADF)	Closed	Opened
91	Feed cover open sensor (Optional ADF)	Closed	Opened

Number	Description	Reading	
		00H	01H
92	Original set sensor (Optional ADF)	Paper not detected.	Paper detected.
93	Registration sensor (Optional ADF)	Paper not detected.	Paper detected.
94	Original trailing edge sensor (Optional ADF)	Paper not detected.	Paper detected.
95	Optional exit sensor (Optional ADF)	Paper not detected.	Paper detected.
96	Original reverse sensor (Optional ADF)	Paper not detected.	Paper detected.
97, 98	Not used		
99	Platen cover sensor	Closed	Opened

Table 1: Paper Size Switch (Main Frame)



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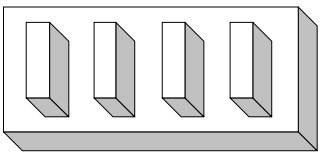
Number	SW 1	SW 2	SW 3	SP Value	Paper Size	
					inches	mm
33, 34	0	0	0	00H	—	
	0	0	1	04H	8 1/2" x 14"	A5 LEF
	0	1	0	02H	8 1/2" x 13"	
	0	1	1	06H	* (Asterisk)	
	1	0	0	01H	A4 LEF	
	1	0	1	05H	11" x 8 1/2"	
	1	1	0	03H	8 1/2" x 11"	A4 SEF
	1	1	1	07H	11" x 17"	A3

1: Pushed

Table 2: Paper Size Switch (Optional Paper Tray Unit)



Number	SW 1	SW 2	SW 3	SW 4	SP Value	Paper Size
39, 40	0	0	0	0	00H	—
	0	0	1	0	04H	A4 LEF
	0	0	1	1	0CH	A4 SEF
	0	1	0	1	0AH	11" x 17"
	0	1	1	1	0EH	11" x 8½"
	1	0	0	0	01H	8½" x 11"
	1	0	1	0	05H	* (Asterisk)
	1	1	0	0	03H	8½" x 14"
	1	1	1	1	0FH	A3

1: Pushed

Table 3: By-pass Paper Size Switch

Number	SP Value	Paper Size	
		mm	inches
27	06H	A3	11" x 17"
	02H	—	—
	03H	A4 SEF	8½" x 11"
	01H	8" x 13"	—
	08H	A5 SEF	5½" x 8½"
	0CH	—	—
	04H	—	—

Table 4: Paper Height Sensors

Number	SP Value	Paper Amount
41, 42	00H	100%
	01H	70 ~ 75%
	02H	Near-end
	03H	25 ~ 30%

Table 5: Paper Tray Unit Set Sensor

Number	SP Value	Unit Installed
55	00H	None
	01H	Paper tray unit (2 trays)
	02H	Paper tray unit (1 tray)

5.1.4 OUTPUT CHECK (SP5-804)

```
Output Check
Code:      0    Data: 0
```

B039M007.WMF

CAUTION: To prevent mechanical or electrical damage, do not keep an electrical component on for a long time.

1. Access SP mode 5-804.
2. Select the SP number that corresponds to the component you wish to check (see the table below), then press *OK* or #.
3. Press "1", then press *OK* or the # key to check that component.
4. To interrupt the test, re-enter SP mode 5-804 and enter a value of "0".

Output Check Table

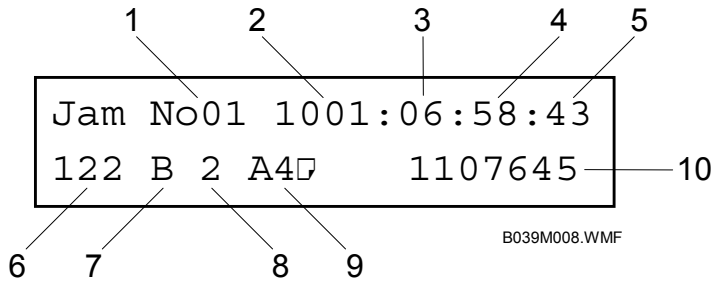
NOTE: Pull out the tray before performing output checks 28, 29, and 31.

Number	Description
0	Not used
1	Main motor (Forward)
2	Main motor (Reverse) Do not use
3	Quenching lamp
4 – 6	Not used
7	Toner supply motor (Forward)
8	Toner supply motor (Reverse) **Do not use**
9	Exhaust fan (High Speed)
10	Exhaust fan (Low Speed)
11	Registration clutch
12	By-pass feed clutch
13	Upper paper feed clutch
14	Lower paper feed clutch
15 – 18	Not used
19	Lower paper lift motor (Up) (Optional paper tray unit)
20	Lower paper lift motor (Down) (Optional paper tray unit)
21	Relay clutch
22	Not used
23	Relay clutch (Optional paper tray unit)
24, 25	Not used
26	Upper paper feed clutch (Optional paper tray unit)
27	Lower paper feed clutch (Optional paper tray unit)
28	Paper feed motor (Optional paper tray unit)

Number	Description
29	Upper paper lift motor (Up) (Optional paper tray unit)
30	Not used
31	Upper paper lift motor (Down) (Optional paper tray unit)
32 – 39	Not used
40	Duplex inverter motor (Reverse)
41	Duplex inverter motor (Forward)
42	Duplex transport motor (Forward)
43	Duplex inverter gate solenoid
44	Duplex inverter motor (Hold)
45	Duplex transport motor (Hold)
46 – 50	Not used
51	Polygonal mirror motor
52	Polygonal mirror motor and laser diode **Do not use**
53	Laser diode **Do not use**
54 – 89	Not used
90	DF transport motor (Optional ADF)
91	DF feed motor (Optional ADF)
92	DF feed clutch (Optional ADF)
93	DF pick-up solenoid (Optional ADF)
94	Stamp solenoid (Optional ADF)
95	DF junction gate solenoid (Optional ADF)
96 – 99	Not used

5.1.5 COPY JAM HISTORY (SP7-903)

After entering the SP mode, select "1" and press *OK* or #. The LCD panel displays the following message,



1. Jam history number
2. Main motor operating time: Date
3. Hour
4. Minute
5. Second
6. Jam code (see the table below)
7. Jam location
8. Paper feed station
9. Paper size
10. Total counter value when the jam occurred

Jam Code	Meaning
001	Jam at power on.
010	Paper did not reach the registration sensor (from a paper tray).
011	Paper did not reach the relay sensor.
012	Paper caught at the relay sensor.
021	Paper did not reach the vertical transport sensor.
022	Paper caught at the vertical transport sensor.
031	Paper did not reach the vertical transport sensor in the optional paper feed unit.
032	Paper caught at the vertical transport sensor in the optional paper feed unit.
050	Paper did not reach the registration sensor (from the by-pass tray).
070	Paper caught at the registration sensor.
120	Paper caught at the exit sensor (previous page).
121	Paper did not reach the exit sensor.
122	Paper caught at the exit sensor.
123	Paper did not reach the duplex inverter sensor (from the registration roller).
124	Paper did not reach the duplex inverter sensor (from the inverter tray).
125	Paper caught at the duplex inverter sensor.
126	Paper did not reach the duplex entrance sensor.
127	Paper caught at the duplex entrance sensor.
128	Paper did not reach the duplex exit sensor.
129	Paper caught at the duplex exit sensor.

NOTE: The NVRAM can store data for up to 10 copy jams. If more than 10 copy jams occur, the oldest data is erased.

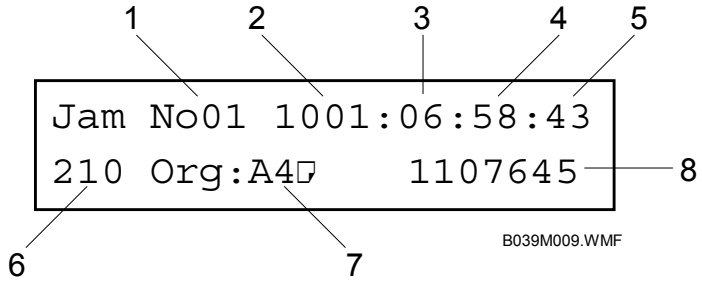
5.1.6 SMC PRINTING (SP5-992)

NOTE: To use this feature on B039 models outside of North America, the optional 16MB must be installed.

1. Access SP mode 5-992 and select the number corresponding to the list that you wish to print.
2. Press ⓐ to access the copy mode display.
3. Select the paper size.
4. Press ⓐ again to print the list.
5. After printing the list, press ⓒ to exit from copy mode.
6. Exit SP mode.

5.1.7 ORIGINAL JAM HISTORY DISPLAY (SP7-905)

After entering the SP mode, select "1" and press *OK* or ⓡ#. The following message is displayed.



1. Jam history number
2. Main motor operating time: Date
3. Hour
4. Minute
5. Second
6. Jam code (see the table below)
7. Original size
8. Total counter value when the original jam occurred

Jam Code	Meaning
210	Original does not reach the registration sensor.
211	Original caught at the registration sensor.
212	Original does not reach the original exit sensor.
213	Original caught at the original exit sensor.
214	Original does not reach the original reverse sensor.
215	Original caught at the original reverse sensor.
216	Short interval between originals.
218	No original at the stamp.

NOTE: The NVRAM can store data for up to 10 original jams. If more than 10 original jams occur, the oldest data will be erased.

5.1.8 MEMORY ALL CLEAR (SP5-801)

NOTE: Memory All Clear mode resets all the settings and counters stored in the NVRAM to the defaults, except for the following:

- Electrical total counter values (SP7-003)
- Machine serial number (SP5-811)
- Plug & Play brand name and production name setting (SP5-907)
- Some SBU settings (SP4-904-6, SP4-904-7, SP4-905-6, SP4-905-7, SP4-906-3, SP4-907-3)
- Language UK/TW Priority (SP5-916) – Asia and Taiwan versions only

Normally, this procedure should not be used. It is necessary only after replacing the NVRAM, or when the copier malfunctions because the NVRAM is damaged.

Using a Flash Memory Card

1. Upload the NVRAM data to a flash memory card (☛ NVRAM Data Upload).
2. Print out all SMC data lists (SP5-992).
   NOTE: 1) For B039 models outside N. America, these lists cannot be printed without the IMB installed. Therefore, if it is not installed, write down all the data stored in NVRAM (all user tool settings, and all SP settings except for those listed above).
   2) Be sure to print out all the lists. If the NVRAM data upload was not completed, it is necessary to change the SP mode settings by hand.
3. Access SP mode 5-801.
4. Press the *Original Type* key and the *OK* key (or R/#) key at the same time. If the operation is successful, the display shows “Action completed.” If the clear fails, the display shows “Error!!!”.
5. Turn the main switch off and back on.
6. Download the NVRAM data from a flash memory card (☛ NVRAM Data Download).

Without Using a Flash Memory Card

If there is no flash memory card, follow the steps below.

1. Print out all SMC data lists (SP5-992).
   NOTE: For B039 models outside N. America, these lists cannot be printed without the IMB installed. Therefore, if it is not installed, write down all the data stored in NVRAM (all user tool settings, and all SP settings except for those listed above).
2. Access SP mode 5-801.
3. Press the *Original Type* key and the *OK* key (or ⓇⓈ) key at the same time. If the operation is successful, the display shows “Action completed”. If the clear fails, the display shows “Error!!!”.
4. Turn the main switch off and back on.
5. Do the printer and scanner registration and magnification adjustments (☛ Replacement and Adjustment – Copy Adjustments).
6. Refer to the SMC lists or the data you have written down, and re-enter any values that differ from the factory settings. In particular, the values for SP4-904, SP4-905, SP4-906, and SP4-907 must be re-entered.
7. Do the standard white level adjustment (SP4-908).

8. Initialize the TD sensor (SP 2-214).
9. Check the copy quality and the paper path, and do any necessary adjustments.

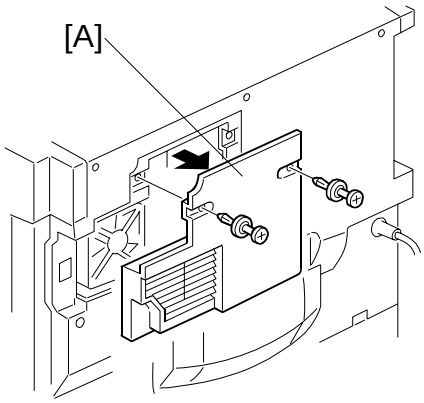
5.1.9 PROGRAM UPLOAD/DOWNLOAD

The BiCU software for this machine is upgraded using a flash memory card.

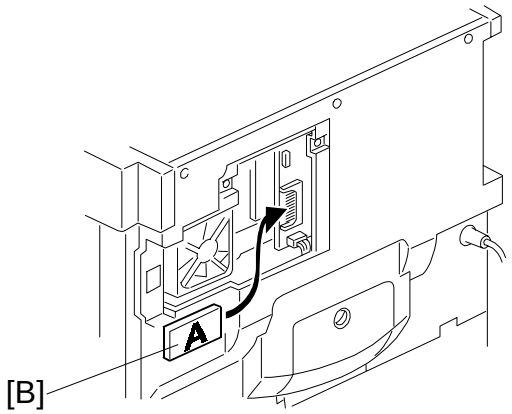
There are two program download procedures.

- SP5-826: Upload from the BiCU to a flash memory card.
- SP5-827: Download from a flash memory card to the BiCU.

Program Download (SP5-827)



B039M934.WMF

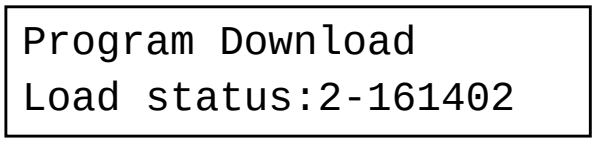


B039M935.WMF

NOTE: Be sure to turn off the main switch before inserting or removing the flash memory. Installing or removing flash memory while the switch is still on may result in damage to the BiCU or to the memory.

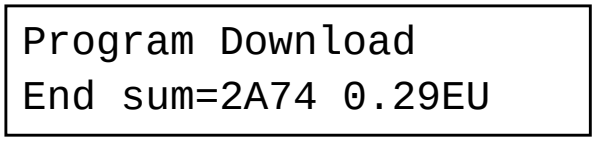
1. Turn off the main switch.
2. Remove the rear middle cover [A] (2 rivets).
3. Insert the flash memory card [B] into the card slot.
   NOTE: Make sure that the printed “A” on the card is facing the outside of the machine.
4. Hold down the *Operation Switch* and turn on the main switch.
5. To start the download, press the “1” key and then press *OK*.
6. The machine erases the current software, then writes the new software to the BiCU. This takes about 60 seconds. If downloading fails, an error message appears, as indicated below. If this occurs, repeat the download procedure.
7. After finishing the software download, turn off the main switch and remove the memory card.

Display during writing.



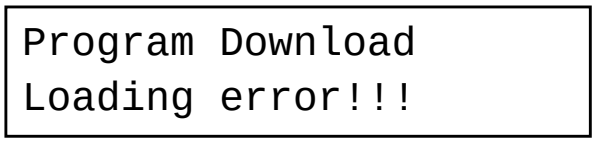
B039M010.WMF

Display when the download is complete.



B039M011.WMF

Display if writing has failed.



B039M012.WMF

NOTE: To view the current firmware version, check SP7-801-1.

Program Upload (SP5-826)

NOTE: Be sure to turn off the main switch before inserting or removing the flash memory. Installing or removing flash memory while the switch is still on may result in damage to the BiCU or to the memory.

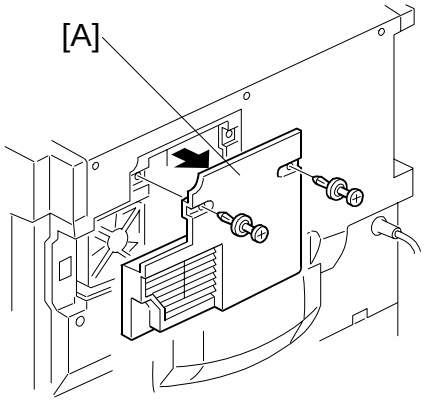
1. Turn off the main switch.
2. Insert a flash memory card into the card slot (see the previous page).
   NOTE: Make sure that the printed “A” on the card is facing the outside of the machine.
3. Turn on the main switch.
4. Access SP mode 5-826.
5. The machine erases the software on the card, then writes the new software to the flash memory card. This takes about 60 seconds. If uploading fails, an error message appears. If this occurs, repeat the upload procedure.
6. Turn off the main switch, then remove the memory card.

5.1.10 NVRAM DATA UPLOAD/DOWNLOAD

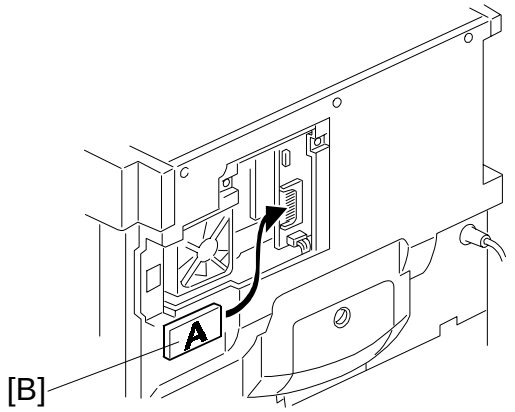
The “memory all clear” procedure will reset all NVRAM settings back to their defaults. It is therefore necessary to upload the NVRAM data before starting the clear, and then to download the data back after completing the clear.

- SP5-824: Upload from the BiCU to a flash memory card.
- SP5-825: Download from a flash memory card to the BiCU.

NVRAM Data Download (SP5-825)



B039M934.WMF



B039M935.WMF

NOTE: This procedure downloads all the settings stored in the NVRAM, except the following values.

- Electrical total counter values (SP7-003)
- Machine serial number (SP5-811, SP5-920, SP5-925)
- Plug & Play brand name and production name setting (SP5-907)
- Some SBU settings (SP4-904-6, SP4-904-7, SP4-905-6, SP4-905-7, SP4-906-3, SP4-907-3)
- Language UK/TW Priority (SP5-916) – Asia and Taiwan versions only

NOTE: Be sure to turn off the main switch before inserting or removing the flash memory. Installing or removing flash memory while the switch is still on may result in damage to the BiCU or to the memory.

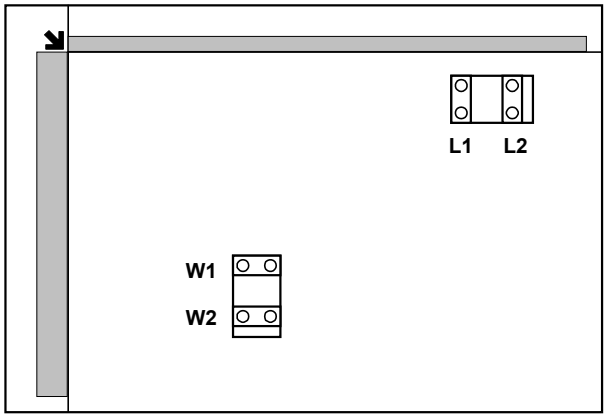
1. Turn off the main switch.
2. Remove the rear middle cover [A] (1 screw).
3. Insert the flash memory card [B] into the card slot.
   NOTE: Make sure that the printed “A” on the card is facing the outside of the machine.
4. Turn on the main switch.
5. Access SP mode 5-825.

6. The machine erases the current settings, then writes the new settings onto the NVRAM on the BiCU board. This takes about 1 second. If downloading fails, an error message appears (☛ "Program Download"). If the error message appears, repeat the download procedure.
7. Turn off the main switch, then remove the memory card.

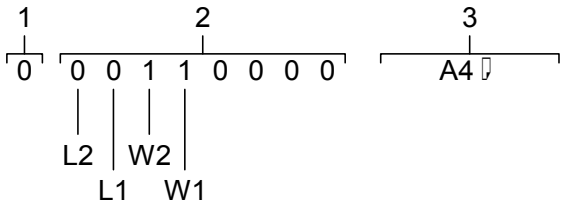
NVRAM Data Upload (SP5-824)

1. Turn off the main switch.
2. Insert a flash memory card into the card slot. (See the previous page.)
   NOTE: Make sure that the printed "A" on the card is facing the outside of the machine.
3. Turn on the main switch.
4. Access SP mode 5-824.
5. The machine erases the settings on the card, then writes the machine's settings to the flash memory card. This takes about 20 seconds. If uploading fails, an error message appears (see "Program Download"). If the error message appears, repeat the upload procedure.
6. Turn off the main switch, then remove the memory card.

5.1.11 APS AND PLATEN/DF POSITION SENSOR OUTPUT DISPLAY (SP4-301)



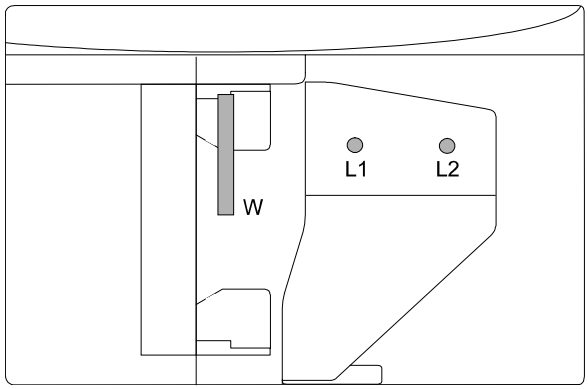
B039M512.WMF



B039M513.WMF

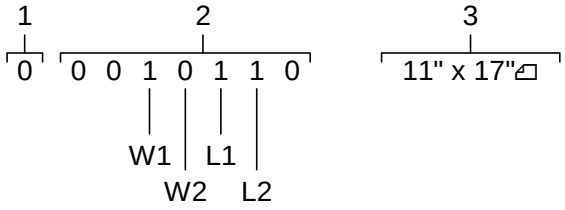
1. Platen cover/DF position sensor status 1 = Opened
2. APS sensor status 1 = Paper detected
3. Paper size display

5.1.12 ADF APS SENSOR OUTPUT DISPLAY (SP6-901)



B039M600.WMF

	Large ◄——————► Small			
W1	0	0	1	1
W2	0	1	0	1



B039M552.WMF

1. Original set sensor status 1 = Paper detected
2. APS sensor status 1 = Paper detected
3. Paper size display

W1	W2	L1	L2	Paper Size	
				NA	EU/AA
0	0	0	0	—	B5 LEF
0	0	1	1	10" x 14"	B4
0	1	0	0	8 1/2" x 5 1/2" LEF	A5 LEF
0	1	1	0	8 1/2" x 11" SEF	A4 SEF
1	1	1	1	8 1/2" x 14"	8 1/2" x 13"
1	0	0	0	11" x 8 1/2" LEF	A4 LEF
1	0	1	1	11" x 17"	A3
1	1	0	0	5 1/2" X 8 1/2" SEF	A5 SEF
1	1	1	0	—	B5 SEF

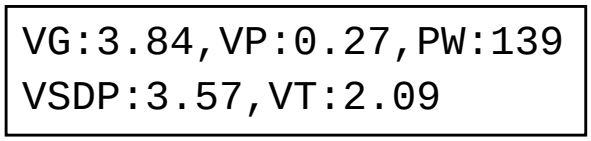
1: Detected

5.1.13 SERIAL NUMBER INPUT (SP5-811)

Used to input the machine's serial number (this is normally done at the factory). The numeric keypad has 12 buttons. Use the first 11 buttons 1 to 9, •/* and 0 to input the serial number (R/# is not used). Each button represents one digit of the serial number. Press consecutively to get the required letter/number. The first 4 buttons allow you to scroll through numbers 0 to 9 and "A" to "Z". Buttons 5 to 11 only scroll through numbers 0 to 9.

1	2	3
1st digit	2nd digit	3rd digit
4	5	6
4th digit	5th digit	6th digit
7	8	9
7th digit	8th digit	9th digit
•/*	0	R/#
10th digit	11th digit	Not used

5.1.14 ID SENSOR ERROR ANALYSIS (SP2-221)



B039M013.WMF

A defective ID sensor does not generate an SC condition, but does cause the image quality to become worse (e.g., dirty background on the copy). If these conditions occur, check the ID sensor output using this SP mode.

1. Vsg (VG in the display)
   Error Condition: Vsg < 2.5V or (Vsg – Vsp) < 1.00V
   Possible causes:
   - ID sensor defective
   - ID sensor dirty
   - Drum does not get charged

2. Vsp (VP in the display)
   Error Condition: Vsp > 2.5V or (Vsg – Vsp) < 1.00V
   Possible causes:
   - Toner density is very low
   - ID sensor pattern is not created

3. Power (PW in the display)
   This is the power for the light source of the ID sensor.
   Error Condition: Vsg < 3.5V when maximum power (979) is applied
   Possible causes:
   - ID sensor defective
   - ID sensor dirty
   - Drum does not get charged

4. Vsdp
   No Error Conditions

5. Vt
   Error Condition: Vt > 4.5V or Vt < 0.2V
   Possible causes:
   - TD sensor defective

5.2 USER TOOLS

The User Tools are accessed by users and key operators and by sales and service staff. User Tools are used to input or change the copier's default settings.

5.2.1 HOW TO ENTER AND EXIT USER TOOLS

Press the User Tools button, then select the User Tools program. After finishing the User Tools program, press the User Tools button to exit.

5.2.2 USER TOOLS TABLE

System Setting Table

2. System Settings	1. Function Priority		
	2. Copy Count Display		
	3. System Reset		
	4. Energy Saver Timer		
	5. Energy Saver Level		
	6. Auto Off Timer		
	7. AOF (Keep It On.)		
	8. Special Paper Size	1. Tray 1	
		2. Tray 2	
		3. Tray 3	
		4. Tray 4	
	9. Paper Tray Priority		
	10. Auto Tray Switch		
	11. Print Priority		
	12. Display Contrast		
	13. Key Operators Tools	1. Show/Print Counter	
		2. Print Counter List	
		3. Key Operator Access	
		4. Program Key Operator Code	
		5. Restricted Access	1. Copier
			2. Fax
			3. Printer

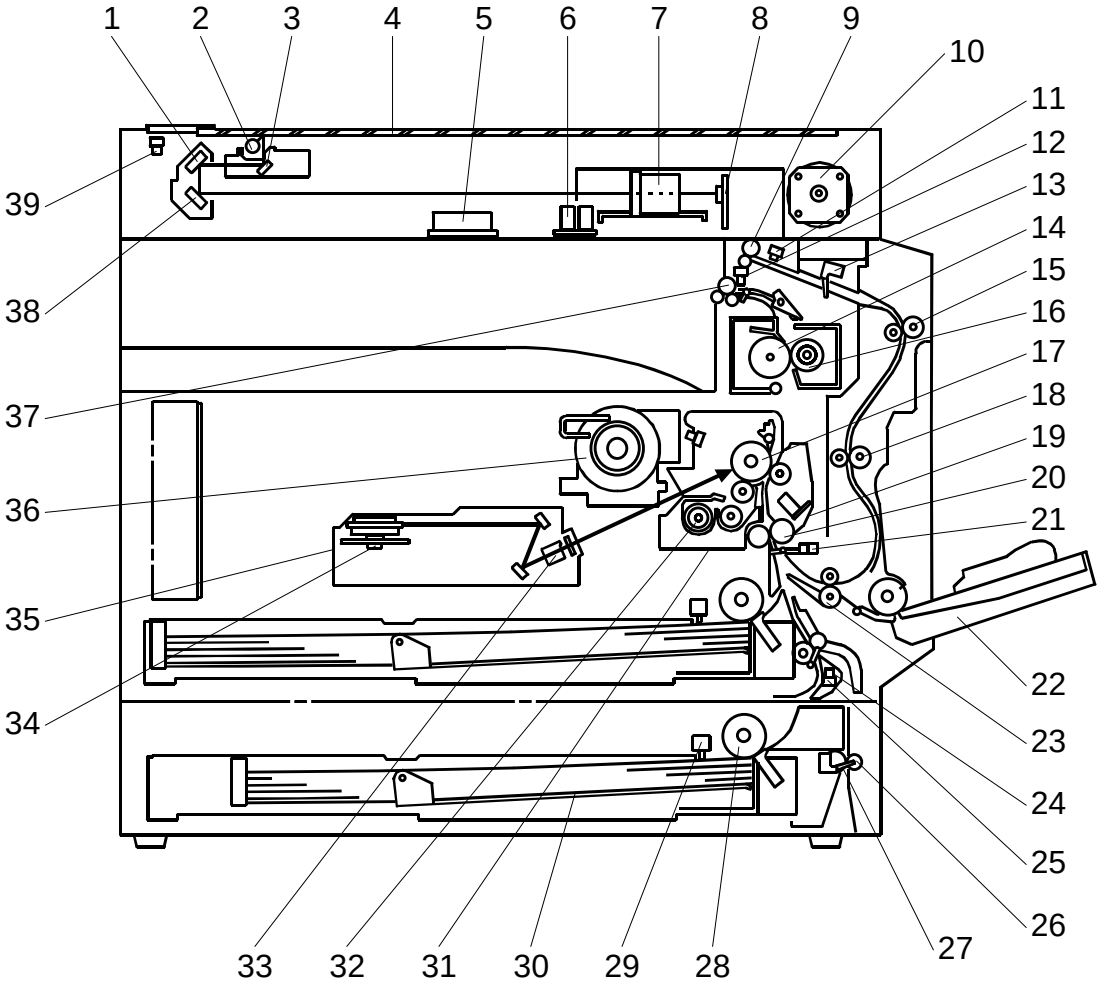
Copy Features Table

3. Copier Features	1. APS Auto Reduce/Enlarge	
	2. Max. Copy Q'ty	
	3. Adjust Original Mode	1. Text
		2. Photo
	4. Set Ratio	
	5. Copy Reset Timer	
	6. SADF Auto Reset	
	7. Rotate Sort Auto Continue	
	8. Orientation	
	9. Sort	
	10. Duplex Priority	
	11. Duplex Margin	
	12. Key Operator Tools	1. User Code Access
		2. Check Copy Counter
		3. Print Counter List
		4. Reset Counter
		5. Clear all User Codes
		6. Reset All Counters
		7. Program User Code
		8. Change User Code
		9. Delete User Code

6. DETAILED SECTION DESCRIPTIONS

6.1 OVERVIEW

6.1.1 COMPONENT LAYOUT

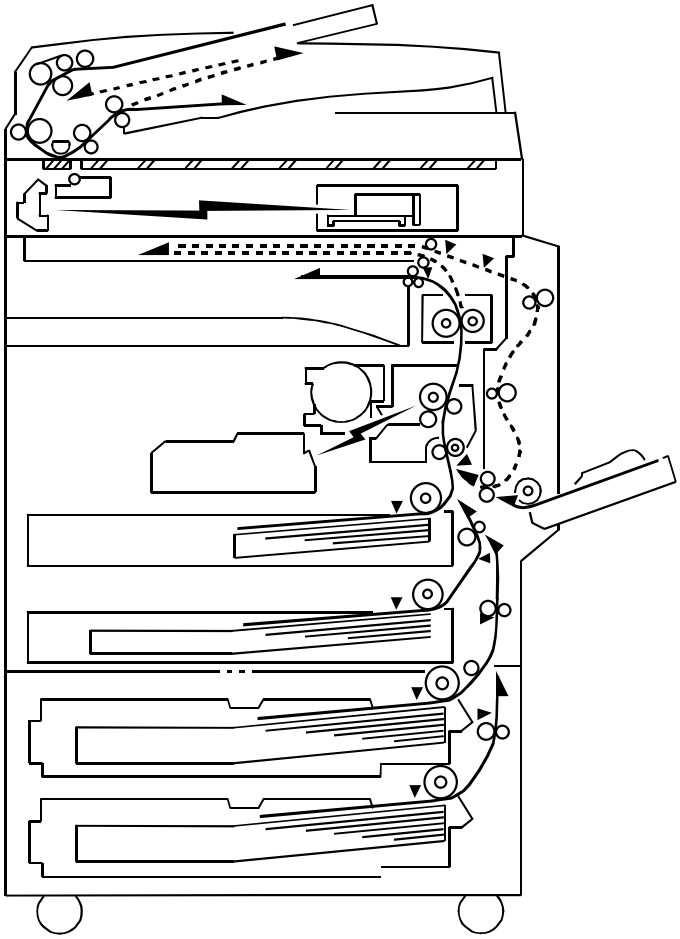


B039D253.WMF

NOTE: The above illustration is the B043 model.
B039: No duplex unit, one paper tray
B040: No duplex unit, two paper trays

1. 2nd Mirror
2. Exposure Lamp
3. 1st Mirror
4. Exposure Glass
5. Original Width Sensors
6. Original Length Sensors
7. Lens Block
8. SBU
9. Inverter Roller
10. Scanner Motor
11. Duplex Inverter Sensor
12. Exit Sensor
13. Duplex Entrance Sensor
14. Hot Roller
15. Upper Transport Roller
16. Pressure Roller
17. OPC Drum
18. Middle Transport Roller
19. Image Density Sensor
20. Registration Roller
21. Registration Sensor
22. By-pass Tray
23. Lower Transport Roller
24. Upper Relay Roller
25. Relay Sensor
26. Lower Relay Roller
27. Vertical Transport Sensor
28. Paper Feed Roller
29. Paper End Sensor
30. Bottom Plate
31. PCU
32. Development Roller
33. WTL
34. Polygon Mirror Motor
35. Laser Unit
36. Toner Supply Bottle Holder
37. Exit Roller
38. Scanner H.P. Sensor
39. 3rd Mirror

6.1.2 PAPER PATH

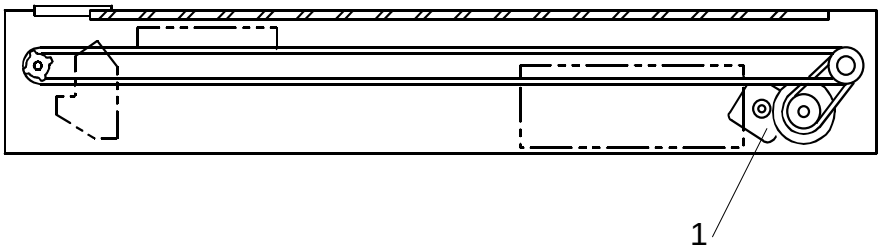


B039D104.WMF

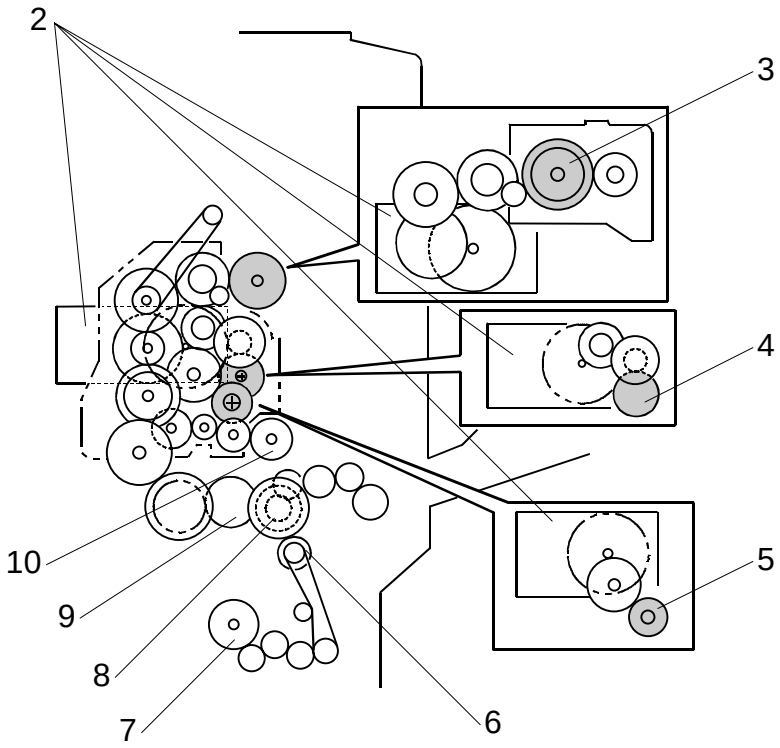
The B043 model has a duplex unit mounted on the right side of the machine.

All models have a by-pass tray.

6.1.3 DRIVE LAYOUT



B039D107.WMF

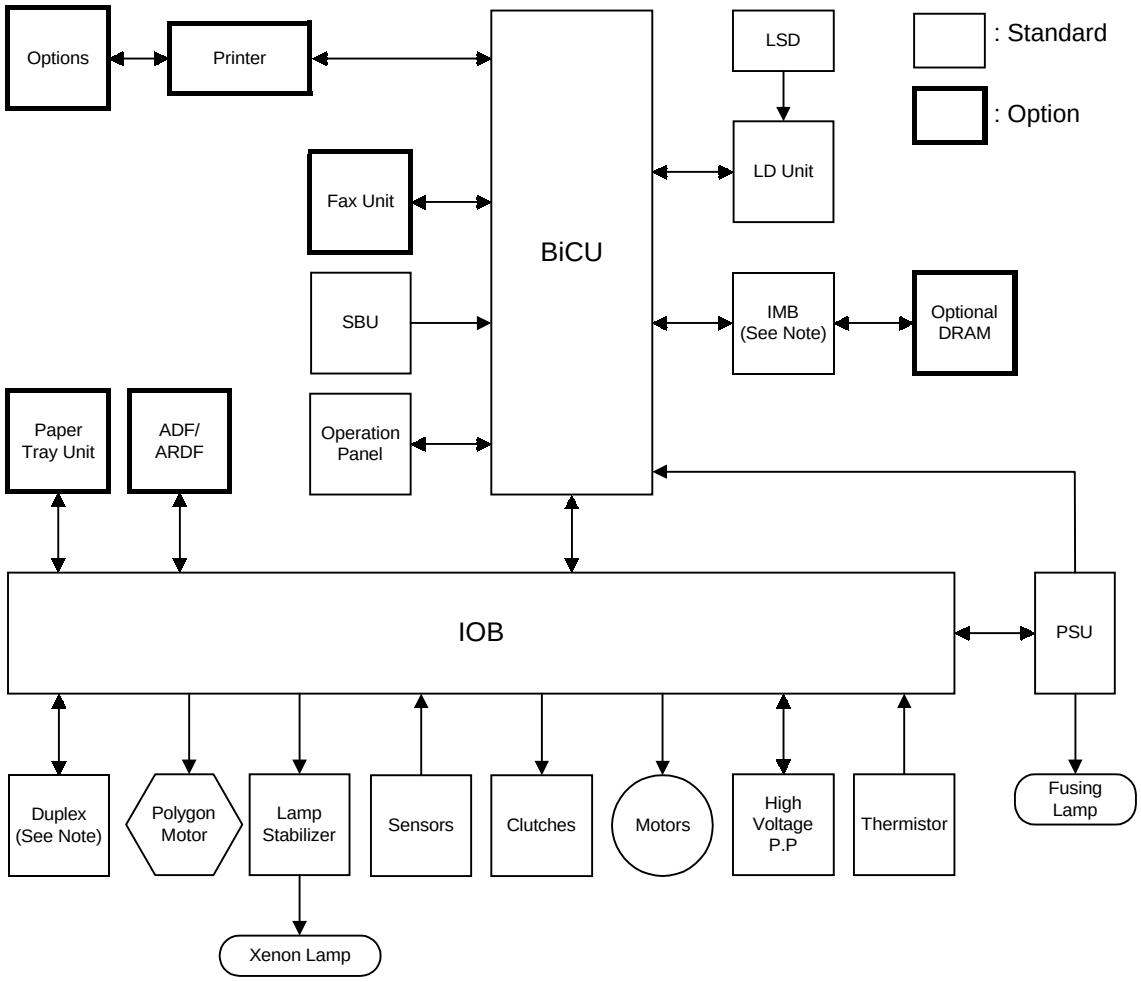


B039D106.WMF

1. Scanner Motor
2. Main Motor
3. Hot Roller
4. OPC Drum
5. Development Roller
6. Relay Clutch
7. Lower Paper Feed Clutch
8. By-pass Feed Clutch
9. Upper Paper Feed Clutch
10. Registration Clutch

6.2 BOARD STRUCTURE

6.2.1 BLOCK DIAGRAM



B039D001.WMF

NOTE: 1) B039 models outside North America do not contain the IMB as a standard component.
2) Only B043 models contain the duplex unit.

Detailed Descriptions

1. BiCU (Base Engine and Image Control Unit)

The main board controls the following functions:

- Engine sequence
- Timing control for peripherals
- Image processing, video control
- Operation control
- Various application boards (fax, printer)
- Machine control, system control

2. IOB (I/O Board)

The IOB handles the following functions:

- Drive control for the sensors, motors, and clutches of the printer and scanner
- High voltage supply board control
- Serial interfaces with peripherals
- Fusing control

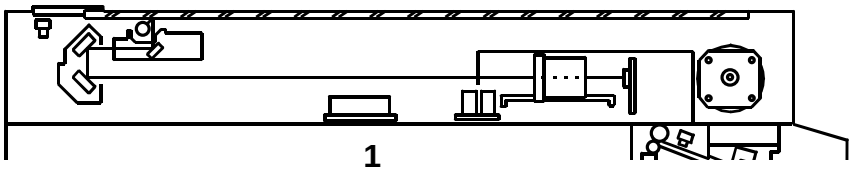
3. SBU (Sensor Board Unit)

The SBU deals with the analog signals from the CCD and converts them into digital signals.

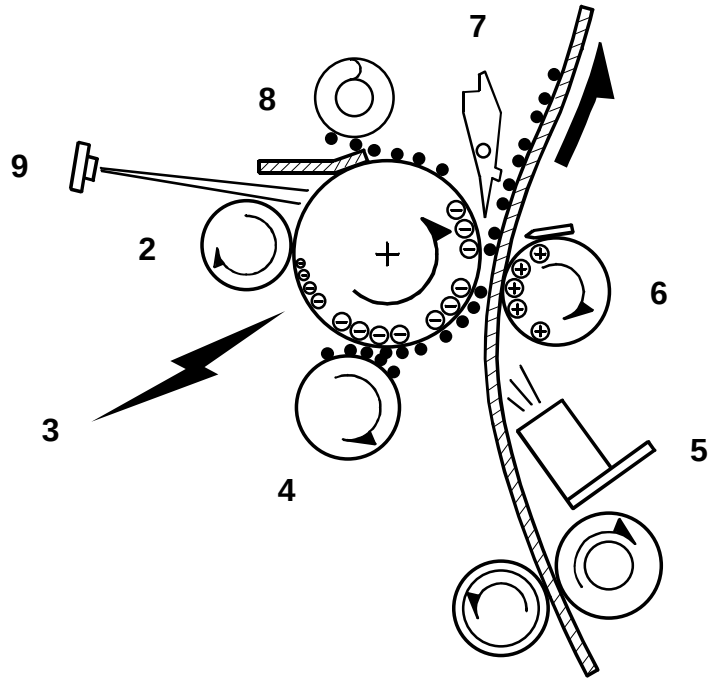
4. IMB (IMAC and Memory Board)

The IMB stores the image data. (☛ 6.5.5 IMB)

6.3 COPY PROCESS OVERVIEW



B039D353.WMF



B039D251.WMF

1. EXPOSURE

A xenon lamp exposes the original. Light reflected from the original passes to the CCD, where it is converted into an analog data signal. This data is converted to a digital signal, processed and stored in the memory. At the time of printing, the data is retrieved and sent to the laser diode.

NOTE: For multi-copy runs, the original is scanned once only and stored to the memory. B039 models outside N. America do not have memory as a standard component, so cannot do multi-copying.

2. DRUM CHARGE

In the dark, the charge roller gives a negative charge to the organic photo-conductive (OPC) drum. The charge remains on the surface of the drum because the OPC layer has a high electrical resistance in the dark.

3. LASER EXPOSURE

The processed data scanned from the original is retrieved from the memory and transferred to the drum by a laser beam, which forms an electrical latent image on the drum surface. The amount of charge remaining as a latent image on the drum depends on the laser beam intensity, which is controlled by the BiCU board.

4. DEVELOPMENT

The magnetic developer brush on the development roller comes in contact with the latent image on the drum surface. Toner particles are electrostatically attached to the areas of the drum surface where the laser reduced the negative charge on the drum.

5. ID SENSOR

The laser forms a sensor pattern on the drum surface. The ID sensor measures the reflectivity of the pattern. The output signal is one of the factors used for toner supply control. Also, the ID sensor measures the reflectivity of the drum surface. The output signal is used for charge roller voltage control.

6. IMAGE TRANSFER

Paper is fed to the area between the drum surface and the transfer roller at the proper time for aligning the copy paper and the developed image on the drum surface. Then, the transfer roller applies a high positive charge to the reverse side of the paper. This positive charge pulls the toner particles from the drum surface onto the paper. At the same time, the paper is electrostatically attracted to the transfer roller.

7. PAPER SEPARATION

Paper separates from the drum as a result of the electrostatic attraction between the paper and the transfer roller. The discharge plate (grounded) helps separate the paper from the drum.

8. CLEANING

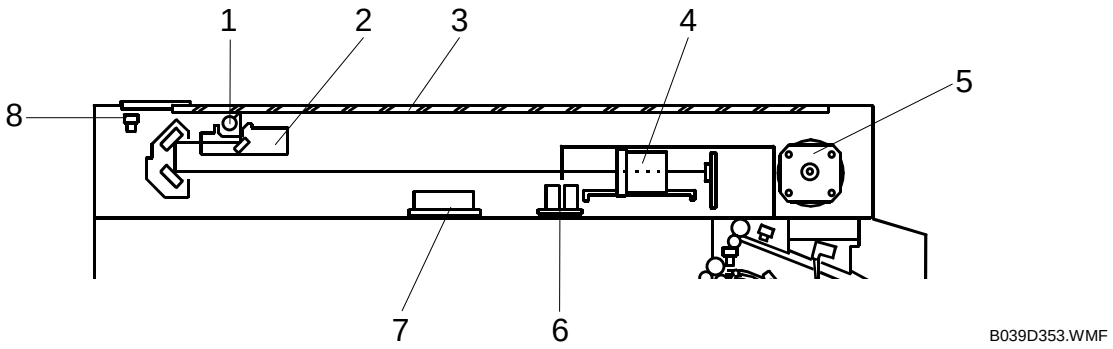
The cleaning blade removes any toner remaining on the drum surface after the image transfers to the paper.

9. QUENCHING

The light from the quenching lamp electrically neutralizes the charge on the drum surface.

6.4 SCANNING

6.4.1 OVERVIEW



1. Exposure Lamp
2. 1st Scanner
3. Exposure Glass
4. Lens Block
5. Scanner Motor
6. Original Length Sensor
7. Original Width Sensors
8. Scanner H.P. Sensor

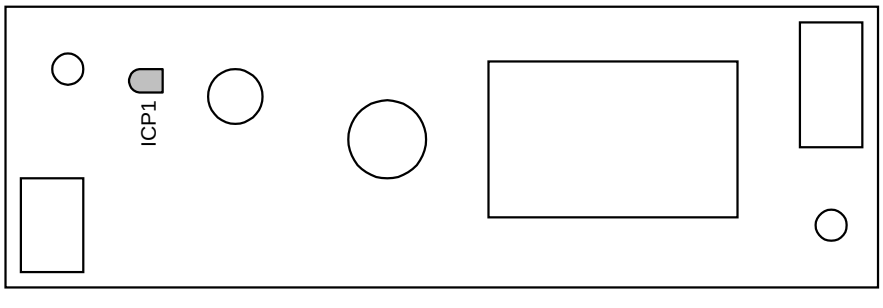
The original is illuminated by the exposure lamp (a xenon lamp). The image is reflected onto a CCD (charge coupled device) on the lens block via the 1st, 2nd, and 3rd mirrors, and through the lens on the lens block.

The 1st scanner consists of the exposure lamp, a reflector, and the 1st mirror.

A lamp stabilizer energizes the exposure lamp. The light reflected by the reflector is of almost equal intensity, to reduce shadows on pasted originals.

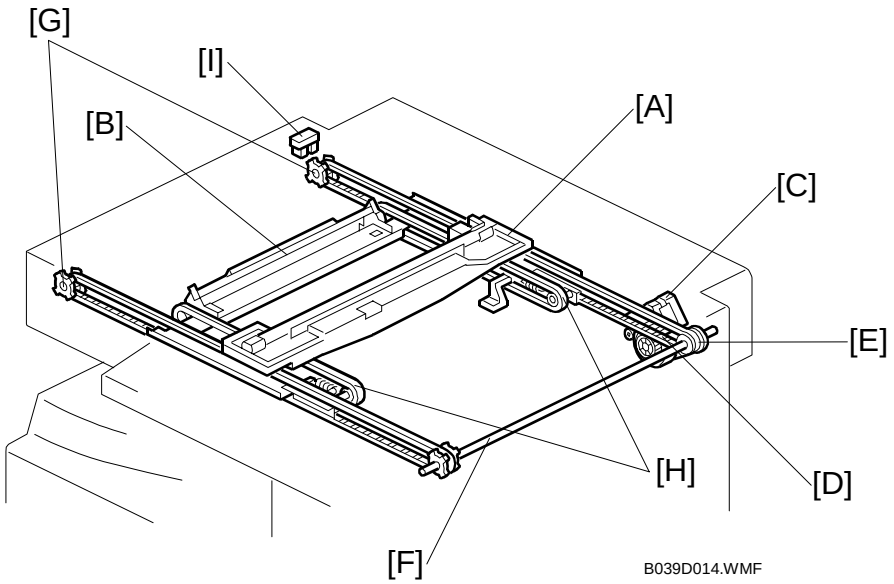
An optics anti-condensation heater is available as an option. It can be installed on the left side of the scanner. It turns on whenever the power cord is plugged in.

Lamp Stabilizer Fuse



	Rating	Manufacturer	Type No.
ICP1	DC50 V/1.5 A	ROHM CO.,LTD	ICP–N38

6.4.2 SCANNER DRIVE



A stepper motor drives the 1st and 2nd scanners [A,B]. The 1st scanner is driven by the scanner drive motor [C], drive gear through the timing belt [D], scanner drive pulley [E], scanner drive shaft [F], and two timing belts [G]. The 2nd scanner is driven through the 1st scanner and two timing belts [H].

- Book mode -

The IOB controls and operates the scanner drive motor. In full size mode, the 1st scanner speed is 89 mm/s during scanning. The 2nd scanner speed is half that of the 1st scanner.

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.

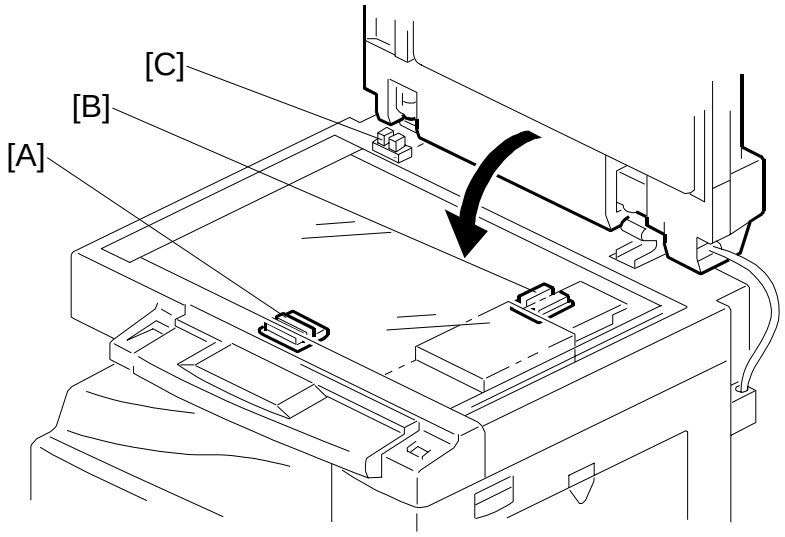
Magnification in the sub-scan direction can be adjusted by changing the scanner drive motor speed using SP4-101. Magnification in the main scan direction can be adjusted using SP4-008.

- ADF mode -

The scanners are always kept at their home position (the scanner H.P. sensor [I] 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.

Magnification in the sub-scan direction can be adjusted by changing the ADF motor speed using SP6-007. In the main scan direction, it can be adjusted with SP4-008, like for book mode.

6.4.3 ORIGINAL SIZE DETECTION IN PLATEN MODE

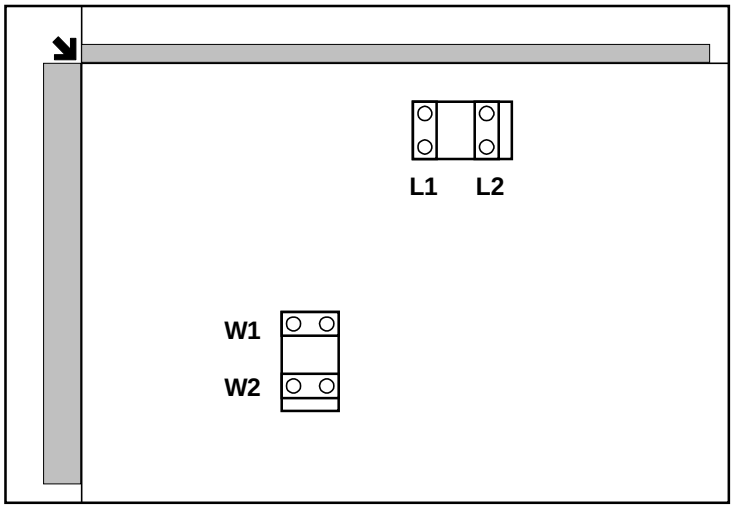


B039D012.WMF

In the optics cavity for original size detection, there are four reflective sensors. The original width sensors [A] detect the original width, and the original length sensors [B] detect the original length. These are the APS (Auto Paper Select) sensors. Each APS sensor is a reflective photosensor.

While the main switch 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. This is when the platen is positioned about 15 cm above the exposure glass, for example while it is being closed. The CPU can recognize the original size from the combination of on/off signals from the APS sensors.

If the copy is made with the platen fully open, the CPU decides the original size from the sensor outputs when the Start key is pressed.



B039D006.WMF

Original Size		Length Sensors		Width Sensors		SP4-301 display
A4/A3 version	LT/DLT version	L2	L1	W2	W1	
A3	11" x 17"	1	1	1	1	11110000
B4	8.5" x 14"	1	1	0	1	11010000
8.5" x 13"	—	1	1	0	0	11000000
A4-SEF	8" x 13"	0	1	0	0	01000000
A4-LEF	11" x 8.5"	0	0	1	1	00110000
B5-LEF	8.5" x 11"	0	0	0	1	00010000
A5-LEF	8.5" x 5.5"	0	0	0	0	00000000

NOTE: 0: High, 1: Low (paper present)

For other combinations, “Cannot Detect Original Size” will be indicated on the operation panel display (if SP4-303 is kept at the default setting).

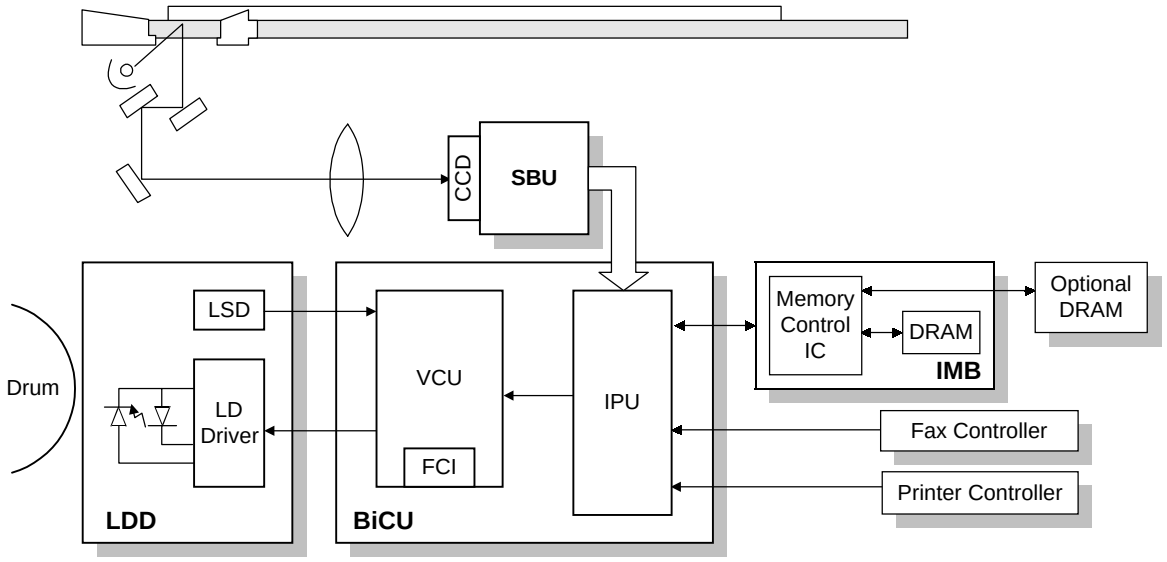
The above table shows the outputs of the sensors for each original size. This original size detection method eliminates the necessity for a pre-scan and increases the machine's productivity.

However, if the by-pass feeder is used, note that the machine assumes that the copy paper is short-edge first. For example, if A4 paper is placed long-edge first on the by-pass tray, the machine assumes it is A3 paper and scans the full A3 area for the first copy of each page of the original, disregarding the original size sensors. However, for each page, the data signal to the laser diode is stopped to match the copy paper length detected by the registration sensor. This means that copy time for the first page may be slower (because of the longer time required for scanning), but it will be normal for the rest of the job.

Original size detection using the ADF is described in the manual for the ADF.

6.5 IMAGE PROCESSING

6.5.1 OVERVIEW



B039D002.WMF

The CCD generates an analog video signal. The SBU (Sensor Board Unit) converts the analog signal to a 6-bit digital signal, then it sends the digital signal to the BiCU board.

The BiCU board can be divided into three image processing blocks: the IPU (Image Processing Unit), FCI (Fine Character Image), and VCU (Video Control Unit).

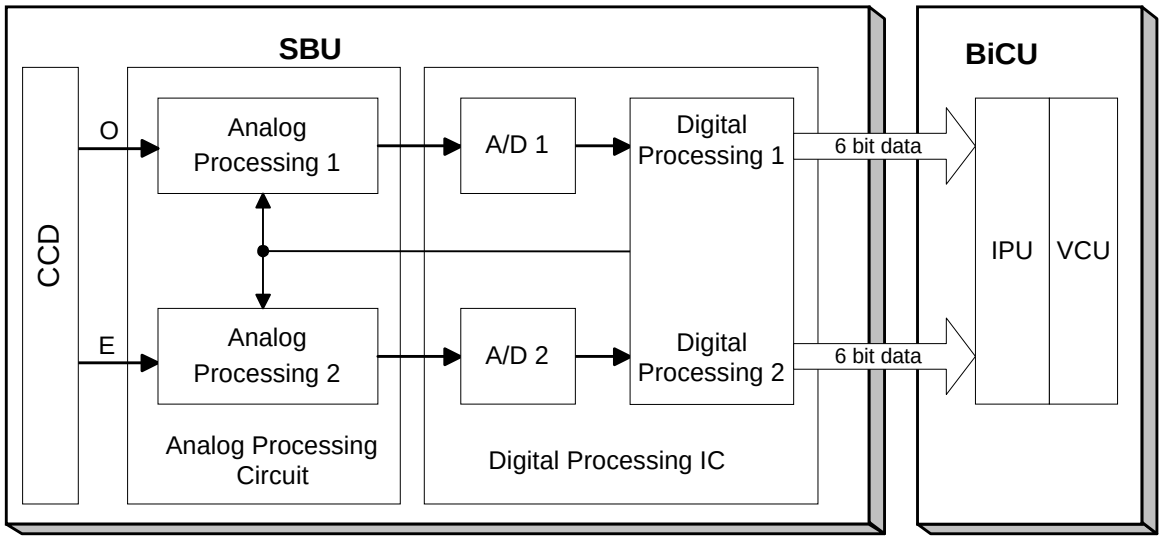
- IPU: Auto shading, filtering, magnification, scanner γ correction, ID γ correction
- VCU: Printer γ correction, LD print timing control and laser power PWM control
- FCI (inside the VCU): Smoothing

NOTE: The IPU and VCU are contained in the same IC on the BiCU

Finally, the BiCU board sends the video data to the LD drive board at the proper time. The IMB provides memory for the copier features (the B039 model outside N. America does not have the IMB as standard equipment). In addition, optional DRAM can be added to the IMB (☛ 6.5.5).

Detailed Descriptions

6.5.2 SBU (SENSOR BOARD UNIT)



B039D004.WMF

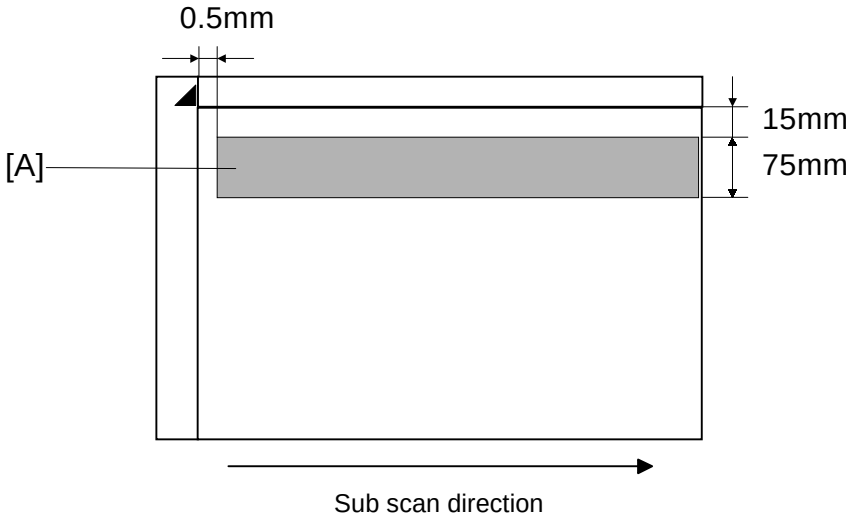
The CCD converts the light reflected from the original into an analog signal. The CCD line has 7,450 pixels and the resolution is 600 dpi (23.6 lines/mm).

The CCD has two output lines, for odd and even pixels, to the analog processing circuit. The analog processing circuit performs the following operations on the signals from the CCD:

1. Z/C (Zero Clamp):
   Adjusts the black level reference for even pixels to match the odd pixels.
2. Signal Amplification:
   The analog signal is amplified by operational amplifiers.

After the above processing, the analog signals are converted to 6-bit signals by the A/D converter. Each pixel will be assigned a value on a scale of 64 grades. Then, the digitized image data goes to the BiCU board.

6.5.3 AUTO IMAGE DENSITY (ADS)



In the SBU

ADS prevents the background of an original from appearing on copies.

The copier scans the auto image density detection area [A] as shown in the diagram. This corresponds to a few mm 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. The IPU determines the reference value for the A/D conversion for a particular scan line using the peak white level for that scan line. Then, the IPU sends the reference value data to the reference 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 ADS, and the machine will use both settings when processing the original.

In the IPU

After the SBU process, the IPU board removes background noise resulting from the SBU-BiCU wiring by adjusting the white level.

By Original Type

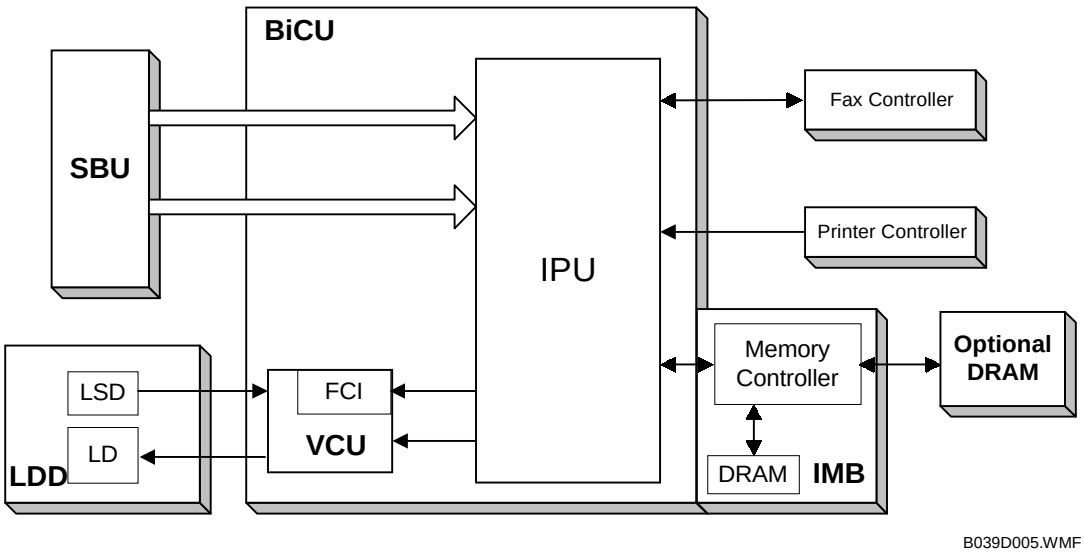
ADS mode is only enabled when the user has selected:

- Text mode 1 or 2 (Normal or Sharp), Photo mode 2 (Text/Priority), or Special mode 1 or 2 (Unneeded background or Colored Text).

This can be done using *Adjust Original Mode* (3) in User Tools (Copier Features).

6.5.4 IPU (IMAGE PROCESSING UNIT)

Overview



The image data from the SBU goes to the IPU (Image Processing Unit) on the BiCU board, which carries out the following processes on the image data:

1. Auto shading
2. White/black line correction
3. Scanner gamma correction
4. Magnification
5. Filtering (MTF and smoothing)
6. ID gamma correction
7. Binary picture processing
8. Error diffusion
9. Dithering
10. Video path control
11. Test pattern generation

The image data then goes to the VCU.

NOTE: The IPU and VCU are contained in the same IC (called KT-ONE) on the BiCU.

Image Processing Modes

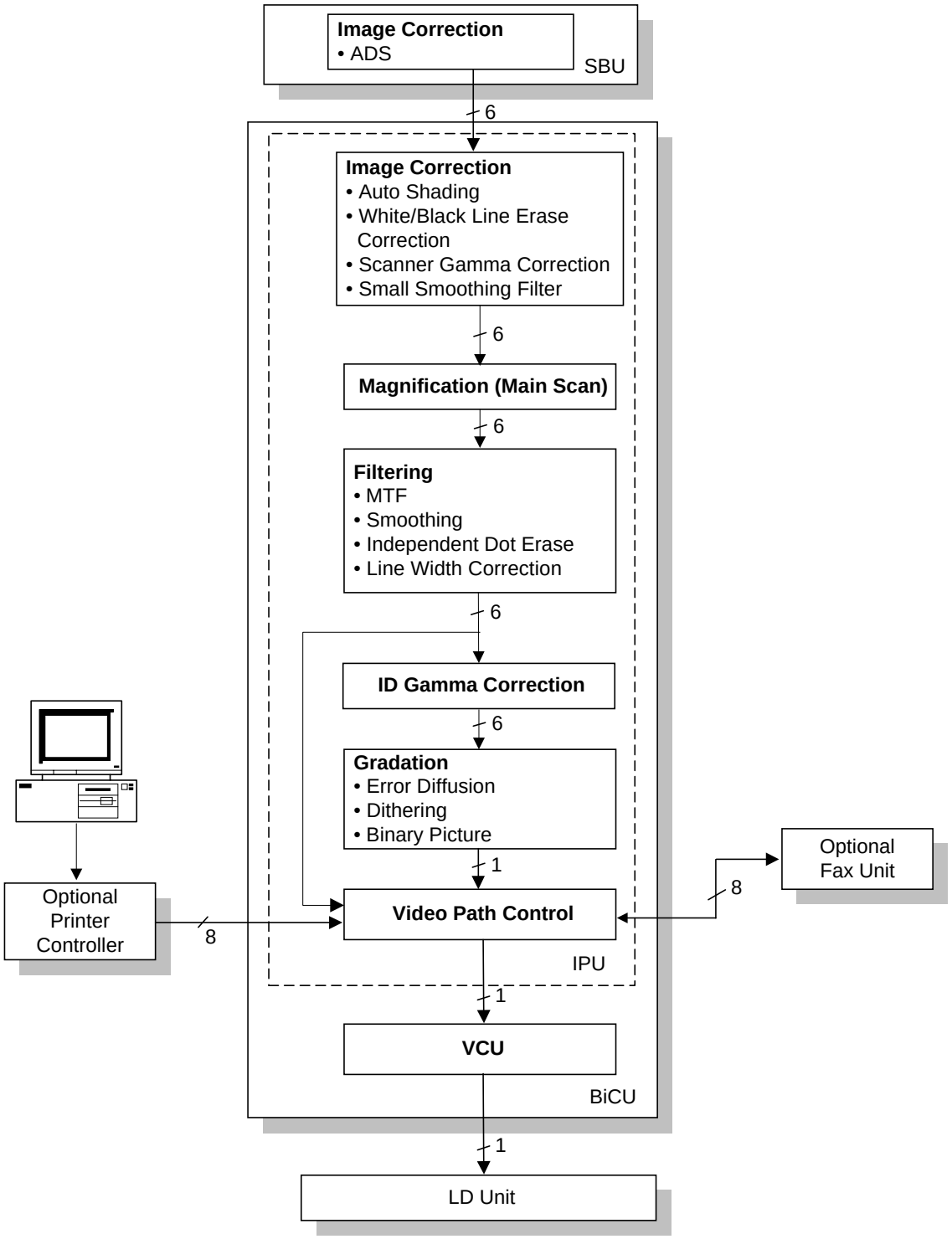
The user can select Text, Photo and Special original types. However, each of these original types has a range of different choices (such as “sharp”, “photographs”, etc), which are listed in the table below.

- All modes can be customized with a range of SP modes that can be adjusted to meet user requirements.
- The user can select the mode that best suits their original with the following user tool: Original Type: User Tools – 3. Copier Features – 3. Adjust Original Mode

Original Type	Mode	Targeted Original Type
Text	Normal	Normal text originals
	Sharp	Newspapers, originals through which the rear side is moderately visible as faint text.
Photo	Photo priority	Text/photo images which contain mainly photo areas
	Text priority	Text/photo images which contain mainly text areas
	Photographs	Actual photographs
Special	Unneeded background	Originals through which the rear side is extremely visible (or have a colored background) with faint text. Also for originals with very grainy backgrounds (some newspapers) and faint text.
	Colored text	Originals with colored text and lines.
	Normal Pixel Photo	Photo images created by dither patterns (dots visible), such as newspaper photos – normal resolution.
	Coarse Pixel Photo	Photo images created by dither patterns (dots visible), such as newspaper photos – coarse resolution.
	Preserved Background (Normal Text)	Use instead of Normal Text if, e.g. an embedded white area causes Auto Image Density to initially remove the surrounding (darker) background but leave the rest. Use if the customer wishes to keep this background.

Image Processing Path

This diagram shows the various stages of image processing and where they are performed.



B039D003.WMF

Original Modes

The machine has 10 original modes. There are two text modes, three photo modes, and five “special” modes.

The original mode key on the operation panel has two settings, text and photo. With the default settings, the machine uses “Normal Text (Text 1)” when the Text indicator is lit, and uses “Photo Priority (Photo 1)” when the Photo indicator is lit.

The customer can allocate different modes to the Text and Photo indicators with User Tools – 3. Copier Features – 3. Adjust Original Mode. Note that the Text indicator does not have to be allocated to a Text mode and the Photo key does not have to be allocated to a Photo mode. For example, the Text indicator can be allocated to Photo 3, and the Photo indicator can be allocated to Special 4.

If the user wishes to customize one of the original modes, the technician can change the settings using SP4-922 to SP4-942. Refer to “SP Modes for Each Image Processing Step”. However, only one of the original modes can be customized at any one time.

SP Modes for Each Image Processing Step

The table on the next page shows which SP modes are used for each step of image processing.

- 4-921: Selects **which original mode** the settings from SP4-922 to SP4-928 will be applied to.
- 4-922: Selects the scanner γ curve. You can select either a curve for text-based originals (brings out text) or a curve for photo originals (better distinctions between shades of dark colors).
- 4-923: Selects the central notch position for the ID adjustment LEDs.
- 4-925-001: Adjusts the clarity of line images and the edges of solid images. Also determines the smoothing filter used when the user selects Special 3 or Special 4.
- 4-925-002: Adjusts the clarity of solid image areas.
- 4-925-003: Adjusts the clarity of low ID lines.
- 4-926: Adjusts the texture removal level.
- 4-927: Adjusts the line width.
- 4-928: Selects the dot erase level.
- 4-941: Selects the white line erase level.
- 4-942: Selects the black line erase level.

NOTE: The gray area means the setting cannot be changed using SP mode.

		Text		Photo			Special					Note
		Normal	**Sharp**	**Photo Priority**	**Text Priority**	**Photographs**	**Unneeded Background**	**Colored Text**	**Normal Pixel Photo**	**Coarse Pixel Photo**	**Preserved Background**	
SBU	ADS	ADS			ADS		ADS					
↓												
Shading Correction	Shading Line Correction	Enabled		Enabled			Enabled					
	White Line Correction			Enabled		Enabled			Enabled			SP4-941
	Black Line Correction	Enabled (DF only)		Enabled (DF only)			Enabled (DF only)					SP4-942
	Scanner γ Correction	Text (Reflection Ratio ID Linear)		Text (Reflection Ratio ID Linear)			Text (Reflection Ratio ID Linear)					SP4-922
	Small Smoothing Filter	Weak			Normal			Normal	Strong	Strong	Weak	Connected with MTF filter (Edge)
↓												
Magnification	Main Scan Magnification	Enabled		Enabled			Enabled					
	Mirroring	Enabled (DF only)		Enabled (DF only)			Enabled (DF only)					
	Side-to-side Registration (Left Side)	Enabled		Enabled			Enabled					
↓												
Filtering	MTF Filter (Edge)	Normal	Strong	Weak (All Area)	Normal	Weak (All Area)	Strong	Normal			Normal	SP4-925-001
	MTF Filter (Solid)		Normal				Normal					SP4-925-002
	MTF Filter (Low ID)	Normal	Normal		Normal		Normal				Normal	SP4-925-003
	Smoothing Filter								Normal			SP4-925-001
	Independent Dot Erase	Weak			Weak		Strong	Weak			Weak	SP4-928
	Line Width Correction	Disabled			Disabled		Disabled	Thick			Disabled	SP4-927
↓												
Graduation	ID γ Correction	Normal	Sharp	Photo Priority	Text Priority	Photographs	Sharp	Normal	Normal Pixel Photo	Coarse Pixel Photo	Preserved Background	SP4-923
↓												
Image Correction	Graduation	Error Diffusion	Binary	Error Difusion			Binary	Error Diffusion	Dithering (105 Lines)	Dithering (53 Lines)	Error Diffusion	SP4-926 (Error diffusion only)
↓												
Path Control	Video Path Control	Enabled		Enabled			Enabled					
↓												
VCU	FCI		Enabled				Enabled					
	Edge Correction								Enabled			
	Printer γ Correction	Enabled		Enabled			Enabled					

Auto Shading

Overview

There are two auto shading methods: black level correction and white level correction. Auto shading corrects errors in the signal level for each pixel.

Unlike previous machines, white level correction is only done when SP4-941 is set to 0, and not by default. However, a process called White Line Erase Compensation is used instead; this process can be adjusted by changing the value of SP4-941 between 1 and 5 (the default setting is 2).

Black level correction is always done.

Black Level Correction

The CPU reads the black dummy data from one end of the CCD signal (32 pixels at the end are blacked off) and takes the average of the black dummy data. Then, the IPU deletes the black level value from each image pixel.

White Level Correction

Previous machines used 8-bit data (256 gradations), but this machine uses 6-bit data (64 gradations). When white level correction is applied to 6-bit data, white lines are more easily generated. This is because the normal variations in CCD pixel response (which are very slight), when rounded off by white level correction, will show up much easier on the copy when the data is divided into 64 gradations.

White level correction is only done when SP4-941 is set to “0” (this is not the default). This is the only setting that will compensate for extremely low (abnormal) pixel response. However, it was judged that under normal conditions, white lines were more likely to occur (due to the above reason) and have a larger effect on the copy.

Before scanning the original, the machine reads a reference waveform from the white plate. The average of the white video level for each pixel is stored as the white shading data in the FIFO memory in the IPU (KT-ONE) chip.

The video signal information for each pixel obtained during image scanning is corrected by the IPU (KT-ONE) chip.

Auto shading is done before scanning for the first original as well as after scanning each page to prepare for the next page.

If the image density or the original mode is changed during a copy run, auto shading is done before scanning the next original.

White Line Erase

Since this machine does not apply white level correction as default, white lines are automatically minimized (the reason is explained above). However, with no white level correction, the images on the edges of the copy would always appear darker than those in the center. This is because the CCD elements on the edges receive less light. Therefore to compensate, SP4-941 can be used to control both the uniformity of the edge/center image density and to minimize white lines. However, it is a trade-off between the two:

SP4-941 applies the correction only to the output from the central CCD elements only, keeping the output from the edge elements constant (as the standard). With a setting of 1, a large amount of correction is applied and the central areas are uniform with the edges. However white lines are relatively visible. With the maximum setting (5), no correction is applied and the central areas appear lighter than the edges (true to the original CCD data). However white lines are minimized.

Note that if SP4-941 is set to 0, white line erase is not used, and white level correction is used instead.

Black Line Erase

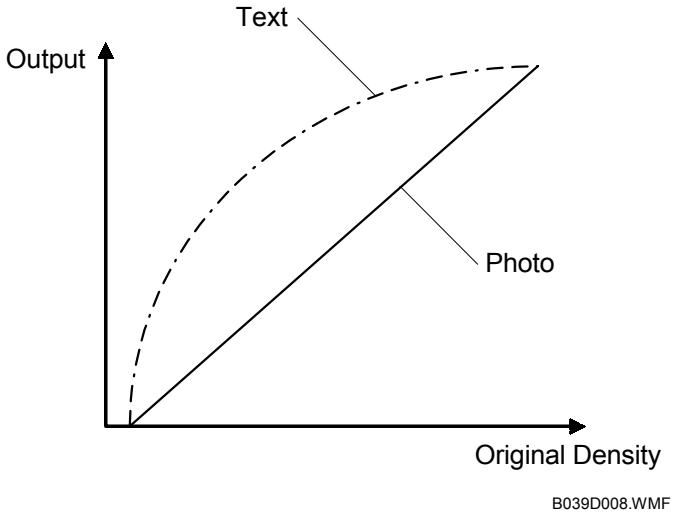
In ADF mode, if extremely low CCD output is detected on the scanning line before the leading edge of original arrives there, this is attributed to abnormal black dots on the exposure glass. This low output is corrected using neighboring pixels. To adjust or switch off this correction, use SP4-942.

Scanner Gamma (γ) Correction

The CCD output is not proportional to the quantity of light received. Scanner γ correction corrects the CCD output so that grayscale data is proportional to the quantity of light received.

The machine has two possible scanner gamma curves: Text and Photo. As the default setting, *Text* is used in all modes (SP4-922). When selecting *Text*, the machine does not use scanner γ correction. As a result, the output is darker than the image density on the original. The advantage of this is that the machine can bring out gradations in paler areas. The disadvantage is that the machine cannot bring out gradations in darker areas, i.e. differences in shades of dark colors are hard to distinguish.

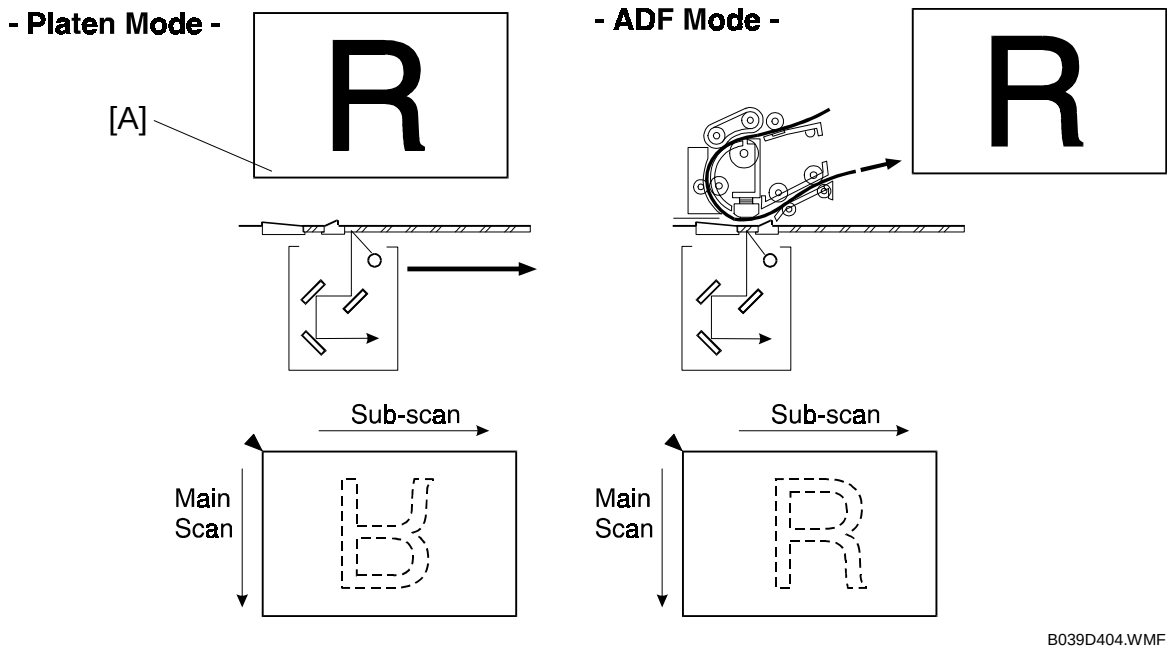
When selecting *Photo*, the machine uses scanner γ correction. One advantage of this is that the machine can bring out gradations in dark areas of photo image originals. The disadvantage is that it in some cases images come out lighter than the customer desires.



Main Scan Magnification

Changing the scanner speed enables enlargement and reduction along the sub scan direction. However, enlargement and reduction along the main scan direction is handled by the IPU (KT-ONE) chip. The processing for main scan enlargement/reduction is the same as in previous digital machines.

Mirroring for ADF Mode



When making copies using the ADF, the magnification circuit creates a mirror image. This is because the scanning start position along the main scan direction in ADF mode is at the opposite corner of platen mode.

In platen mode, the original is placed face down on the exposure glass. The main scan start position is at corner [A], and the scanner moves down the page. In ADF mode, the ADF feeds the leading edge of the original to the DF exposure glass. Therefore as mentioned above, the main scan start position will be at the opposite corner.

To create the mirror image, the IPU stores each line in LIFO (Last In First Out) memory.

Filtering

Overview

There are several software filtering processes for enhancing the desired image qualities of the selected original mode. There are three MTF filters, a smoothing filter, independent dot erase, and line width correction. Each can be used only when certain modes are selected (details below) and are automatically applied.

The strength levels for the MTF and smoothing filters are controlled by SP4-925. The levels for independent dot erase and line width correction are controlled by SP4-927 and 4-928, respectively.

The MTF filters bring out sharpness. The three MTF filters are Edge, Solid Image and Low ID Line. Independent dot erase removes unwanted dots from the image. Line width correction adjusts the line width.

MTF Filter Adjustment - Edge

In order to determine whether a given dot is part of an edge or not, the IPU checks all surrounding dots (vertical, horizontal, and diagonal). If the IPU determines that the dot is part of an edge, the machine applies the MTF filter for edges, using the value set in SP4-925-001. The higher the setting, the sharper the image. However, this is only used when the customer uses Text 1, Text 2, Photo 1-3, Special 1, Special 2, or Special 5.

The default value is “0” for each mode. However the actual strength of “0” differs from mode to mode.

MTF Filter Adjustment - Solid

If the IPU detects that the dot is not part of an edge, the machine applies the MTF filter for solid areas using the value set in SP4-925-002. The higher the setting, the sharper the image. However, this is only used when the customer uses Text 2 or Special 1.

The default value is “0” for each mode. However the actual strength of “0” differs from mode to mode.

MTF Filter Adjustment - Low ID Line

The IPU also checks the image density of all dots. If a succession of low-density dots is detected, the machine interprets this as a low ID line and applies the MTF filter for low ID lines, using the value set in SP4-925-003. The higher the setting, the sharper the image. However, this is only used when the customer uses Text 1, Text 2, Photo 2, Special 1, Special 2, or Special 5.

The default value is “0” for each mode. However the actual strength of “0” differs from mode to mode.

Smoothing Filter Adjustment

The machine will apply the smoothing filter when the user selects Special 3 or 4 (Dithering), using the value in SP4-925-001. Note that this SP is also used when the machine applies the MTF Filter for Edges (see above). The higher the setting, the sharper the image.

The default value is “0” for each mode. However, the actual strength of “0” differs from mode to mode.

Independent Dot Erase

When the user selects Text 1 and 2, Photo 2, and Special 1, 2, and 5 modes, independent dots are detected using a matrix and erased from the image. The detection level can be adjusted with SP4-928.

The higher setting, the greater number of dots the machine will erase. The machine erases the dots regardless of their image density. However, note that dots in mesh-like images may be mistakenly detected as independent dots.

Line Width Correction

When the user selects Text 1 and 2, Photo 2, Special 1, 2, and 5, the thickness of lines is adjusted using the setting of SP4-927. Note that the default for all modes except Special 2 is OFF.

The higher the setting, the thicker the line. However note that Special 2 starts with a thickness value higher than normal line thickness, whereas the others begin at normal line thickness. So even if Special 2 is set to –2, the lines will still come out thicker than normal.

Line width correction is done by the IPU (KT-ONE) chip.

ID Gamma (γ) Correction

The machine automatically selects the most appropriate ID gamma correction based on the selected original type and the operation panel ID setting .

Except for Special 1 and 2, each original mode has its own ID gamma correction type. Special 2 uses the same type as Text 1, and Special 1 uses the same type as Text 2.

In all modes, ID gamma correction can be adjusted with SP4-923.

Gradation Processing

Overview

There are three types of gradation processing (listed below). Refer to the “Default Image Processing Mode for Each Original Type” section for more details on which processes are used for each original mode.

- Binary picture processing
- Error diffusion
- Dithering

Binary Picture Processing

The 6-bit image data is converted into 1-bit data (black and white image data). This is done when the user selects Text 2 or Special 1. The threshold for deciding whether a pixel is black or white cannot be adjusted.

Error Diffusion

Error diffusion reduces the difference in contrast between light and dark areas of a halftone image. Each pixel is corrected using the difference between it and the surrounding pixels. The corrected pixels are compared with an error diffusion matrix.

Error diffusion is applied when the user selects Text 1, Photo 1-3 and Special 2 and 5.

As the final step in error diffusion, a process called Texture Removal is applied to Text 1, Special 2, and Special 5 by default, but can also be applied to Photo 1-3 by changing the value of SP4-926.

Texture removal uses 64 threshold values in an 8 x 8 matrix. The value of SP4-926 controls the application of Texture Removal for each of the 5 modes listed above. The settings are as follows:

0: The default value for each mode is used. Text 1, Special 2, and Special 5 have a default of 3 (see below) and Photo 1-3 have a default of 1.

1: No removal applied.

2 – 5: Removal applied at the level specified here. The higher the setting (level), the less clear the image will become (more texture removal).

Dithering

Each pixel is compared with the threshold in a dither matrix. Several matrices are available to bring out half-tone areas in images such as newspaper-type photographs. Dithering is only used for Special 3 and Special 4.

6.5.5 IMB (MEMORY CONTROLLER AND DRAM)

The functions of the these two IMB component devices are as follows:

Memory Controller: Compression of the 1-bit image data
Image rotation
Image data transfer to the DRAM

DRAM (16MB): Stores the compressed data
Processing area

The data goes to the memory controller after binary picture/grayscale processing. The data is first compressed and then stored in the DRAM. For printing, the data from the DRAM goes back to the memory controller, where it is decompressed and goes through image editing (e.g., image rotation, repeat image).

When the 16 and 32 MB memory is installed on the BiCU board, the memory capacity changes as follows:

A4 size, Text mode (Number of pages)

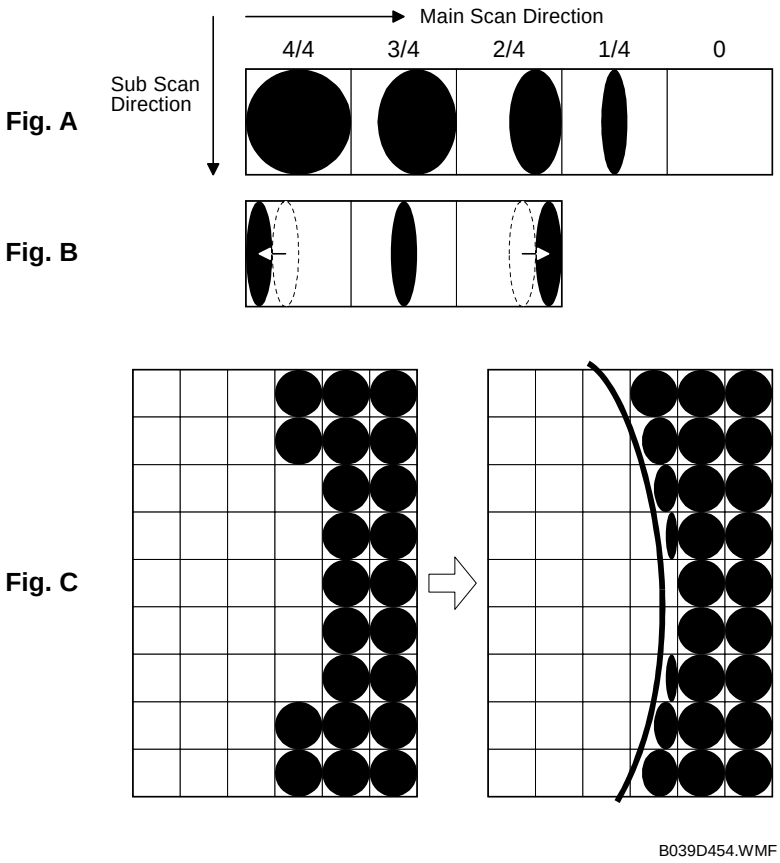
	0 MB	16 MB	48 (16+32) MB
A4 6%	0	71	99
ITU-T#4 (12% black)	0	34	99

NOTE: The amount of standard memory depends on the model:
B039: North America (16MB standard), Others (no standard memory).
B040, B043: 16MB standard.

6.5.6 VIDEO CONTROL UNIT (VCU)

Fine Character and Image (FCI)

The FCI performs image smoothing. This functions only affects binary picture processed images for certain original modes.



Usually, binary picture processing generates jagged edges on characters, as shown in the above illustration. These are reduced using edge smoothing. The FCI changes the laser pulse duration and position for certain pixels.

Fig. A shows the four possible pulse durations, and Fig. B shows how the laser pulse can be in one of three positions within the pixel. Fig. C shows an example of how edge smoothing is used.

FCI smoothing is only effective when Text 2 or Special 1 is selected. There is no SP adjustment for this.

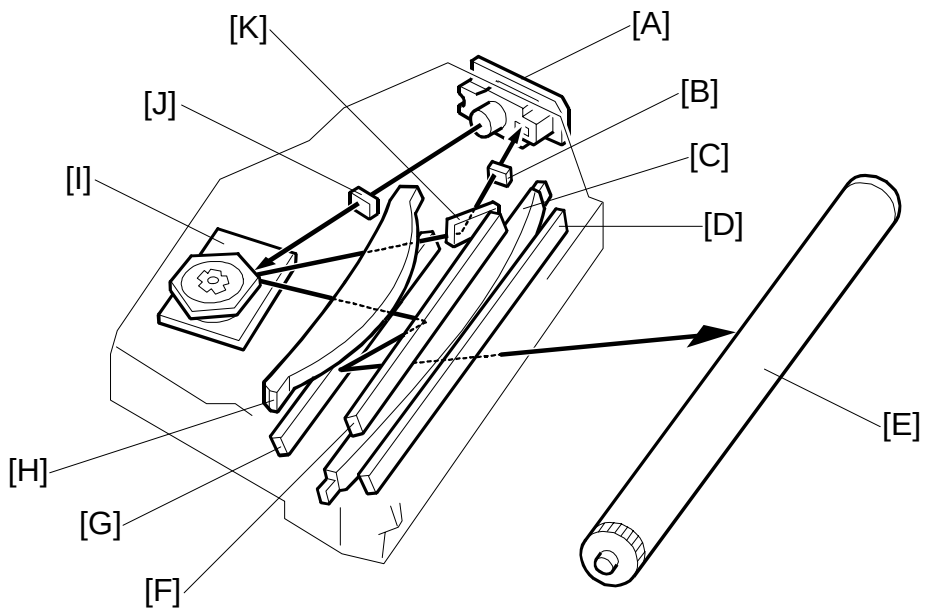
Printer Gamma Correction

Printer correction corrects the data output from the IPU to the laser diode to account for the characteristics of the engine components (e.g. drum, laser diode, lenses).

The machine chooses the most suitable gamma curve for the original type selected by the user. There is no SP adjustment for this.

6.6 LASER EXPOSURE

6.6.1 OVERVIEW



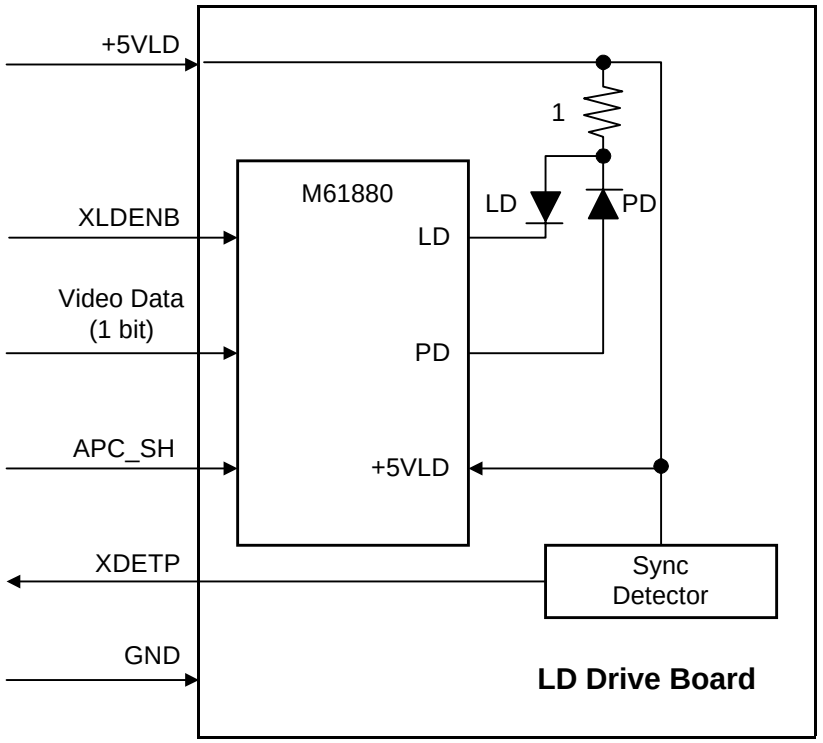
B039D101.WMF

[A]: LD unit
[B]: Synchronization detector lens
[C]: Double troidal lens
[D]: Shield glass
[E]: OPC drum
[F]: 1st mirror

[A]: 2nd mirror
[B]: F-theta lens
[C]: Polygon mirror
[D]: Cylindrical lens
[E]: Synchronization detector mirror

- The LD drive board controls both the laser output and laser synchronization mechanism.
- The machine cuts off the power supply to the LD drive board if the front or right cover is opened.

6.6.2 AUTO POWER CONTROL (APC)



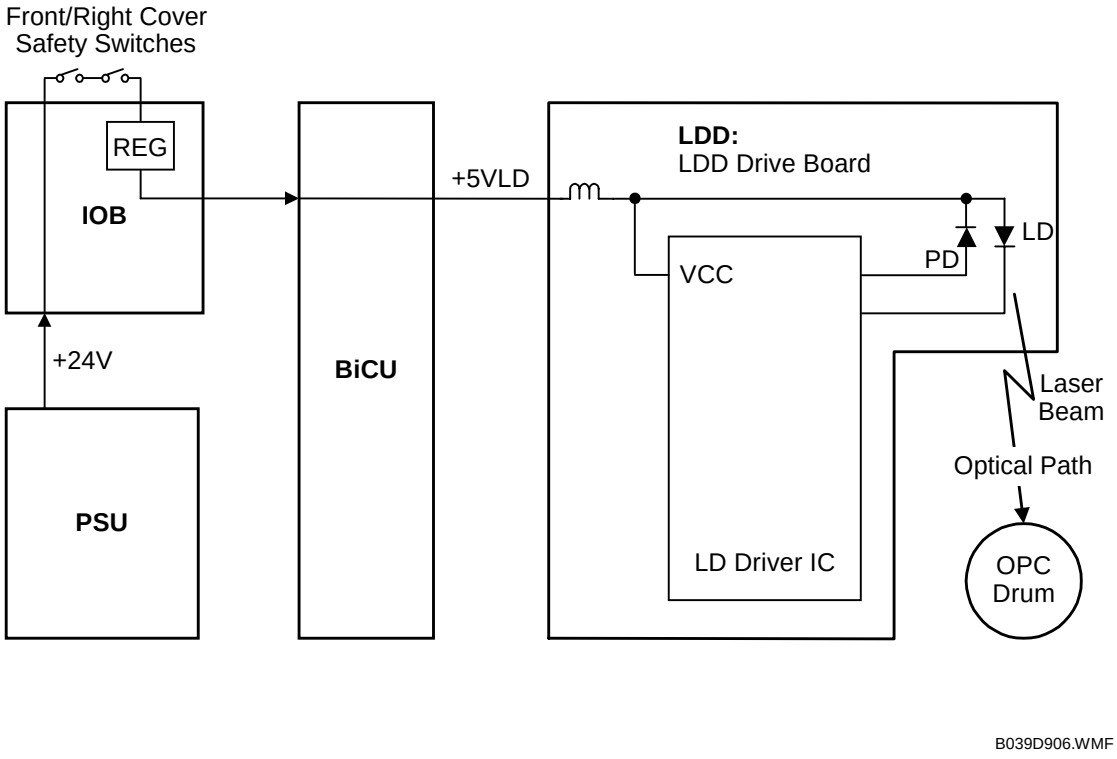
B039D013.WMF

The LD driver IC drives the laser diode. To prevent the intensity of the laser beam from changing because of the temperature, the machine monitors the current passing through the laser diode (LD). The machine adjusts the current to the laser diode by comparing it with the reference level from the reference circuit.
This auto power control is done just after the machine is turned on and during printing.

The laser diode power is adjusted on the production line.

NOTE: Do not touch the variable resistors on the LD unit in the field.

6.6.3 LD SAFETY SWITCH



B039D906.WMF

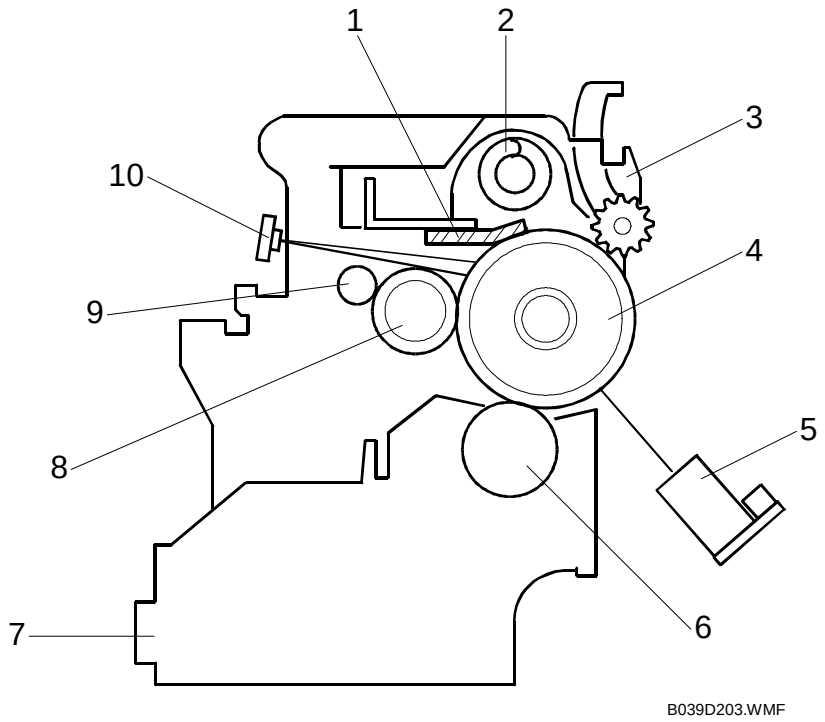
To ensure technician and user safety and to prevent the laser beam from inadvertently switching on during servicing, there are safety switches at the front and right covers.

When the front cover or the right cover is opened, the power supply to the laser diode is interrupted.

The switches are installed on the +24V line coming from the power supply unit, then the +5VLD is generated from the +24V supply after it goes through the interlock switches.

6.7 PHOTOCONDUCTOR UNIT (PCU)

6.7.1 OVERVIEW

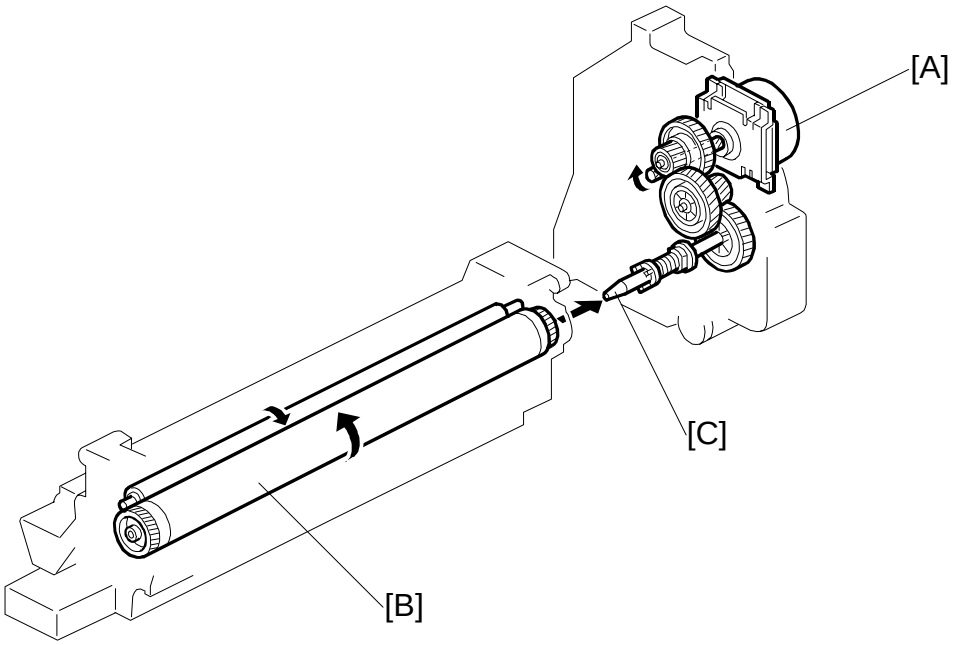


The PCU consists of the components shown in the above illustration. An organic photoconductor (OPC) drum (diameter: 30 mm) is used in this machine.

1. Cleaning Blade
2. Toner Collection Coil
3. Pick-off Pawl
4. OPC Drum
5. ID Sensor (see note)
6. Development Roller
7. Development Unit
8. Charge Roller
9. Charge Roller Cleaning Brush
10. Quenching Lamp (see note)

NOTE: The ID sensor and quenching lamp are not included in the PCU.

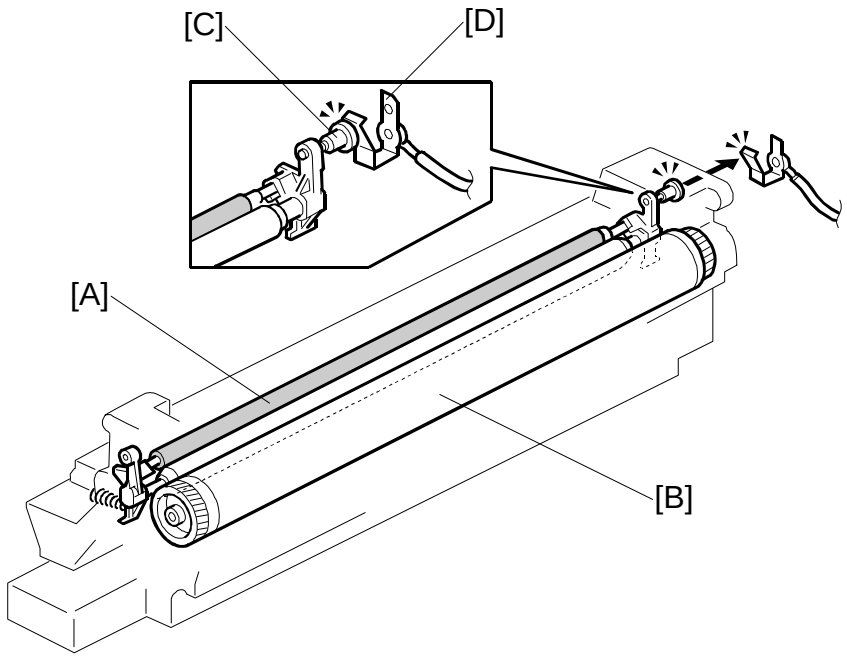
6.7.2 DRIVE



The main motor [A] drives the drum [B] through a series of gears and the drum drive shaft [C]. The main motor assembly includes a drive controller, which outputs a motor lock signal when the rotation speed is out of the specified range.

6.8 DRUM CHARGE

6.8.1 OVERVIEW



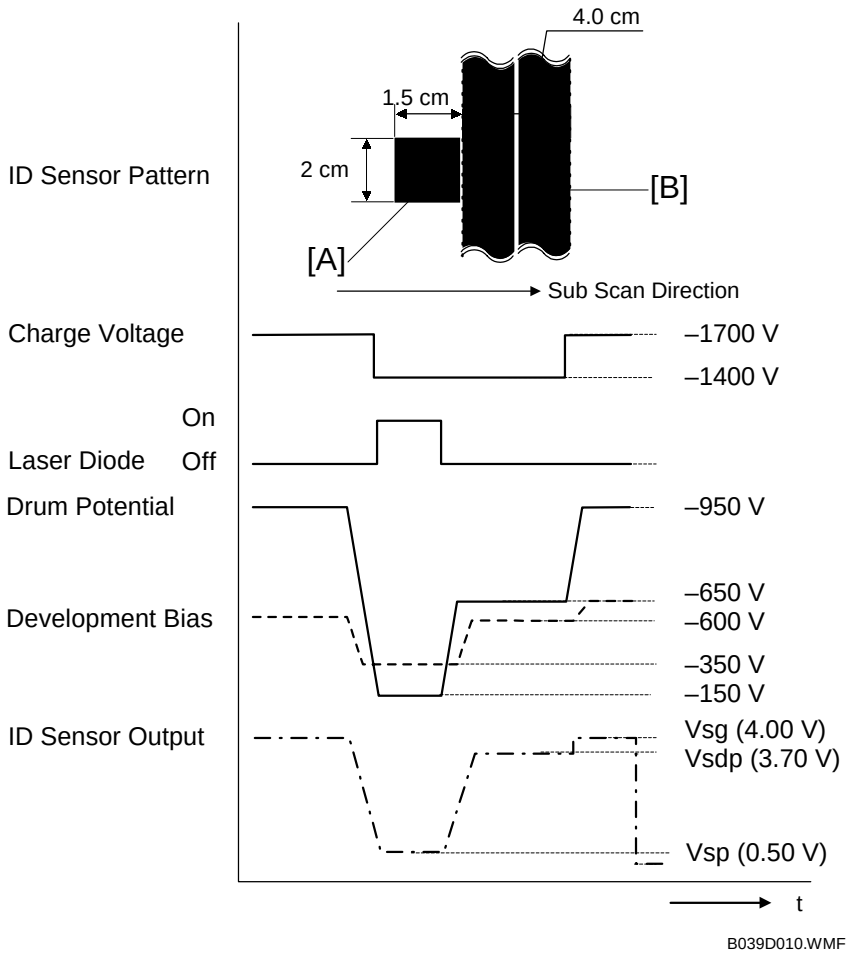
B039D205.WMF

This copier uses a drum charge roller to charge the drum. The drum charge roller [A] always contacts the surface of the drum [B] to give it a negative charge of –950 V.

The high voltage supply board gives a negative charge of –1700 V to the drum charge roller through the screw [C] and terminal plate [D]. This voltage can be changed using SP2-001-1.

6.8.2 CHARGE ROLLER VOLTAGE CORRECTION

Correction for Environmental Conditions



With a drum charge roller system, the voltage transferred from roller to drum varies with the temperature and humidity around the drum charge roller. The higher the temperature or humidity is the higher the applied voltage required.

To compensate, the machine uses the ID sensor to measure the effects of current environmental conditions. For this measurement, the process control parameters are balanced so that any small change in drum potential caused by environmental effects is reflected in a change in the amount of toner transferred to the drum.

This measurement is made immediately after the ID sensor pattern for toner density control. Immediately after making ID sensor pattern [A], the charge roller voltage stays the same, but the development bias goes up to –600 V; as a result the drum potential is reduced to –650 V. The laser diode is not switched on, and the drum potential is now slightly higher than the development bias, so a very small amount of toner transfers to the drum. The ID sensor measures the density of this pattern [B], and the output voltage is known as Vsdp. This voltage is compared with Vsg (read from the bare drum at the same time).

If the humidity drops, the drum potential goes up (to a higher –ve voltage) even if the charge roller voltage supply stays the same (efficiency of voltage transfer is higher with lower humidity). As a result, less toner is transferred to ID sensor pattern [B]. If the sensor output reaches a certain point, the drum charge voltage will be reduced.

To determine whether to change the drum charge roller voltage, the machine compares Vsdp with Vsg.

- Vsdp/Vsg > 0.95 = Make the drum charge voltage less –ve (smaller) by 50 V
- Vsdp/Vsg < 0.90 = Make the drum charge voltage more –ve (larger) by 50 V

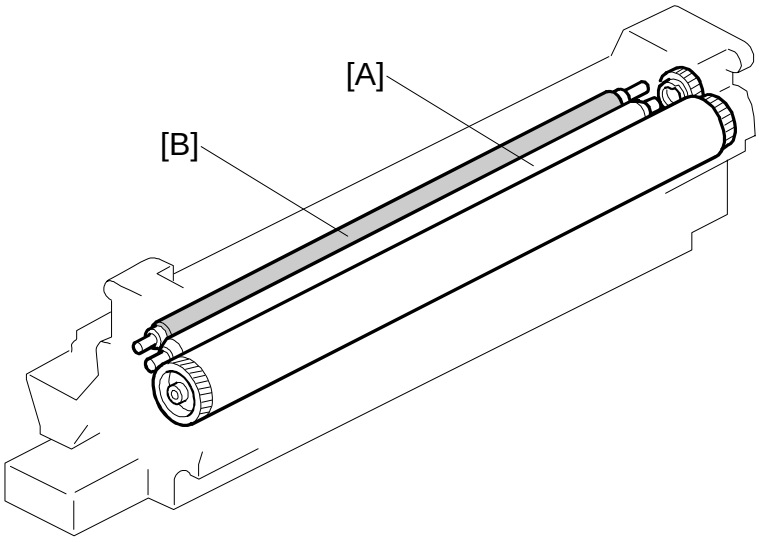
6.8.3 ID SENSOR PATTERN PRODUCTION TIMING

The ID sensor pattern is not made every page or every job.

It is only made in the following conditions:

- During warm-up at power on
- If the machine starts warming up after a certain time (default: 90 minutes) has passed since entering night/off mode or low power mode.
  The 90-minute interval can be changed using SP2-995.

6.8.4 DRUM CHARGE ROLLER CLEANING

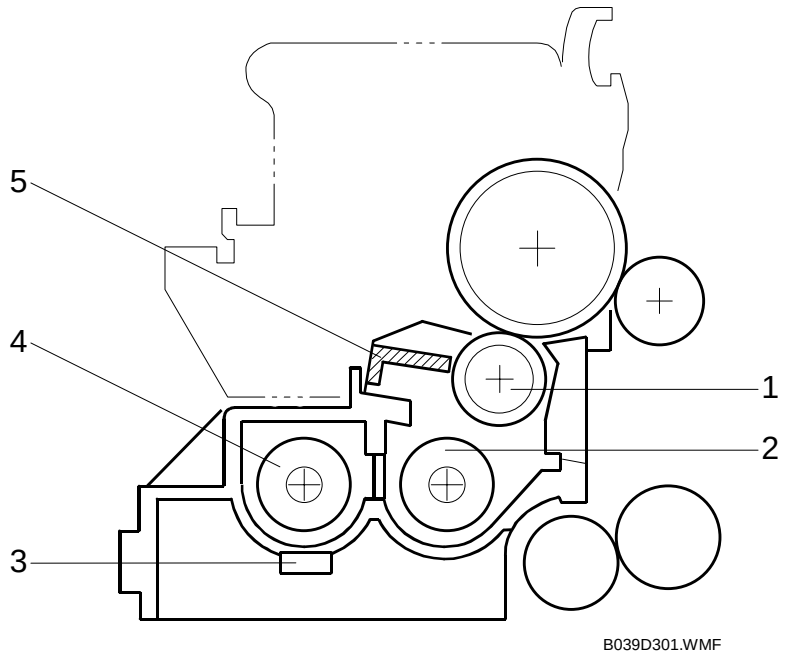


B039D201.WMF

Because the drum charge roller [A] always contacts the drum, it gets dirty easily. So, the cleaning brush [B] also contacts the drum charge roller all the time to clean the surface of the drum charge roller.

6.9 DEVELOPMENT

6.9.1 OVERVIEW



The development unit consists of the following parts.

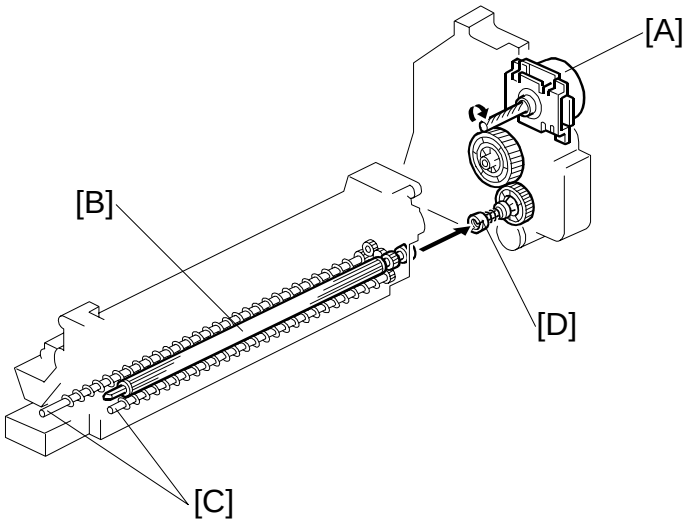
1. Development roller
2. Mixing auger 2
3. TD sensor
4. Mixing auger 1
5. Doctor blade

This machine uses a single-roller development system. Two mixing augers mix the developer. The toner density (TD) sensor and image density (ID) sensor (see the illustration in the PCU section) are used to control the image density on the copy.

6.9.2 DRIVE

The main motor [A] drives the development roller [B] and mixing augers [C] through a train of gears and the development drive shaft [D]. When the PCU is pushed in, the development drive shaft engages the development roller gear.

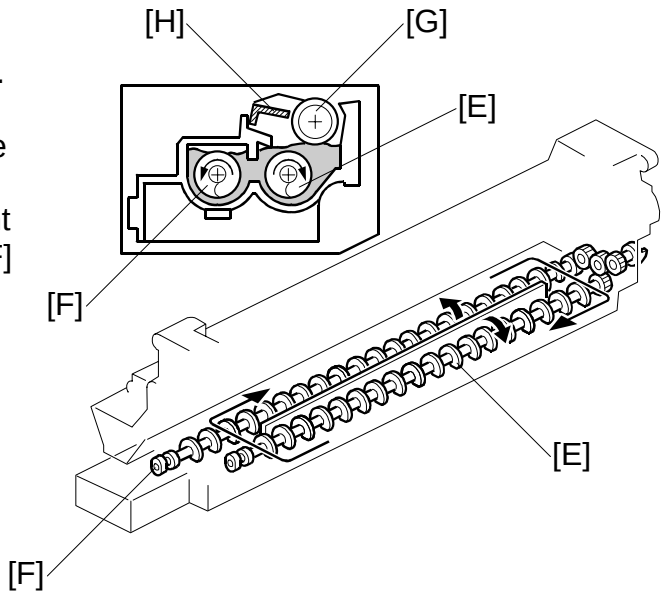
The development drive gears (except for the gears in the development unit) are helical gears. These gears are quieter than normal gears.



B039D304.WMF

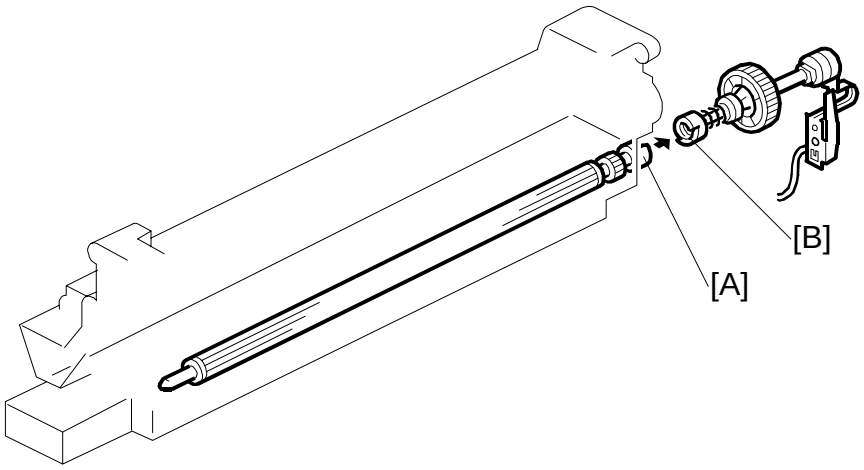
6.9.3 DEVELOPER MIXING

The two mixing augers, [E, F] keep the developer evenly mixed. Mixing auger 2 [E] transports excess developer, scraped off the development roller [G] by the doctor blade [H], towards the front of the machine. Mixing auger 1 [F] returns the excess developer, along with new toner, to the rear of the mixing assembly. Here the developer is reapplied to the development roller.



B039D302.WMF

6.9.4 DEVELOPMENT BIAS



B039D303.WMF

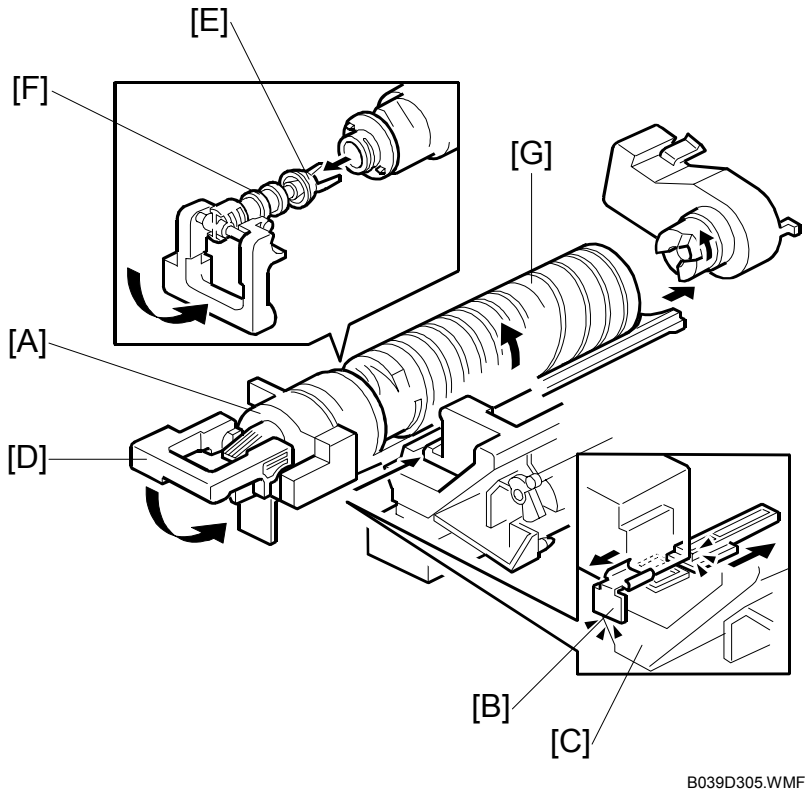
This machine uses a negative-positive development system, in which black areas of the latent image are at a low negative charge (about –154 ± 50 V) and white areas are at a high negative charge (about –950 V).

To attract negatively charged toner to the black areas of the latent image on the drum, the high voltage supply board applies a bias of –650 volts to the development rollers throughout the image development process. The bias is applied to the development roller shaft [A] through the drive shaft [B].

The development bias voltage (–650 V) can be adjusted with SP2-201-1.

6.9.5 TONER SUPPLY

Toner Bottle Replenishment Mechanism



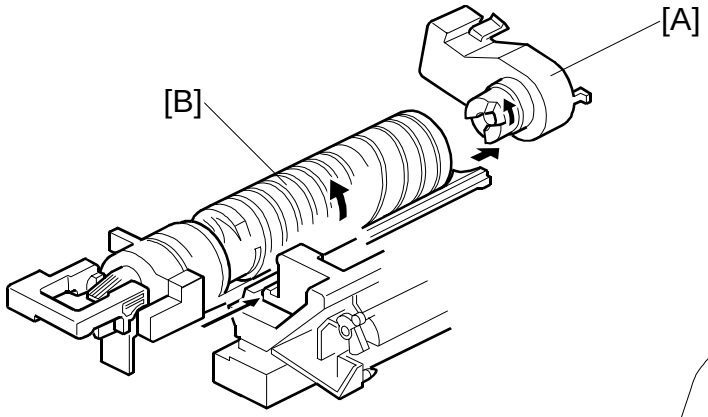
When a toner bottle is placed in the bottle holder unit [A] and the unit is pushed in completely, toner shutter [B] moves against the side [C] of the PCU. When the toner bottle holder lever [D] is put back in the original position, the cap [E] on the toner bottle is pulled away and kept in place by the chuck [F].

The toner supply mechanism transports toner from the bottle to the development unit. The toner bottle has a spiral groove [G] that helps move toner to the development unit.

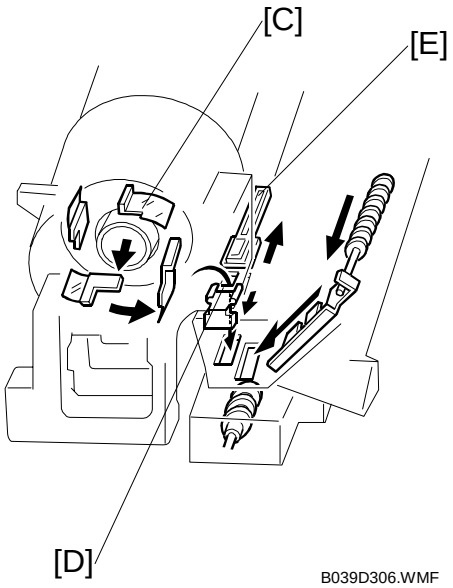
To add a new toner bottle, first lift the toner bottle holder. When this is done, the chuck releases the toner bottle cap into its proper position to prevent toner from scattering.

Then, when the bottle holder unit is pulled out to add a new toner bottle, the toner shutter shuts to block the opening as a result of pressure from a spring.

Toner Supply Mechanism



B039D508.WMF



B039D306.WMF

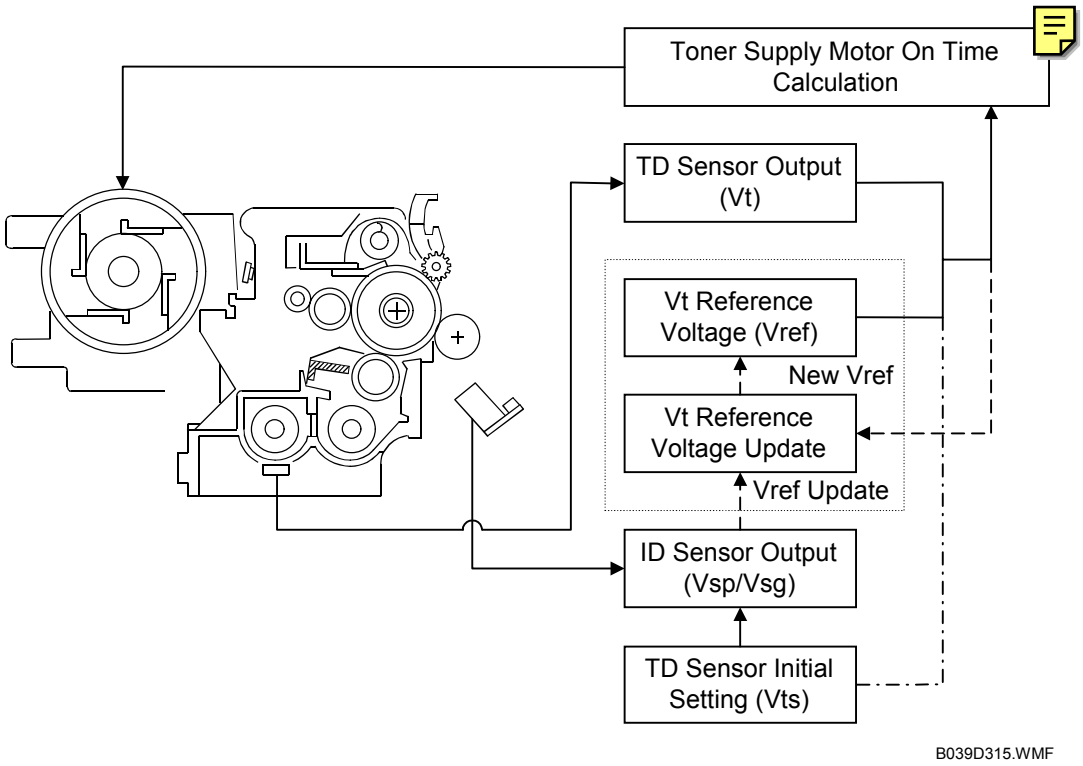
The toner supply motor [A] drives the toner bottle [B] and the mylar blades [C]. First, the toner falls down into the toner bottle holder. The toner supply mylar blades transfer the toner to the slit [D]. When the PCU is installed in the machine, the shutter [E] above the PCU is opened by the toner bottle holder. Then the toner falls down into the development unit through the slit and the shutter.

6.9.6 TONER DENSITY CONTROL

Overview

There are four modes for controlling toner supply as shown in the following tables, which can be changed with by SP2-921. The factory setting is sensor control 1 mode.

Basically, the toner concentration in the developer is controlled using the standard TD sensor voltage (Vts), toner supply reference voltage (Vref), actual TD sensor output voltage (Vt), and ID sensor output data (Vsp/Vsg).



The four toner density control modes are as follows.

Mode	Sensor control 1 (SP2-921, “0”): Normally use this setting only
Toner supply decision	Compare Vt with a reference voltage (Vts or Vref)
Toner control process	Toner is supplied to the development unit when Vt is higher than the reference voltage (Vts or Vref). This mode keeps the Vref value for use with the next toner density control. Vts is used for the first toner density control after a new PCU has been installed, until it has been corrected with the ID sensor output. Vref is used after Vts has been corrected with the ID sensor output voltage (corrected during the first toner density control for a new PCU).
Toner supply amount	Varies
Toner end detection	Performed

Mode	Sensor control 2 (SP2-921, “1”): For designer’s use only; do not use in the field
Toner supply decision	Compare Vt with a reference voltage (Vts)
Toner control process	This toner control process is the same as sensor control 1 mode. However, the reference voltage used is always Vts.
Toner supply amount	Varies
Toner end detection	Performed

Mode	Fixed control 1 (SP2-921, “2”): For designer’s use only; do not use in the field
Toner supply decision	Compare Vt with a reference voltage (Vts or Vref)
Toner control process	This toner control process is the same as sensor control 1 mode.
Toner supply amount	Fixed (SP2-925)
Toner end detection	Performed

Mode	Fixed control 2 (SP2-921, “3”): Use temporarily if the TD sensor needs to be replaced
Toner supply decision	None
Toner control process	Toner is supplied every printed page regardless of Vt.
Toner supply amount	Fixed (SP2-925)
Toner end detection	Not performed

Toner Density Sensor Initial Setting

The TD sensor initial setting (SP2-214: Developer Initialize) procedure must be done after replacing the developer. During TD sensor initial setting, the TD sensor is set so that the TD sensor output is the value of SP2-926 (default: 2.4 V). This value will be used as the standard reference voltage (Vts) of the TD sensor.

Toner Concentration Measurement

The toner concentration in the developer is detected once every copy cycle. The sensor output voltage (Vt) during the detection cycle is compared with the standard reference voltage (Vts) or the toner supply reference voltage (Vref).

Vsp/Vsg Detection

The ID sensor detects the following voltages.

- Vsg: The ID sensor output when checking the drum surface
- Vsp: The ID sensor output when checking the ID sensor pattern

In this way, the reflectivity of both the drum surface and the pattern on the drum are checked, compensating for any variations in the reflectivity of the pattern on the drum or the reflectivity of the drum surface.

The ID sensor pattern is made on the drum by the charge roller and laser diode.

Vsp/Vsg is not detected every page or job; it is detected at the following times to decide Vref.

- During warm-up at power on
- If the machine starts warming up after a certain time (default: 90 minutes) has passed since entering night mode or low power mode
  The 90-minute interval can be changed using SP2-995.

Toner Supply Reference Voltage (Vref) Determination

The toner supply reference voltage (Vref) is used for toner supply determination (see below). Vref is determined using the following data:

- ID sensor output (Vsp/Vsg)
- (Vts or the current Vref) - Vt

Toner Supply Determination

The reference voltage (Vts or Vref) is the threshold voltage for determining whether or not to supply toner. If Vt becomes greater than the reference voltage, the machine supplies additional toner.

This can be checked using SP2-220.

Toner Supply Motor On Time Determinations

For fixed control mode, the toner supply motor on time is specified by the setting of SP2-925, and does not vary. The default setting is 200 ms for each copy. The toner supply motor on time for each value of SP2-925 is as follows.

Value of SP2-925	Motor On Time (t = 200 ms)
0	t
1	2t
2	4t
3	8t
4	12t
5	16t
6	Continuously
7	Not supplied

For sensor control modes 1 and 2, the toner supply motor on time is decided by the following factors.

- Vt
- Vref or Vts
- TD sensor sensitivity (coefficient: S, value is 0.4)

There are seven levels for toner supply motor on time as shown below.

Level	Decision	Motor On Time (seconds)
1	(Vts or Vref) < Vt ≤ (Vts or Vref) + S/16	t (0.4)
2	(Vts or Vref) < Vt ≤ (Vts or Vref) + S/8	t x 2 (0.8)
3	(Vts or Vref) < Vt ≤ (Vts or Vref) + S/4	t x 4 (1.6)
4	(Vts or Vref) < Vt ≤ (Vts or Vref) + S/2	t x 8 (3.2)
5	(Vts or Vref) < Vt ≤ (Vts or Vref) + 4S/5	t x 16 (6.4)
6	Vt ≥ (Vts or Vref) + 4S/16 (near-end)	T (30); see note 3
7	Vt ≥ (Vts or Vref) + S (toner end)	T (30); see note 3

NOTE: 1) The value of “t” can be changed using SP2-922 (default: 0.4 second)
2) The value of “T” can be changed using SP2-923 (default: 30 seconds)
3) T (30) means that toner is supplied intermittently in a 1/3 duty cycle (1 s on, 2 s off) for 30 seconds

6.9.7 TONER SUPPLY IN ABNORMAL SENSOR CONDITIONS

ID Sensor

Readings are abnormal if any of the following conditions occur:

- Vsg $\leq$ 2.5V
- Vsg < 3.5V when maximum power (979) is applied
- Vsp $\geq$ 2.5V
- (Vsg – Vsp) < 1.0V
- Vt $\geq$ 4.5V or Vt $\leq$ 0.2V

The above ID sensor values can be checked using SP2-221.

When this is detected, the machine changes the value of Vref to 2.5 V then does the toner density control process (in a similar way to sensor control mode 2).

No SC code is generated if the ID sensor is defective.

TD Sensor

The TD sensor output is checked every copy. If the readings from the TD sensor become abnormal, the machine changes the toner density control mode to fixed supply mode 2, and the toner supply amount per page is always 200 ms, regardless of the value of SP2-925. If the machine detects the TD sensor error condition 10 times consecutively, an SC code is generated (SC390) and the machine must be repaired.

6.9.8 TONER NEAR END/END DETECTION AND RECOVERY

The toner near end and end conditions are detected using the Vt and Vref values, in a similar way to toner density control.

This is done in all toner supply modes except for fixed mode 2, when toner end is not detected.

Toner Near End Detection

If Vt is at level 6 (see the table on the previous page) five times consecutively, the machine enters the toner near end condition and the toner end indicator starts blinking. Then the machine supplies toner for a certain time, which depends on the setting of SP2-923 (see the previous page).

Toner Near End Recovery

If the machine detects "Vt < (Vref or Vts) + 4S/5" twice consecutively in any of the following situations, the machine clears the toner near end condition.

- While in the toner recovery cycle (supplying toner on and off for 30 s—see the previous page) after the machine has detected a toner near end condition.
- During copying in the toner near end condition.
- If the front cover is opened and closed for more than 10 seconds while a toner near end condition exists.

Toner End Detection

There are two situations for entering the toner end condition.

- When Vt is level 7 three times consecutively, the machine enters the toner end condition.
- When 50 copies have been made since entering the toner near end condition. The number of copies between toner near-end and toner end can be changed using SP2-213.

Toner End Recovery

While turning on the main switch, if the front cover is opened for 10 seconds or more and then closed while a Toner End condition exists (following toner bottle replacement), the machine clears the Toner End condition. The recovery procedure is the same as for toner near end. It takes about two minutes.

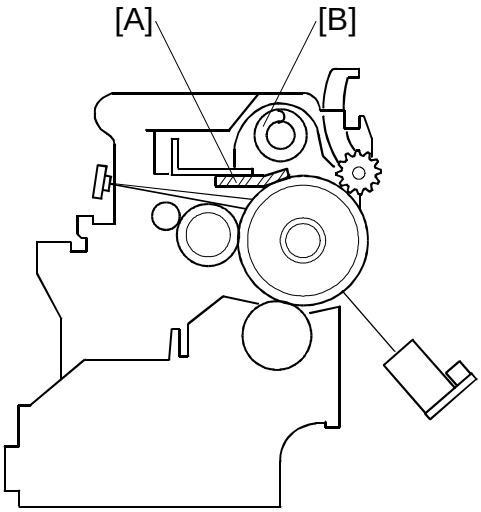
6.10 DRUM CLEANING AND TONER RECYCLING

6.10.1 DRUM CLEANING

The cleaning blade [A] removes any toner remaining on the drum after the image is transferred to the paper. This model uses a counter blade system.

The cleaning blade scrapes off toner remaining on the drum. When toner builds up in the cleaning unit, toner at the top of the pile is removed by the toner collection coil [B].

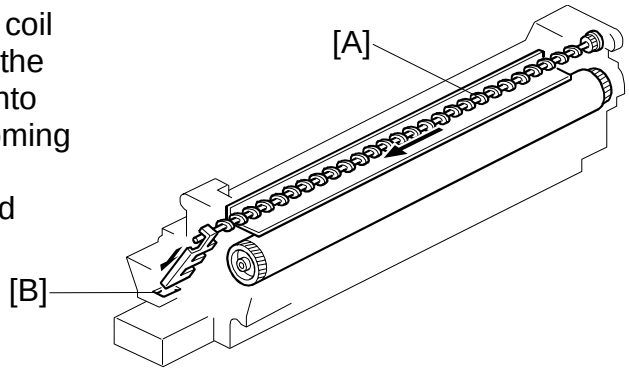
To remove the toner and other particles that are accumulated at the edge of the cleaning blade, the drum turns in reverse for about 5 mm at the end of every copy job.



B039D203.WMF

6.10.2 TONER RECYCLING

Toner picked up by the toner collection coil [A], is transported to the opening [B] in the side of the PCU. Then, this toner falls into the development unit with new toner coming from the toner bottle and it is all mixed together by mixing auger 1 [C] and used again.



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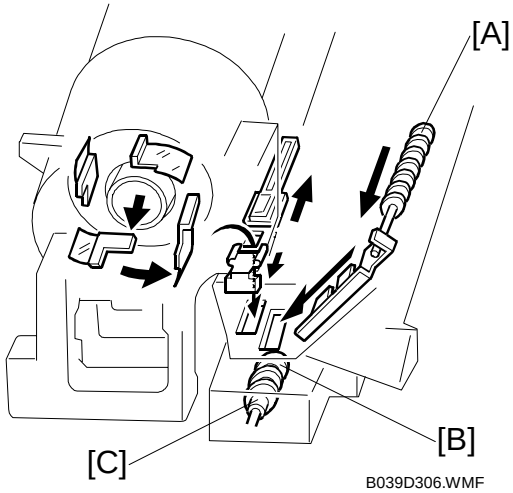

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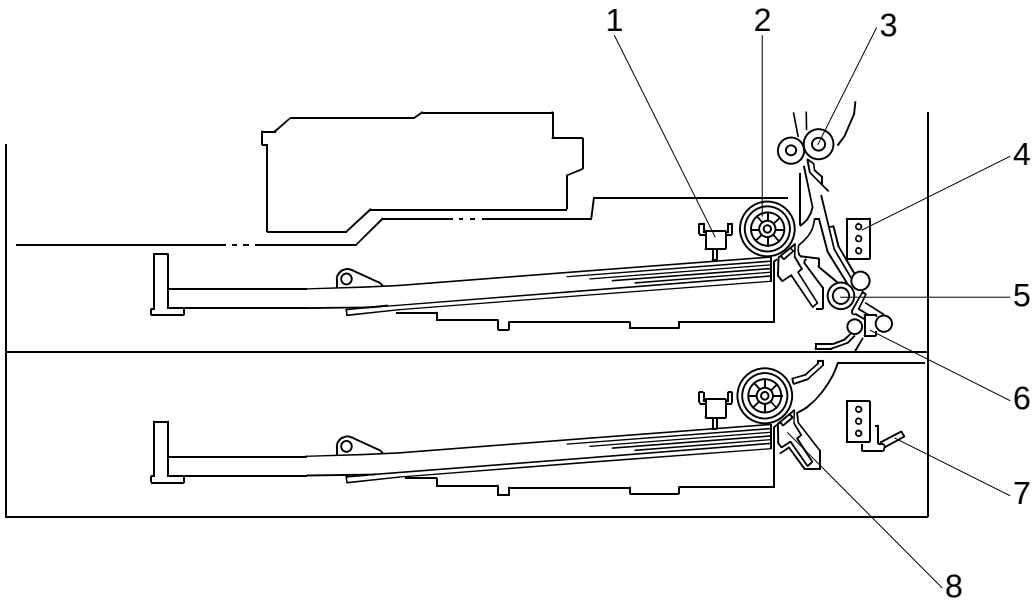
6.11 PAPER FEED

6.11.1 OVERVIEW



B039D701.WMF

There are one or two paper trays, each of which can hold 250 sheets.

The paper tray feed stations use a friction pad system. To prevent paper from getting caught inside the machine when the tray is pulled out, the paper feed roller and shaft do not separate from the tray when the tray is pulled out.

The two relay sensors are used for paper jam detection. The lower one detects jams when paper is fed up from the optional paper feed unit.

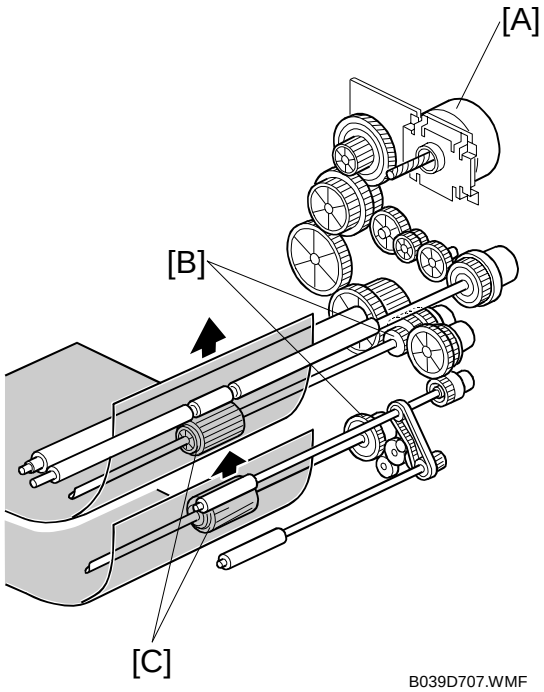
The components of the paper feed station are as follows.

1. Paper End Sensor
2. Paper Feed Roller
3. Registration Roller
4. Paper Size Switch
5. Upper Relay Roller
6. Upper Relay Sensor
7. Lower Relay Sensor
8. Friction Pad

6.11.2 PAPER FEED DRIVE MECHANISM

The main motor [A] drives the pick-up and feed mechanism of both the first and second paper trays. The paper feed clutches [B] transfer drive from this motor to the paper feed rollers [C].

When the paper feed clutch turns on, the feed roller starts to feed the paper. The paper feed clutch stays on until shortly after the registration sensor has been activated.

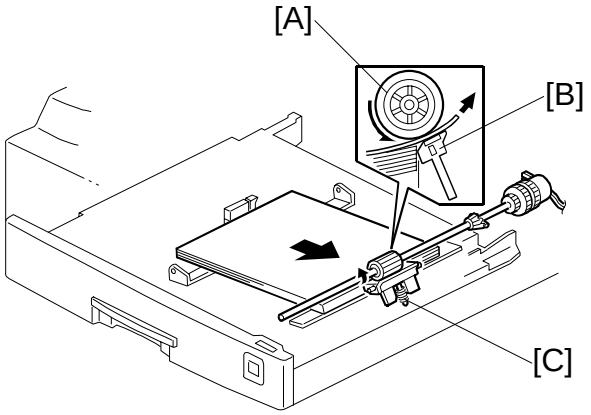


B039D707.WMF

6.11.3 PAPER FEED AND SEPARATION MECHANISM

The paper feed roller [A] drives the top sheet of paper from the paper tray to the copier. The friction pad [B] allows only one sheet to feed at a time. The friction pad applies pressure to the feed roller with a spring [C].

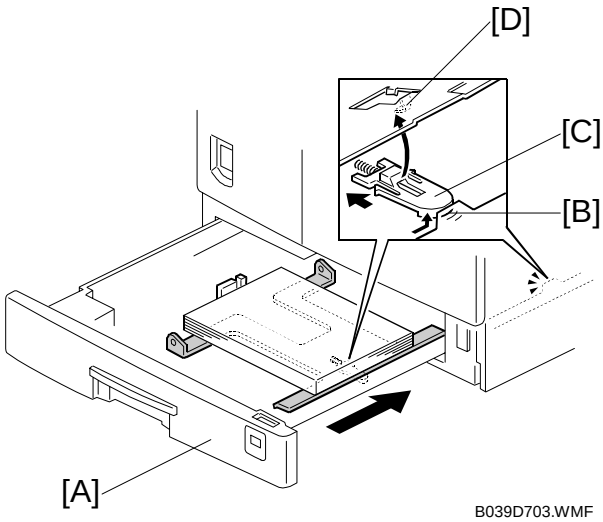
The friction pad pressure cannot be adjusted.



B039D702.WMF

6.11.4 PAPER LIFT MECHANISM

When the paper tray [A] is closed, projection [B] on the copier frame pushes slider [C] (on the bottom part of the paper tray) off the bottom plate hook [D]. After the release slide comes off, compressed springs lift the bottom plate.



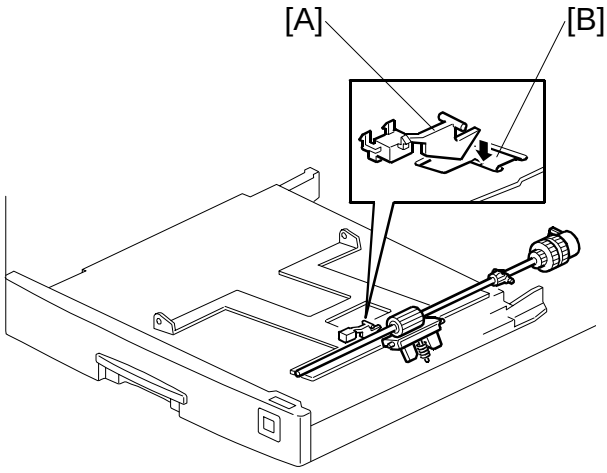
B039D703.WMF

6.11.5 PAPER END DETECTION

If there is any paper in the paper tray, the paper stack lifts the feeler, the paper end sensor [A] is deactivated.

When the paper tray runs out of paper, the paper end feeler drops into the cutout [B] in the tray bottom plate and the paper end sensor is activated.

When the paper tray is drawn out with no paper in the tray, the shape of the paper end feeler causes it to lift up.



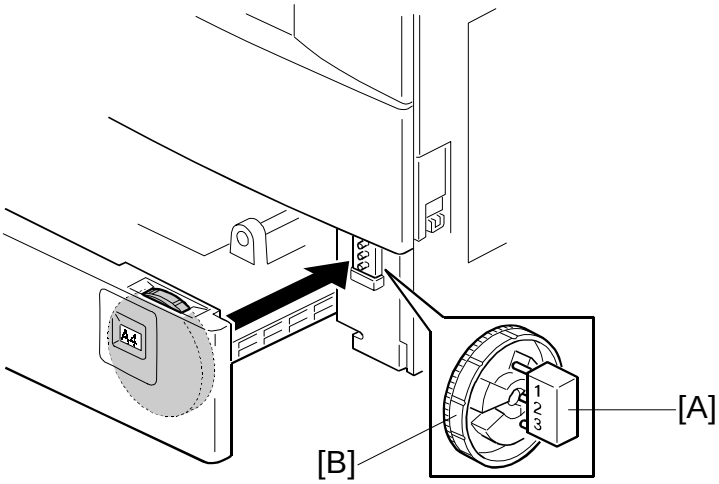
B039D706.WMF

6.11.6 PAPER SIZE DETECTION

Paper Tray

SW / Size	1	2	3
A3, 11" x 17"	❍	❍	❍
A4 LEF	●	●	❍
A4 SEF, 8 1/2" x 11"	●	❍	❍
A5 LEF, 8 1/2" x 14"	❍	●	●
8 1/2" x 13"	●	❍	●
11" x 8 1/2"	❍	●	❍
* (Asterisk)	❍	❍	●

●: ON (Not pushed)
❍: OFF (Pushed)



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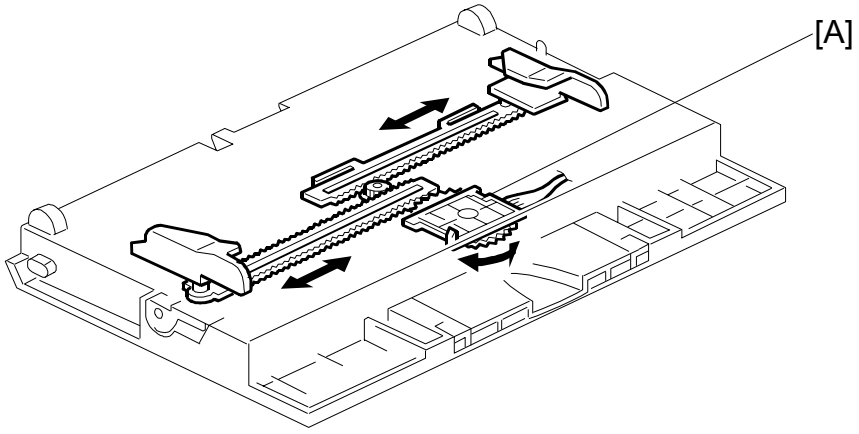
There are three paper size microswitches [A] on the front right plate of the paper tray unit. The switches are actuated by a paper size actuator [B] behind the paper size indicator plate, which is on the front right of the tray.

Each paper size has its own actuator, with a unique combination of notches. To determine which size has been installed, the CPU reads which microswitches the actuator has switched 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 Add Paper indicator will light.

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 User Tools. If the paper size for this position is changed without changing the User Tool setting, a paper jam will result.

By-pass Tray



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The by-pass feed paper size switch [A] monitors the paper width. The side fence is connected to the terminal plate gear. When the side fences move to match the paper width, the circular terminal plate rotates over the wiring patterns on the rectangular part of the paper size switch. The patterns for each paper width in the paper size switch are unique.

North America

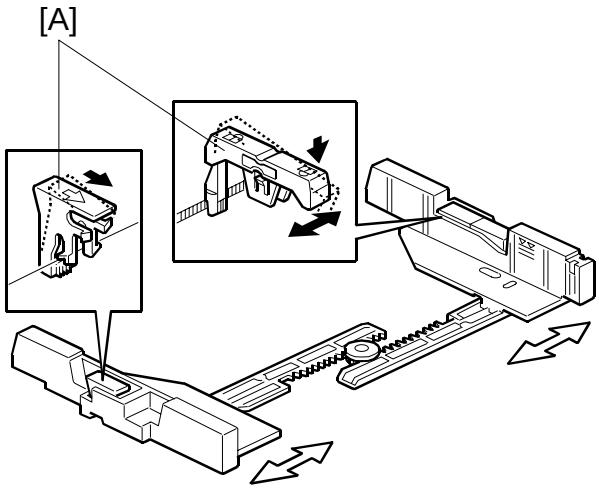
CN No. (IOB)	11" x 17"	8 1/2" x 11"	5 1/2" x 8 1/2"		
CN311-1	ON/OFF	OFF	OFF	OFF	OFF
CN311-2	OFF	OFF	OFF	ON	OFF
CN311-3 (GND)	OFF	OFF	OFF	OFF	OFF
CN311-4	OFF	ON	OFF	OFF	ON
CN311-5	ON	ON	OFF	OFF	OFF

Europe/Asia

CN No. (IOB)	A3	A4 SEF	8" x 13"	A5 SEF
CN311-1	ON/OFF	OFF	OFF	OFF
CN311-2	OFF	OFF	OFF	ON/OFF
CN311-3 (GND)	OFF	OFF	OFF	OFF
CN311-4	OFF	ON	ON	OFF
CN311-5	ON	ON	OFF	OFF

6.11.7 SIDE FENCES

If the tray is full of paper and it is pushed in strongly, the fences may deform or bend. This may cause the paper to skew or the side-to-side registration to be incorrect. To correct this, each side fence has a stopper [A] attached to it. Each side fence can be secured with a screw, for customers who do not want to change the paper size.



B039D705.WMF

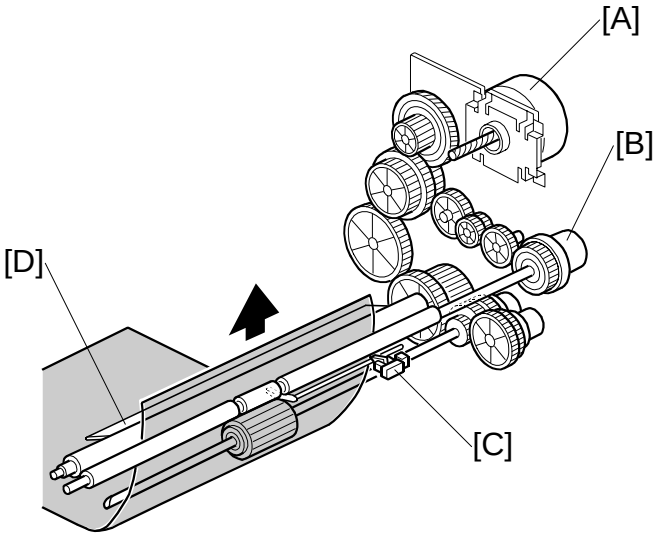
6.11.8 PAPER REGISTRATION

The drive from the main motor [A] is transmitted to the registration roller through the registration clutch gear [B].

The registration sensor [C] is used for correcting paper skew and for detecting paper misfeeds.

The cleaning mylar [D] contacts the registration roller. It removes paper dust from the registration roller so that this dust will not transfer into the development unit through the drum cleaning unit.

The amount of paper buckle at the registration roller to correct skew can be adjusted with SP1-003.

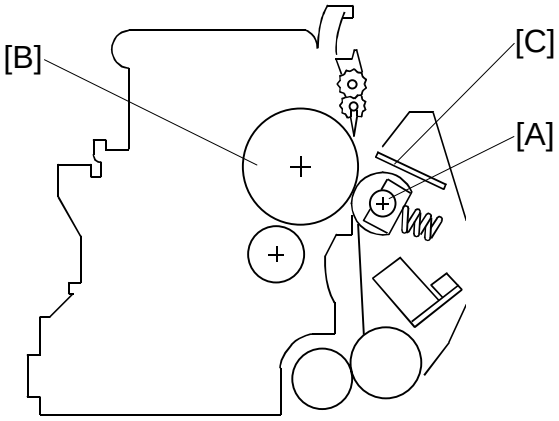


B039D709.WMF

If jams frequently occur after registration, SP1-903 can be used to activate the relay clutch so that the relay roller assists the registration roller in feeding the paper along. When feeding from the by-pass tray, the by-pass feed clutch is activated, turning the by-pass feed roller. This feature may be needed when feeding thick paper, and cannot be used for the first paper feed tray.

6.12 IMAGE TRANSFER AND PAPER SEPARATION

6.12.1 OVERVIEW



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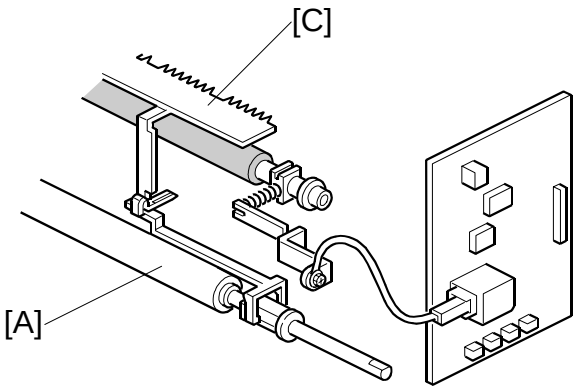
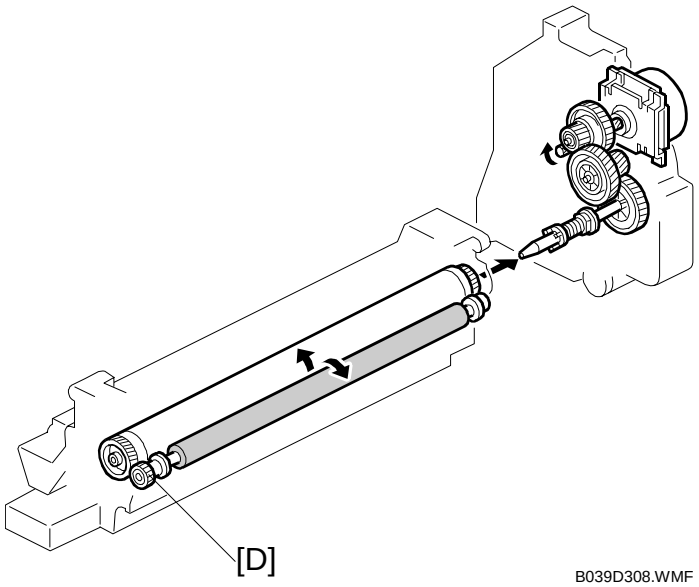


B039D401.WMF



B039D308.WMF

The transfer roller [A] touches the surface of the drum [B]. The high voltage supply board supplies a positive current to the transfer roller, which attracts the toner from the drum onto the paper. The current depends on the paper width, paper type, and paper feed tray.

The curvature of the drum and the discharge plate [C] help the paper to separate from the drum. The discharge plate is grounded.

Drive from the drum through a gear [D] turns the transfer roller.

6.12.2 IMAGE TRANSFER CURRENT TIMING

There are two transfer current levels: low and high. The image transfer procedure is as follows:

1. When the CPU receives the image writing start signal, the CPU instructs the high voltage supply board to supply +10μA (low transfer current level) to the roller. This prevents any positively charged toner on the drum surface from transferring to the transfer roller.
2. At a certain time after the low transfer current has been supplied to the roller, high transfer current is applied to the roller to transfer the toner to the paper (see the table below).
3. After the trailing edge of the paper has passed through the roller, transfer current turns off. In multiple copy mode, the transfer current shifts again to the low transfer current.

The high transfer current levels (default) are as shown in the following table. With SP2-301, the high transfer current level used for the paper feed trays, duplex tray, by-pass tray, and cleaning an be adjusted.

Paper Size	Paper Tray/ By-pass Tray (Normal)	By-pass Tray (Thick/OHP)	By-pass Tray (Special/ Envelope)	Duplex (2nd Side)
A3/A4 LEF	11 μA	10 μA	12 μA	9 μA
11" x 17"	16 μA	11 μA	13 μA	11 μA
B4/B5 LEF	11 μA	11 μA	13 μA	16 μA
8 1/2" x 11"	15 μA	15 μA	13 μA	17 μA
A4 SEF	13 μA	19 μA	25 μA	19 μA
B5 SEF	17 μA	20 μA	25 μA	20 μA
A5/A6/B6/5 1/2" x 8 1/2" SEF	17 μA	20 μA	25 μA	25 μA

Be careful when increasing the transfer current. This may cause a ghosting effect, in which part of the image at the top of the page is repeated lower down the page at a lower density. In the worst case, it may also damage the OPC drum.

6.12.3 TRANSFER ROLLER CLEANING

If the paper size is smaller than the image, or if a paper jam occurs during printing, toner may be transferred to the roller surface. To prevent the toner from transferring to the back side of the printouts, the transfer roller requires cleaning before the next printing run.

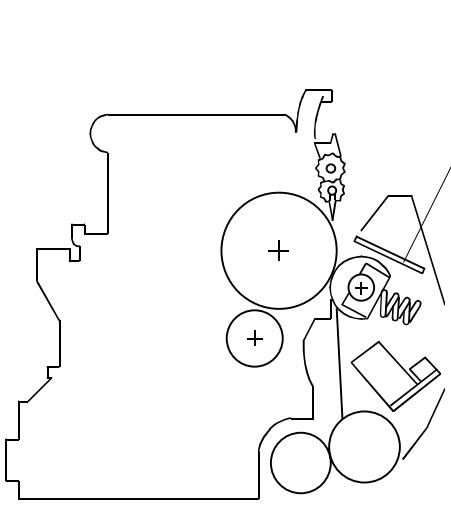
During transfer roller cleaning, the high voltage supply unit supplies a negative cleaning voltage (about –1 kV) to the transfer roller. Any negatively charged toner on the transfer roller is then transferred back to the drum. Then a positive cleaning current (+10 μA) is applied to the transfer roller to push back to the drum any positively charged toner on the transfer roller.

The machine goes through the cleaning mode in the following conditions:

- Before starting the printing job (only if enabled with SP2-996; note that the default setting is off)
- Just after the power is switched on.
- After a copy jam has been cleared
- After 10 or more sheets of paper have been copied and the copy job has finished.

Also, the transfer roller cleaning current can be adjusted using SP2-301-4.

6.12.4 PAPER SEPARATION MECHANISM



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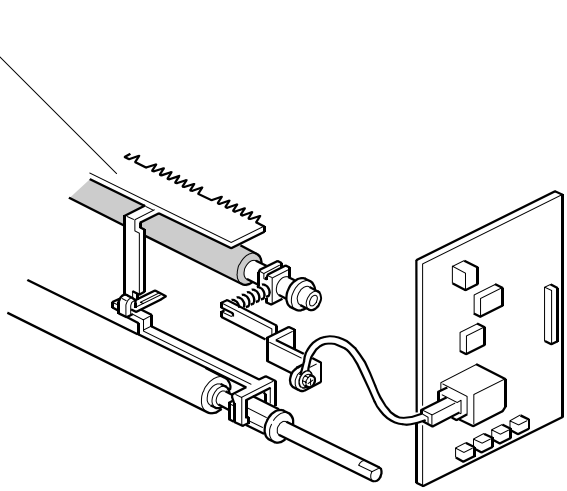


B039D401.WMF

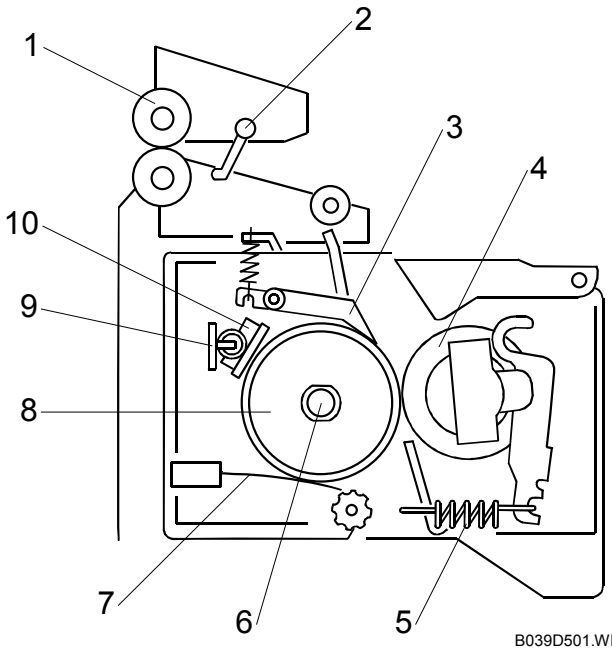
The discharge plate [A] and the drum curvature of the drum help the paper to separate away from the drum. The discharge plate is grounded.

6.13 IMAGE FUSING AND PAPER EXIT

6.13.1 OVERVIEW

The fusing unit and paper exit area consist of the following parts.

1. Paper exit roller
2. Exit sensor
3. Hot roller strippers
4. Pressure roller
5. Pressure spring
6. Fusing lamp
7. Thermistor
8. Hot roller
9. Thermofuse
10. Thermostat

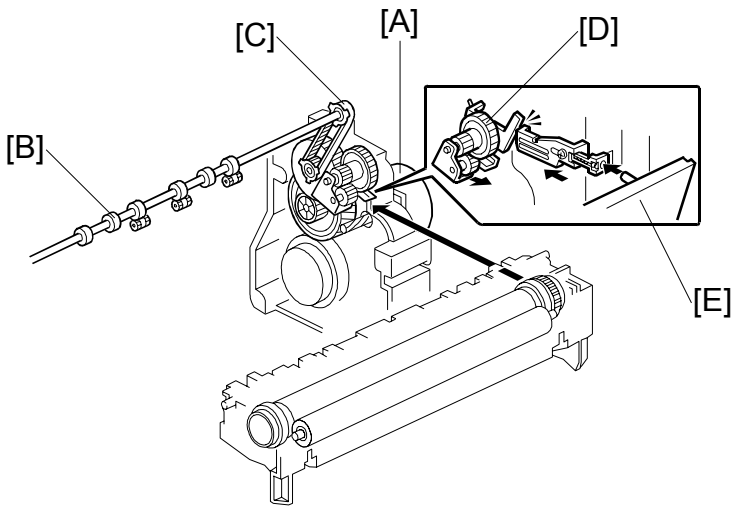


B039D501.WMF

6.13.2 FUSING DRIVE AND RELEASE MECHANISM

The main motor [A] drives the fusing unit through a gear train and drives the paper exit rollers [B] through a timing belt [C].

The fusing unit release mechanism automatically disengages the fusing unit drive gear [D] when the right cover [E] is opened. This allows the fusing unit drive gear to rotate freely so that misfed paper can easily be removed.

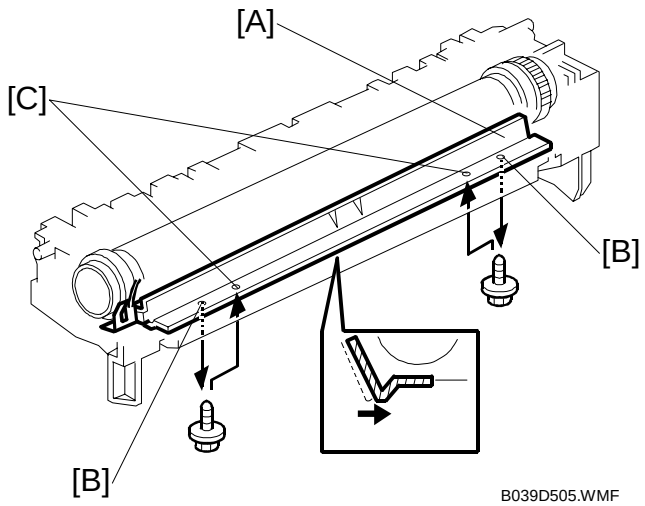


B039D554.WMF

6.13.3 FUSING ENTRANCE GUIDE SHIFT

The entrance guide [A] is adjustable for paper thickness to prevent creasing. The outer screw holes [B] on each side are used as the default setting.

If creasing occurs frequently in the fusing unit, adjust the entrance guide to the right, by securing it with the inner holes [C]. This allows more direct access to the gap between the hot roller and the pressure roller.

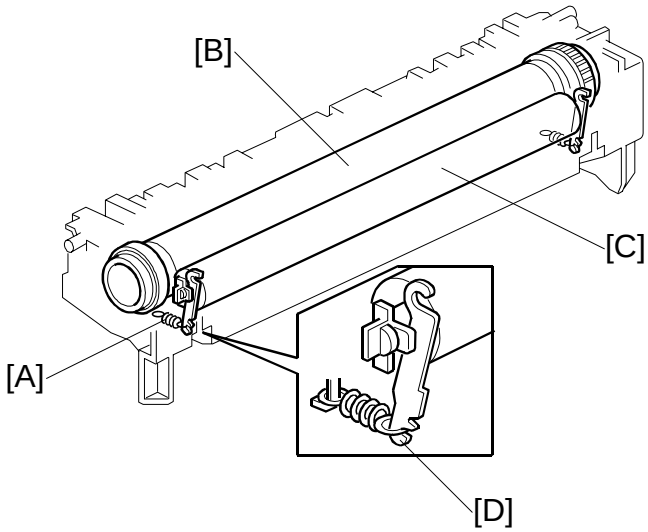


B039D505.WMF

6.13.4 PRESSURE ROLLER

The pressure springs [A] constantly apply pressure between the hot roller [B] and the pressure roller [C].

Applied pressure can be changed by adjusting the position of the pressure springs. The spring is positioned at the end [D] as the default setting.



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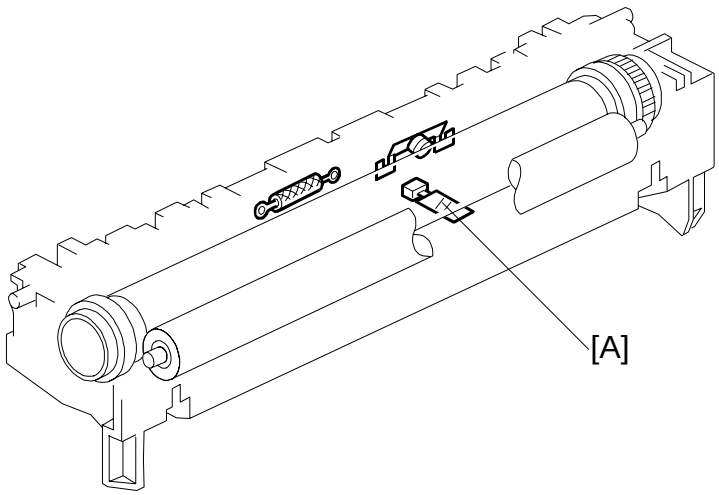
6.13.5 FUSING TEMPERATURE CONTROL

Overview



B039D506.WMF

The fusing temperature is controlled using the fusing thermistor [A].

The CPU checks the output from the fusing thermistor once a second. The CPU compares the current and previous temperature, then decides the power-on ratio for the next second. To maintain the target temperature, the CPU controls the fusing lamp power-on ratio as shown in the following table (the temperature control algorithm only works with whole numbers).

The fusing lamp works to maintain a target fusing temperature of 175°C during copying.

Initializing

Sampling cycle: 1 second
Soft start setting: 3 cycles

	Current minus Target				
Previous minus Current	**–3°C or less**	**–2°C or –1°C**	**0°C**	**+1°C or +2°C**	**+3°C or more**
–3°C or less	100%	50%	0%	0%	0%
From –2°C to –1°C	100%	50%	0%	0%	0%
0°C	100%	50%	0%	0%	0%
From +1°C to +2°C	100%	50%	0%	0%	0%
+3°C or more	100%	50%	0%	0%	0%

Ratio (%): The proportion of time that the fusing lamp power is on

Copying (North America Model)

Sampling cycle: 1 second
Soft start setting: 3 cycles

	Current minus Target				
Previous minus Current	**–3°C or less**	**–2°C or –1°C**	**0°C**	**+1°C or +2°C**	**+3°C or more**
-3°C or less	100%	100%	100%	100%	0%
From –2°C to –1°C	100%	70%	70%	70%	0%
0°C	100%	50%	30%	30%	0%
From +1°C to +2°C	100%	30%	0%	0%	0%
+3°C or more	100%	0%	0%	0%	0%

Ratio (%): The proportion of time that the fusing lamp power is on

Copying (Europe Model)

Sampling cycle: 1 second
Soft start setting: 10 cycles

	Current minus Target				
Previous minus Current	**–3°C or less**	**–2°C or –1°C**	**0°C**	**+1°C or +2°C**	**+3°C or more**
–3°C or less	100%	100%	100%	0%	0%
From –2°C to –1°C	100%	100%	100%	0%	0%
0°C	100%	100%	100%	0%	0%
From +1°C to +2°C	100%	100%	100%	100%	0%
+3°C or more	100%	100%	100%	100%	0%

Ratio (%): The proportion of time that the fusing lamp power is on

Standby

Sampling cycle: 1 second
Soft start setting: 3 cycles (Europe model: 20 cycles)

	Current minus Target				
Previous minus Current	**–3°C or less**	**–2°C or –1°C**	**0°C**	**+1°C or +2°C**	**+3°C or more**
–3°C or less	100%	100%	0%	0%	0%
From –2°C to –1°C	100%	100%	0%	0%	0%
0°C	100%	100%	0%	0%	0%
From +1°C to +2°C	100%	100%	100%	0%	0%
+3°C or more	100%	100%	100%	0%	0%

Ratio (%): The proportion of time that the fusing lamp power is on

Fusing Lamp Control

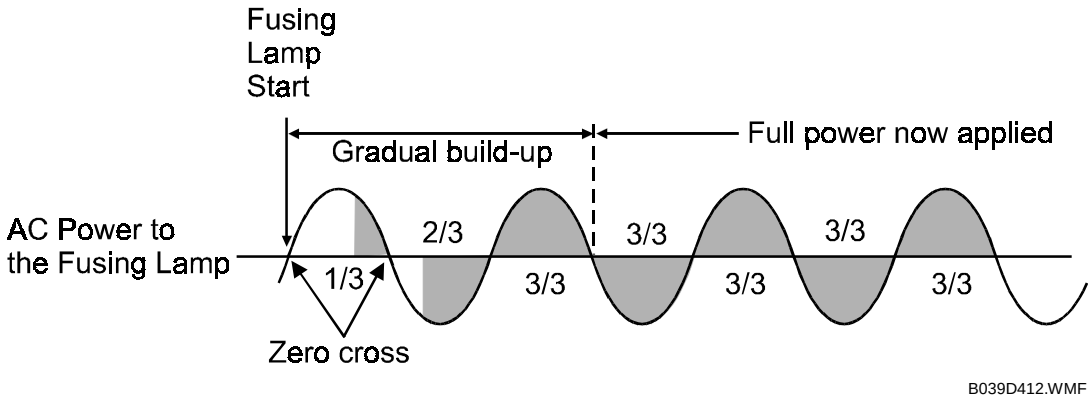
Turning on and off the fusing lamp power causes fluorescent light in the room to flicker. To reduce the flickering, use the following SP modes.

Fusing temperature detection cycle (SP1-108)
The CPU checks the output from the fusing thermistor once a second (default setting). The CPU compares the current and previous temperatures. Based on the result, it then decides how long the fusing lamp power should be on during the next one-second interval (also, if the current temperature is too high, the power will not be needed).

Starting and stopping the fusing lamp power every second causes fluorescent lighting in the room to flicker. To reduce this flickering, use SP1-108 to change the cycle from 1 second to 3 seconds.

Fusing soft-start (SP1-107)
In addition, whenever the fusing lamp power switches on, full power is applied to the fusing lamp gradually, not all at once. This prevents the power in the room from dropping suddenly. This feature is known as “Soft Start”. The machine does this by gradually allowing more power to the fusing lamp over a number of zero-cross cycles of the ac supply. The diagram below shows full power being applied gradually over the duration of 3 zero-cross cycles. With SP1-107, this number can be set to 3, 10, or 20. Soft start occurs every time the fusing lamp power switches on (i.e., at some time during every second), not just at the start of the print job.

NOTE: This SP mode is effective to counter flickering lights. However, generated noise increases if the setting is changed from the default. If a radio or a TV is close by the machine, the noise may have some effect on the image or sound.



Fusing Temperature Control for Thick Paper at the By-pass Tray

When thick paper mode is selected, the machine changes the target fusing temperature from 175°C to 185°C. When the by-pass tray is selected, the machine detects that the paper is thick. This setting can be changed with SP5-952.

Pre-heat Mode (Fusing Idling)

When the machine is powered on, or the front or right door is closed, the hot roller turns for 6 seconds.

If the SP1-103 setting is 1 (Yes), when the fusing thermistor detects a temperature lower than 100°C, the hot roller turns for 30 seconds (instead of for just 10 s) after the machine is powered on, or the right door is closed. This maintains conditions for fusing copies made on thick paper during cold weather conditions.

To Prevent Offset when Making Multiple Copies on Small-width Paper

This prevents the temperature at the ends of the hot roller from being higher than at the center.

If the smallest copy paper width detected during a 40 seconds interval is less than 220 mm, the machine lowers the target fusing temperature by 10°C.

Then, during the next 80 seconds, if the smallest width detected is less than 220 mm again, the machine lowers the target temperature by another 5°C.

Reduced Copy Speed with Narrow Paper

To ensure that images are properly fused onto paper 220 mm or less in width, the machine automatically reduces the copy speed under the following conditions:

- After 180 seconds of continuous copying
- When Thick or Special paper mode is used
- Paper is fed from the by-pass tray

Paper Size	Copy Speed Until 180 s	Copy Speed From 180 s
8 1/2" x 11" SEF (216 x 279)	14	9.3
8 1/2" x 13" (216 x 356)	12	8.4
A4 SEF (210 x 297)	14	9.3
A5 LEF (210 x 148)	20.5	11.9
B5 SEF (182 x 257)	16	10.2
A5 SEF (148 x 210)	18	11
5 1/2" x 8 1/2" SEF (140 x 216)	18	11
A6 SEF (105 x 148)	18	11

Copy speed is measured in copies/minute.

6.13.6 OVERHEAT PROTECTION

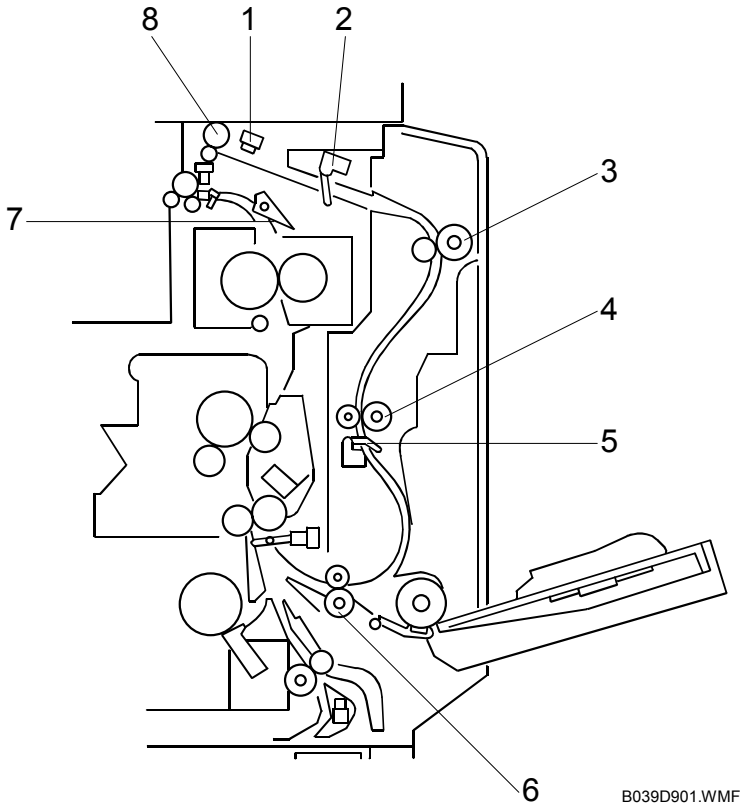
If the hot roller temperature becomes greater than 230°C for more than 1 second, the CPU cuts off the power to the fusing lamp. At this time, the LCD will display SC543.

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 180°C, the thermostat opens, cutting the power to the fusing lamp, and printing stops. At the same time, SC544 or 546 is generated. After resetting the SC, when turning on the main switch, SC541 will appear.

There is also a thermofuse to ensure overheat protection. If the temperature of the thermofuse reaches 172°C, the thermofuse opens, cutting the power to the fusing lamp. The thermofuse is farther from the hot roller than the thermostat, so it opens later than the thermostat.

6.14 DUPLEX UNIT

6.14.1 OVERALL

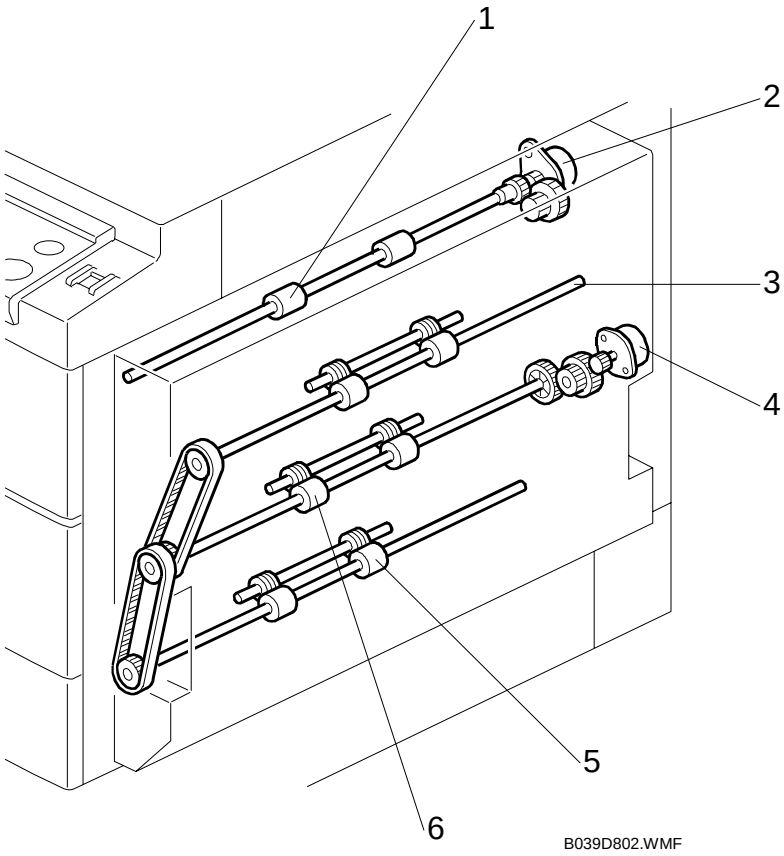


The printed page from the fusing unit goes straight through to the exit tray, or upward to the inverter section, depending on the position of the junction gate.

If the user selects duplex mode, the page is directed to the inverter tray, then reversed through the duplex unit, and back into the machine for printing the second side.

1. Duplex Inverter Sensor
2. Duplex Entrance Sensor
3. Upper Transport Roller
4. Middle Transport Roller
5. Duplex Exit Sensor
6. Lower Transport Roller
7. Junction Gate
8. Duplex Inverter Roller

6.14.2 DRIVE MECHANISM



1. Duplex Inverter Roller
2. Duplex Inverter Motor
3. Upper Transport Roller
4. Duplex Transport Motor
5. Lower Transport Roller
6. Middle Transport Roller

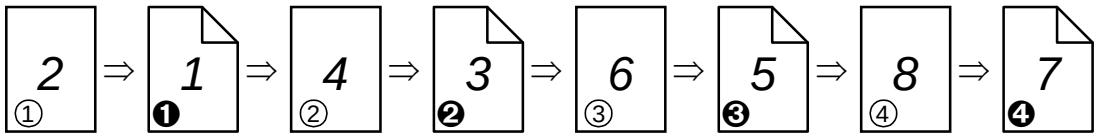
6.14.3 BASIC OPERATION

To increase the productivity of the duplex unit, copies are printed as follows.

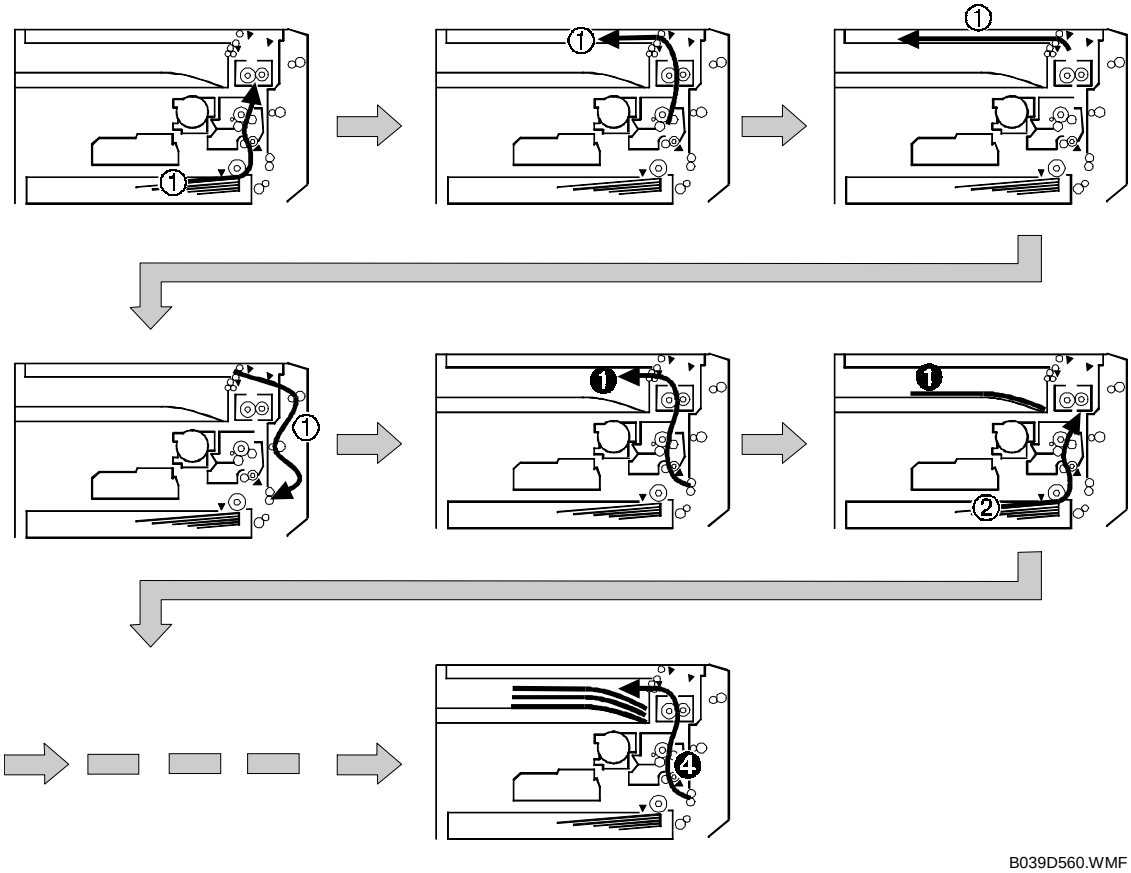
Larger than A4 Short-edge/LT Short-edge

The paper feed path can hold only one sheet of copy paper at a time.

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 black, this indicates the second side).



B039D563.WMF

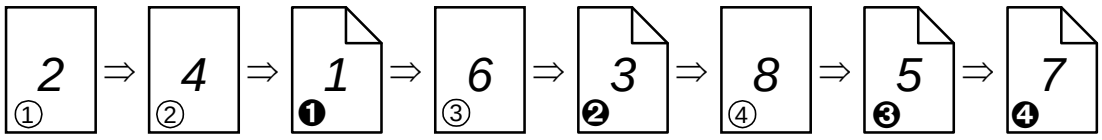


B039D560.WMF

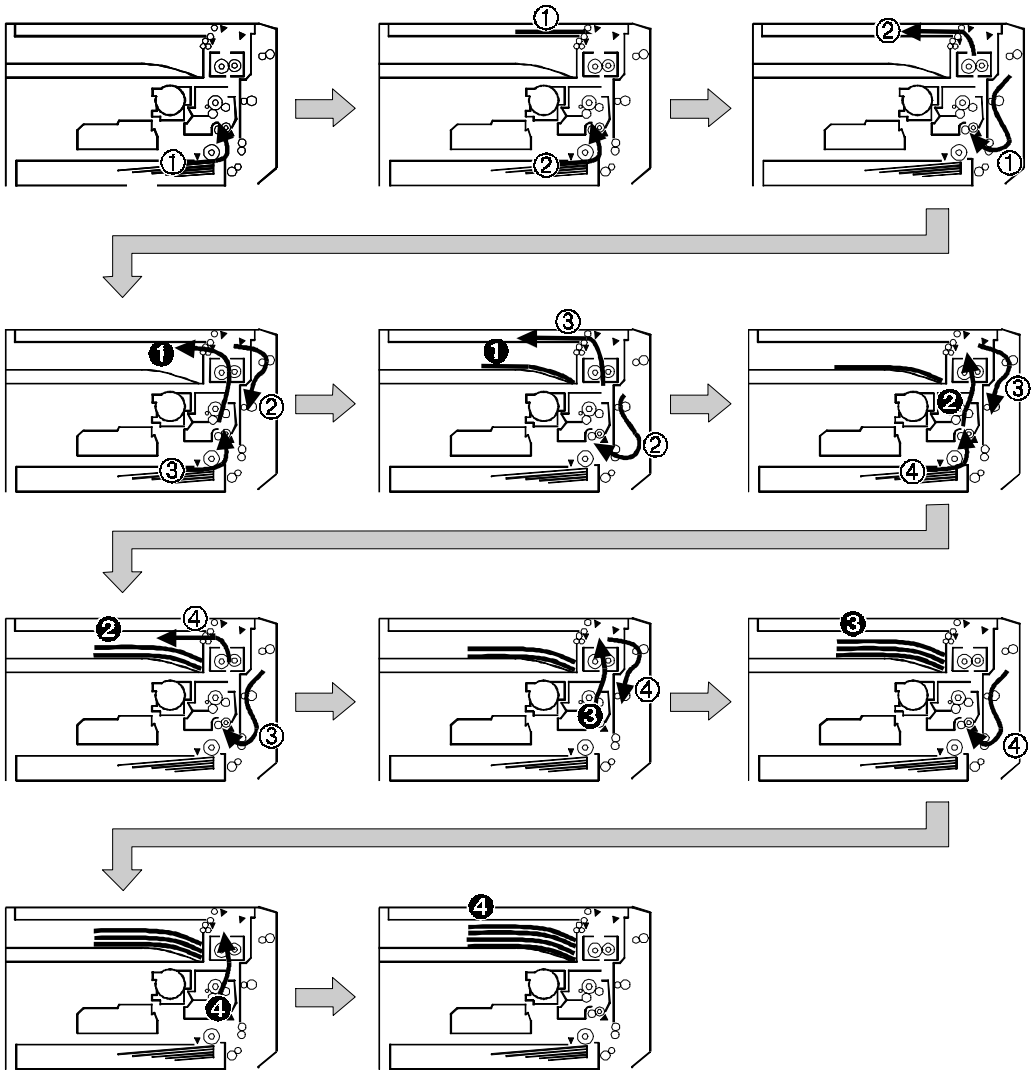
Up to A4 Short-edge/LT Short-edge

The paper feed path can hold 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 black, this indicates the second side).

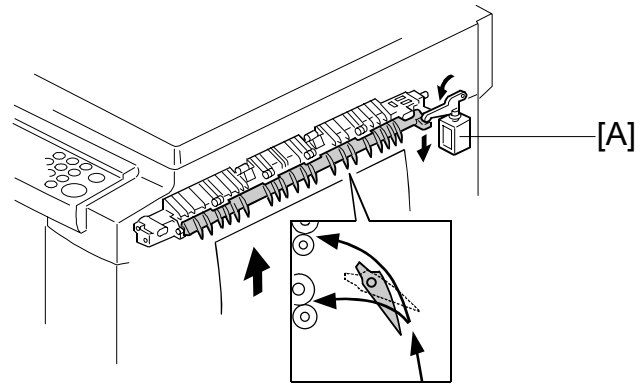


B039D562.WMF

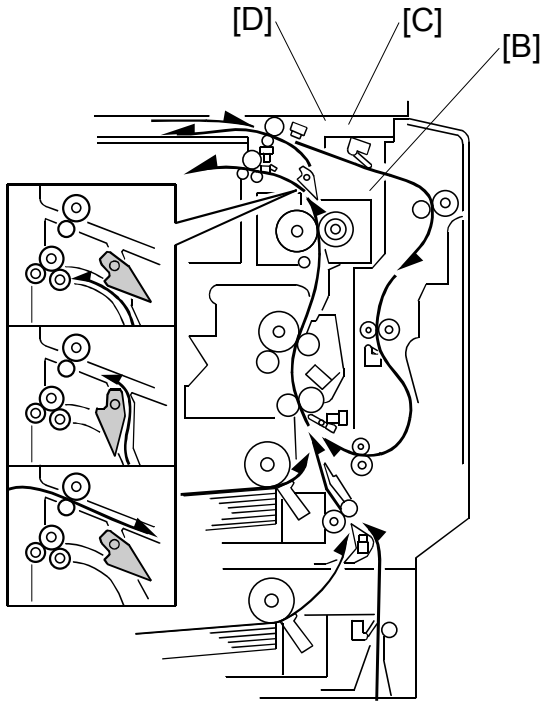


B039D561.WMF

6.14.4 FEED IN AND EXIT MECHANISM



B039D903.WMF



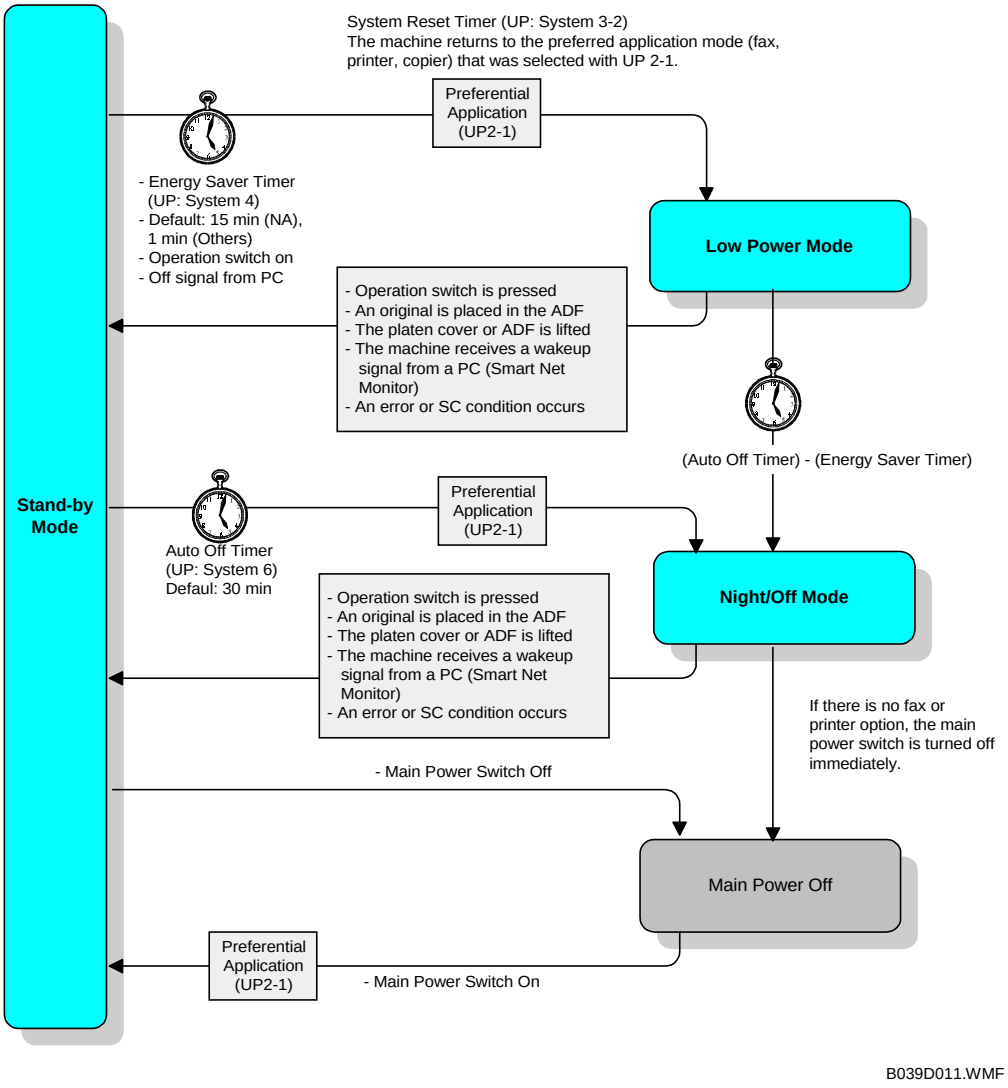
B039D902.WMF

During duplex copying, the inverter gate solenoid [A] switches on and the junction gate [B] switches over to direct the paper to the inverter. When the paper trailing edge reaches the duplex inverter sensor [C], the inverter roller [D] reverses its rotation direction and the paper goes to the duplex unit. The paper is then sent to the mainframe registration rollers to print the reverse side.

If there are two or more copies being made with A4/8 1/2" x 11" SEF (or smaller), the next sheet waits at the registration sensor for the current sheet to exit the inverter.

6.15 ENERGY SAVER MODES

6.15.1 OVERVIEW



B039D011.WMF

When the machine is not used, the energy saver function reduces power consumption by lowering the fusing temperature.

This machine has two types of energy saver modes:

1) Low power mode
2) Night/off mode

These modes are controlled by the following User Tools.

- Energy saver timer (Low power timer)
- Auto off timer
- Energy saver level
- Auto off disabling

The way that the machine operates depends on the combination of equipment installed (i.e. copier only, fax and/or printer installed).

6.15.2 LOW POWER MODE

Entering Low Power Mode

The machine enters low power mode when:

- The energy saver timer has expired following the last time engine components or sensors were active (e.g. end of a copy job, platen cover lifted, key pressed, etc).

  User Tools - System Settings - Energy Saver Timer
  The default setting is 15 min (NA), 1 min (Other)

If the energy saver timer setting is longer than the auto off timer setting, the machine will not enter low power mode. It will enter night/off mode instead, when the auto off timer runs out after the end of the job.

What Happens in Low Power Mode

There are three low power modes: Low power mode level 1, 2, and 3. The user can select the level with a User Tool (System Settings—Energy Saver Level).

Mode	Operation Switch	Fusing Temp.	Approx. Recovery Time	System +5V
Low Power Mode Level 1	Off	105 °C	10 s (NA) 12 s (Other)	On
Low Power Mode Level 2	Off	60 °C	15 s (NA) 18 s (Other)	On
Low Power Mode Level 3	Off	Room Temp. (Fusing lamp off)	20 s (N. America) 25 s (other)	On

NOTE: When there a fax or printer option is installed, low power mode level 3 is the same as night/off mode (☛ 6.15.3 Night/Off Mode). However, when no fax or printer is installed, power switches off in night/off mode (but not in low power mode).

When the machine enters low power mode, the fusing lamp drops to a certain temperature and the operation panel indicators are turned off except for the main 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. However, the operation panel indicators stay off.

The fusing temperature for level 2 low power mode can be changed with SP1-105 (the default setting is 60°C).

Returning to Stand-by Mode

If one of the following is done, the machine returns to standby mode:

- Operation switch is pressed
- An original is placed in the ADF
- The platen cover or ADF is lifted
- The machine receives the wake-up signal from a PC (Smart Net Monitor)
- An error or SC condition occurs

6.15.3 NIGHT/OFF MODE

The machine's behaviour depends on whether a fax or printer option has been installed.

If no optional fax and/or printer unit is installed, the main power switches off when the machine enters night/off mode. (This is the same as the Auto Off Mode used in previous models).

If an optional fax and/or printer unit is installed, the main power does not switch off when the machine enters night/off mode. The machine enters a watching mode that is the same as low power mode level 3.

Entering Night/off Mode

The machine enters night/off mode when:

- The auto off timer has expired following the last time engine components or sensors were active (e.g. end of a copy job, platen cover lifted, key pressed, etc).

  User Tools—System Settings—Auto Off Timer
  The default setting is 30 min

If the energy saver timer setting is greater than the auto off timer setting, the machine will enter night/off mode (rather than low power mode) when the auto off timer runs out after the end of the job.

What Happens in Night/off Mode

When the machine enters night/off mode, the fusing lamp and the operation panel indicators are turned off except for the main power LED.

If there is no fax or printer option, the main power switch is turned off immediately (this is the same as the Auto Off Mode in previous models).

Returning to Stand-by Mode

When no fax or printer option is installed, the main power switch must be turned on.

When a fax and/or printer option is installed, the machine returns to stand-by mode in the same way as from the low power mode.

The recovery time is about 20 s (NA/TWN) or 25 s (EU/ASIA).

Mode	Operation Switch	Fusing Temp.	Approx. Recovery Time	System +5V
With not fax/printer	Off	Room Temp. (Fusing lamp off)	20 s (N. America) 25 s (other)	Off
With fax/printer option	Off	Room Temp. (Fusing lamp off)	20 s (N. America) 25 s (other)	On

SPECIFICATIONS

1. GENERAL SPECIFICATIONS

Configuration: Desktop

Copy Process: Dry electrostatic transfer system

Originals: Sheet/Book

Original Size: Maximum A3/11" x 17"

Copy Paper Size:
Maximum
A3/11" x 17"
Minimum
A5 LEF/8 1/2" x 5 1/2" (Paper tray)
A6 SEF/5 1/2" x 8 1/2" (Bypass)
Custom sizes in the bypass tray:
Width: 90 – 305 mm (3.5" – 12.0")
Length: 148 – 1,260 mm (5.8" – 49.6")

Copy Paper Weight:
Paper Tray:
60 – 90 g/m^2, 16 – 24 lb.
Bypass:
52 – 162 g/m^2, 14 – 43 lb.

Reproduction Ratios: 3 enlargement and 4 reduction

	A4/A3 Version	LT/DLT Version
Enlargement	200% 141% 122%	155% 129% 121%
Full Size	100%	100%
Reduction	93% 82% 71% 50%	93% 78% 65% 50%

Zoom: 50% to 200%, in 1% steps

Power Source:
Taiwan
110 V, 50/60 Hz
12 A
America
120 V, 50/60 Hz
12 A
Europe, Asia
220 – 240 V, 50/60 Hz
7 A

Power Consumption:

	Mainframe Only		Full System	
	120 V	**220 ~ 240 V**	**120 V**	**220 ~ 240 V**
Maximum	Not above 1.1 kW	Not above 1.0 kW	Not above 1.2 kW	Not above 1.2 kW
Copying	Not above 480 W	Not above 480 W	Not above 480 W	Not above 480 W
Warm-up	Not above 880 W	Not above 780 W	Not above 890 W	Not above 790 W
Standby	Not above 125 W	Not above 125 W	Not above 125 W	Not above 125 W
Low Power Level 1	Not above 70 W	Not above 70 W	Not above 80 W	Not above 80 W
Low Power Level 2	Not above 40 W	Not above 40 W	Not above 50 W	Not above 50 W
Night/Off	Not above 1 W	Not above 1 W	N/A	N/A

NOTE: Full system - Maximum possible power consumption (any combination of mainframe and options), excluding optional heaters, key counter, fax unit, and printer controller.

Noise Emission

	Sound Power Level	Sound Pressure Level
Standby (Mainframe/Full system):	Not above 39.6 dB(A)	Not above 28.2 dB(A)
Operating (Mainframe only):	Not above 60.1 dB(A)	Not above 51.2 dB(A)
Operating (Full System):	Not above 62.9 dB(A)	Not above 53.6 dB(A)

NOTE: The above measurements were made in accordance with ISO 7779. Measurements were taken from the normal position of the operator.

Dimensions (W x D x H)

B039: 550 x 568 x 420 mm (21.7" x 22.4" x 16.5")
B040: 550 x 568 x 518 mm (21.7" x 22.4" x 20.4")
B043: 587 x 568 x 518 mm (23.1" x 22.4" x 20.4")

NOTE: Measurement Conditions
1) With bypass feed table closed
2) Without the A(R)DF

Weight

B039: 35 kg (77 lb.)
B040: 42 kg (92 lb.)
B043: 45 kg (99 lb.)

(Excluding A(R)DF, platen cover, toner, and developer)

Copying Speed in Multicopy Mode (copies/minute):

	A4 LEF/ 11" x 8 1/2"	B4 / 8 1/2" x 14"	A3 / 11" x 17"
Non-memory copy mode			
B039:	15	9	8
Memory copy mode			
B039*:	15	10	9
B040/B043:	18	12	10
DF 1-to-1			
B039*:	15	10	8
B040/B043:	15	10	9
1-sided → 2-sided 2-sided → 2-sided			
B043:	15	6	4
DF 1-to-1 (1-sided to 2-sided)			
B043:	6	5	4
DF 1-to-1 (2-sided to 2-sided)			
B043:	6	4	4

*Requires 16MB base memory, which is optional on all B039 models outside North America, and standard on all other models.

NOTE: Measurement Conditions:
1) Figures are for one-sided original to one-sided copy only
2) Not APS mode
3) 100% size

Warm-up Time: NA models: Less than 20 seconds (at 20°C [68°F])
Others: Less than 25 seconds (at 20°C [68°F])

First Copy Time: Not more than 6.9 seconds

NOTE: Measurement Conditions
1) From the ready state, with the polygonal mirror motor spinning.
2) A4/LT copying
3) Not APS mode
4) 100%size
5) Paper feed from the upper tray

Copy Number Input: Numeric keypad, 1 to 99 (increment, decrement)

Manual Image Density: 5 steps

Automatic Reset: Default is 60 seconds. Can be set from 10 to 999 seconds with user tools.

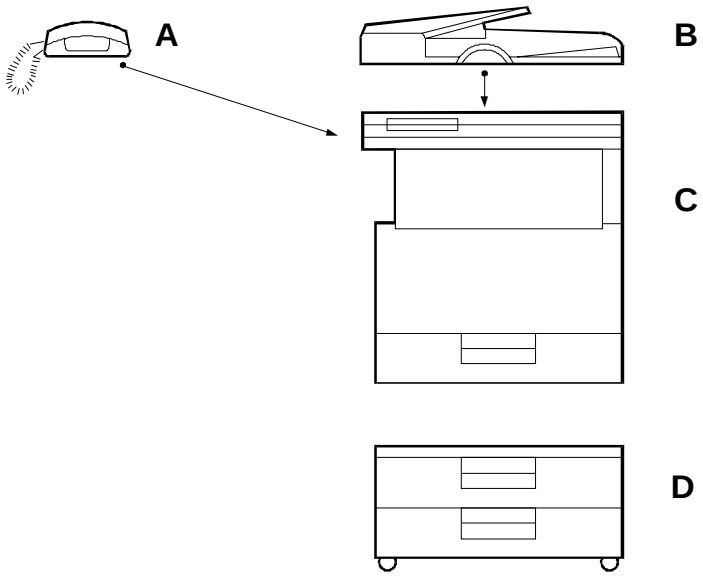
Automatic Shut-off: Default is 30 minutes. Can be set from 1 to 240 minutes with user tools.

Copy Paper Capacity:	Paper Tray: 250 sheets (B039) 250 sheets x 2 (B040/B043) Optional Paper Tray Unit: 500 sheets x 1, or 500 sheets x 2 Bypass Tray: 100 sheets (sheets up to 432 mm [17"]) 10 sheets (sheets longer than 432 mm [17"]) 40 postcards 10 envelopes **NOTE:** Copy weight: 80 g/m^2 (20 lb.)
Toner Replenishment:	Cartridge replacement (260 g/cartridge)
Optional Equipment:	• Platen cover • Auto document feeder • Auto-reverse document feeder • Paper tray unit (1 tray) • Paper tray unit (2 trays) • Tray heater • Optics anti-condensation heater
Toner Yield:	9k copies (A4 LEF, 6% full black, 1 to 2 copying, normal text mode)
Copy-Tray Capacity	250 sheets
Memory Capacity	
• B039 (outside North America):	0 standard; 16MB (IMB) and 32MB DIMM as options (max. 48MB) [Since the DIMM installs onto the IMB, the DIMM option requires the presence of the IMB option.]
• B039 (North America), B040, B043	16MB IMB standard; 32MB DIMM as option (max. 48MB)

Duplex Unit (B043 only)

Copy Paper Size:	Maximum A3/11" x 17" Minimum A5/8$^{1/2}$" x 11"
Copy Paper Weight:	64 – 90 g/m^2 (20 – 24 lb.)

2. MACHINE CONFIGURATION



B039V501.WMF

Version	Item	Machine Code	Letter.
Copier	Copier (1-tray model)	B039	C
	Copier (2-tray non-duplex model)	B040	C
	Copier (2-tray with duplex)	B043	C
	Platen Cover (optional)	B406	
	ADF (optional)	B387	B
	ARDF (optional)	B379	B
	Paper Tray Unit – 1 tray (optional)	B385	D
	Paper Tray Unit – 2 trays (optional)	B384	D
	16MB IMB memory board (for B039 models outside North America only [all other models include this as standard])	B407	
	32MB Memory (optional)	G578	
	Tray Heater (optional)	—	
	Optics Anti-condensation Heater (optional)	—	
Fax Unit	Fax Controller (optional)	B404	
	Handset (optional)	B433	A
Printer	Printer Controller (optional)	B405	
	NIB (optional)	B430	
	32MB Memory (optional)	G578	
	64MB Memory (optional)	G579	
	128MB Memory (optional)	G580	
	PS2 (optional)	B431	

3. OPTIONAL EQUIPMENT

ARDF

Original Size:	Standard sizes Single-sided mode: A3 to A5, 11" x 17" to 5 1/2" x 8 1/2" Double-sided mode: A3 to A5, 11" x 17" to 5 1/2" x 8 1/2" Non-standard sizes (Single-sided mode only) Max. width 297 mm Min. width 105 mm Max. length 1260 mm Min. length 128 mm
Original Weight:	Single-sided mode: 40 – 28 g/m^2,10 – 34 lb. Double-sided mode: 52 – 105 g/m^2,14 – 28 lb.
Table Capacity:	50 sheets (80 g/m^2, 70 kg)
Original Standard Position:	Center
Separation:	FRR
Original Transport:	Roller transport
Original Feed Order:	From the top original
Reproduction Range:	50 to 200% (Sub scan direction only)
Power Source:	24 and 5 Vdc from the copier
Power Consumption:	50 W
Dimensions (W x D x H):	550 x 470 x 130 mm
Weight:	10 kg

ADF

Original Size:	Standard sizes (Single-sided mode only): A3 to A5, 11" x 17" to 5 1/2" x 8 1/2" Non-standard sizes (Single-sided mode only): Max. width 297 mm Min. width 105 mm Max. length 1,260 mm Min. length 128 mm
Original Weight:	52 – 105 g/m^2 (14 – 28 lb.)
Table Capacity:	30 sheets (80 g/m^2, 22 lb.)
Original Standard Position:	Center
Separation:	FRR
Original Transport:	Roller transport
Original Feed Order:	From the top original
Reproduction Range:	50 – 200%
Power Source:	24 and 5 Vdc from the copier
Power Consumption:	25 W
Dimensions (W x D x H):	550 mm x 470 mm x 90 mm
Weight:	Not above 7 kg

ONE-TRAY PAPER TRAY UNIT

Paper Size:	A5 to A3 5 1/2" x 8 1/2" SEF to 11" x 17"
Paper Weight:	60 – 105 g/m^2, 16 – 28 lb.
Tray Capacity:	500 sheets (80 g/m^2, 20 lb.) x 1 tray
Paper Feed System:	Feed roller and friction pad
Paper Height Detection:	4 steps (100%, 70%, 30%, Near end)
Power Source:	24 Vdc and 5Vdc (from the copier/printer): 120 Vac: 120 V version, from the copier/printer when the optional tray heater is installed 220 – 240 Vac: 230 V version, from the copier/printer when the optional tray heater is installed
Power Consumption:	Max: 20 W (Copying/printing) 23 W (Optional Tray Heater On) Average: 13 W (Copying/printing) 15 W (Optional Tray Heater On)
Weight:	12 kg (26.4 lb.)
Size (W x D x H):	550 mm x 520 mm x 134 mm

TWO-TRAY PAPER TRAY UNIT

Paper Size:	A5 to A3 5 1/2" x 8 1/2" SEF to 11" x 17"
Paper Weight:	60 – 105 g/m^2, 16 – 28 lb.
Tray Capacity:	500 sheets (80 g/m^2, 20 lb.) x 2 trays
Paper Feed System:	Feed roller and friction pad
Paper Height Detection:	4 steps (100%, 70%, 30%, Near end)
Power Source:	24 Vdc, 5 Vdc (from the copier/printer) 120 Vac: 120 V version, from the copier/printer when the optional tray heater is installed 220 – 240 Vac: 230 V version, from the copier/printer when the optional tray heater is installed
Power Consumption:	Max: 30 W (Copying/printing) 23 W (Optional Tray Heater On) Average: 17 W (Copying/printing) 15 W (Optional Tray Heater On)
Weight:	25 kg (55 lb.)
Size (W x D x H):	550 mm x 520 mm x 271 mm

*16MB IMB (Copier Memory Unit)**

Memory:	16MB (with slot for 32MB expansion DIMM)

*This component is included as standard on all models other than B039 machines sold outside of North America.

B039/B040/B043 POINT TO POINT CIRCUIT DIAGRAM

I/O Board (PCB1)

BiCU (PCB2)

Duplex Control Board (PCB9)

Paper Tray Unit – 2 Trays (B384)

Tray Main Board (PCB1)

Paper Tray Unit – 1 Trays (B385)

DF Drive Board (PCB1)

Auto Reverse Document Feeder (B379)

Auto Document Feeder (B387)

Power Supply Unit (PCB6)

Laser Diode Unit (PCB7)

<CN108>

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	/I0BCNT2	16	GND	31	+5VS	46	TM_RSV
2	GND	17	GND	32	GND	47	GND
3	GND	18	GND	33	IOA6	48	/RES_IOB
4	IOA5	19	/INT_ZERO	34	IOA4	49	/INT_GT
5	IOA3	20	AN7	35	IOA2	50	AN6
6	IOA1	21	AN5	36	IOA0	51	AN4
7	GND	22	AN3	37	GND	52	AN2
8	D15	23	AN1	38	D14	53	AN0
9	D13	24	GND	39	D12	54	GND
10	D11	25	SMO0	40	D10	55	SMO1
11	D9	26	SMO2	41	D8	56	SMO3
12	GND	27	SMO4	42	GND	57	SMO5
13	/IORD	28	GND	43	/IOWR	58	GND
14	GND	29	SMO8	44	GND	59	SMO9
15	/CS_GATEX	30	GND	45	PMCLK	60	/IOBCNT1

<CN101>

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	GND	16	GND	31	SDE2	46	GND
2	/CN_SBU	17	SDO2	32	SDE3	47	GND
3	+5V	18	SDO3	33	GND	48	–12V
4	+5V	19	GND	34	SDE4	49	–12V
5	+5V	20	SDO4	35	SDE5	50	GND
6	+5V	21	SDO5	36	SDE6		
7	GND	22	SDO6	37	SDE7		
8	/LAMP_ERR	23	SDO7	38	GND		
9	+5V	24	GND	39	/SSCAN		
10	+5V	25	GND	40	/SLEAD		
11	/RDSYNC	26	/SCK	41	GND		
12	/SHGATE	27	GND	42	DI_SBU		
13	/OPBYNC	28	GND	43	DO_SBU		
14	GND	29	GND	44	CLK_SBU		
15	GND	30	GND	45	/DE_SBU		

<CN110>

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	GND	21	A12	41	D15	61	N.C.
2	D3	22	A7	42	/CS_ICC	62	N.C.
3	D4	23	A6	43	N.C.	63	N.C.
4	D5	24	A5	44	N.C.	64	D8
5	D6	25	A4	45	N.C.	65	D9
6	D7	26	A3	46	A17	66	D10
7	/CS_ICC	27	A2	47	A18	67	/CD2
8	A10	28	A1	48	A19	68	GND
9	/RD	29	A0	49	A20		
10	A11	30	D0	50	A21		
11	A9	31	D1	51	+5V		
12	A8	32	D2	52	N.C.		
13	A13	33	N.C.	53	A22		
14	A14	34	GND	54	A23		
15	/EHLWR	35	GND	55	GND		
16	N.C.	36	/CD1	56	N.C.		
17	+5V	37	D11	57	/LWR		
18	N.C.	38	D12	58	N.C.		
19	A16	39	D13	59	N.C.		
20	A15	40	D14	60	/STBY		

<CN111>

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	+3.3V	16	GND	31	+3.3V	46	GND
2	+3.3V	17	ED7	32	+3.3V	47	ED6
3	+3.3V	18	ED5	33	+3.3V	48	ED4
4	+3.3V	19	ED3	34	+3.3V	49	ED2
5	GND	20	ED1	35	GND	50	ED0
6	GND	21	GND	36	GND	51	GND
7	/MID	22	GND	37	GND	52	EA6
8	GND	23	EA5	38	/MIFGATE	53	EA4
9	/MILSYNC	24	EA3	39	/MILGATE	54	EA2
10	GND	25	EA1	40	GND	55	EA0
11	/MOD	26	GND	41	GND	56	GND
12	GND	27	/ERD	42	/MFGATE	57	/EHWR
13	/MLSYNC	28	GND	43	/MSYNC	58	GND
14	GND	29	/CS_IMAC	44	GND	59	/RES_IMAC
15	CK0	30	GND	45	GND	60	/CN_IMB

<CN105>

Pin No.	Signal	Pin No.	Signal	Pin No.	Signal	Pin No.	Signal
1	GND	16	/ARCLK	31	GND	46	GND
2	TXD_PRN	17	/ARKD7	32	RXD_PRN	47	/ARKD6
3	/CTSF	18	/ARKD5	33	RXRDYF	48	/ARKD4
4	RXDF	19	/ARKD3	34	TXDF	49	/ARKD2
5	/WKUP_PRN	20	/ARKD1	35	/DWN_PRN	50	/ARKD0
6	TXD_DWNL	21	GND	36	/SLEEP	51	GND
7	N.C.	22	GND	37	N.C.	52	GND
8	GND	23	GND	38	GND	53	GND
9	GND	24	/WRSYNC	39	GND	54	/FSYNC
10	GND	25	+5V	40	GND	55	+5V
11	GND	26	+5V	41	GND	56	+5V
12	/OE_PRN	27	+5V	42	N.C.	57	+5V
13	N.C.	28	GND	43	N.C.	58	GND
14	/ARFGATE	29	GND	44	/ARLSYNC	59	GND
15	GND	30	/CN_PRN	45	/ARLGATE	60	GND

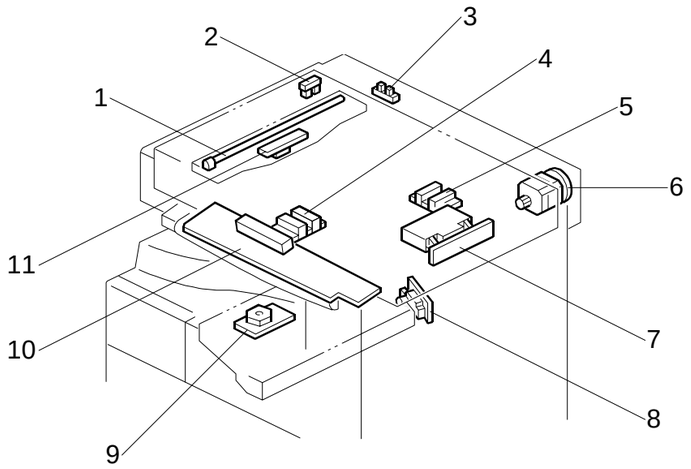
<CN106>

Pin No.	Signal	Pin No.	Signal
1	GND	26	/AWKD6
2	GND	27	/AWKD5
3	TXDF	28	/AWKD4
4	RXDF	29	/AWKD3
5	RXRDYF	30	/AWKD2
6	/CTSF	31	/AWKD1
7	TXD_DWNL	32	/AWKD0
8	/DWNL_FCU	33	GND
9	TXD_FCU	34	GND
10	RXD_FCU	35	/ARFGATE
11	/WKUP_FCU	36	/ARLSYNC
12	/SLEEP	37	/ARLGATE
13	GND	38	GND
14	/OE_FCU	39	/ARCLK
15	GND	40	GND
16	/AWFGATE	41	/ARKD7
17	/AWLSYNC	42	/ARKD6
18	/AWLGATE	43	/ARKD5
19	GND	44	/ARKD4
20	/AWCLK	45	/ARKD3
21	GND	46	/ARKD2
22	/WRSYNC	47	/ARKD1
23	/FSYNC	48	/ARKD0
24	GND	49	GND
25	/AWKD7	50	/CN_FCU

SYMBOL TABLE

◀▶ Signal Direction on
▲ Active High
▼ Active Low
[ ] Voltage

ELECTRICAL COMPONENT LAYOUT (B039/B040/B043)



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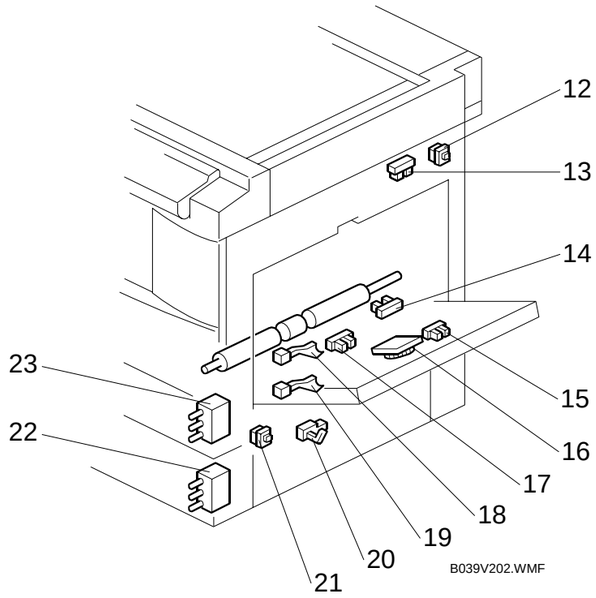

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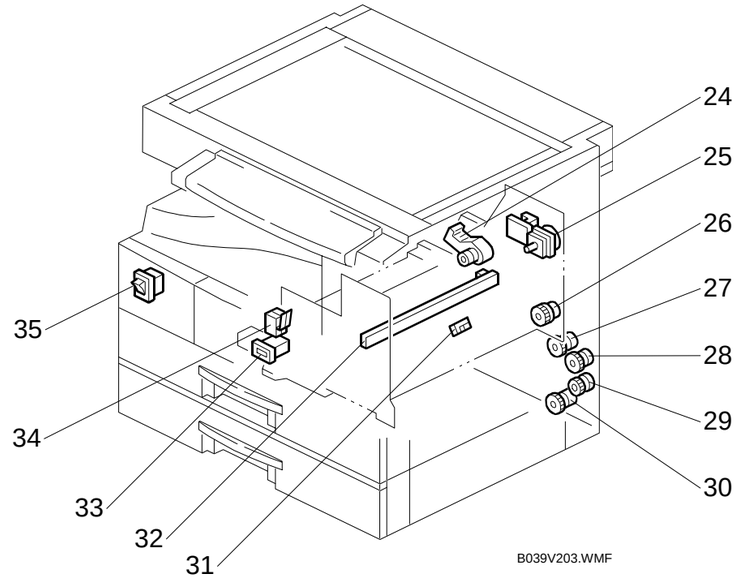

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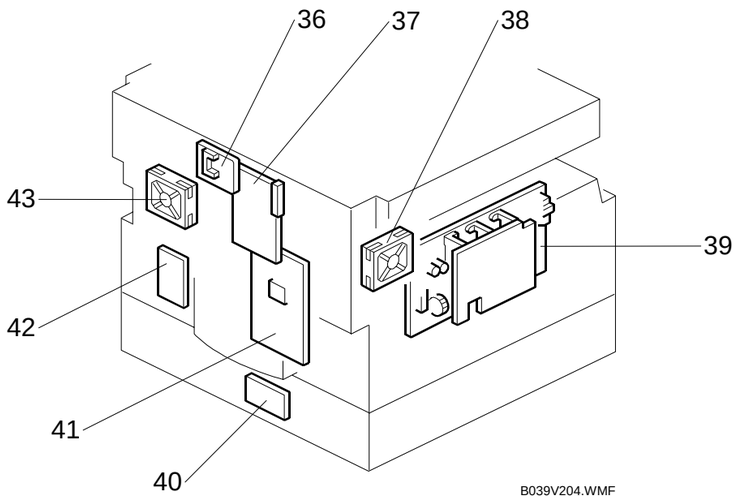

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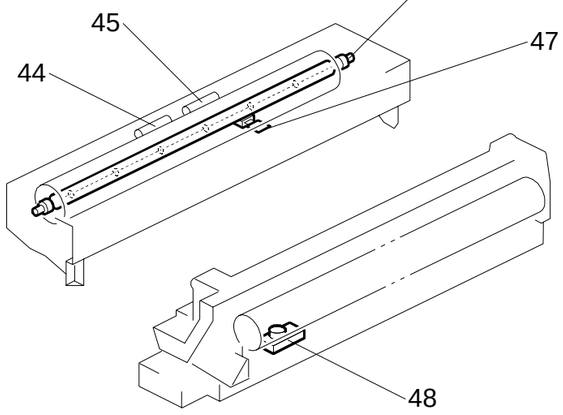

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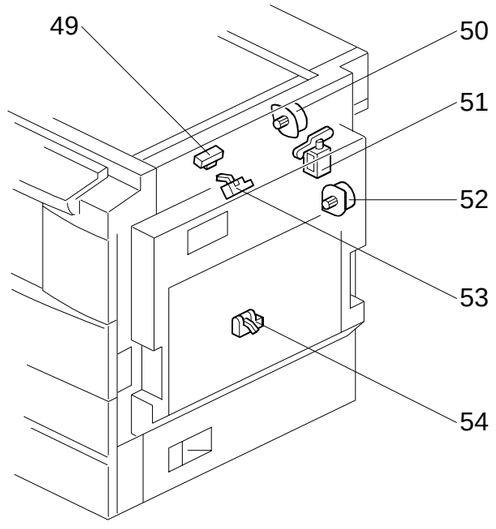


B039V301.WMF

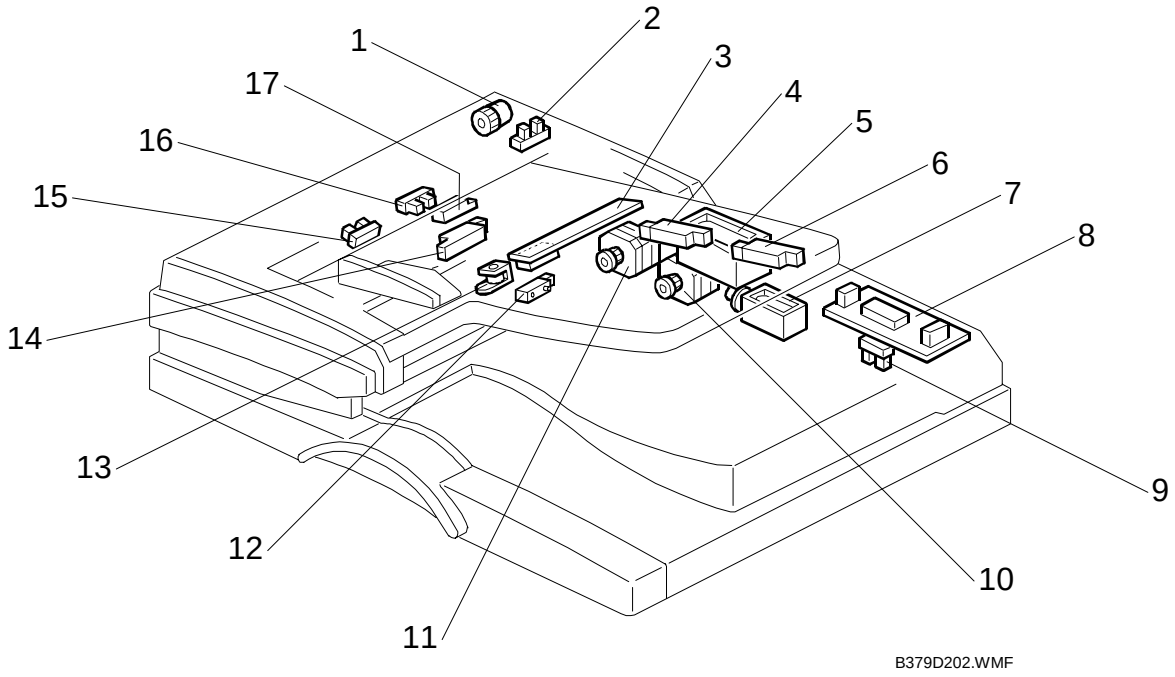
Symbol	Description	Index No.	P-to-P
Sensors			
S1	Registration	14	A1
S2	Relay	15	A1
S3	Upper Paper End	18	A2
S4	Vertical Transport	20	A3
S5	Lower Paper End	19	A4
S6	By-pass Paper End	17	A5
S7	Exit	13	A7
S8	Toner Density (TD)	48	A8
S9	Image Density (ID)	31	A9
S10	Scanner H.P.	2	A11
S11	Platen Cover	3	A12
S12	Original Width	4	A12
S13	Original Length	5	A12
S14	Duplex Inverter	49	D3
S15	Duplex Entrance	53	F1
S16	Duplex Exit	54	F1
Switches			
SW1	Upper Paper Size	23	A2

Symbol	Description	Index No.	P-to-P
SW2	Vertical Transport Door	21	A3
SW3	Lower Paper Size	22	A3
SW4	By-pass Paper Size	16	A4
SW5	Right Door	12	A7
SW6	Front/Right Cover	34	A10
SW7	Main	35	I1
Magnetic Clutches			
MC1	Lower Paper Feed	30	A3
MC2	Relay	29	A14
MC3	Upper Paper Feed	27	A15
MC4	By-pass Feed	28	A15
MC5	Registration	26	A15
Motors			
M1	Main	25	A5
M2	Rear Exhaust Fan	43	A6
M3	Left Exhaust Fan	38	A7
M4	Toner Supply	24	A8
M5	Polygonal Mirror	9	A10
M6	Scanner	6	A13

Symbol	Description	Index No.	P-to-P
M7	Duplex Inverter	50	D3
M8	Duplex Transport	52	F2
Lamps			
L1	Exposure	1	A11
L2	Fusing	46	H1
L3	Quenching (LED)	32	A8
Counters			
CO1	Total	33	A9
CO2	Key (Option)	—	A16
Solenoids			
SOL1	Duplex Inverter Gate	51	D3
Solenoids			
PP1	Power Pack-BCT/CL	42	B14
PCBs			
PCB1	IO Board (IOB)	41	C6
PCB2	BiCU	37	D7

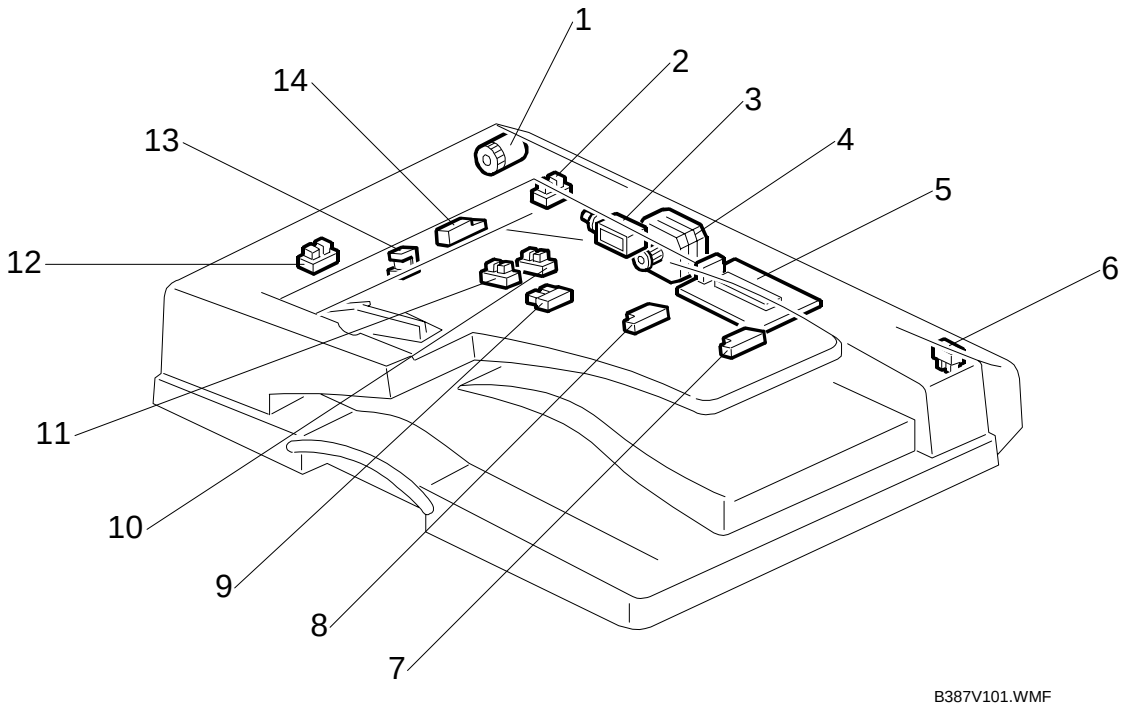
Symbol	Description	Index No.	P-to-P
PCB3	Operation Panel Board (OPU)	10	C6
PCB4	SBU	7	D6
PCB5	IMB	36	D5
PCB6	Power Supply Unit (PSU)	39	H3
PCB7	Laser Diode Unit (LDU)	8	I11
PCB8	Lamp Stabilizer Board	11	B11
PCB9	Duplex Control Board (DCB)	40	E2
Heaters			
H1	Anti-condensation – Optic (Option)	—	F2
H2	Upper Tray (Option)	—	F3
H3	Lower Tray (Option)	—	F3
Others			
TH1	Fusing Thermistor	47	H1
TF1	Fusing Thermofuse	44	H1
TS1	Fusing Thermostat	45	H1

ELECTRICAL COMPONENT LAYOUT (B379)



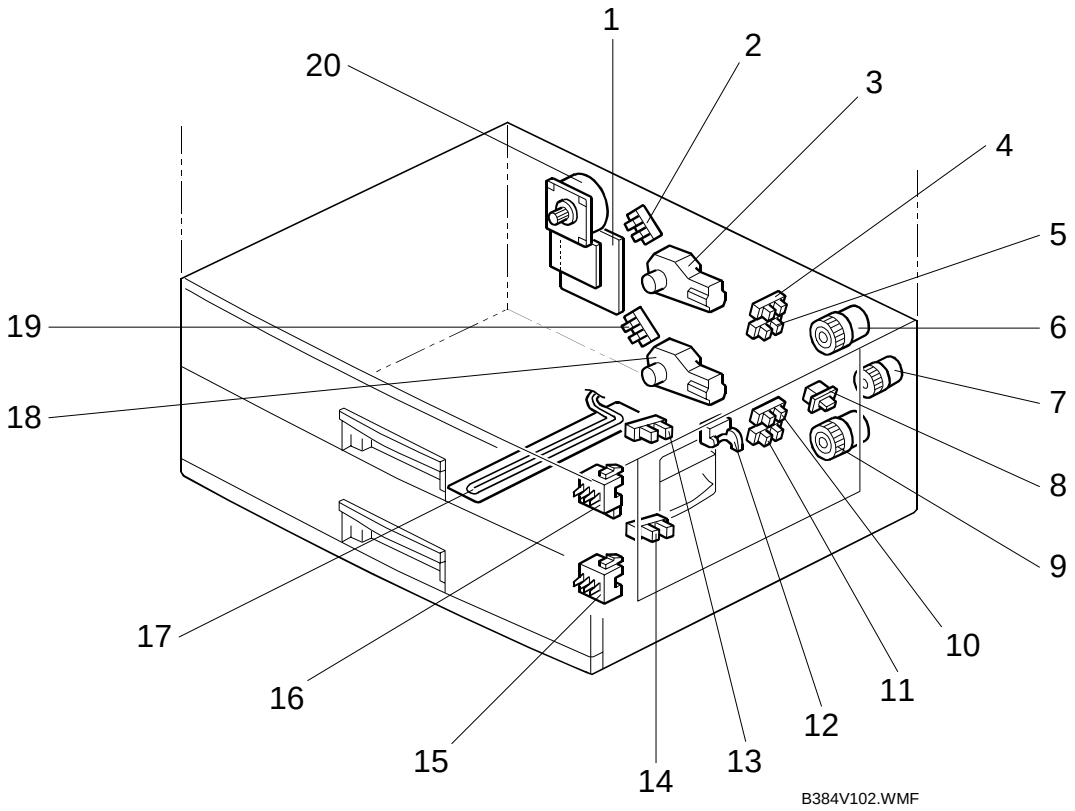
Symbol	Name	Index No.	P-to-P
Motors			
M1	DF Feed	10	H12
M2	DF Transport	11	H12
Sensors			
S1	Original Exit	12	H14
S2	Original Reverse	16	H14
S3	Registration	17	H14
S4	Original Set	15	H14
S5	DF Position	9	H15
S6	Feed Cover Open	2	H15
S7	Original Length - 1	4	H15
S8	Original Length - 2	6	H16
S9	Original Trailing Edge	14	H16
Solenoids			
SOL1	Stamp	13	H13
SOL2	DF Pick-up	5	H13
SOL3	Junction Gate	7	H13
Magnetic Clutches			
MC1	DF Feed	1	H13
PCBs			
PCB1	DF Drive Board	8	H12-16
PCB2	Original Width Sensor Board	3	H15

ELECTRICAL COMPONENT LAYOUT (B387)



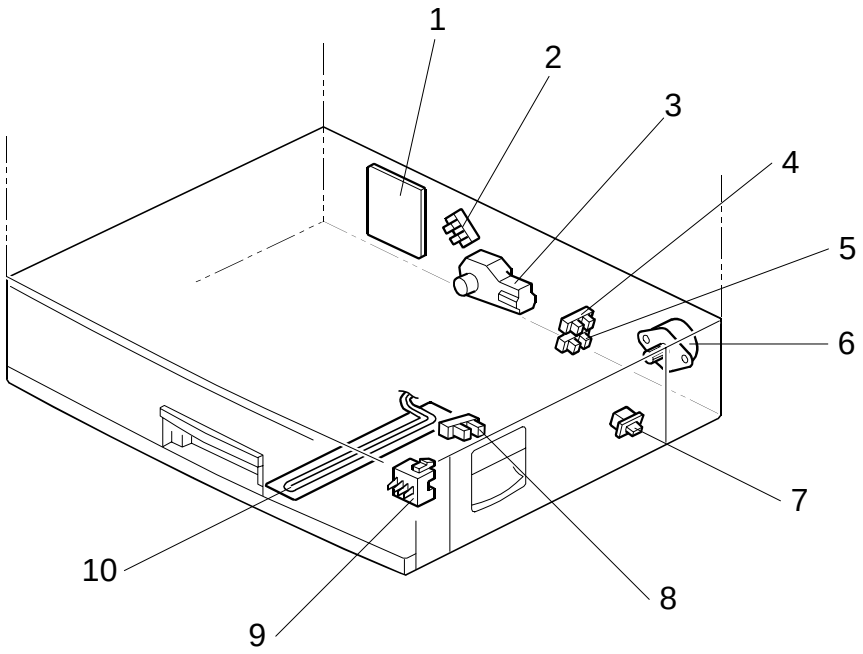
Symbol	Name	Index No.	P-to-P
Motors			
M1	DF Transport	4	J13
Sensors			
S1	Registration	14	J14
S2	Original Set	12	J14
S3	DF Position	6	J14
S4	Feed Cover Open	2	J15
S5	Original Width 1	10	J15
S6	Original Width 2	11	J15
S7	Original Trailing Edge	9	J15
S8	Original Length 1	7	J16
S9	Original Length 2	8	J16
Solenoids			
SOL1	Stamp	13	J13
SOL2	DF Pick-up	3	J14
Magnetic Clutches			
MC1	DF Feed	1	J13
PCBs			
PCB1	DF Drive	5	I13-16

ELECTRICAL COMPONENT LAYOUT (B384)



Symbol	Name	Index No.	P-to-P
Motors			
M1	Paper Feed	20	E12
M2	Lower Lift	18	E13
M3	Upper Lift	3	E13
Sensors			
S1	Lower Paper Height 2	10	E8
S2	Lower Paper Height 1	11	E9
S3	Upper Paper Height 2	4	E9
S4	Upper Paper Height 1	5	E9
S5	Vertical Transport	12	E10
S6	Lower Paper End	14	E10
S7	Upper Paper End	13	E11
S8	Lower Lift	19	E13
S9	Upper Lift	2	E13
Switches			
SW1	Upper Paper Size	16	E9
SW2	Lower Paper Size	15	E10
SW3	Tray Cover	8	E11
Magnetic Clutches			
MC1	Upper Paper Feed	6	E11
MC2	Relay	7	E11
MC3	Lower Paper Feed	9	E12
PCBs			
PCB1	Tray Main	1	D9-13
Others			
H1	Optional Tray Heater	17	E14

ELECTRICAL COMPONENT LAYOUT (B385)



B385V102.WMF

Symbol	Name	Index No.	P-to-P
Motors			
M1	Lift	3	H9
M2	Paper Feed	6	H10
Sensors			
S1	Lift	2	H9
S2	Paper Height 2	4	H9
S3	Paper Height 1	5	H9
S4	Paper End	8	H9
Switches			
SW1	Paper Size	9	H10
SW2	Tray Cover	7	H10
PCBs			
PCB1	Tray Main	1	G9-10
Others			
H1	Optional Tray Heater	10	H11