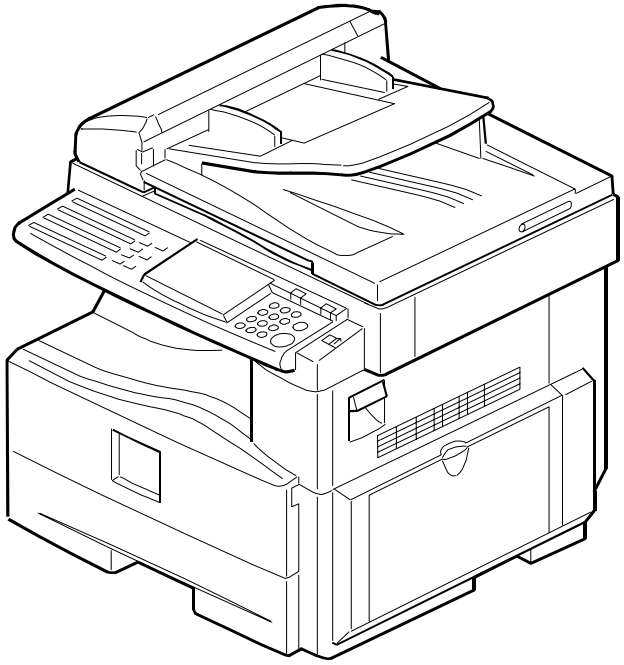
Model S-C1
(Machine Code: B045/B049/B044/B046)
SERVICE MANUAL



B046I100.WMF

17 July, 2001
Subject to change

⚠IMPORTANT SAFETY NOTICES

PREVENTION OF PHYSICAL INJURY

1. Be sure that the power cord is unplugged before disassembling or assembling parts of the copier or peripherals.
2. The wall outlet should be near the copier and easily accessible.
3. Note that electrical voltage is supplied to some components of the copier and the paper tray unit even while the main power switch is off.
4. If you start a job before the copier completes the warm-up or initializing period, keep hands away from the mechanical and electrical components until job execution has started. The copier will start making copies as soon as warm-up or initialization is finished.
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 nontoxic, but getting either of these into your eyes may cause temporary eye discomfort. Try to remove with eye drops or flush with water. If material remains in eye or if discomfort continues, 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 relevant models.

LITHIUM BATTERIES

Incorrect replacement of lithium battery(s) on the FCU may pose risk of explosion. Replace only with the same type or with an equivalent type recommended by the manufacturer. Discard used batteries in accordance with the manufacturer's instructions.

SAFE AND ECOLOGICAL DISPOSAL

1. Do not incinerate toner bottles or used toner. Toner dust may ignite suddenly if exposed to an open flame.
2. Dispose of used toner, developer, and organic photoconductors in accordance with local regulations. (These are nontoxic 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 not specified in this manual, or performance of adjustments or procedures not 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 cause serious damage to eyes.

CAUTION MARKING:

Symbols and Abbreviations

This manual uses the symbols and abbreviations shown below.

Symbol	Meaning
☛	"See," "Refer to"
	Clip ring
	Screw
	Connector
SEF	Short Edge Feed
LEF	Long Edge Feed
CT	Core Technology manual

TABLE OF CONTENTS

PAPER TRAY UNIT (B421)

DOCUMENT FEEDER (B444)

SPECIFICATIONS

1. INSTALLATION

⚠CAUTION

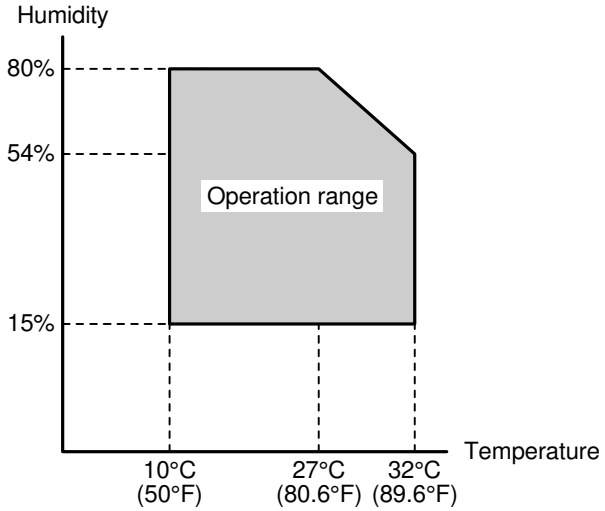
Before installing options, please do the following:

1. **If there is a fax unit on the machine, print out all messages stored in the memory, all user-programmed items, and a system parameter list.**
2. **If there is a printer option on 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–



B046I512.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 3 times/hr/person
5. Ambient Dust Less than 0.1 mg/m^3
6. Do not install the machine where it will be exposed to direct sunlight or to direct airflow (from a fan, air conditioner, air cleaner, etc.).
7. Do not install the machine where it will be exposed to corrosive gas.
8. Place the machine on a firm and level base.
9. Do not install the machine where it may be subjected to strong vibration.

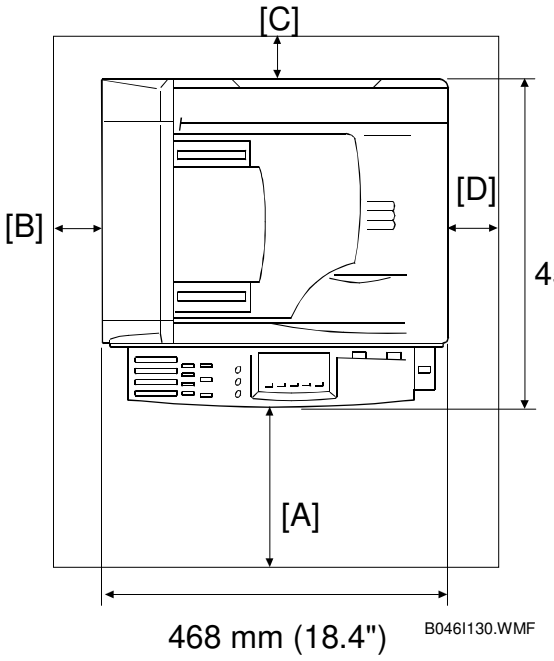
1.1.2 MACHINE LEVEL

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

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

1.1.3 MINIMUM OPERATIONAL SPACE REQUIREMENTS

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



A: Front > 750 mm (29.6")
B: Left > 100 mm (3.9")
C: Rear > 105 mm (4.1")
D: Right > 230 mm (9.0")

NOTE: 1) The 750-mm front space indicated above is sufficient to allow the paper tray to be pulled out. Additional space is required to allow an operator to stand at the front of the machine.

2) Actual minimum space requirement for left, rear, and right sides is 10mm (0.4") each, but note that this will not allow room for opening of the bypass tray, right door, platen cover, or ADF unit.

1.1.4 POWER REQUIREMENTS

⚠CAUTION

1. **Make sure that the wall outlet is near the machine 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.**

Input voltage:

North America: 120 V, 60 Hz, 7 A
Europe: 220 – 240 V, 50/60 Hz, 4 A

Image quality guaranteed at rated voltage ± 10%.
Operation guaranteed at rated voltage ± 15%.

1.2 COPIER

1.2.1 ACCESSORY CHECK

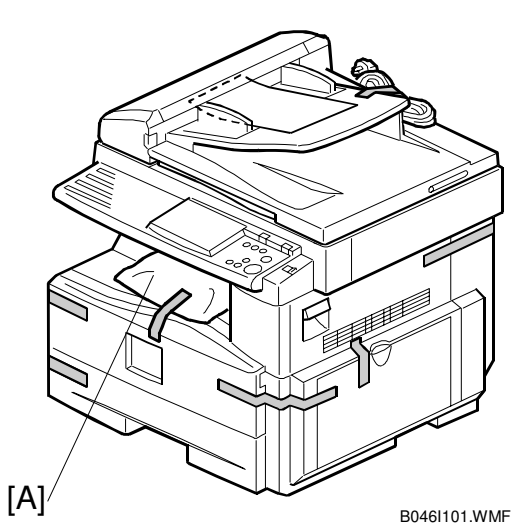
Check that you have the accessories indicated below. Note that accessories vary according to model and location.

No.	Description	Q'ty
1	Copier Operating Instructions (-17, -26, -29)	1
2	EU safety sheet (-22, -24, -26, -27)	1
3	NECR (-17, -27, -29)	1
4	Paper-size decals	1 set
5	Energy Star seal (-26)	1
6	Branding plaques (-22)	1 set
7	Brand decals (-22)	1 set
8	Handset bracket (B046-17)	1

1.2.2 INSTALLATION PROCEDURE

⚠CAUTION

Make sure that the copier remains unplugged during installation.



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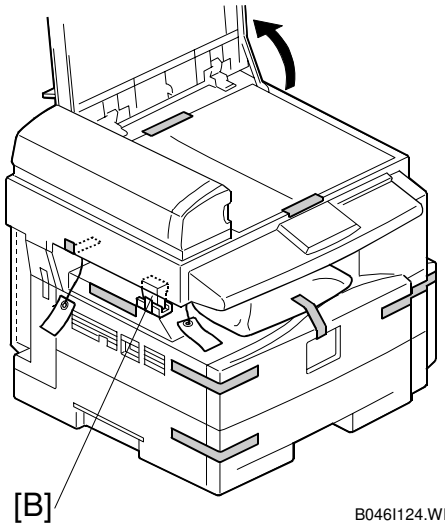
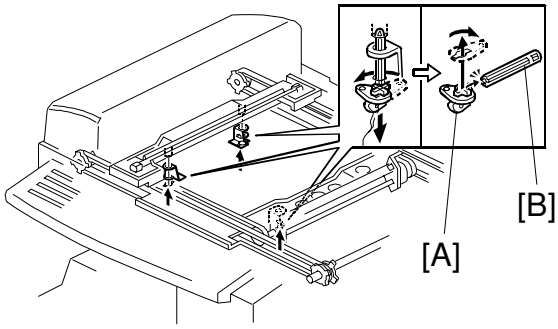


B046I124.WMF

1. Remove the strips of tape.
2. Remove the bag [A] holding the included accessories.
3. Remove the spacing wedge [B].

4. Remove the 3 scanner lock pins. (A tag is hanging from each pin.) To remove: Grasp the base of the pin [A], turn 90 degrees, and pull down and out.

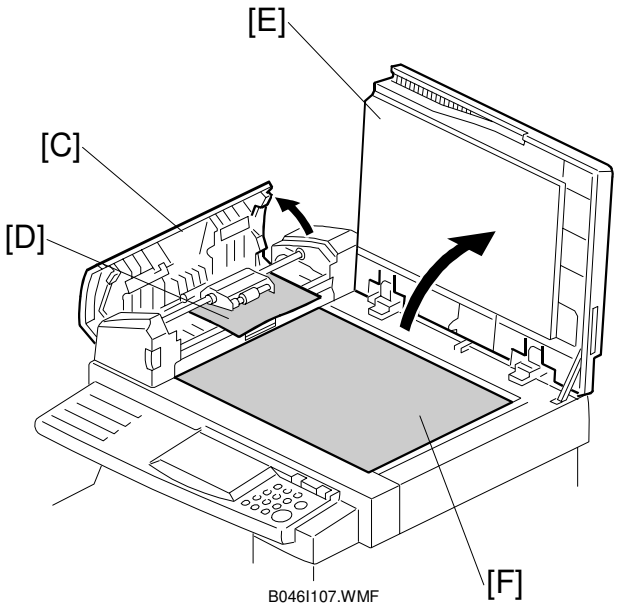


B046I106.WMF

5. Remove the tags from the pins. Then break each pin off of its base [A], discard the pin part [B], and set each base [A] back into its original hole, turning it 90° to lock it into place. (Be sure to do this for all three pins.)

6. ***If installing a DF-equipped model (B046 or B049):*** Raise the DF upper guide [C] and remove the protective paper [D] at the feed unit. Then lower the guide.

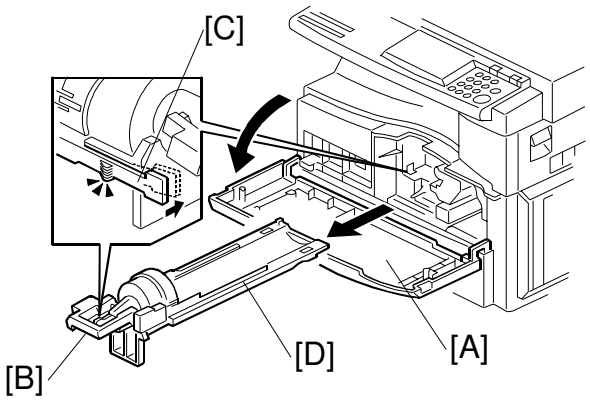
7. Open the platen cover [E] and remove the protective paper [F] covering the exposure glass. Then close the platen cover.



B046I107.WMF

8. Open the front door [A].

9. ***If installing a toner-bottle model (B044 or B046):***
   - Lift lever [B], press in on latch [C] and pull the bottle holder [D] out. (It is not necessary to pull it completely out of the machine, however.)
   - Take a new bottle of toner, *shake it several times*, remove its outer cap [E], and load as shown. Then push the bottle holder back into the machine, and press the latch down to lock it.



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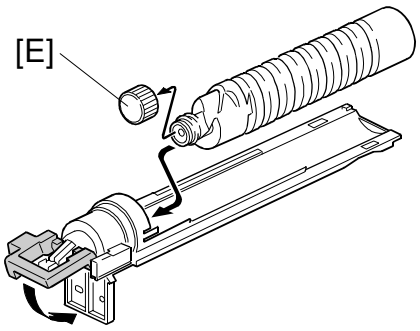
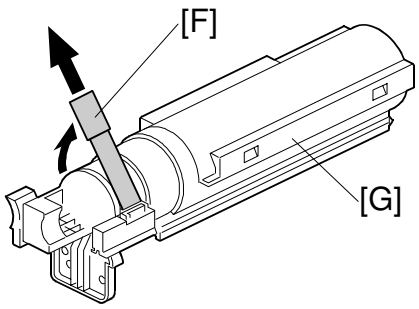


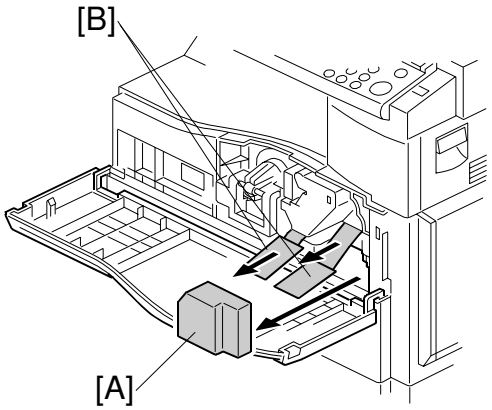
B046I301.WMF

If installing a toner-hopper magazine model (B045 or B049):
- *Shake the magazine several times*, then peel off the paper [F] from a new THM [G], and load the THM into the machine.



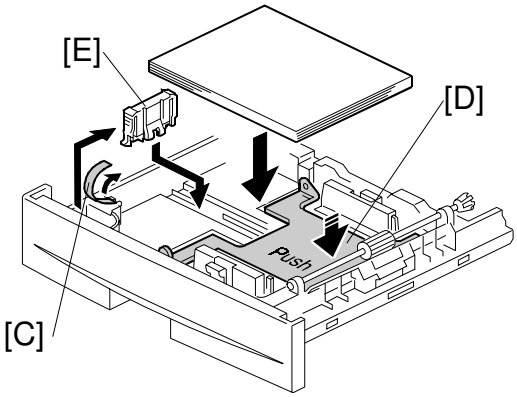
B046I114.WMF

10. Remove the foam cushion [A] and pull the tabbed strips [B] all the way out of the PCU. Then close the front door.



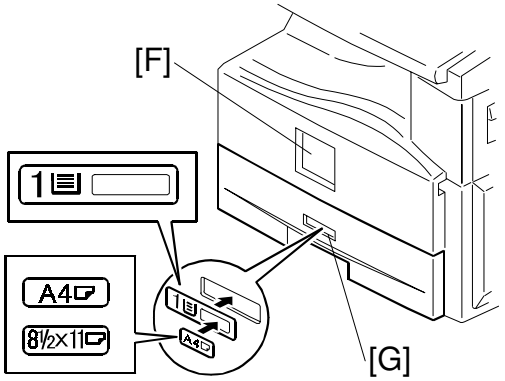
B046I104.WMF

11. Pull open the paper tray, and remove the tape [C] securing the end fence in the compartment.
12. Push the bottom plate [D] down, load paper, and adjust the side fences. If loading paper shorter than A4, remove the end fence [E] from its compartment, set it into the tray, and adjust it to the correct length.



B046I119.WMF

13. Push the tray back in.
14. Adhere the appropriate branding decal (not shown) to the center of the front door [F], and adhere the tray number decal and appropriate paper-size decal to the front of the paper tray (at [G]) as shown.
15. ***Hong Kong only:***
    If installing model B046 or B049 in Hong Kong, you must change the position of the TB1 jumper on the NCU. Turn to the fax service manual and carry out steps 4 to 8 of the installation procedure (fax service manual, section 1.2.2).



B046I515.WMF

16. Plug in the machine and turn on the main switch.
17. Enter SP mode, and run SP7-825 to initialize the electrical total counter to 0.

NOTE: 1) After selecting SP7-825, enter "1" and then hold down the *Original Type* key and press the *OK* key to initialize the counter. If initialization is successful, the screen displays "Action completed."
2) SP7-825 is effective only once, at time of machine installation.

18. ***Models B046 and B049 only:*** Access SP5-992 and select "2" to print out a full SMC report. Confirm that the report shows a "YES" for SP7-801-3.
19. ***Models B046 and B049 only:*** Press the On Hook key on the fax operation panel, and confirm that you hear a dial tone coming from the monitor speaker.
20. Program the required items, as indicated below.

Initial Programming: Faxless models (B044, B045)

Items to Program (Service Level – SP Mode)*1	SP No.
Date and time	5-302
Language replacement (Firmware download)	5-827

*1: See Section 5 for SP-mode usage instructions.

Items to Program (User Level)*2	User Tools
Display contrast	User Tools → System Settings
Energy saver level (low power mode)	
Reception mode	
Other items, as necessary	***2**

*2: Refer to the Operating Instructions for details.

Initial Programming: Fax-equipped models (B046, B049)

Items to Program (Service Level – Service Functions)*3	Function No.
Country code (System switch 0F)	01
Protocol requirements (G3 switch 0B) - EU only	01
PM call (System switch 01 – bit 0)	01
Country code (NCU parameter 00)	07
Service station's fax number	09

*3: See Section 5.1.1 of the fax service manual for information about using service functions.

Items to Program (Service Level – SP Mode)[*4]	SP No.
Machine's serial number	5-811
Language replacement (Firmware download)	5-827
PSTN access code (RAM address 4000DB)	7-955
PSTN access method (RAM address 4000CD)	
Periodic service call (RAM addresses 40054F to 400553)	

*4: See Section 5 for SP-mode usage instructions.

Items to Program (User Administrator Level)[*5]	User Tools
Monitor volume	Fax Features → Setup
Display contrast	
Date and Time	
Reception mode	
Fax Header/Own Name/Own No. (TTI/RTI/CSI)	
Reports on/off	Key Op. Tools
Country Code (except NA)	
Fusing power control during energy saver mode	System Settings
Language selection	Language
Other initial programming items	*5

*5: Refer to the Operating Instructions for details.

1.3 PAPER TRAY UNIT

1.3.1 ACCESSORY CHECK

Confirm that you have the accessories indicated below.

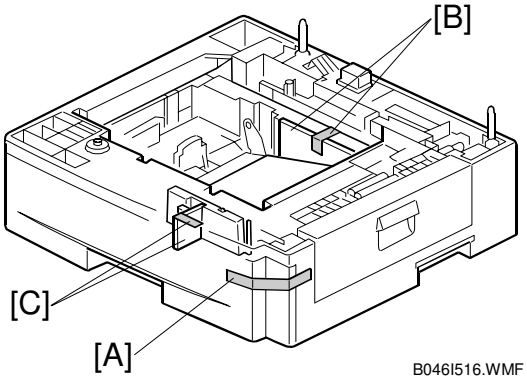
No.	Description	Q'ty
1	Paper-size decals	1 sheet
2	Installation Procedure (for service person)	1
3	Installation Procedure (for user)	1

1.3.2 INSTALLATION PROCEDURE

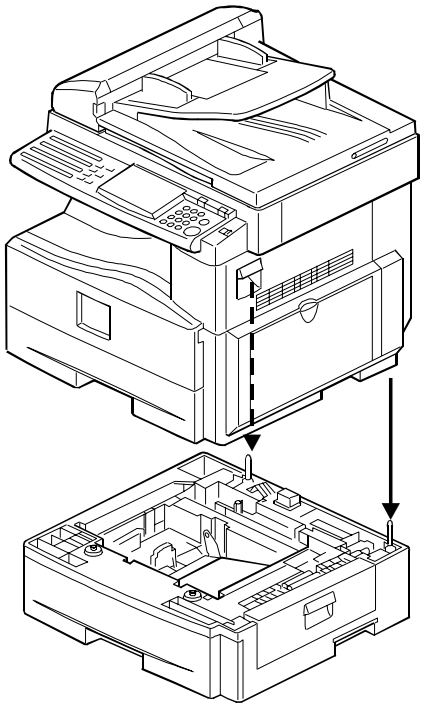
⚠CAUTION

Unplug the main machine's power cord before starting the following procedure.

1. Remove the tape at [A], and the tape and cardboard at [B].
2. Pull the paper tray part way out of the unit, remove the tape and cardboard at [C], and push the tray back in.

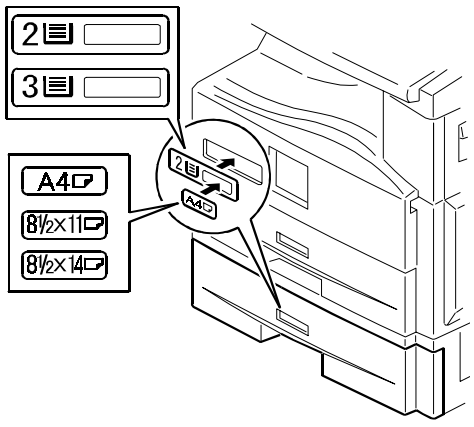


3. Set the machine onto the paper tray unit.



B046I527.WMF

4. Remove the paper tray from the paper tray unit.
5. Load paper into the paper tray. Adjust the side and end fences as necessary. If loading 8 1/2"x 14" paper, remove the end fence and set it into the special compartment.
6. Set the paper tray back into the paper tray unit.
7. Stick on the appropriate tray-number decal and paper-size decal, at the locations indicated in the illustration.



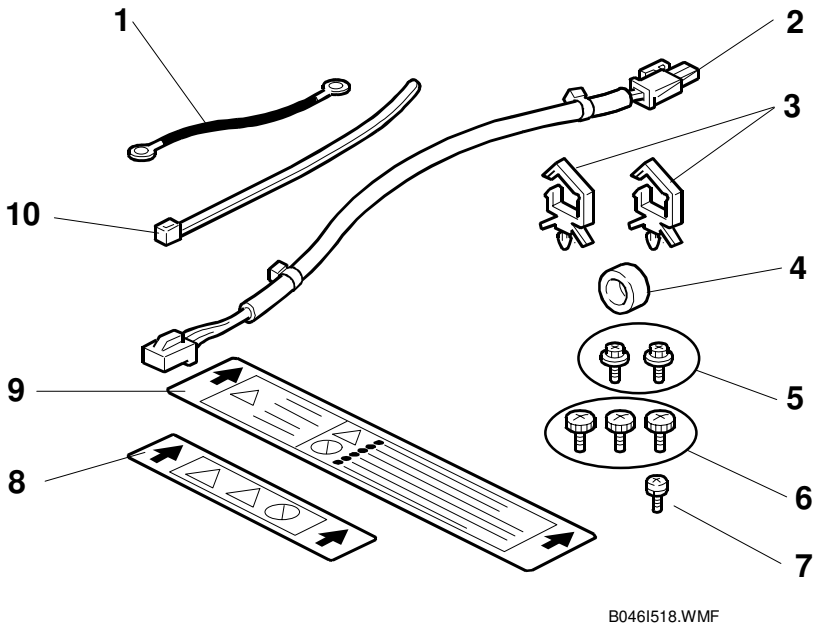
B046I517.WMF

1.4 PAPER TRAY UNIT HEATER

1.4.1 ACCESSORY CHECK

Confirm that you have the accessories indicated below.

No.	Description	Q'ty
1	Grounding wire	1
2	Relay harness	1
3	Clamps	2
4	Ferrite core	1
5	Heater fastening screws	2
6	PTU fastening screws	3
7	Grounding screw	1
8	Decal for copier	1
9	Decal for paper unit	1
10	Tie wrap	1



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1.4.2 INSTALLATION PROCEDURE

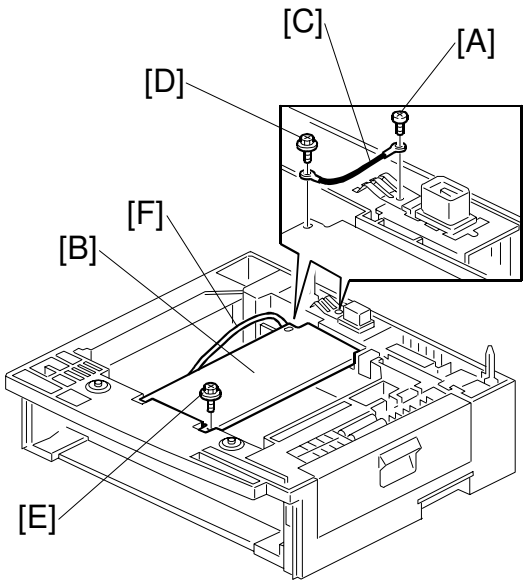
⚠CAUTION

Unplug the main machine's power cord before starting the following procedure.

1. If the paper tray unit is already installed, uninstall it by lifting the copier off of it. (Refer to illustrations for Procedure 1.3.2, above.)
2. Remove both paper trays—the one from the copier, and the one from the paper tray unit.

3. Remove the ground screw [A] at the rear of the paper tray unit.

4. Fasten the heater [B] and the supplied ground wire [C] to the paper tray unit with 3 screws as shown. Note that [A] is the grounding screw you removed at Step 3 (returned to its original hole), and [D] and [E] are the two supplied heater fastening screws.
   NOTE: Be sure to position the ground wire [C] and heater harness [F] so that they will be out of the way of the copier when you set it onto the paper tray unit.



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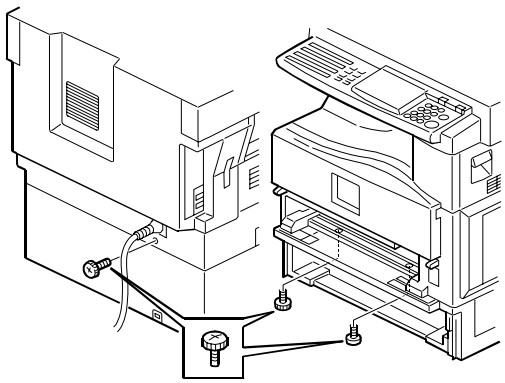
5. Set the copier onto the paper tray unit.

6. Screw the paper tray unit into place using three supplied PTU fastening screws.



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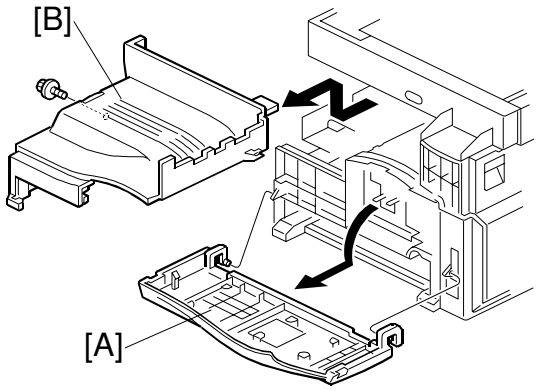
7. Open the front door [A] and remove the copy tray [B] (×1). Then close the front door.



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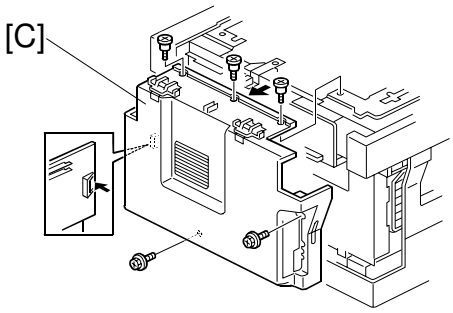
8. Remove the rear cover [C] (x 5).



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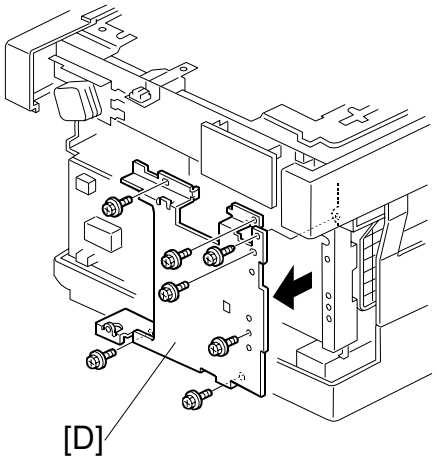
9. Remove the FCU cover plate [D] (7 screws on faxless machines, 8 screws on fax-equipped machines).
NOTE: On fax-equipped machines, detach the NCU connector [E] first.

Faxless machines:



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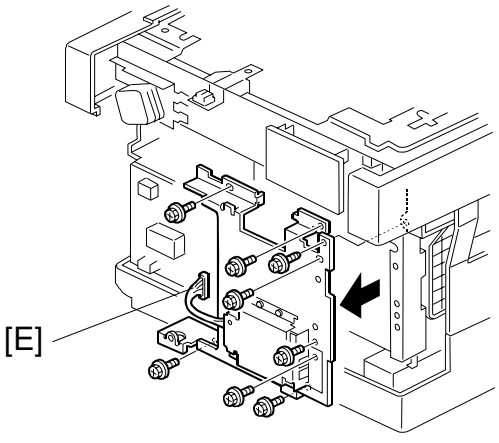
Fax-equipped machines:



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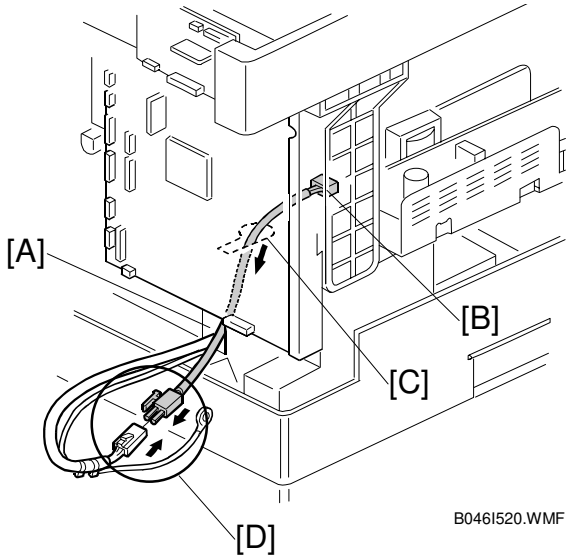
10. Pass the heater's harness through the hole [A] at the rear of the copier.

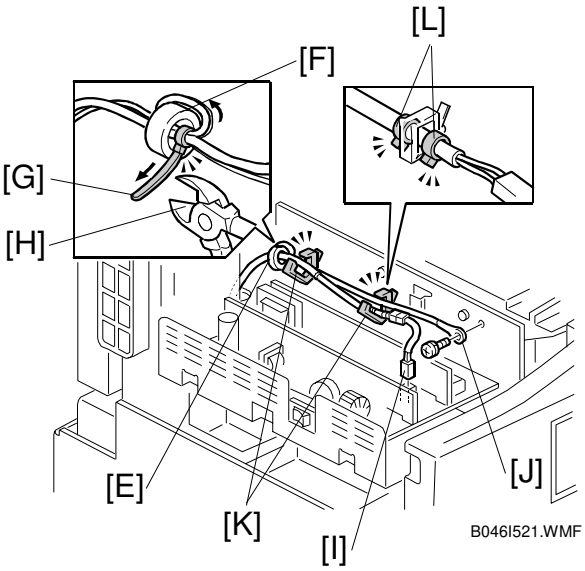
11. Pass relay harness [B] through the circular opening at [C] (at the rear of the PSU board bracket), and then through the hole at [A]. Then connect the relay harness to the heater's harness [D].



12. Pull the relay harness back into the copier. Then set the ferrite core [E] over the relay harness, and push it back so that it is over the heater's harness.

13. Wrap the heater's harness once around the core (see [F]). Adjust so that the core is located toward the rear of the copier (at position [E], behind the rear clamp). Secure the core into position using the supplied tie wrap [G].

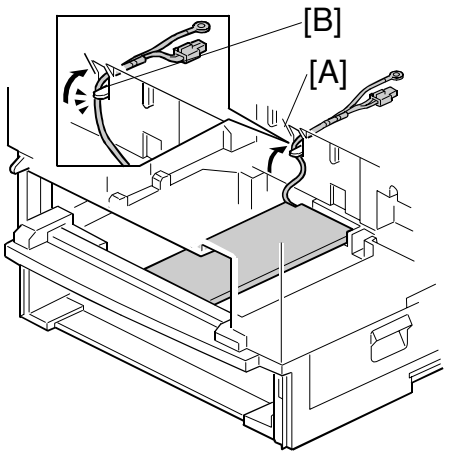
14. Clip off the excess length of the tie wrap [H].



15. Connect the relay harness connector [I] to the large connector at the front center of the PSU board. Screw the ground wire [J] to the PSU board bracket, using the included grounding screw.

16. Attach the supplied clamps [K] to corresponding holes on the PSU board bracket, and set the heater harness though the clamps. Position the harness so that the front clamp is between the two bindings [L] on the harness. Then fasten the clamps.

17. Pull the excess length of the heater's harness out the hole at the rear [A].
    NOTE: Be sure that the harness passes to the side of the grounding plate [B] at the bottom of the hole. (The front of the grounding plate must remain clear.)



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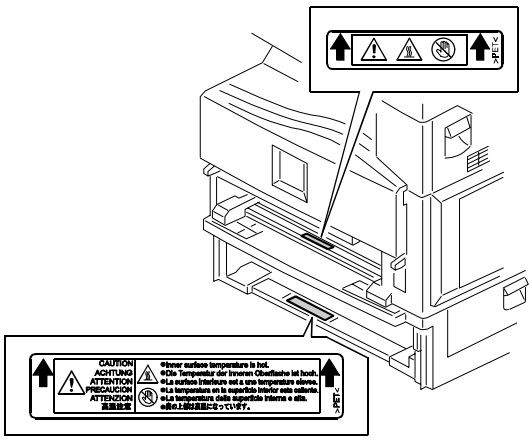
18. Arrange the excess harness length so that it sits beneath the FCU cover plate.

19. Attach the caution decals to the locations shown in the illustration.



B046I523.WMF

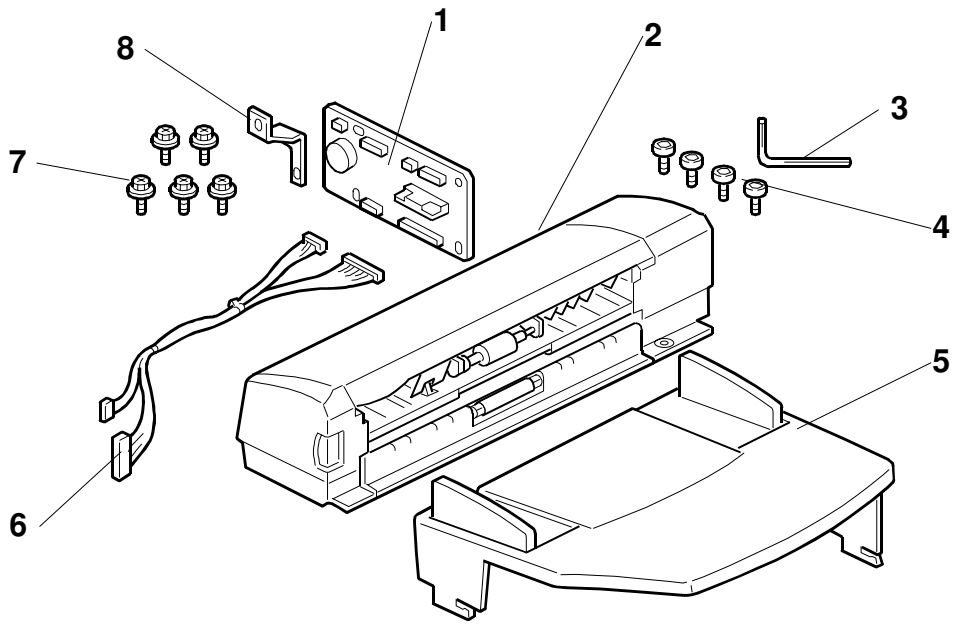
20. Reinsert the paper trays, and reattach the copy tray and the rear cover.

1.5 DOCUMENT FEEDER

1.5.1 ACCESSORY CHECK

Confirm that you have the components and accessories indicated below.

No.	Description	Q'ty
1	DF connection board	1
2	DF body	1
3	Hex wrench	1
4	Hex screws	4
5	DF original table	1
6	Wire harness	1
7	Phillips-head screws	5
8	Bracket	1
–	Installation Procedure	1



B046I524.WMF

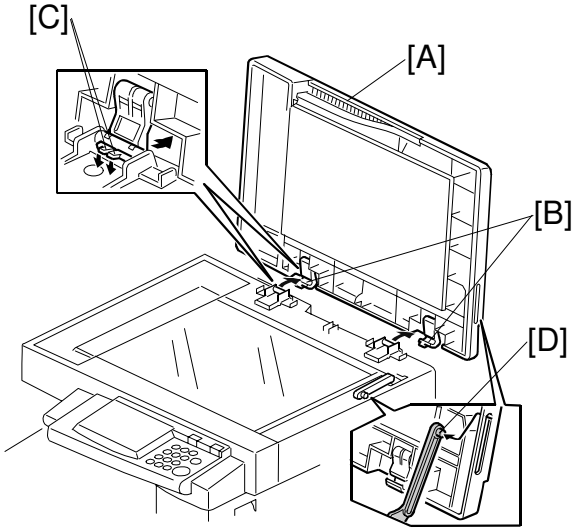
1.5.2 INSTALLATION PROCEDURE

⚠CAUTION

Unplug the main machine's power cord before starting the following procedure.

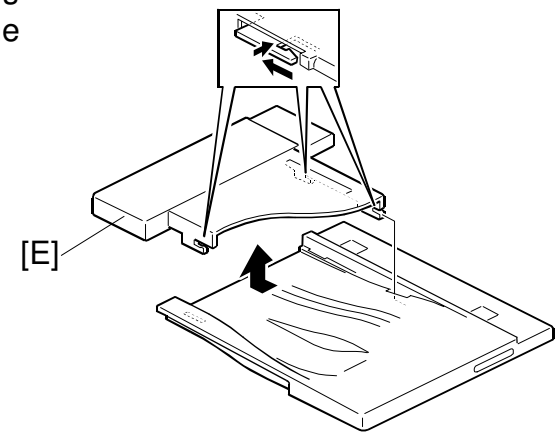
1. Unpack the ADF and remove the packing tape from the bottom of the ADF body.

2. Remove the platen cover [A]. To remove: Lift the cover, unlatch the two latches [B] (press down on the tabs [C] and push the latch back), and detach the cover from the hook [D].



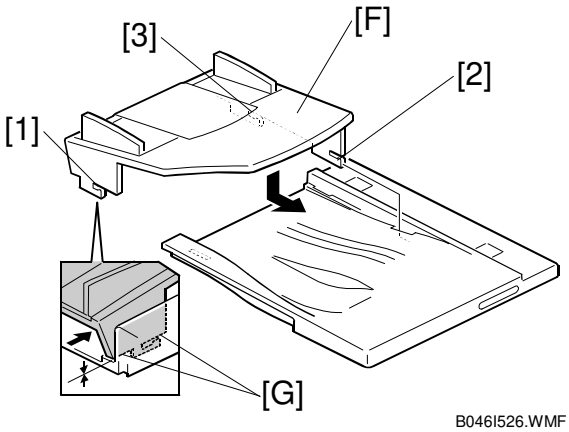
B046I505.WMF

3. Remove the left piece [E] of the copier's platen cover by pushing the piece to the left and then pulling it up and off.



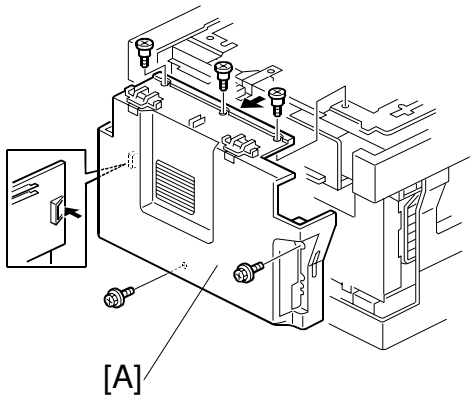
B046I525.WMF

4. Place the DF original table [F] flat onto the platen cover, so that the 3 latches go all the way into the openings and so that the contact area [G] around each latch is flush against the cover. Then push so that latch [1] locks into place, then latch [2], and then latch [3] (at the rear left).
   NOTE: The latches may break if you try to push the table in at an angle.



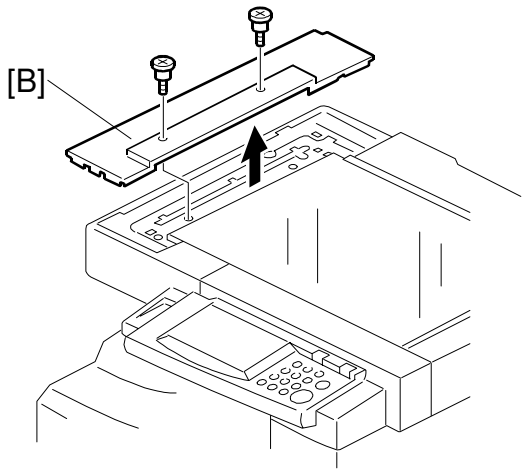
B046I526.WMF

5. Remove the rear cover [A] (🔩 x 5).



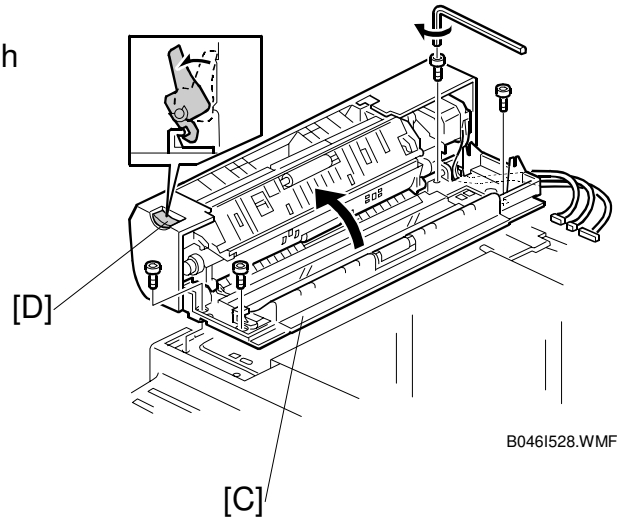
B046I514.WMF

6. Remove the left scale plate [B] (🔩 x 2).



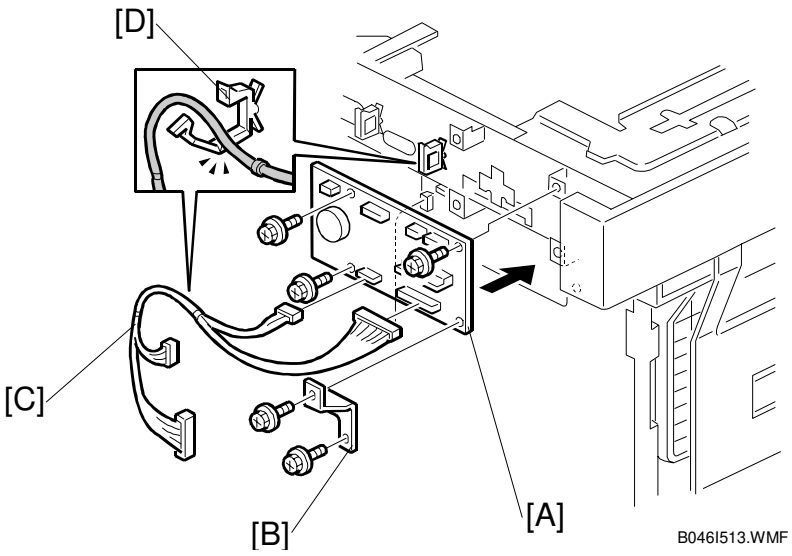
B046I506.WMF

7. Set the DF body [C] onto the copier in its correct position. Press the latch [D] to raise the top half of the body, and fasten to the copier with the 4 hex screws (using the included hex wrench).



B046I528.WMF

8. Install the DF connection board [A] and DF board bracket [B]. (🔩 x 5)



9. Connect the four wire sets from the DF body to CN103, CN105, CN106, and CN107 on the DF connection board. (Not shown in illustration.)
10. Connect one end of the supplied wire harness [C] to CN101 and CN102 on the DF connection board, and connect the other end to connectors CN9 and CN10 on the FCU. Secure the wire harness into the clamp [D] located to the side of the DF board.
11. Reattach the rear cover and the platen cover.
12. Plug in the power cord, and turn on the main switch.
13. Make a full-size copy from the first tray using the ADF, and check the side-to-side and leading edge registrations. If the registration is incorrect, adjust as necessary (☛ 3.13.3).

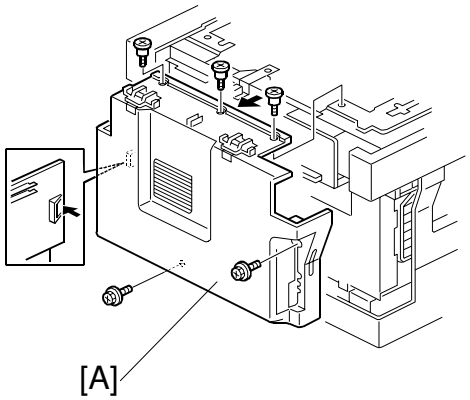
1.6 DIMM

1.6.1 INSTALLATION PROCEDURE

⚠CAUTION

Unplug the main machine's power cord before starting the following procedure.

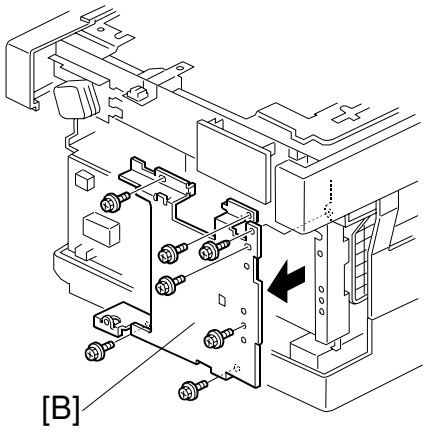
1. Remove the rear cover [A] (🔩 x 5).



B046I508.WMF

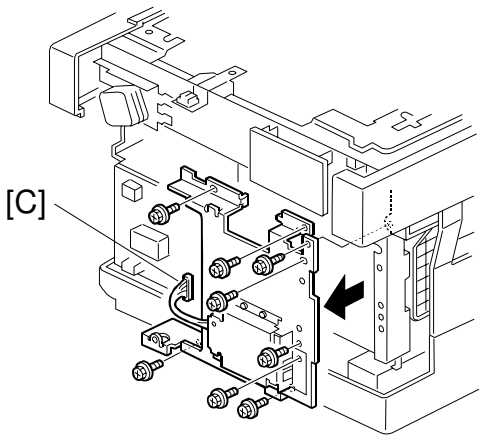
2. Remove the FCU cover plate [B] (7 screws on faxless machines, 8 screws on fax-equipped machines).
   NOTE: On fax-equipped machines, detach the NCU connector [C] first.

Faxless machines:



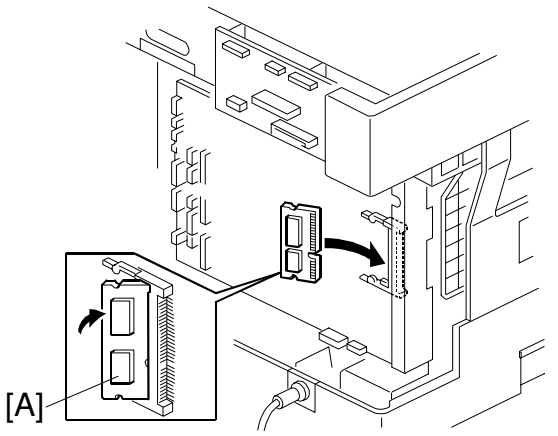
B046I509.WMF

Fax-equipped machines:



B046I510.WMF

3. Insert the DIMM [A] at an angle into slot CN2 on the FCU.
4. Press the free end of the DIMM toward the FCU, so that the DIMM snaps into place parallel to the FCU.
5. Reinstall the FCU cover plate and the rear cover.



B046I105.WMF

2. PREVENTIVE MAINTENANCE SCHEDULES

2.1 PM TABLES

NOTE: 1) After carrying out PM, clear the PM counter (SP7-804).
2) PM intervals (45k, 90k) indicate the number of prints.

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

	Every 45k	Every 90k	AN	NOTE
OPTICS				
Reflector	C		C	Optics cloth
1st mirror	C		C	Optics cloth
2nd mirror	C		C	Optics cloth
3rd mirror	C		C	Optics cloth
Platen cover	C		C	Dry cloth
Exposure glass	C		C	Dry cloth
Toner shield glass	C		C	Dry cloth
DRUM AREA				
PCU	R			On B044 and B046: Also clean toner-bottle holder.
Transfer roller		R		
Discharge plate		R		
PAPER FEED				
Paper feed roller		R	C	Water or alcohol.
Friction pad		R	C	Dry cloth
Bottom-plate pad	C		C	Water or alcohol.
Registration roller	C		C	Water or alcohol.
FUSING UNIT				
Hot roller		R		
Pressure roller		R		
Hot roller bearings		R		
Pressure-roller bushings		I		
Inlet guide		C		
Outlet guide		C		
Hot roller stripper pawls		R		
Thermistor		C		

	Every 90k	AN	NOTE
DF			
Separation roller	R	C	Water or alcohol
Pick-up roller	R	C	Water or alcohol
White plate		C	Water or alcohol
DF exposure glass		C	Water
Rollers R0, R1, R2		C	Water or alcohol

	Every 120k	AN	NOTE
PAPER TRAY UNIT			
Paper feed roller	R		
Bottom-plate pad		C	Dry cloth
Friction pad	R		

2.2 HOW TO CLEAR THE PM COUNTER

After finishing PM, clear the PM counter as follows.

1. Access SP mode 7-804.
2. Hold down the *Original Type* key and press the *OK* key (or ⓡ/# key) 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 PRECAUTIONS

3.1.1 GENERAL

⚠CAUTION

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

But note that you should not turn off the main switch while mechanical parts are active, as this may cause parts to stop out of home position. Attempting to remove or install the PCU or other such units while parts are out of home position may result in damage. Wait for operation to stop before turning off the machine.

3.1.2 LITHIUM BATTERIES

⚠CAUTION: Lithium Batteries

Incorrect replacement of lithium battery(s) on the FCU poses risk of explosion. Replace only with the same type or with an equivalent type recommended by the manufacturer. Discard used batteries in accordance with the manufacturer's instructions.

3.1.3 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.

3.1.4 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.

3.1.5 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.

3.1.6 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, as these are permanently adjusted at the factory. If replacement of the LD drive board is necessary, replace the entire LD unit.
3. Keep the polygon mirror and toroidal lens free of dust. Laser performance is very sensitive to dust on these components.
4. Do not touch the shield glass, the lenses, or the surface of the polygon mirror with bare hands.

3.1.7 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.

3.1.8 PAPER FEED

1. Do not touch the surface of 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 loaded paper size.

3.1.9 IMPORTANT

1. The machine will automatically start toner agitation when you install a new PCU. Be sure to wait for initialization to finish before reopening the front cover or turning off the main switch.
2. If the optional anti-condensation heater (for the optional paper tray unit) is installed, keep the copier's power cord plugged in even while the main switch is off, so that the heater remains energized.

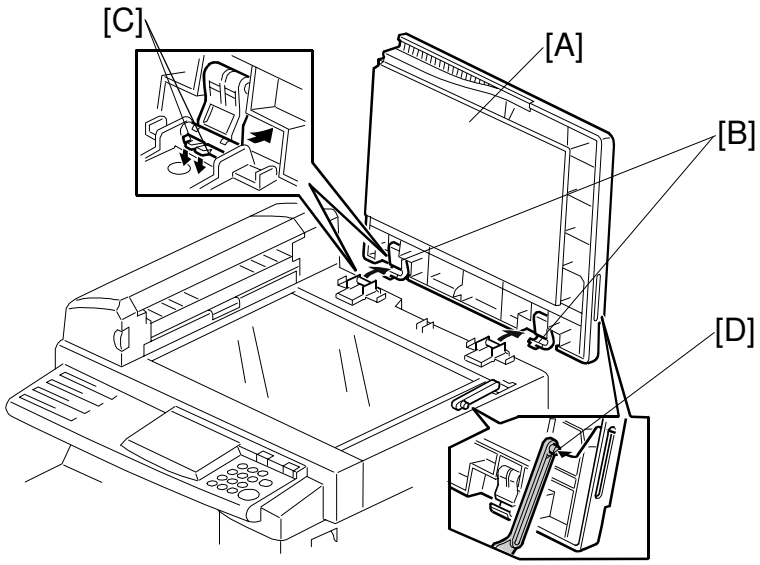
3.2 SPECIAL TOOLS AND LUBRICANTS

Part Number	Description	Q'ty	Common with...
A1849501	Optics Adjustment Tools (2 pcs/set)	1 set	Skylark
A2929500	Test Chart – S5S (10 pcs/set)	1 set	Mojito
A0299387	Digital Multimeter – Fluke 87	1	Russian-C, Stinger-C
N8036701	Flash Memory Card (4MB)	1	Russian-C, Stinger-C
N8031000	Case for Flash Memory Card	1	Russian-C, Stinger-C
A2579300	Grease Barrierta – S552R	1	Russian-C, Stinger-C
52039501	Silicone Grease G-501	1	Russian-C, Stinger-C
G0219350	Loopback connector	1	Russian-C, Stinger-C

3.3 EXTERIOR COVER AND OPERATION PANEL

3.3.1 PLATEN COVER

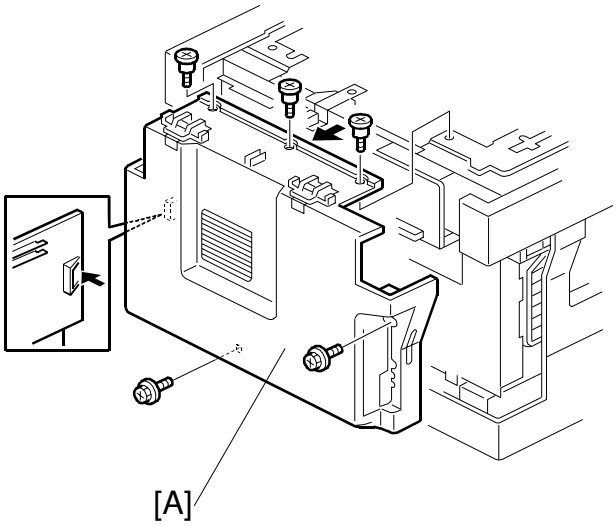
1. Lift the platen cover [A].
2. Unlatch the two latches [B].
   NOTE: To unlatch, press down on the tabs [C] and then push the latch back.
3. Detach the cover from the hook [D]



B046R904.WMF

3.3.2 REAR COVER

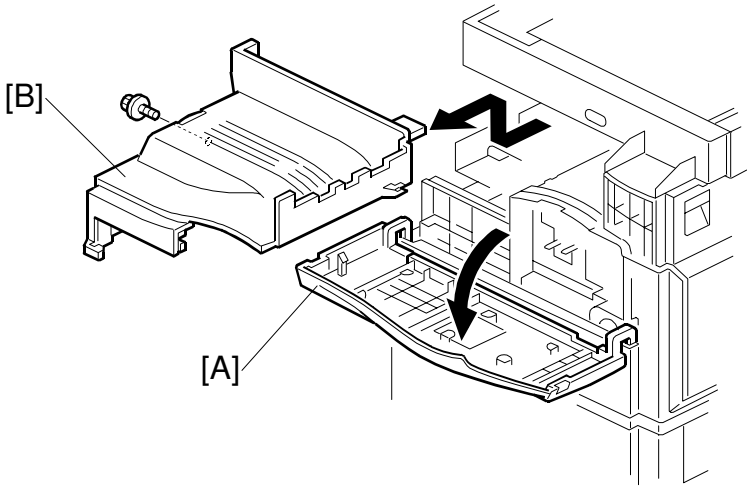
1. Platen cover (☛ 3.3.1)
2. Rear cover [A] (☞ x 5)



B046R903.WMF

3.3.3 COPY TRAY

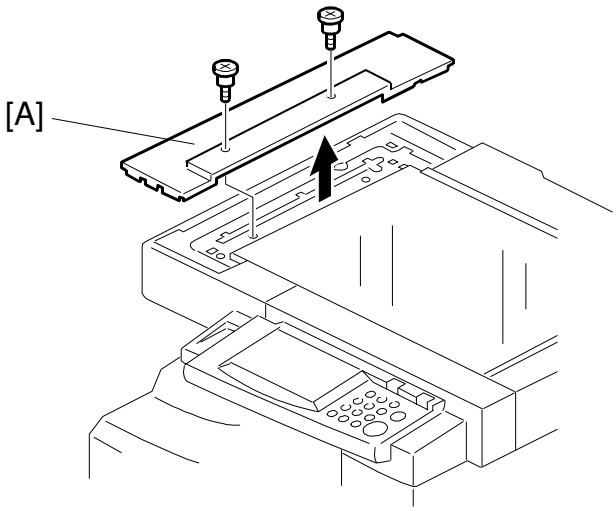
1. Open the front door [A].
2. Copy tray [B] (🔩 x 1)



B046R912.WMF

3.3.4 SCALE PLATE (B044 AND B045 ONLY)

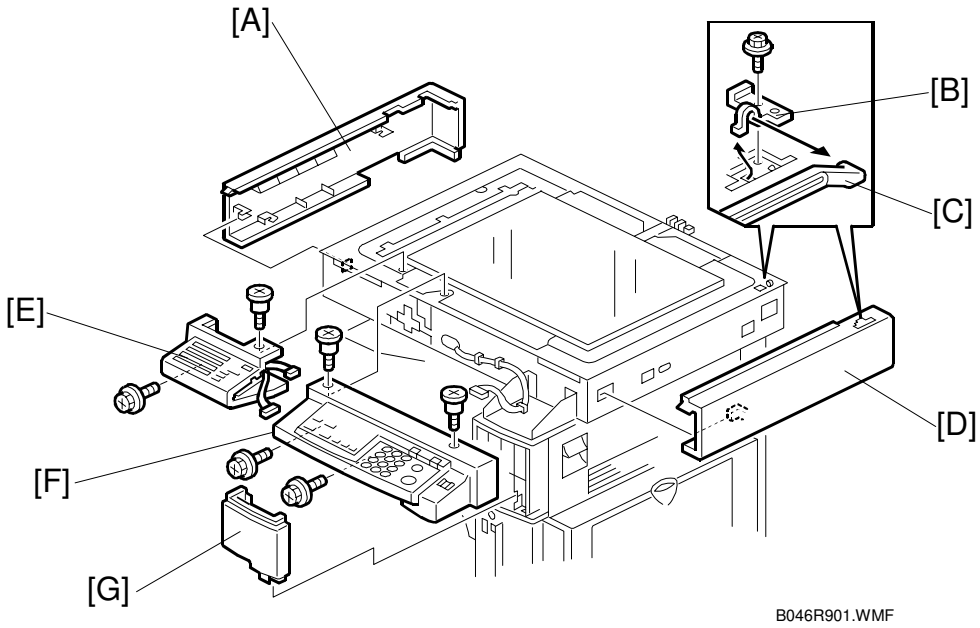
1. Scale plate [A] (🔩 × 2)



B046R551.WMF

3.3.5 LEFT COVER

1. Rear cover (☛ 3.3.2)
2. Slide the left cover [A] toward the rear to remove it.



3.3.6 RIGHT COVER

1. Rear cover (☛ 3.3.2)
2. Remove the metal fitting [B], and the platen-cover arm [C].
3. Slide the right cover [D] toward the rear to remove it.

3.3.7 FRONT LEFT COVER AND OPERATION PANEL

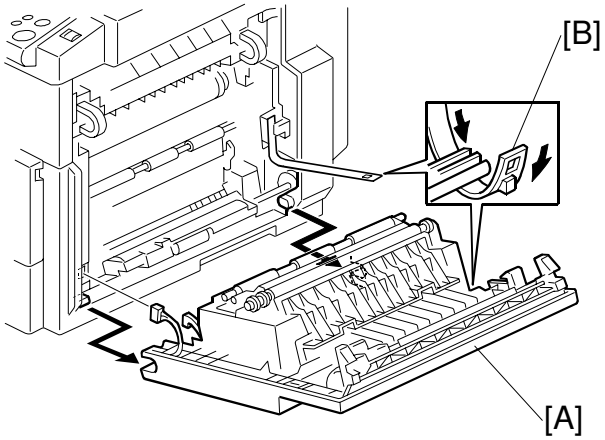
1. Front left cover [E] (On B044/5: ☞ × 2) (On B046/9: ☞ × 2, ☞ × 2)
   NOTE: The illustration shows B046/9.
2. Operation panel [F] (☞ × 4, ☞ × 1)

3.3.8 FRONT RIGHT COVER

1. Operation panel (☛ 3.3.7)
2. Open the right door.
3. Front right cover [G]

3.3.9 RIGHT DOOR

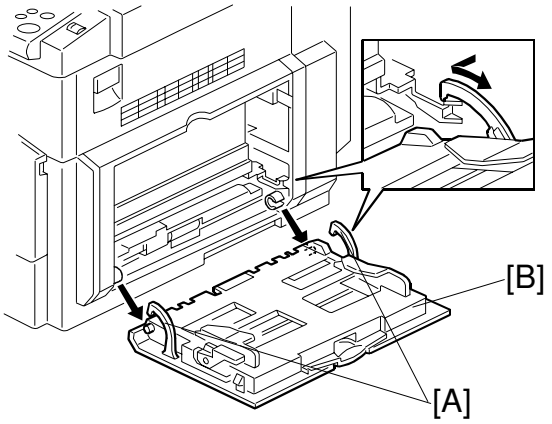
1. Open the right door [A].
2. Undo the strap [B].
3. Right door (☞ × 1)



B046R909.WMF

3.3.10 BYPASS TRAY (B044 AND B046 ONLY)

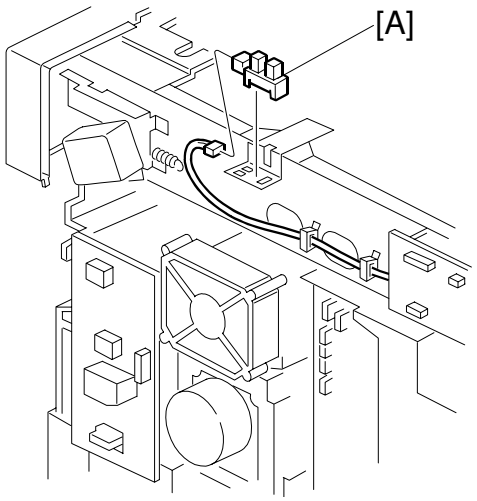
1. Press the stopper rails [A] inward and remove the bypass tray [B].



B046R908.WMF

3.3.11 PLATEN COVER SENSOR

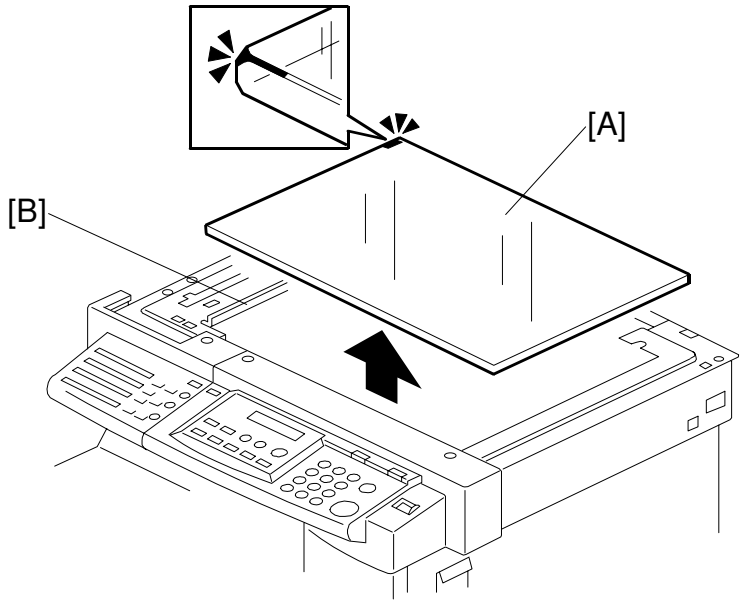
1. Rear cover (☛ 3.3.2)
2. Platen cover sensor [A] (✋ × 1)



B046R931.WMF

3.4 SCANNER SECTION

3.4.1 EXPOSURE GLASS



B046R005.WMF

Non-DF machines

1. Rear cover (☛ 3.3.2)
2. Scale plate (☛ 3.3.4)
3. Exposure glass [A]

DF-equipped machines

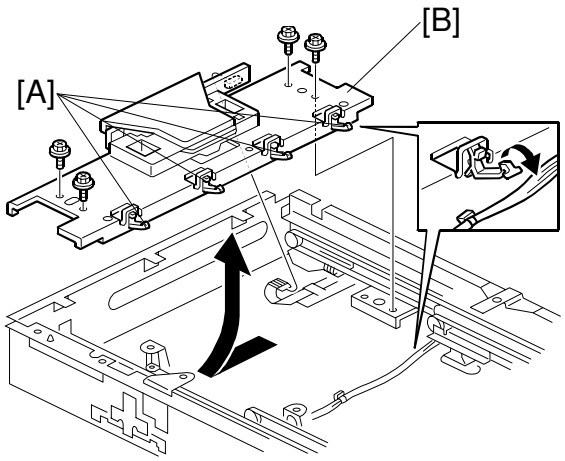
1. Rear cover (☛ 3.3.2)
2. Right cover (☛ 3.3.6)
3. Exposure glass [A]

NOTE: *When reinstalling*: Be sure that the marking on the glass is at the rear left corner, and be sure the left edge of the glass is aligned flush against the support ridge [B] on the frame.

3.4.2 LENS BLOCK

1. Exposure glass (☛ 3.4.1)
2. Unclamp four clamps [A], and take the wire out of the clamps.
3. Lens block [B] (☞ × 4, 1 flat cable)

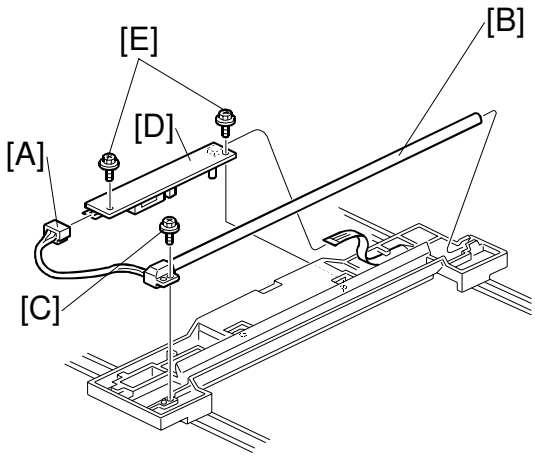
NOTE: 1) Do not loosen the paint-locked screws holding the lens unit in place.
2) After installing a new lens block, carry out copy adjustments. (☛ 3.13)



B046R003.WMF

3.4.3 EXPOSURE LAMP, LAMP STABILIZER BOARD

1. Exposure glass (☛ 3.4.1)
2. Operation panel (☛ 3.3.7)
3. Slide the 1st scanner to a position where the lamp and scanner are clear of the metal lids.
4. Disconnect the lamp connector [A].
5. Remove either or both of the following:
   - Exposure lamp [B] (1 screw at [C])
   - Lamp stabilizer board [D] (2 screws at [E], 1 flat cable)

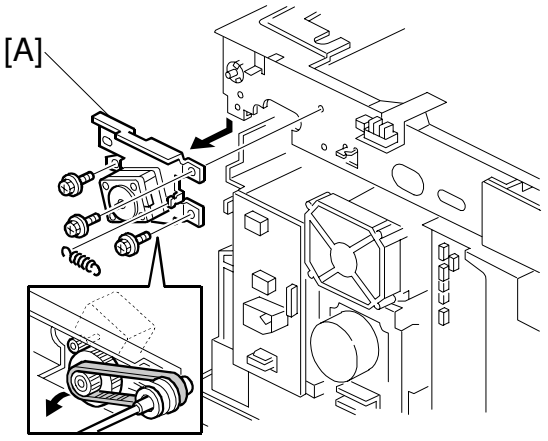


B046R001.WMF

3.4.4 SCANNER MOTOR

1. Right cover (☛ 3.3.6)
2. Scanner motor [A] (🔩 × 4, 1 spring, 🔌 × 1)

NOTE: *When reinstalling*: Fasten the screws loosely, then set the spring in place, then tighten up the screws.

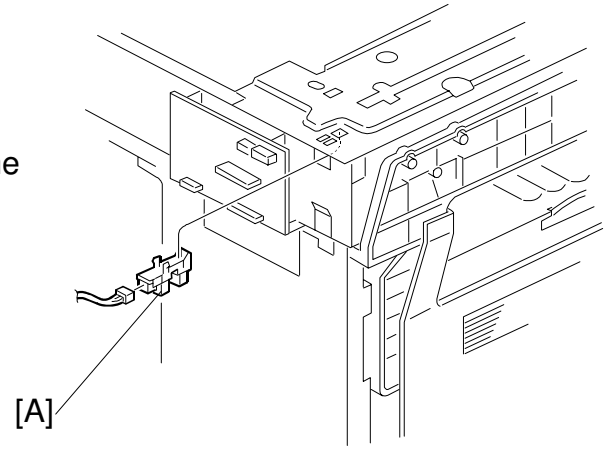


B046R923.WMF

3.4.5 SCANNER HP SENSOR

1. Left cover (☛ 3.3.6)
2. *If non-DF machine:* Scale plate (☛ 3.3.4)

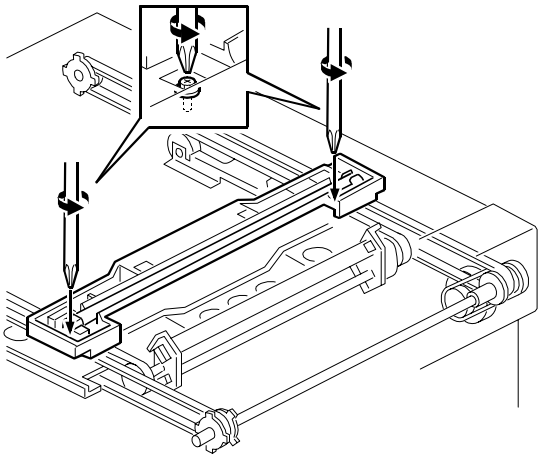
   If DF-equipped machine: Press on the DF latch and open the DF.
3. Scanner HP sensor [A] (🔌 × 1)



B046R020.WMF

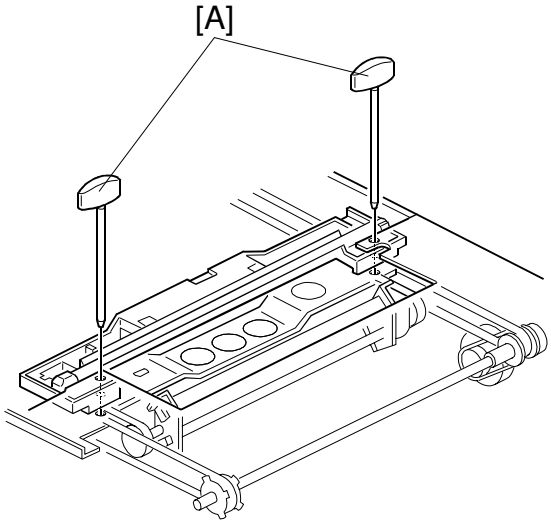
3.4.6 SCANNER ALIGNMENT ADJUSTMENT

1. Remove the rear cover (☛ 3.3.2), operation panel (☛ 3.3.7), and exposure glass (☛ 3.4.1).
2. Loosen the 2 screws holding the 1st and 2nd scanner belts in place.



B046D002.WMF

3. Slide the 1st and 2nd scanners so that all four of the following are roughly aligned on both the front and back sides:
   - The hole on the copier's lid
   - The hole on the 1st scanner
   - The corner right hole on the 2nd scanner
   - The hole at the base of the scanner
4. Insert the two optics adjustment tools [A], and adjust the scanners as necessary so that the tools go through all four holes.
5. Tighten the two screws that you loosened at step 2 above, so that the belts are firmly clamped into place.
6. Remove the adjustment tools.



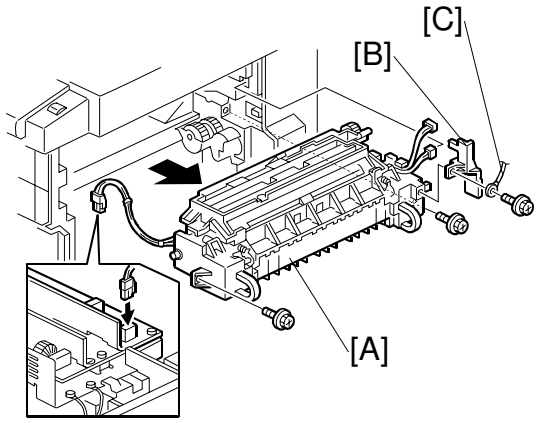
B046D003.WMF

3.5 FUSING

3.5.1 FUSING UNIT

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

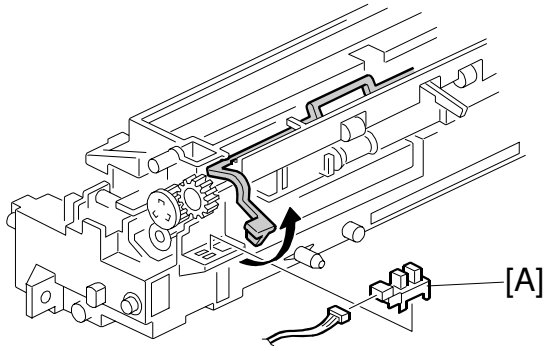
1. Turn off the main switch, and unplug the machine.
2. Copy tray (☛ 3.3.3)
3. Fusing unit [A] (🔧 × 3, ✋ × 3)
   NOTE: *When reinstalling the unit:*
   Replace the spacer [B] in the correct position, and remember to set the grounding wire [C] into place.



B046R501.WMF

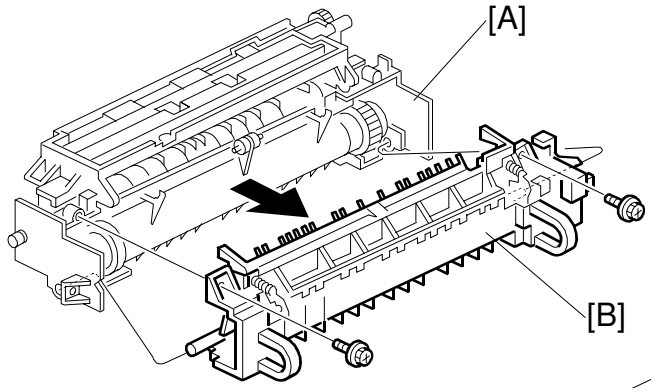
3.5.2 EXIT SENSOR

1. Fusing unit (☛ 3.5.1)
2. Exit sensor [A] (✋ × 1)

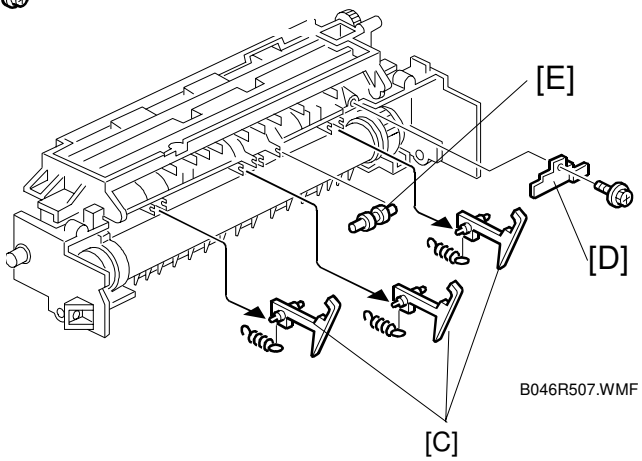


B046R508.WMF

3.5.3 HOT ROLLER STRIPPER PAWLS



B046R502.WMF

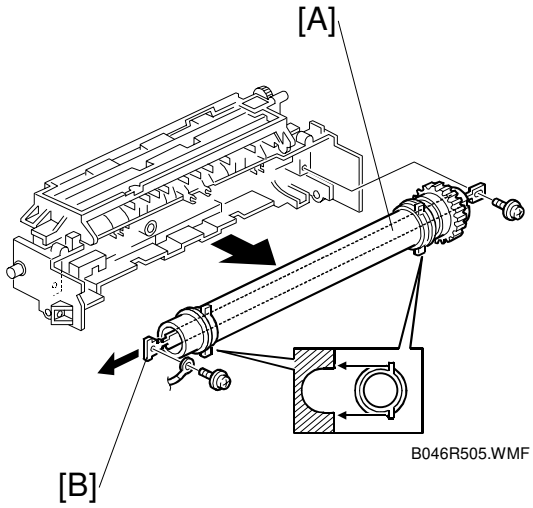


B046R507.WMF

1. Fusing unit (☛ 3.5.1)
2. Separate the fusing unit into two sections: the hot roller section [A], and the pressure roller section [B]. (☞ × 2)
   NOTE: After removing the screws, lower the pressure roller section about halfway and then slide it toward the front side to detach it.
3. Hot roller stripper pawls [C] (1 spring for each pawl)
   NOTE: 1) To remove the right pawl, first remove the plastic spacer at [D] (☞ × 1).
   2) When reinstalling the center pawl, be sure to set roller [E] back into place.

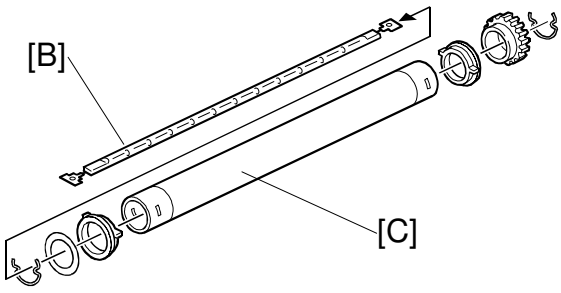
3.5.4 HOT ROLLER & FUSING LAMP

1. Hot roller stripper pawls (☛ 3.5.3)
2. Hot roller assembly [A] (🔩 × 2)
   NOTE: 1) Each of the screws has a washer.
   2) After removing the screws, lift the hot roller assembly out from the rear side.
3. Fusing lamp [B]



B046R505.WMF

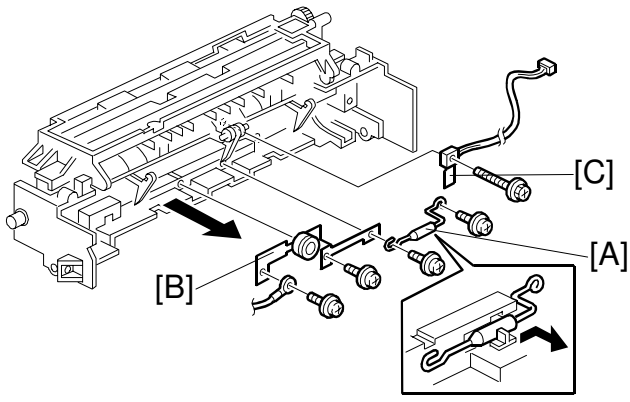
4. Hot roller [C] (2 C-rings, 1 spacer, 1 gear, 2 bushings)



B046R509.WMF

3.5.5 THERMOFUSE, THERMOSWITCH, AND THERMISTOR

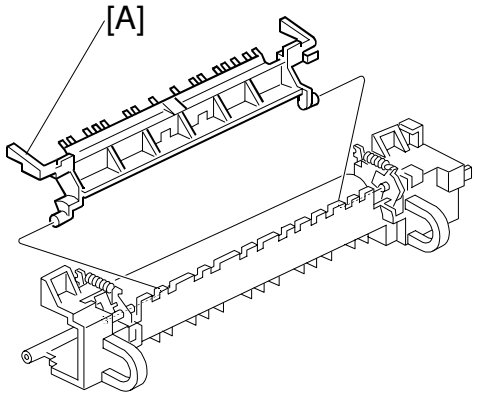
1. Remove the hot roller assembly from the hot roller section. (☛ 3.5.3)
2. Thermofuse [A] (🔩 × 2).
3. Thermoswitch [B] (🔩 × 2)
   NOTE: You must remove the thermofuse first.
4. Thermistor [C] (🔩 × 1)



B046R506.WMF

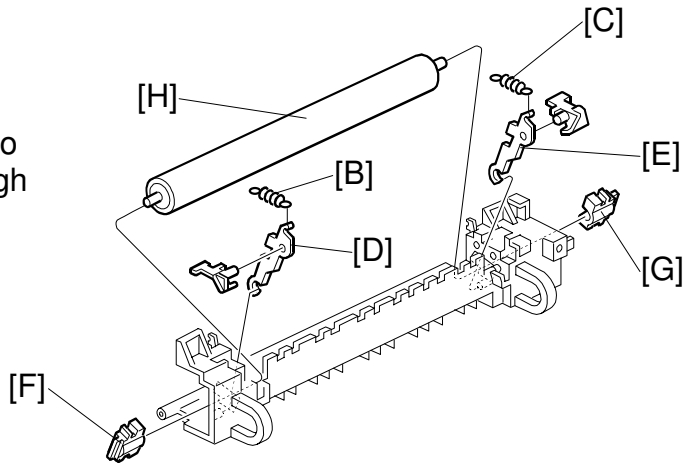
3.5.6 PRESSURE ROLLER

1. Fusing unit (☛ 3.5.1)
2. Separate the fusing unit into two sections: the hot roller section and the pressure roller section (☛ 3.5.3, Step 2). Carry out the remaining steps on the pressure roller section.
3. Fusing entrance guide [A]



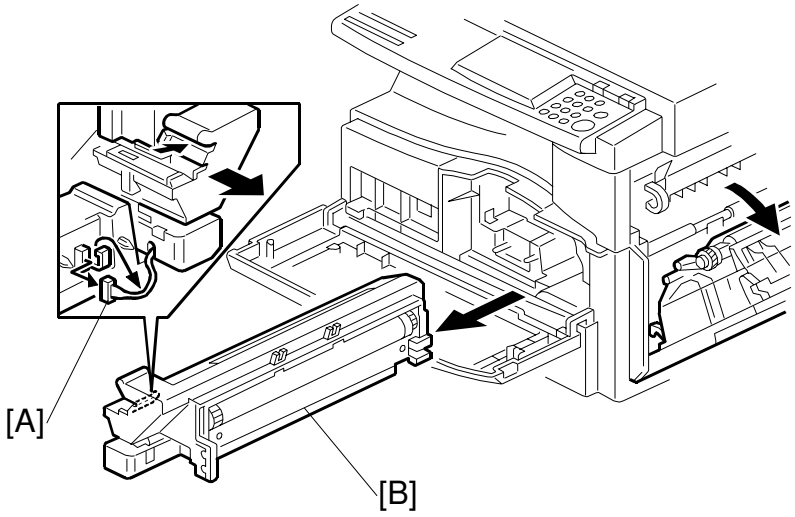
B046R504.WMF

4. 2 springs ([B], [C])
5. 2 pressure arms ([D], [E])
   NOTE: Manipulate each arm so that it comes out through the slit in the casing.
6. 2 bushings ([F], [G])
7. Pressure roller [H]



B046R503.WMF

3.6 PCU

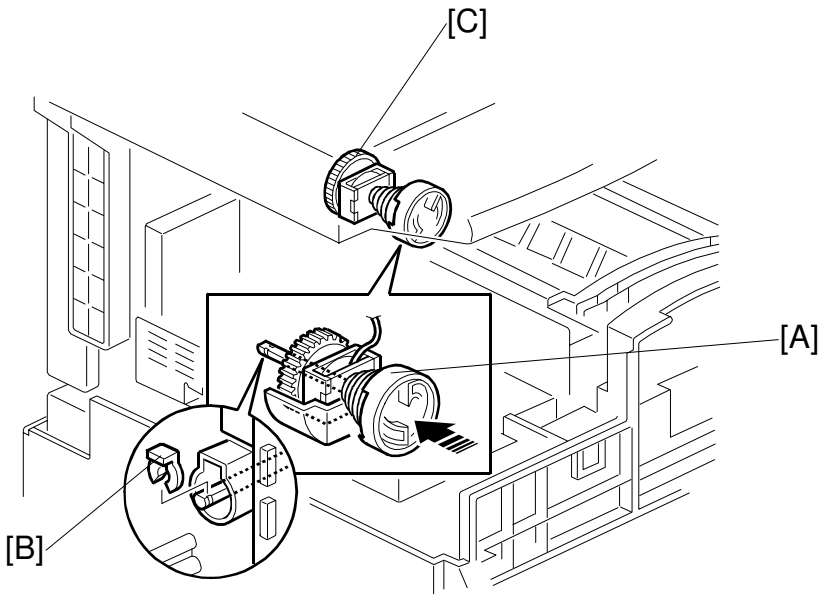


B046I109.WMF

1. Open the right door.
   NOTE: ***Do not forget to open the right door.*** The PCU may become stuck if you try to remove it while the front door is closed.
2. Open the front door.
3. Remove the toner bottle holder or THM.
   NOTE: If working on a toner-bottle model, clean away all spilled toner from the toner bottle area and from the inside of the front door.
4. Detach the connector [A] and pull out the PCU [B].

NOTE: 1) After installing the new PCU, be sure to remove the Styrofoam piece and to pull off the two tags. (☛ 1.1.2, Step 10)
2) The machine will automatically detect the new PCU and begin toner initialization. (☛ 6.10.4)

3.7 TONER SUPPLY CLUTCH



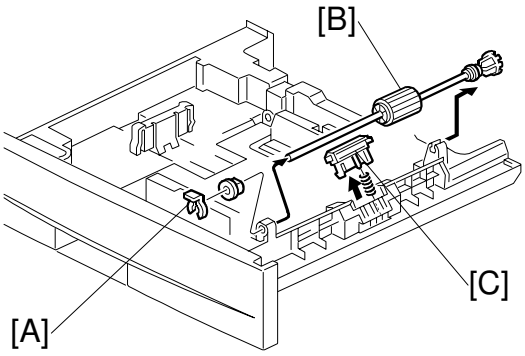
B046R932.WMF

1. Remove the toner bottle or THM.
2. Copy tray (☛ 3.3.3)
3. Rear cover (☛ 3.3.2)
4. Disconnect the connector on C19 on the FCU.
5. Reach into to the machine and push the clutch coupler [A] toward the rear, and at the same time reach around the back and remove the clip ring [B].
6. Remove the cone and spring, then lift the toner supply clutch mechanism [C] out of its housing and remove it.
   NOTE: When removing, note how the wire goes through a clamp, and also note where it passes through the rear of the machine.

3.8 PAPER FEED SECTION

3.8.1 PAPER FEED ROLLER AND FRICTION PAD

1. Take out the paper tray.
2. Clip ring [A]
3. Pull the shaft back, and lift it out.
4. Remove either or both of the following:
   - Paper feed roller [B]
   - Friction pad [C]

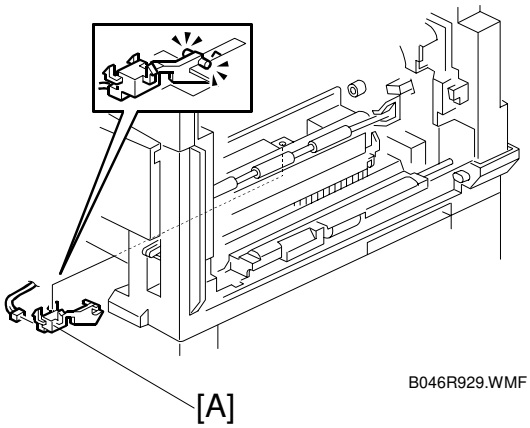


B046R702.WMF

3.8.2 PAPER END SENSOR

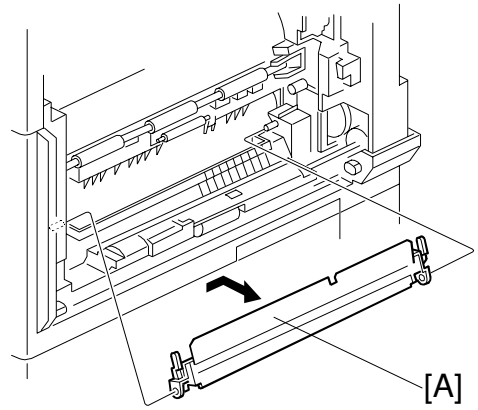
1. Take out the paper tray.
2. Open the right door.
3. PCU (☛ 3.5)
4. Paper end sensor [A] (☞ × 1)

NOTE: When installing the new sensor, reach your left hand in through the front and your right hand in through the right side, and view from the right side.

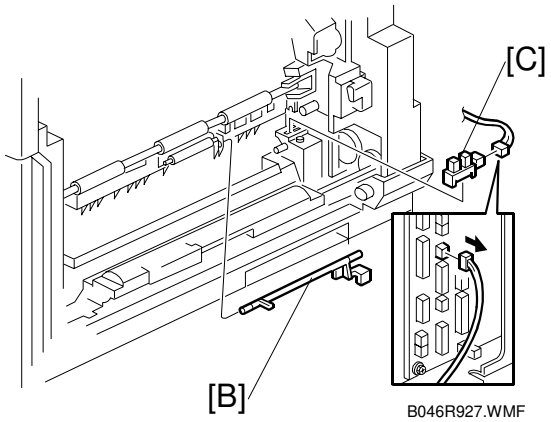


B046R929.WMF

3.8.3 REGISTRATION SENSOR



B046R926.WMF

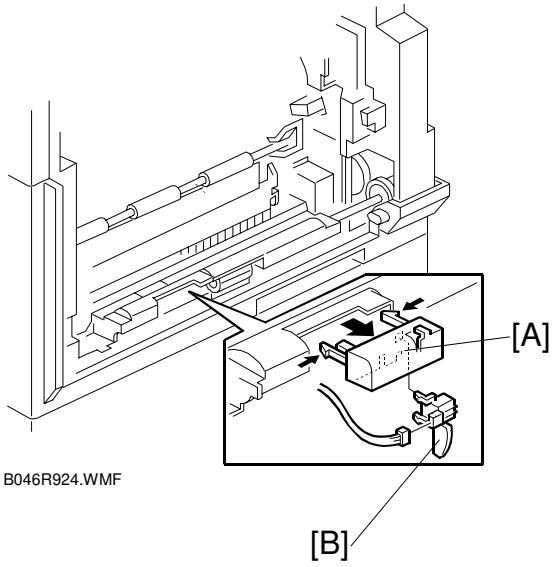


B046R927.WMF

1. Take out the paper tray.
2. Open the right door.
3. Black guide piece [A]
4. Registration sensor feeler [B]
5. Registration sensor [C] (☞ × 1)

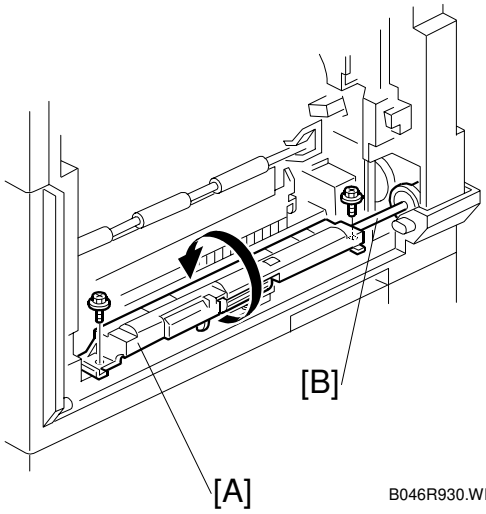
3.8.4 BYPASS PAPER END SENSOR (B044 AND B046 ONLY)

1. Right door (☛ 3.3.9)
2. Detach the sensor compartment [A].
3. Bypass paper end sensor [B] (☞ × 1)

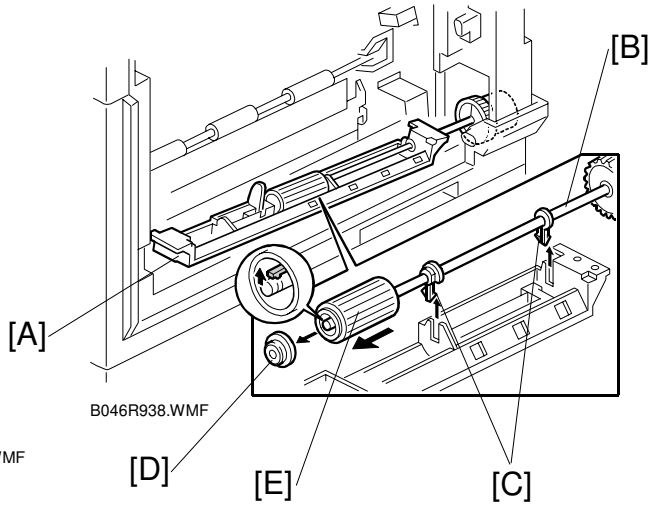


B046R924.WMF

3.8.5 BYPASS FEED ROLLER (B044 AND B046 ONLY)



B046R930.WMF

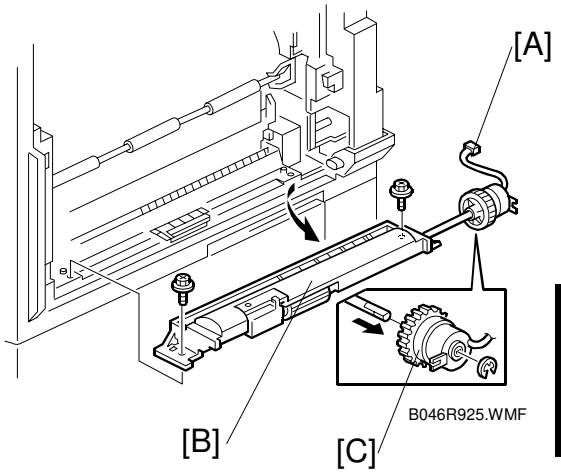


B046R938.WMF

1. Right door (☛ 3.3.9)
2. Unscrew the feed roller frame [A] (☞ × 2) and rotate it about the feed roller shaft [B] so that it is upside down.
3. Detach the feed roller shaft [B] from the feed roller frame (unsnap the two snap pawls [C] and remove the spacer [D]).
4. Bypass feed roller [E]

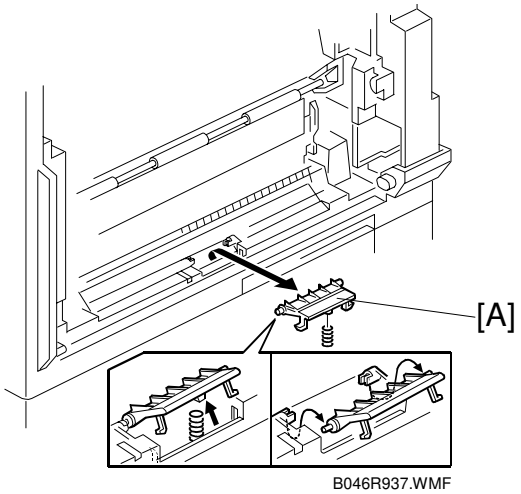
3.8.6 BYPASS FEED CLUTCH (B044 AND B046 ONLY)

1. Rear cover (☛ 3.3.2)
2. Right door (☛ 3.3.9)
3. Detach the bypass feed clutch connector [A] from CN3 on the high-voltage power supply board.
4. Unscrew the bypass feed roller housing [B] (☞ × 2), and pull it out of the machine.
   NOTE: It is not necessary to remove or disconnect the bypass paper end sensor.
5. Bypass feed clutch [C] (ℂ × 1)



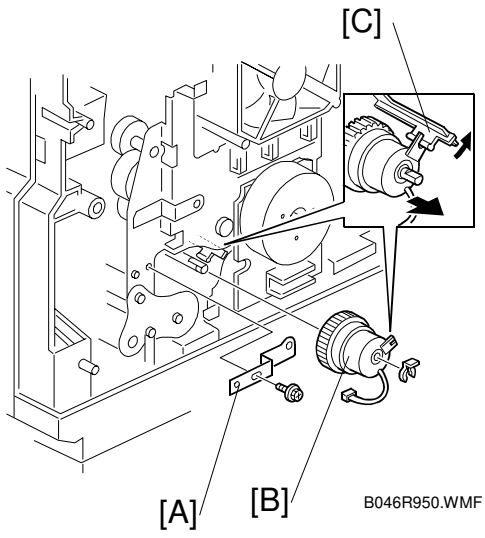
3.8.7 BYPASS FRICTION PAD (B044 AND B046 ONLY)

1. Right door (☛ 3.3.9)
2. Detach the roller housing [B] (☞ × 2), and move it out of the way.
3. Bypass friction pad [A]

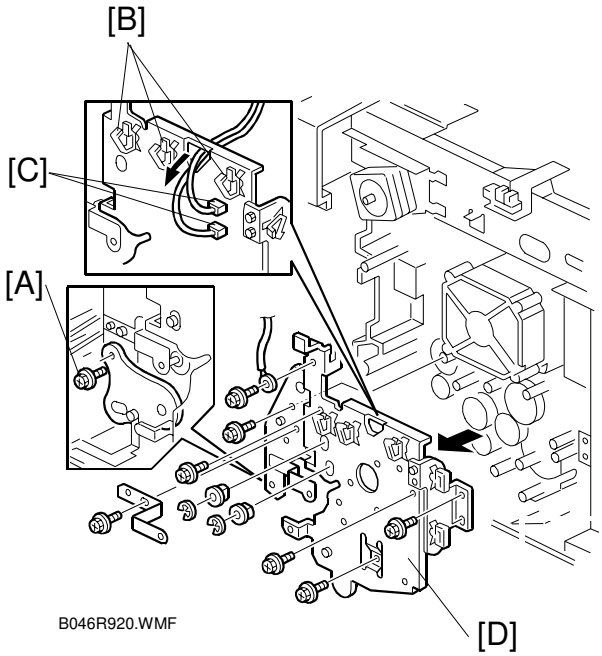


3.8.8 REGISTRATION CLUTCH

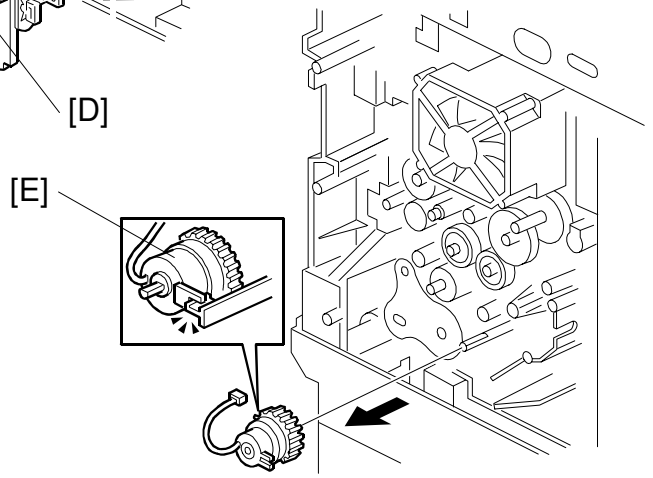
1. Rear cover (☛ 3.3.2)
2. High-voltage power supply board (☛ 3.12.2)
3. Ground plate [A] (☞)
4. Registration clutch [B] (× 1, × 1)
   NOTE: To free the clutch, pry clip [C] gently away from it using a screwdriver.



3.8.9 PAPER FEED CLUTCH



B046R920.WMF



B046R922.WMF

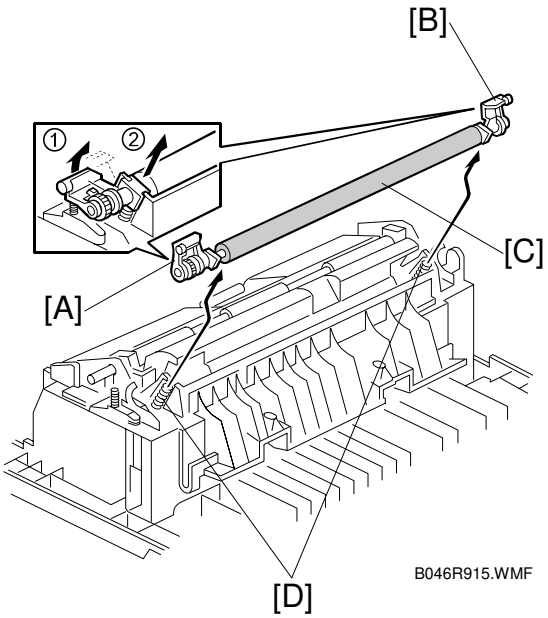
1. Pull the paper tray part way out.
2. High-voltage power supply board (☛ 3.12.2)
3. Main motor (☛ 3.12.4)
4. Remove 1 screw [A] from the small cover plate.
5. Open 3 clamps [B] on the large cover plate, and remove the wiring.
6. Detach two connectors [C] from the FCU.
7. Large cover plate [D] (🖗 × 7, ℂ × 2, 2 bushings)
8. Paper feed clutch [E]

3.9 IMAGE TRANSFER

3.9.1 IMAGE TRANSFER ROLLER

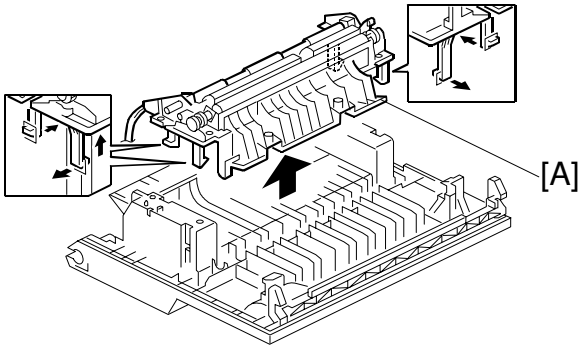
1. Right door (☛ 3.3.9)
2. Raise the levers ([A], [B]) at the ends of the image transfer roller, and remove the roller [C].

NOTE: 1) Note the position of the 2 springs [D] at each end. When reinstalling the roller, be sure that the pegs on the plastic end pieces fit into the springs.
2) Do not touch the transfer roller surface with bare hands.

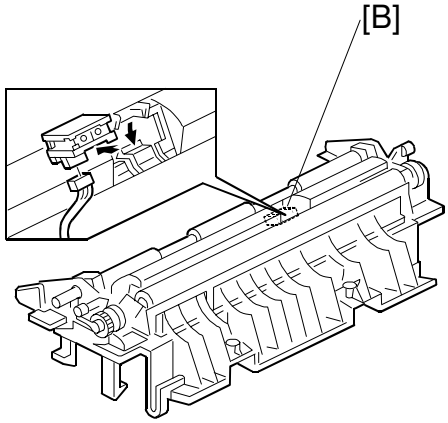


B046R915.WMF

3.9.2 ID (IMAGE DENSITY) SENSOR



B046R913.WMF

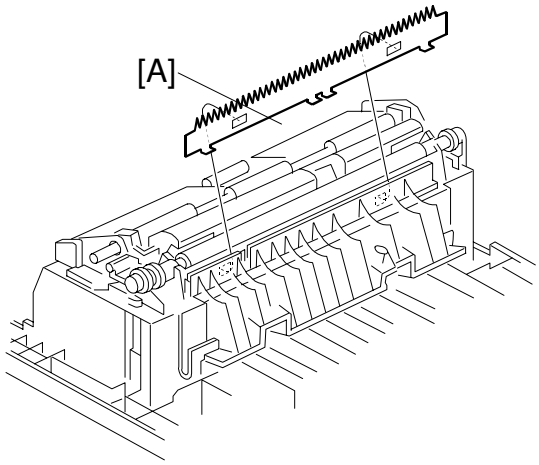


B046R914.WMF

1. Right door (☛ 3.3.9)
2. Push in the latches as shown, and pry off the entire section [A].
3. ID sensor [B] (☞ × 1)

3.9.3 DISCHARGE PLATE

1. Right door (☛ 3.3.9)
2. Use a tweezers to remove the discharge plate [A].

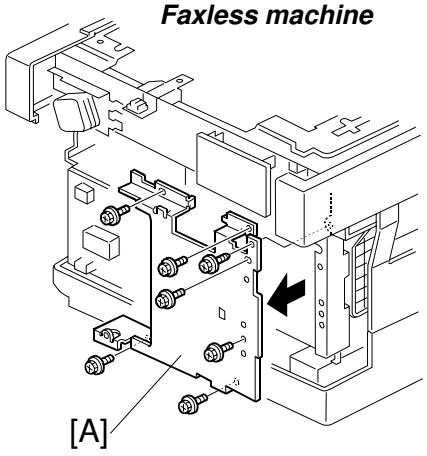


B046R934.WMF

3.10 FUNCTION CONTROL UNIT (FCU)

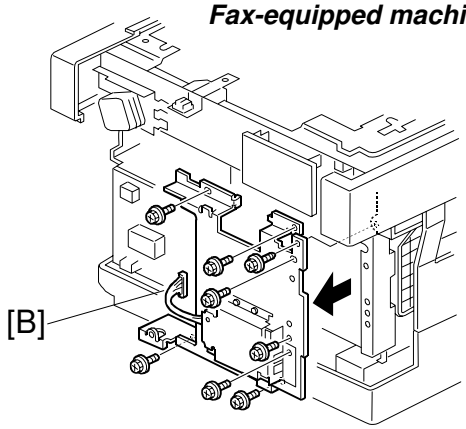
NOTE: 1) Before starting replacement, use SP5-824 to save SRAM user data from the existing FCU into a flash memory card. After finishing the replacement, use SP5-825 to reload the data from the card into the SRAM on the new FCU. For instructions, see Section 5.1.8.
2) Replacement FCUs ship with the battery jumper switch set to the OFF position. Be sure to change the jumper switch to the ON position before installing the replacement FCU.

Faxless machine

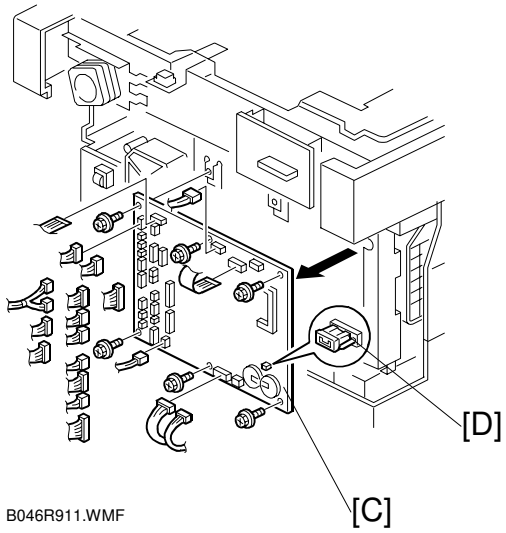


B046R907.WMF

Fax-equipped machine:



B046R910.WMF



B046R911.WMF

1. Rear cover (☛ 3.3.2)
2. FCU cover plate [A] (7 screws on faxless machines, 8 on fax-equipped machines)

   NOTE: On fax-equipped machines, detach the NCU connector [B] first, then unscrew the cover plate and remove the cover plate together with the NCU.

3. FCU [C] (all connectors, 2 flat cables, 🔩 x 6)

   NOTE: If an optional DIMM is installed on the FCU, remove it and install it on the new FCU. (☛ 1.6)

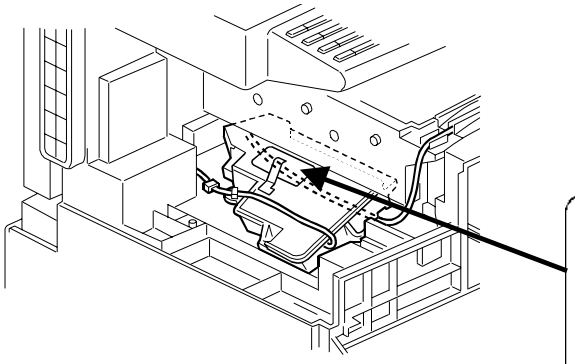
4. Before installing the new board, set the new board's TB1 battery jumper switch [D] to the ON position.

3.11 LASER UNIT

⚠WARNING

The laser beam can cause serious eye damage. Be sure that the main power switch is off and that the machine is unplugged before accessing the laser unit.

3.11.1 LOCATION OF "CAUTION" DECAL

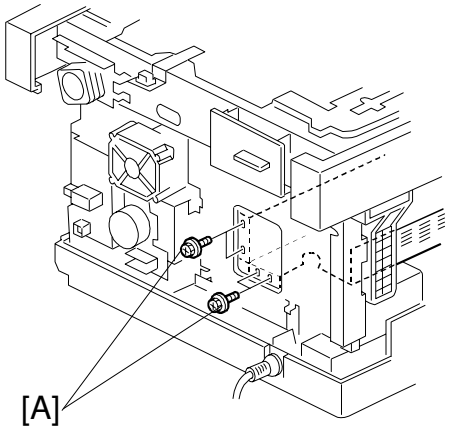


B046I103.WMF

B046RLW.WMF

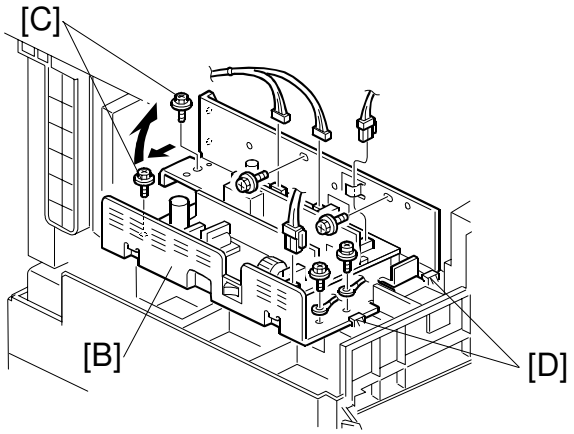
3.11.2 PSU BRACKET

1. FCU (☛ 3.10)
   NOTE: After removing the copy tray, leave the front door open.
2. Remove the 4 screws at [A].



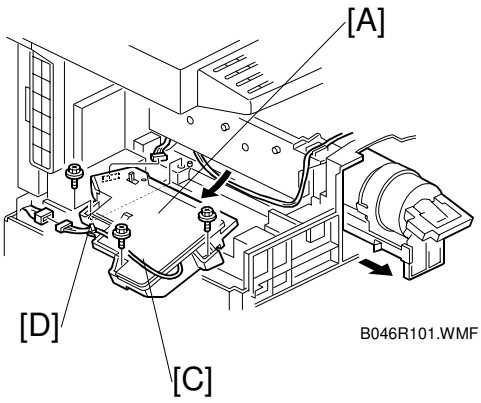
B046R905.WMF

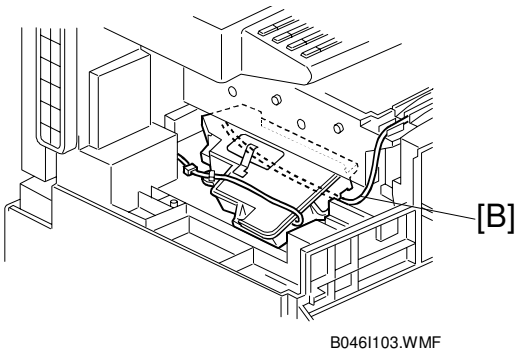
3. Unscrew the 6 screws securing the PSU bracket [B], and detach the 4 connectors.
   NOTE: Use a stubby screwdriver to remove the 2 screws at [C].
4. Hold the PSU bracket at the rear (viewing from the front of the machine), pull the rear end out to the left slightly, then lift the bracket upward at the rear so that it comes free of the hooks [D] at the front.
5. Pull the PSU bracket out.



B046R906

3.11.3 LASER UNIT

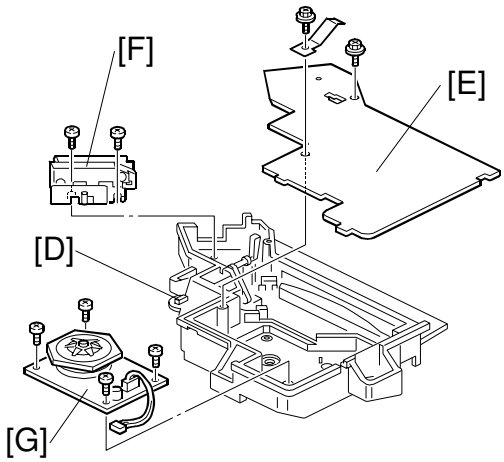




1. PSU bracket (☛ 3.11.2)
   NOTE: After removing the PSU bracket, leave the front door open.
2. Release the toner bottle holder (if model B044 or B046) or THM (if model B045 or B049), and pull it out slightly. (Illustration shows toner-bottle model.)
3. Laser unit [A] (x 3, x 2)
   NOTE: When reinstalling the laser unit, be sure that the wire at [B] passes under the unit. In particular, be certain that the wire does not pass in front of the glass area on the unit.

3.11.4 LD UNIT

1. Laser unit (☛ 3.11.3)
2. Remove the harness ([C] in figure above) from the clamp [D].
3. Laser unit cover [E] (x 2)
4. LD unit [F] (x 2)
   NOTE: The LD drive board itself is not adjustable, and is not a replaceable part. You must replace the entire bracket.



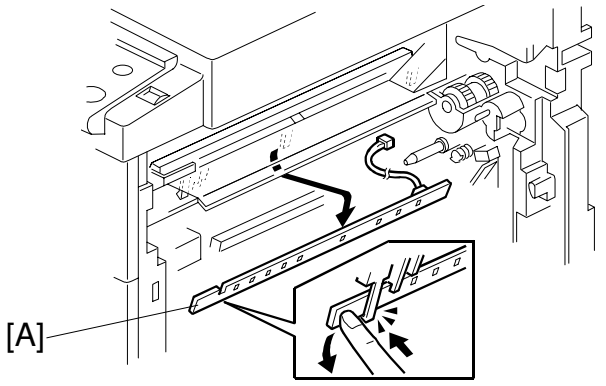
3.11.5 POLYGON MIRROR MOTOR

1. Laser unit (☛ 3.11.3)
2. Remove the harness ([C] in figure above) from the clamp [D].
3. Laser unit cover [E] (x 2)
4. Polygon mirror motor [G] (x 4)

3.12 OTHER REPLACEMENTS

3.12.1 QUENCHING LAMP

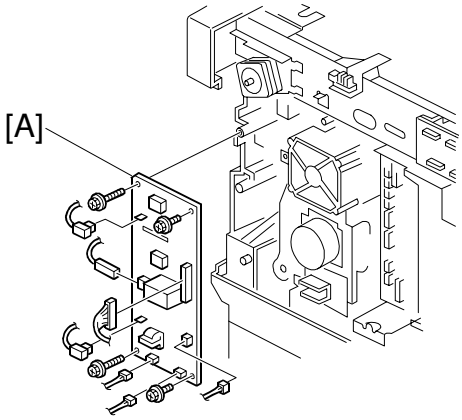
1. PCU (☛ 3.1.3)
2. Quenching lamp [A] (✋ × 1)



B046R928.WMF

3.12.2 HIGH-VOLTAGE POWER SUPPLY BOARD

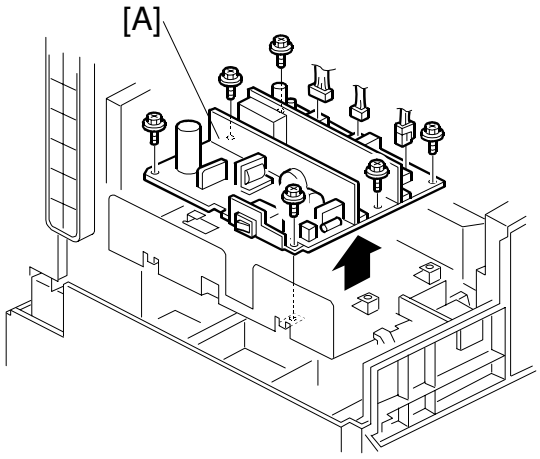
1. Rear cover (☛ 3.3.2)
2. High-voltage power supply board [A] (🔩 × 4, all connectors)



B046R936.WMF

3.12.3 PSU

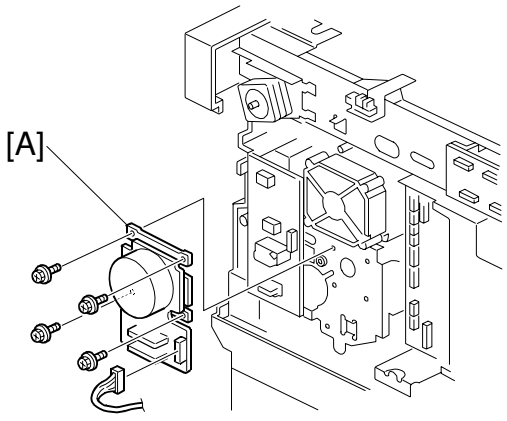
1. Copy tray
2. PSU [A] (🔩 × 6, all connectors)



B046R935.WMF

3.12.4 MAIN MOTOR

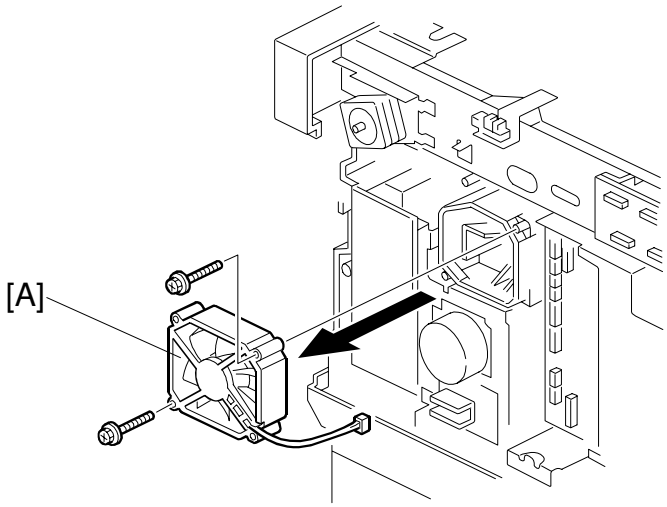
1. Rear cover (☛ 3.3.2)
2. Main motor [A] (🔩 × 4, 🖐 × 1)



B046R919.WMF

3.12.5 EXHAUST FAN

1. Rear cover (☛ 3.3.2)
2. Exhaust fan [A] (🔩 × 2, 🖐 × 1)



B046R918.WMF

3.13 COPY IMAGE 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
- Polygon Mirror Motor
- Paper Tray

2) For detailed explanations about how to access and use SP mode, 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) Reset SP5-902 to 0 after completing these printing adjustments.

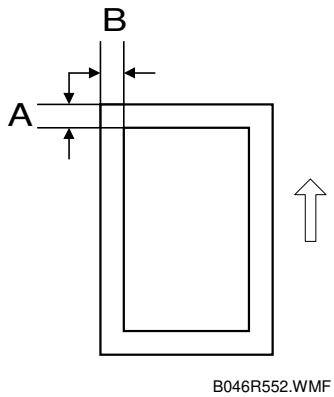
Registration - Leading Edge/Side-to-Side

1. Check the leading edge registration [A] for each paper feed station, and adjust each of these registrations using SP1-001.

Tray	SP mode	Specification
Paper tray(s)	SP1-001-1	0 ± 2 mm
100-sheet bypass	SP1-001-2	0 ± 2 mm
1-sheet bypass		0 ± 4 mm

2. Check the side-to-side registration [B] 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 [if installed], then the bypass).

Tray	SP mode	Specification
1st tray	SP1-002-1	0 ± 2 mm
2nd tray	SP1-002-2	
100-sheet bypass	SP1-002-5	0 ± 2 mm
1-sheet bypass		0 ± 4 mm



B046R552.WMF

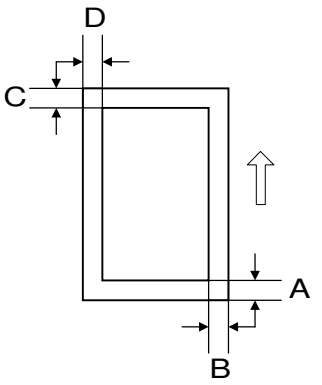
A: Leading Edge Registration
B: Side-to-side Registration

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 (except for 1-sheet bypass)	SP2-101-4	3 ± 2 mm
Trailing edge for 1-sheet bypass	SP2-101-12	5 ± 3 mm
Right edge	SP2-101-6	2 +2.5/-1.5 mm
Leading edge (except for 1-sheet bypass)	SP2-101-1	3 ± 2 mm
Leading edge for 1-sheet bypass	SP2-101-11	5 ± 3 mm
Left edge	SP2-101-5	2 ± 1.5 mm



B046R553.WMF

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

Main-Scan Magnification

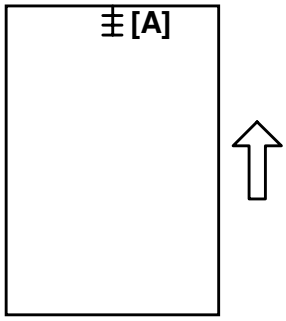
1. Print the single-dot grid pattern (SP5-902-5).
2. Check the magnification (the grid size should be 2.7 x 2.7 mm), and if necessary use SP2-998 to adjust it. The specification is 100 ± 1% in both directions.

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 A4 test chart to perform the following adjustments.

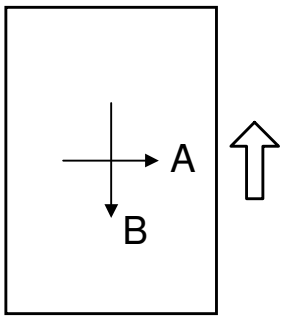
Registration: Platen Mode

1. Place the test chart on the exposure glass and make a copy from one of the feed stations.
2. Check the leading edge registration [A], and adjust as necessary using SP4-010. (Specification is 0 ± 2mm.)



B046R557.WMF

Magnification



A: Main scan magnification
B: Sub-scan magnification

B046R555.WMF

Main Scan Magnification

1. Place the A4 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 A4 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
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:

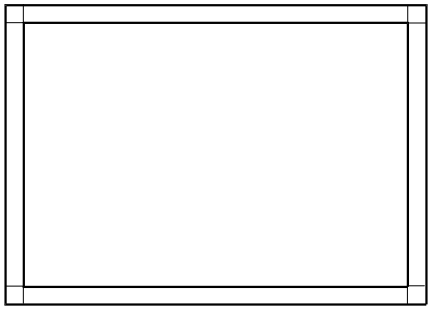
- After replacing the standard white plate.
- After replacing the FCU.
- After replacing the lens block.
- After performing a memory all clear (SP5-801).

Procedure:

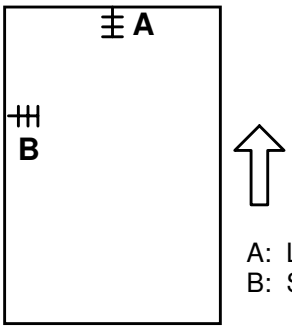
1. Place 10 sheets of new A4 paper on the exposure glass, and close the platen cover.
2. Access SP4-908, enter "1", and press *OK*. The machine automatically adjusts the standard white density.

3.13.3 DF IMAGE ADJUSTMENT

Registration and Blank Margin



B046R556.WMF



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

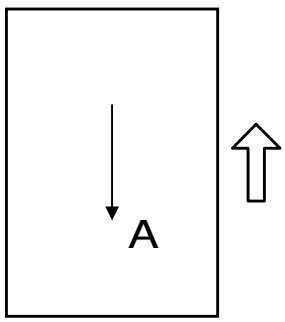
B046R559.WMF

NOTE: Make a temporary test chart as shown above, using A4 / 8 1/2"x11" paper.

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

Sub-scan Magnification



A: Sub-scan magnification

B046R558.WMF

NOTE: Make a temporary test chart as shown above, using A4 / 8 1/2"x11" paper.

1. Place the temporary test chart on the DF 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 two service-call levels, as follows.

Level	Definition	Reset Procedure
A	To prevent possible damage to the machine, level-A service calls can be cleared only by a service representative The machine will not operate until the representative clears the call.	Enter SP 5-810 (SC code reset) and select "1". Then simultaneously press the *Original Type* key and the *OK* (or ⓇⓈ) key. (There is no need to turn the main switch off and on.).
B	These SCs can be cleared by turning the main power switch off and on.	Turn the main power switch off and on.

NOTE: 1) *If a problem involves circuit boards:* Before deciding to replace a circuit board, first see if you can solve the problem by disconnecting and then reconnecting all connectors.
2) *If a problem involves a motor lock:* Check the mechanical load first, before deciding whether to replace motors or sensors.
3) If working on a fax-equipped machine, keep in mind that switching power off and back on may in some cases cause loss of data stored in SAF memory.

4.1.2 SC CODE DESCRIPTIONS

No. Definition			Symptom	Possible Cause
SC Code	Error Code	Level		
101	1-04	B	Exposure Lamp Error	
			Insufficient white level detected when scanning the white plate.	• Exposure lamp defective • SBU harness defective • Bad connection • Defect in optics system (dirty scanner mirror, mirror out of position, etc.) • Lamp stabilizer board (or connector) defective • Incorrect start position or length for white plate scanning (☛ SP4-015) • Scanner HP sensor out of position
120	9-93	B	Scanner home position error 1	
			Scanner home position sensor did not detect OFF condition during initialization or copying.	• Forgot to remove one or more of the scanner stoppers • Scanner motor defective • Scanner HP sensor (or connector) defective • FCU defective • Scanner belt loose or detached
121	9-92	B	Scanner home position error 2	
			Scanner home position sensor did not detect ON condition during initialization or copying.	• Forgot to remove one or more of the scanner stoppers • Scanner motor defective • Scanner HP sensor (or connector) defective • FCU defective • Scanner belt loose or detached
122	9-91	B	Scanner home position error 3	
			Scanner home position sensor did not detect OFF condition during book or ADF scan operation.	• Forgot to remove one or more of the scanner stoppers • Scanner motor defective • Scanner HP sensor (or connector) defective • FCU defective • Scanner belt loose or detached
123	9-90	B	Scanner home position error 4	
			Scanner home position sensor did not detect ON condition during book or ADF scan operation.	• Forgot to remove one or more of the scanner stoppers • Scanner motor defective • Scanner HP sensor (or connector) defective • FCU defective • Scanner belt loose or detached

No. Definition			Symptom	Possible Cause
SC Code	Error Code	Level		
192	1-05	B	SBU auto-adjustment error	
			During SBU auto-adjustment (☛ SP4-908), the detected white level was out of range.	• SBU auto adjustment was not done correctly (☛ 3.13) • Exposure lamp defective • SBU harness defective • Bad connection • Defect in optics system (dirty scanner mirror, mirror out of position. etc.) • Defective stabilizer board (or connector) • Incorrect start position or length for white plate scanning (☛ SP4-015) • Scanner HP sensor out of position
302	9-17	B	Charge roller current leak	
			Current leak at the charge roller was detected.	• Charge roller damaged • High voltage supply board defective • Poor connection of the PCU
320	9-23	B	Polygon mirror motor error	
			Did not detect lock signal from polygon mirror motor within 10 seconds after motor ON signal; or, lost lock signal for continuous 1.5 seconds after signal was detected.	• Polygon mirror motor (or harness) defective • FCU defective
322	9-20	B	Laser synchronization error	
			Detected LD error signal for continuous 1.5 seconds while polygon mirror motor was running at constant speed.	• Synchronization detection mirror defective • LD unit defective • FCU defective • LD harness damaged • THM not in place
390	9-73	B	TD sensor error	
			The TD sensor output less than 0.33 V or greater than 2.64 V ten times in succession.	• TD sensor defective • Bad connection
391	9-29	B	Development bias leak	
			Development bias leak signal was detected.	• Development roller defective • High voltage supply board defective
392	9-74	B	Developer initialization error	
			Error reading ID sensor pattern during developer initialization.	• Forgot to remove heat seal from replacement PCU • ID sensor defective • TD sensor defective • Drum is not turning • Development roller is not turning • Right door not closed firmly

No. Definition			Symptom	Possible Cause
SC Code	Error Code	Level		
401	9-29	B	Transfer roller leak error 1 ("+" leak)	
			A current leak signal for the transfer roller was detected. (Current feedback signal was not detected for at least 200ms).	• Transfer roller damaged • High voltage supply board defective • Poor connection between transfer unit and machine • Transfer unit set incorrectly
402	9-29	B	Transfer roller leak error 2 ("-" leak)	
			A current leak signal for the transfer roller was detected. (Current feedback signal was not detected for at least 200ms).	• Transfer roller damaged • High voltage supply board defective • Poor connection between transfer unit and machine • Transfer unit set incorrectly
500	9-24	B	Main motor lock error	
			Failed to detect main motor lock signal for 7 checks in succession (total of 700ms) after main motor started to rotate, or after last lock signal was detected. (☛ 4.4)	• Main motor defective • Too much load on the drive mechanism • Motor driver damaged
541	9-22	A	Fusing thermistor open	
			Thermistor generated abnormal values immediately after 24V power on. (☛ 4.4)	• Fusing thermistor defective or disconnected • Fusing lamp defective • Fuse blown • PSU defective • Bad connection between fuser and machine
542	9-22	A	Fusing temperature warm-up error	
			During fusing warm-up, fusing temperature failed to reach target range within 22 seconds (when starting at least 25°C below the target temperature). (☛ 4.4)	• Fusing thermistor defective • Fusing lamp defective • Thermofuse blown • PSU defective • Bad connection between fuser and machine
543	9-22	A	Fusing overheat error	
			Detected fusing temperature remained above 230°C for 1 second. (☛ 4.4)	• Fusing thermistor defective • PSU defective
544	9-22	A	Fusing low temperature error	
			Detected fusing temperature remained abnormally low for 1 second during fusing operation (below 140°C) or during stand-by mode. (☛ 4.4)	• Fusing thermistor defective • PSU defective • Bad connection between fuser and machine

No. Definition			Symptom	Possible Cause
SC Code	Error Code	Level		
546	9-22	A	Unstable fusing temperature	
			Detected that fusing temperature changed more than ± 25°C/second two seconds in succession. (☛ 4.4)	• Fusing thermistor defective • PSU defective • Bad connection between fuser and machine
547	9-22	B	Zero-cross detection error	
			Detection error (detection overflow or busy) occurred 8 times in succession (at 20-ms intervals) while 24V power was on. (☛ 4.4)	• PSU defective • FCU defective
548	9-22	A	Fusing-temperature range violation (too high)	
			During paper transport, fusing temperature moved above limit (200°C for plain paper, 210°C for thick paper) and remained above limit for 10 seconds. (☛ 4.4)	• TRIAC short • Fan not running
549	9-22	A	Fusing-temperature range violation (too low)	
			During paper transport, fusing temperature fell below lower limit (155°C) and remained below limit for 6 seconds. (☛ 4.4)	• Fusing thermistor defective • PSU defective
550	9-22	A	Standby temperature error 1	
			Fusing temperature failed to drop to expected level within a given time (15 seconds, 15 minutes, or 25 minutes, depending on mode) after entering standby or low-power mode. (☛ 4.4)	• TRIAC short • Fan not running
551	9-22	A	Standby overheat	
			Temperature during standby or low-power mode remained too high for a specified interval (10 seconds or 25 seconds, depending on the mode). (☛ 4.4)	• TRIAC short
552	9-22	A	Standby low temperature error	
			After reaching expected temperature in low-power mode (level 1) or standby mode, temperature fell and remained below 155°C for 20 seconds. (☛ 4.4)	• Fusing thermistor defective • PSU defective

No. Definition			Symptom	Possible Cause
SC Code	Error Code	Level		
692	9-49	B	Communication error between FCU and printer controller	
			Printer failed to acknowledge message from FCU within 1.2 seconds.	• Printer controller defective • FCU defective • Poor connection between FCU and printer controller
900	9-79	B	Electrical total counter error	
			The electrical total counter is not working properly.	• SRAM defective. *The only way to correct this error is to replace the FCU.*
901	9-78	B	Mechanical total counter	
			The mechanical total counter is not working properly.	• Mechanical total counter disconnected
2001	9-48	B	Printer controller self-diagnostic error	
			Printer controller's power-on self-diagnostic detected an error.	• Self-diagnostic error
2002	9-47	B	Printer controller: FGATE error	
			Printer application returned FGATE error notification to copier.	• FGATE error

4.2 ELECTRICAL COMPONENT DEFECTS

4.2.1 SENSOR/SWITCH OPEN ERRORS

Sensor or Switch	CN	Symptom
Registration Sensor	FCU 27-2	"A" or "Y" paper jam reported.
Paper End Sensor	FCU 29-2	Paper-end error when attempting to feed from main tray. Fax key blinks red.
Bypass Paper End Sensor *(B044 and B046 only)*	FCU 30-2	"Paper End" message when attempting to feed from bypass tray. .
Exit Sensor	FCU 28-2	"A" or "Y" paper jam reported.
Image Density (ID) Sensor	FCU 32-1	Toner control process changes.
Toner Density (TD) Sensor	FCU 23-3	"Reset PCU Correctly" message appears, and Caution indicator stays on.
Scanner HP Sensor	FCU 26-3	SC120 is displayed.
Platen Cover Sensor	FCU 26-5	Delays start of polygon motor by a few seconds. (Longer time for first copy.)
ADF Guide Open Sensor	DF 105-5	"Close ADF" message appears, and Caution indicator stays on.
ADF Original Set Sensor	DF 105-7	Fails to detect originals at ADF.
ADF Registration Sensor	DF 105 2	"P" paper jam reported.
Front/Right Door Switch	FCU 14	"Close Front/Right Cover" message appears, and the Caution indicator stays on.

Trouble-shooting

4.3 BLOWN FUSE CONDITIONS

Fuse	Rating		At main switch ON
	120 V	220 – 240 V	
Power Supply Board			
FU1	12 A/125 V	6.3 A/250 V	No response.
F2	1 A/250 V	1 A/250 V	Anti-condensation heater (option) does not turn on.
F3	4 A/250 V	2 A/250 V	No response.
F201	5 A/250 V	5 A/250 V	No response.

4.4 DUMPING THE FUSER TEMPERATURE LOG

The FCU monitors the fuser temperature and maintains a log of the most recent temperature values. If a heating-related SC error occurs (error code "9-22"; SCs 541 to 552), you may wish to print out a dump of the logged data before clearing the SC condition. The printout can then be submitted for analysis.

To dump the log, proceed as follows.

1. Before clearing the SC, use SP7-955 to write "02h" into address 40191C. This freezes the log data.
2. Clear the SC.
3. Use SP-992 setting "3" (☛ 5.1.5) to print out a dump of addresses 401900 to 410CFF.
4. Use SP7-955 to write "00h" into 40191C. This will restart temperature logging.

5. SERVICE TABLES

5.1 USING SERVICE PROGRAM MODE

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

Accessing SP Mode

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.

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

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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 H5557200  E1 class1
No.1 Feed
```

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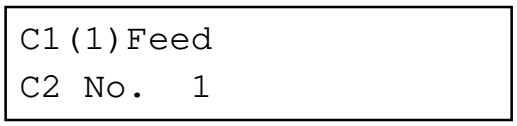
How to Exit SP Mode

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

Accessing Copy Mode from within SP Mode

1. Press the (◊) key.
2. Select the appropriate copy mode and make trial copies.
   NOTE: The *User Tools* LED flashes while you are using copy mode from within SP mode.
3. To return to SP mode, press the [ ] key.

How to Select a Program Number



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Each SP 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 R/# key or the *OK* key.
2. Enter the second-class program number with the numeric keypad (or *Right* or *Left* cursor key), and press R/# or *OK*.
3. To select a third-class program: select the second-class number and then use the *Right* or *Left* cursor key.
4. To return to the next higher class, press ⌫.

To Input a Value or Setting

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

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

5.1.1 SP MODE TABLES

NOTE: 1) An asterisk (*) after the SP number means that this SP's value is stored in the SRAM. If you do a RAM reset, all these SP settings will be returned to their factory defaults.

2) In the Function/[Setting] column:
- Comments are in *italics*.
- The setting range is enclosed in brackets, with the default setting written in **bold**.
- **DFU** stands for **D**esign/**F**actory **U**se only. Values marked **DFU** should not be changed.
- **IAJ** means that you should refer to Section 3.13 ("Replacement and Adjustment – Copy Image Adjustments") for more information. **IP** means that you should refer to Section 6.7, (Detailed Descriptions – Image Processing").

SP1-XXX (Feed)

1	Mode Number/Name		Function/[Setting]
001*	Leading Edge Registration		
	1	Paper tray (copy, fax)	Adjusts the plotter leading-edge registration from each paper feed station. Use the Trimming Area Pattern (SP5-902, No.10) to make the adjustment.) [–9.0 ~ 9.0 / **0.0** / 0.1 mm/step] **IAJ** • *Specification: 0 ± 2 mm* • *Use the # key to select "+" or "–" when entering the value.*
	2	Bypass (copy fax)	
	4	Paper tray (optional printer)	
	5	Bypass (optional printer)	
002*	Side-to-Side Registration		
	1	1st tray	Adjusts the printing side-to-side registration from each paper feed station. (Use Trimming Area Pattern (SP5-902, No.10) to make the adjustment.) The 2nd-tray adjustment is for the optional tray. [–9.0 ~ 9.0 / **0.0** / 0.1 mm/step] **IAJ** • *Specification: 0 ± 2 mm* • *Use the # key to select "+" or "–" when entering the value.*
	2	2nd tray	
	5	Bypass	
003*	Paper Feed Timing		
	1	1st tray	Adjusts the amount of buckle the paper feed clutch applies to the paper (by adjusting delay between triggering of the registration sensor and activation of registration clutch). A higher setting applies greater buckling. [0 ~ 10 / **5** / 1 mm/step]
	2	Other trays	
	3	Bypass	
106	Fusing Temperature Display		
	1		Displays the fusing temperature. *Press Exit to exit the display.*

Service Tables

1	Mode Number/Name		Function/[Setting]
109	Fusing Nip Band Check		
	1		Checks the fusing nip band. [**1 = No** / 0= Yes] **DFU**
901	Auto-Restart Interval		
	1		Sets the time interval between completion of one copy and automatic start of next copy. [0 ~ 9999 / **0** / 1 s] **DFU**
902	AC Frequency Display		
	1		Displays the fusing lamp power control frequency (as detected by the zero cross signal generator), in Hz.

SP2-XXX (Drum)

2	Mode Number/Name		Function/[Setting]
001*	Charge Bias Adjustment		
	1	Image area	Adjusts the voltage applied to the charge roller when printing. [–1800 ~ –1500 / **–1650** / 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 ID sensor pattern. [0 ~ 400 / **200** / 1 V/step] *The actual charge-roller voltage is obtained by adding this value to the value of SP2-001-1.*
	3	Manual	Use this feature to adjust the voltage to the image area when diagnosing a problem. [-1900 ~ 0 / **0** / 1 V/step] • *The value is applied as an offset to the value set by SP2-001-001.* • *This setting is lost at power-off.*
005	Charge Bias Correction		
	1	Vsdp min.	Sets lower limit for application of charge-bias correction. [0 ~ 100 / **90** / 1%/step] *Correction is applied if Vsdp/Vsg is less than this value.*
	2	Vsdp max.	Sets upper limit for application of charge-bias correction. [0 ~ 100 / **95** / 1%/step] *Correction is applied if Vsdp/Vsg is greater than this value.*
	3	Correction step	Sets the correction step (the amount of voltage added or subtracted for each correction). [0 ~ 200 / **50** / 1V/step]

2	Mode Number/Name		Function/[Setting]
101*	Erase Margin Adjustment		
	1	Leading edge	Adjusts the leading edge erase margin. [0.0 ~ 9.0 / **3.0** / 0.1 mm/step] **IAJ** *Does not apply to 1-sheet bypass feed.*
	4	Trailing	Adjusts the trailing edge erase margin. [0.0 ~ 9.0 / **4.0** / 0.1 mm/step] **IAJ** *Does not apply to 1-sheet bypass feed.*
	5	Left side	Adjusts the left edge erase margin. [0.0 ~ 9.0 / **2.0** / 0.1 mm/step] **IAJ**
	6	Right side	Adjusts the right edge erase margin. [0.0 ~ 9.0 / **2.0** / 0.1 mm/step] **IAJ**
	11	1-sheet bypass leading edge	Adjusts the leading edge erase margin for 1-sheet bypass. [0.0 ~ 9.0 / **4.5** / 0.1 mm/step] **IAJ**
	12	1-sheet bypass trailing	Adjusts the trailing edge erase margin for 1-sheet bypass. [0.0 ~ 9.0 / **4.5** / 0.1 mm/step] **IAJ**
201*	Development Bias Adjustment		
	1	Image area	Adjusts the voltage applied to the development roller when printing. [–800 ~ 0 / **–600** / 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. [**0 = N (200 V)** / 1 = H (240 V) / 3 = HH (280 V) / 4 = LL (120V)] *The actual voltage applied is this setting – 600V.*
213*	Copies after Toner Near End		
	1		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	Initial Developer Running		
			Initializes the developer (by forced churning). [**0 = No** / 1 = Yes] • *To start forced developer initialization, you must turn the machine off and back on.* • *Since the machine automatically initializes the developer when a replacement PCU is installed, there is no need to carry out this SP when replacing the PCU.* • *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 to mix the developer.*

2	Mode Number/Name		Function/[Setting]
220	TD Sensor Value Display		
	1		Displays: a) Current TD sensor output value (Vt) b) Target TD output value [Vts corrected by 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 Display		
	1		Displays Vsg, Vsp, Vsdp, Vt, and the ID sensor's PWM output. 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.* • *(☛ 5.1.11)*
301*	Transfer Current		
	1	Normal paper	Adjusts the current applied to the transfer roller when feeding from a paper tray. [0 = –2 μA / **1 = 0 μA** / 2 = +2 μA / 3 = +4 μA] • *Use a high setting if the user normally feeds relatively thick paper (within spec).* • *(☛ 6.14.2, , "Image Transfer Current Timing")*
	2	Thick/Thin paper	Adjusts the current applied to the transfer roller when feeding from the bypass tray. [0 = –2 μA / **–1 = 0 μA** / 2 = +2 μA / 3 = +4 μA] • *Use a high setting (a) if the user normally feeds relatively thick paper, or (b) if waste toner is re-attracted from the drum (which can occur when using transparencies).* • *(☛ 6.14.2, , "Image Transfer Current Timing")*
	4	Cleaning	Adjusts the current applied to the transfer roller for roller cleaning. [–10 ~ 0 / **–4** / 1 μA/step] • *Increase the current if toner remains on the roller after cleaning. (Remaining toner may cause dirty background on the rear side.)* • *(☛ 6.14.2, "Image Transfer Current Timing")*
	5	Manual (Temporary)	**DFU**

2	Mode Number/Name		Function/[Setting]
906*	Tailing Correction		
	1	Shift value	When printing multiple copies, the machine will shift the image writing position by the specified amount after every *n* copies, where *n* is given 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 corrects the problem by shifting the paper after every specified number of copies.*
	2	Interval	Changes the interval for the image shift specified by SP2-906-1. [1 ~ 10 / **1** / 1 page/step] *If the setting is* n*, the machine executes the shift after the first* n *copies, then shifts back to standard position after the next* n *copies, and so on.*
908	Forced Toner Supply		
	1		Forces the toner bottle (or toner hopper) to supply toner to the toner supply unit. Press "1" to start. [**0 = No** / 1 = Yes] *The machine supplies toner over a total of 15 seconds (1.5 second on, 1.5 second off, repeated 5 times).*
915*	Polygon Mirror Motor Idling Time		
	1		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 (25 s), the motor will stop if the user does nothing for 25 s. If the setting is "0", the motor will not switch off during standby. (Regardless of the setting, the motor will switch off when the machine enters low-power mode.)*
922*	Toner Supply Time		
	1		Adjusts the toner supply motor ON time. [0.1 ~ 5.0 / **0.6** / 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.* • *(☛ 6.11.4, "Toner Density Control")*
926*	Standard Vt		
	1		Adjusts Vts (the reference voltage used for new developer). The TD sensor output is adjusted to this value during the TD sensor initial setting process. [0.00 ~ 3.3 / **1.25** / 0.01 V/step] **DFU**

Service Tables

2	Mode Number/Name		Function/[Setting]
927*	ID Sensor Control		
	1		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.*
928	Toner End Clear		
	1		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 and near-end indicator* • *Toner near-end counter* • *Toner end counter (sheets)* • *Toner end counter (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 toner runs out. This attracted carrier may damage the drum.*
929*	Vref Limits		
	1	Upper	Adjust the upper Vref limit. [0.50 ~ 3.50 / **1.80** / 0.01V/step]
	2	Lower	Adjust the lower Vref limit. [0.00 ~ 3.50 / **0.45** / 0.01V/step]
995*	ID Detection Interval		
	1		Sets the interval after which ID detection will be carried out at start of printing (relative to previous ID detection). [0 ~ 999 / **480** / 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 (and rear side of paper) will become dirty.*
998*	Main Scan Magnification (Printing)		
	1		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 "–" when entering the value.*

SP4-XXX (Scanner)

4	Mode Number/Name		Function/[Setting]
008*	Main Scan Magnification (Scanner)		
	1		Adjusts the magnification along the main scan direction, for scanning. [–0.9 ~ +9.0 / **0.0** / 0.1%/step] **IAJ** • *Use the (+/*) key to select "+" or "–" when entering the value*
010*	Leading Edge Registration (Scanner)		
	1		Adjusts the leading edge registration for scanning in platen mode. [–2.0 ~ +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 "–" when entering the value*
011*	Side-to-side Registration (Scanner)		
	1		Adjusts the side-to-side registration for scanning in platen mode. [–0.9 ~ 0.9 / **0.0** / 0.1 mm/step] **IAJ** • *Increasing the value shifts the image to the right* • *Use the (+/*) key to select "+" or "–" when entering the value*
013	Scanner Free Run		
			Performs a scanner free run with the exposure lamp on. [0 = No / 1 = Yes] • *For details about free runs: ☛ 5.1.7.* • *After selecting "1", press OK or (R/#) twice to start the run. Press (C/⊗) to stop.*
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] • *Positive settings move the position away from HP.*
	2	Scanning area	Adjusts the end position of the white plate scan, in the main scan direction. The scan begins at the start position [as set by SP4-015-1] and extends for the specified length. [–3.0 ~ +6.0 / **0.0** / 0.1 mm/step] • *The total scanning length (as determined by SP2-015-1 and SP2-105-2) must be at least 2.0mm.*
101*	Sub-Scan Magnification (Scanning)		
	1		Adjusts the actual sub-scan scanning magnification. The higher the setting, the lower the scanner motor speed. [-0.9 ~ +0.9 / **0.0** / 0.1%/step]

4	Mode Number/Name		Function/[Setting]
902*	Exposure Lamp ON		
			Lets you turn the exposure lamp on and off. [0 = Lamp Off / 1 = Lamp On] • *To turn the exposure lamp on, press "1". To turn the lamp off, press "0". To exit, press ⏎ or Cancel to exit.* • *The scanner moves to the shading position and remains there until you exit the SP.* • *The display also shows the minimum and maximum white-plate values (updated every 0.5 sec.).*
908	SBU Auto-Adjustment		
	1		Performs auto scanner adjustment. [0 = No (normal operation) / 1 = Yes (start adjustment)] • *Use this SP after replacing the white plate, FCU, or lens block, and after executing a Memory All Clear (SP5-801).* • *(☛ IAJ, "Standard White Density Adjustment".)*
913*	DF Shading Interval Time		
	1		Adjusts the interval used for shading processing in DF mode. [0 ~ 255 / **30** / 1s/step] • *Setting this value to 255 will switch off auto-shading between pages of DF copy jobs.* • *Light and heat may affect scanner response. Reduce this setting if copy quality indicates that the white level is drifting during DF copy jobs.*
921*	Image Adjustment Selection		
	1		Use this to select the processing mode (pattern) that you wish to set adjustment parameters for. After selecting the mode, you can set the adjustment parameters for that mode using SPs 4-922 to 4-966. **IP** There are 11 modes ("Pattern 1" to "Pattern 11"), as follows. 1 = Text 1 7 = Special 3 2 = Text 2 8 = Fax Text 1 ("text sharp") 3 = Photo 1 9 = Fax Photo 1 "(photo smooth") 4 = Photo 2 10 = Fax Photo 2 ("photo normal") 5 = Special 1 11 = Fax Text 2 ("text dropout") 6 = Special 2 First use the right or left cursor key to select the mode ["Pattern 1" to "Pattern 11"], and then press "1" to enable adjustment for that mode. Then press *OK*, and then proceed to use SPs 4-922 to 4-966 to make adjustments. • *If you press "0" and then press OK, SPs 4-922 to 4-966 will not operate.*

4	Mode Number/Name	Function/[Setting]
922*	Scanning Density Adjustment	
		Selects the gamma table used for linear adjustment by the mode selected by SP4-921. [**0 = Linear** / 1 = 16-bit gray] **IP**
923*	Notch Selection	
		Selects the value of the center ID adjustment notch for the ID adjustment LEDs. Applies only to the mode selected by SP4-921. [–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).*
925*	Sharpness Adjustment	
		Adjusts the image sharpness processing (MTF and smoothing coefficients) for the mode selected by SP4-921. [–2 ~ 2 / **0** / 1/step] **IP** *Higher values produce greater sharpness.*
926*	Texture Removal Threshold	
		Adjusts the texture removal threshold for the mode selected by SP4-921. **IP** [0 ~ 4 / **0**], where: 0: The mode's default value is used. 1: Fixed threshold. 2: Varying threshold (low variance) 3: Varying threshold (medium variance) 4: Varying threshold (photo error diffusion)
927*	Line Width Correction	
		Adjusts the line width correction algorithm for the mode selected by SP4-921. Positive settings produce thicker lines; negative settings produce thinner lines. [–2 ~ 2 / **0** / 1/step] **IP**
928*	Independent Dot Erase	
		Selects the dot erase level for the mode selected by SP4-921. Higher settings provide greater erasure. [–2 ~ 2 / **0** / 1/step] **IP**
930	Binary Data Select	
		Not effective on this machine. **DFU**
931*	Uneven Dot Adjustment	
		Selects the bad-dot correction method used by the mode selected by SP4-921. [**0 = selected mode's default** / 1 = off / 2 =1-dot correct / 3 = 2-dot correct / 4 = 3-dot correct / 5 = 4-dot correct] **DFU** (Not effective on this machine.)

4	Mode Number/Name	Function/[Setting]
932*	Auto Density Adjustment	
		[-2 ~ 2 / **0** / 1/step] **DFU** (Not effective on this machine.)
933*	Blank-Page Sensor Level Adjustment	
		[-2 ~ 2 / **0** / 1] **DFU** (Not effective on this machine.)
934*	Peak Setting	
		Sets adjustment the machine will use when setting white peak prior to start of scanning, for the mode selected by SP4-921. [–128 ~ 127 / **0** / 1/step] • *If AE tracking is enabled, the applied peak becomes: [(detected peak + this setting) x approx. 40%]* • *If AE tracking is disabled, the applied peak becomes: [(detected peak + this setting)*
935*	AE Tracking Speed	
		Adjusts the white-peak tracking speed for the mode selected by SP4-921. [–2 ~ 2 / **0** / 1/step] *Negative settings reduce the speed; positive settings increase it.*
936*	Peak Offset Select	
		Sets the peak correction offset for the mode selected by SP4-921. [–2 ~ 2 / **0** / 1/step] **IP** *Negative settings produce better reproduction of low-contrast originals. Positive settings provide better elimination of dirty background.*
961*	Plotter Mode Select	
		Selects the plotter mode used by the processing mode selected by SP4-921. **IP** [**0 = Selected processing mode's default** / 1 = Normal (no correction) / 2 = Toner save / 3 = FCI • *The default varies according to the processing mode selected by SP4-241*
962*	Marking Image Density Conversion	
		Selects the image density conversion for the processing mode selected by SP4-921. [–2 ~ 2 / **0** / 1/step] **IP** *A setting of "0" sets conversion OFF. Negative settings reduce the black marking size, while positive values magnify it.*
963*	Marking Image Density Setting	
		Sets the density adjustment type for the mode selected by SP4-921. **IP** [0 ~ 5 / **0** / 1/step], where: 0: The mode's default value is used. 1: Distortion prevention 2: Distortion prevention and edge correction 3: Normal 4: Light edge correction 5: Dense edge correction

4	Mode Number/Name	Function/[Setting]
964*	Spot Dot Enhancement Select	
		Selects emphasis used for lone dots, for the mode selected by SP4-921. **IP** [–2 ~ 2 / **0** / 1/step
965*	Toner Save Level	
		Sets the toner save level for the mode selected by SP4-921. [0 ~ 4 / **0** / 1/step], where: 0: The mode's default value is used. 1: Thin lines 2: Mask 1 (with edge detect) 3: Mask 2 (no edge detect) 4: Mask 3 (with edge detect)
966*	Smoothing Select	
		Selects whether smoothing is used for the mode selected by SP4-921. **IP** [0 ~ 4 / **0** / 1/step], where: 0: The mode's default value is used. 1: OFF 2: ON

SP5-XXX (Mode)

5	Mode Number/Name		Function/[Setting]
001	All Indicators On		
			Sets on all indicators on the operation panel, and causes the display to blink (empty for five second, all pixels black for five seconds). *After checking, press ⊡ or Cancel to exit.*
302*	Date/Time		
			Sets the date and time. • *For the year value, you can set the last two digits only. (The first two digits are fixed at "20".)* • *You cannot set the seconds value directly. Instead, the seconds value automatically resets to 0 when you enter the setting for the minutes value.* • *Use cursor keys (or OK) to move from field to field (the selected field flashes), and enter values with the numeric keys. Your new settings are saved only if you press OK while the minutes field is selected.*
501*	PM Alarm Mode		
	1	Interval	Sets the base PM interval. [1 ~ 255 / **45** / 1K copies/step] *This setting is meaningful only if SP5-501-2 is set to "1".*
	2	On/Off	Enables/disables the PM alarm for the total number of prints, copies, and faxes. [0 = Disable / **1 = Enable**]
801	Memory All Clear		
			Resets all SP/UP settings and values to their defaults, with the exception of plug-and-play settings (SP5-907), total print counters (SP7-003), and the serial number setting (SP5-811). *(☛ 5.1.6)* [**0 = No** / 1 = Yes] • *Before clearing the SRAM, be sure to output an SMC printout of all current SRAM content. (☛ SP5-992).* • *This SP mode should generally not be used.*
802	Free Run		
			Starts a free run of both the scanner and the printer. [**0: = No** / 1 = Yes] • *For details about free runs: ☛ 5.1.7.* • *After selecting "1", press the OK key (or the # key) twice to start the free run. Press C to stop the free run.*
803	Input Check		
			Displays the signals being received from a selected sensor or switch. *(☛ 0)* *Press ⊡ to exit the program.*
804	Output Check		
			Turns on a selected electrical component for test purposes. *(☛ 5.1.4)*

5	Mode Number/Name	Function/[Setting]
810	SC Code Reset	
		Resets all level-A service call conditions, such as fusing errors. [**0 = No** / 1 = Yes] • *After selecting "1", hold down the Original Type key and press the OK key (or the # key) to execute the reset. If the reset succeeds, the machine reboots. If it 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. *(☛ 5.1.10)*
812*	Service Telephone Number	
		Use this to input the telephone number of the service representative. (This number is displayed when a service call condition occurs.) • *To input a dash, press *.* • *Use C to delete the existing phone number or to delete the last digit that you entered.*
824	SRAM Data Upload	
		Uploads SP and UP settings from the machine's SRAM to a flash memory card. *(☛ 5.1.9)* [**0 = No** / 1 = Yes] • *This SP is effective only if a flash memory card has been plugged into the machine's card slot.*
825	SRAM Data Download	
		Downloads SP mode data from a flash memory card to the machine's SRAM. *(☛ 5.1.9)* [**0 = No** / 1 = Yes] • *This SP is effective only if a flash memory card has been plugged into the machine's card slot.*
826	Program Upload	
		Uploads the system program from the machine's SRAM into the flash memory card plugged into the machine's card slot. *(☛ 5.1.8)* [**0 = No** / 1 = Yes] • *This SP is effective only if a flash memory card has been plugged into the machine's card slot.*
827	Program Download	
		Downloads the system program from a flash memory card to the machine's SRAM. *(☛ 5.1.8)* [**0 = No** / 1 = Download first 2MB / 2= Download last 2MB] • *This SP is effective only if you have booted the machine from a flash memory card.*

5	Mode Number/Name	Function/[Setting]
837	Program Checksums	
		Displays checksums of the contents of the machine's SRAM. • *The screen shows three check sums: "SUM" (total checksum, "B" (boot sum), and "M" (main sum).* • *If you have used SP-827 to download new firmware, be sure to reboot the software before running this SP. (If you don't reboot, the screen will show checksums for the previous firmware.)*
901	Printer Free Run	
		Starts a printer free run. [**0 = No** / 1 = Yes] • *For details about free runs: ☛ 5.1.7.* • *After selecting "1", press the OK key (or the R/# key) twice to start the free run. Press C/⊘ to stop the free run.*
902	Test Pattern Print	
	1	Prints a test pattern. *(☛ 5.1.2)*
906*	Exhaust-Fan Control Timer	
	1	Inputs the fan control time. [30 ~ 120 / **30** / 1 s/step] *The fan maintains existing speed for the specified time before slowing or stopping (after occurrence of an SC or following entry into warm-up, standby, or low-power 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 SRAM. If the SRAM 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 R/#) 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 holding down the Darker key. (If the production name is too long to fit on the screen, you can view the rest of the name by holding down both the Darker and Lighter keys).* • *To exit, press ⌧ or the Cancel key.*
908*	C1a/C1b Select	
	1	Selects whether the machine identifies itself as a C1a (B045/B059) or C1b (B044/B046) when reporting to firmware. **[0 = no setting** / 1 = C1a / 2 = C1b] • *You can visually identify the machine is C1a or C1b by its bypass. C1a machines have 1-sheet bypass; C1b machines have 100-sheet bypass.* • *If the setting is "0", the machine automatically checks its own bypass type to determine how to report itself.*

5	Mode Number/Name		Function/[Setting]
912*	PCU Alarm		
	1	Alarm Display On/Off	Selects whether or not the machine will display a "Replace PCU' warning when the PCU alarm counter reaches the interval set by SP912-2. [**0 = Display** / 1 = Do not display]
	2	Interval	Sets the PCU Alarm interval (count) at which a "Replace PCU' warning occurs. [1 ~ 255 / **45** / 1000 sheets/step]
913	UP Mode Data Reset		
	1		Resets the user tools settings (with the exception of the copy user codes and copy user code counters). [**0 = No** / 1 = Yes] • *This operation is equivalent to executing a System Reset with the User Tools.* • *After selecting "1", hold down the Original Type key and press the OK key (or # key) to execute the reset. If the reset is successful, the display shows "Action completed." If the reset fails, the display shows "Error!!!"*
956	Preset Small-Size Setting		
	1		Enables setting of small paper sizes. [**0 = No** / 1 = Yes] • *Setting this value to "1" enables setting of the following standard small sizes, for both paper tray and bypass tray: B5 SEF, Executive SEF.* If you change the setting from "1" to "0" when one of these sizes is set, the size setting changes to each tray's default.
991*	Debug Monitor Mode		
	1		[0 ~ 3 / **0** / 1/step] **DFU**
992	SMC Printing		
			Prints out machine data. *(☛ 5.1.5)* [**0 = No** / 1 = SP settings / 2 = All / 3 = Memory]

SP6-XXX (Peripherals)

6	Mode Number/Name		Function/[Setting]
006	ADF Registration		
	1	Side-to-Side	Adjusts the side-to-side registration for DF mode. [–9.0 ~ +9.0 / **0.0** / 0.1 mm/step] **IAJ** *Use the * key to select "+" or "–" when entering the value.*
	2	Leading Edge	Adjusts the leading edge registration for DF mode. [–5.0 ~ +5.0 / **0.0** / 0.1 mm/step] **IAJ** 0.1 mm/step *Use the * key to select "+" or "–" when entering the value.*
	3	Trailing Edge Erase	Adjusts the trailing edge erase margin for DF mode. [–3.0 ~ +3.0 / **–1.0** / 0.1 mm/step] **IAJ** *Use the * key to select "+" or "–" when entering the value.*
007	ADF Sub-scan Magnification		
	1		Adjusts the actual magnification ratio in the sub-scan direction, for DF mode. [–0.9 ~ +0.9 / **0.0** / 0.1%/step] **IAJ** *Use the * key to select "+" or "–" when entering the value.*
009	ADF Free Run		
			Performs a DF free run . [**0 = No** / 1 = Yes] • *For details about free runs: ☛ 5.1.7.* • *After selecting "1", press OK or # twice to start the run. Press C to stop.*
910	ADF/Printer Free Run		
			Performs a free run of the DF and printer. [**0 = No** / 1 = Yes] • *For details about free runs: ☛ 5.1.7.* • *After selecting "1", press OK or # twice to start the run. Press C to stop.*

SP7-XXX (Data Log)

7	Mode Number/Name		Function/[Setting]
002*	Total Original Counter		
	1	All Modes	Displays the total number of scanned originals (total).
	2	Copy	Displays total number of scanned originals (copy mode only).
	3	Fax	Displays total number of scanned originals (fax mode only).
003*	Total Print Counter		
	1	All Modes	Displays the total number of prints (total).
	2	Copy	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).
101*	Copy Counter – Paper Size		
	1	A4	Displays the total number of copies by paper size.
	2	B5	
	3	LG	
	4	LT	
	5	HLT	
	6	Others	
201*	Total Scan Counter		
	1		Displays the total number of scanned originals.
204*	Copy Counter - Paper Tray		
	1	1st	Displays the total number of sheets fed from each paper feed station.
	2	2nd	
	3	Bypass	
205*	Total ADF Counter		
	1		Displays the total number of originals fed by the DF.
401*	Total SC Counter		
	1		Displays the total number of logged SC codes.
402*	SC Type Counter		
	1		Displays the total number of each type of logged SC code.
501*	Total Jam Counter		
	1		Displays the total number of jams (copy paper + original).
502*	Total Paper Jam Counter		
	1		Displays the total number of copy paper jams.
503*	Total Original Jam Counter		
	1		Displays the total number of original jams.
504*	Jam Counter – by Location		
	1	“A” jams	Displays the total number of copy paper jams by location.
	2	“B” jams	
	3	“C” jams	
	4	“Y” jams	
	5	1st Tray	
	6	2nd Tray	
	7	Bypass	

7	Mode Number/Name		Function/[Setting]
801	ROM Versions and Option Connections ***Note: SP7-801 cannot be accessed at the screen.*** *This information appears on SMC printouts only. (Go to SP5-992 and select "2" to print out all data. The SP-801 information will appear in the "LOG DATA" section on the second page of the printout. [☛ 5.1.5])*		
			Shows software versions and option connection statuses.
	1	Firmware Version	
	2	No meaning (Fixed at "VER. 1")	
	3	Fax Unit ["Yes" = installed, "No" = Not installed]	
	4	Printer Unit ["Yes" = installed, "No" = Not installed]	
	5	ADF ["Yes" = installed, "No" = Not installed]	
	6	Optional Memory ["No" (None installed), "32MB", "40MB", "64MB"]	
	7	Paper Tray Unit ["Yes" = installed, "No" = Not installed]	
	8	Bypass Type ["1" = 1 sheet / "100" = 100-sheet]	
803*	PM Counter Display		
	1		Displays the PM counter value (the count since the last PM).
804	PM Counter Reset		
	1		Resets the PM counter. [**0 = No** / 1 = Yes] *After selecting "1", hold down the Original Type key and press the OK key (or # key) to execute the reset. If the reset is successful, the display shows "Action completed." If the reset fails, the display shows "Error!!!".*
807	SC/Jam Counter Reset		
	1		Resets the SC counter and all jam counters. [**0 = No** / 1 = Yes] *After selecting "1", hold down the Original Type key and press the OK key (or # key) 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		
	1		Resets all counters, except for the total counter (SP7-003). [**0 = No** / 1 = Yes] *After selecting "1", hold down the Original Type key and press the OK key (or # key) 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]
825	Total Counter Reset		
	1		Resets the electronic total counter. [**0 = No** / 1 = Yes] • *This reset is generally performed at installation. This SP mode is effective only once, while the counter still has a negative value. This SP cannot be used once the counter takes a positive value.* • *After selecting "1", hold down the Original Type key and press the OK key (or # key) to execute the reset. If the reset is successful, the display shows "Action completed." If the reset fails, the display shows "Error!!!".*
901	SC History Display		
	1		Displays the codes of the last fifty errors that have occurred. [0 = No / 1 = Yes] *On fax-equipped models, you can print out the last fifty error codes using fax service mode 04. For information, refer to the fax service manual.*
902	SC History Reset		
	1		Clears the SC history. [**0 = No** / 1 = Yes] • *Note that when executed on fax-equipped models, this operation will not clear the machine's service-report data.* • *After selecting "1", hold down the Original Type key and press the OK key (or # key) to execute the reset. If the reset is successful, the display shows "Action completed." If the reset fails, the display shows "Error!!!".*
908	PCU Counter Display		
	1		*Displays the number of prints made since the PCU was last replaced.*
909	PCU Counter Reset		
	1		Resets the developer 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!!!".*
911*	ID Sensor Error Counter Display		
	1		Displays the total number of logged ID sensor errors. *For information about how to analyze these errors, see Section 5.1.11.*
912	ID Sensor Error Counter Reset		
	1		Resets the ID sensor error counter. [**0 = No** / 1 = Yes] *After selecting "1", hold down the Original Type key and press the OK key (or # key) to execute the reset. If the reset is successful, the display shows "Action completed." If the reset fails, the display shows "Error!!!".*

Service Tables

7	Mode Number/Name	Function/[Setting]
955	Memory Read/Write (Byte Access)	
		Lets you read byte values from arbitrary RAM addresses, and write values into arbitrary addresses. *(☛ 5.1.12)*
956	Memory Read/Write (Word Access)	
		Same as SP7-955, except that access is in (2-byte) words. **DFU** *This SP is not intended for use on models outside of Japan. Always use SP-955 to carry out memory reads and writes.*

5.1.2 TEST PATTERN PRINTING (SP5-902)

1. Enter SP mode and select SP5-902.
2. Input the number for the test pattern you wish to print.
3. Press ⓞ to access the copy mode display.
4. Select the copy features (paper size, image density, magnification, etc.).
5. Press ⓞ again to print the test pattern.
6. After checking the test pattern, press ⌧ key to exit from copy mode.
7. To print other test patterns, repeat steps 2 to 6.
8. When finished, exit SP mode.

No.	Test Pattern
0	Blank
1	Horiz. lines (1-dot printed line, 1-dot blank line, alternating)
2	Horiz. lines (1-dot printed line, 2-dot blank line, alternating)
3	Horiz. Lines (2-dot printed line, 1-dot blank line, alternating)
4	Horiz. Lines (2-dot printed line, 2-dot blank line, alternating)
5	Grid (1-dot line thickness)
6	Grid (2-dot line thickness)
7	Alternating dots (1 horiz. line of repeating 1 dot printed, 2 dots blank; followed by 2 horizontal lines completely blank; repeating)
8	Solid Black
9	——
10	Trimming Area
11	Grayscale, 2 x 2–dot [Horizontal line of repeating 2 dots printed, 2 dots blank; printed every other line.]
12	Grayscale, 4 x 4–dot [Horizontal line of repeating 4 dots printed, 4 dots blank; printed every 4th line.]
13	——
14	——
15	——
16	——
17	——
18	——
19	——

No.	Test Pattern
20	——
21	Diagonal line pattern, ascending (1-dot width) [600dpi]
22	Diagonal line pattern, ascending (2-dot width) [600dpi]
23	Diagonal line pattern, descending (1-dot width) [600dpi]
24	Diagonal line pattern, descending (2-dot width) [600dpi]
25	Diagonal line pattern, ascending (1-dot width) [400dpi]
26	Diagonal line pattern, ascending (2-dot width) [400dpi]
27	Diagonal line pattern, descending (1-dot width) [400dpi]
28	Diagonal line pattern, descending (2-dot width) [400dpi]
	——
51	Vertical-line VPM (**DFU**)
52	Horiz.-line VPM (**DFU**)
53	Diagonal-line VPM (**DFU**)
54	Grayscale VPM (**DFU**)

5.1.3 INPUT CHECK (SP5-803)

B046M005.WMF

1. Access SP5-803.
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 mode, then press ⓐ.
5. The LCD panel will display “00H” or “01H”, as shown below.

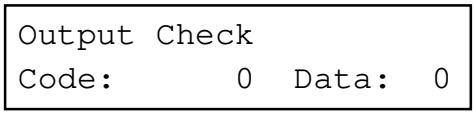
B046M010.WMF

The following table shows the meaning of the value displayed for each switch and sensor.

Input Check Table

Number	Description	Reading	
		00H	01H
1	DF registration sensor	No paper	Paper detected
3	DF original set sensor	No paper	Paper detected
12	Scanner HP sensor	Not at home	At home
13	Platen cover sensor	Platen cover closed	Platen cover open
15	Registration sensor	No paper	Paper detected
16	Exit Sensor	No paper	Paper detected
17	Front door switch	Door closed	Door open
18	Right door switch	Door closed	Door open
23	Mechanical counter sensing	Counter not installed	Counter installed
35	Paper end sensor (standard tray)	Paper not detected.	Paper detected.
44	Paper end sensor (optional paper tray unit)	No paper	Paper detected
88	Bypass paper end sensor (100-sheet bypass)	No paper	Paper detected

5.1.4 OUTPUT CHECK (SP5-804)



B046M011.WMF

CAUTION: To avoid mechanical or electrical damage, do not leave electrical components on continuously for a prolonged period of time.

1. Access SP5-804.
2. Select the 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 5-804 and enter a value of "0".

Input Check Table

Number	Description
1	Polygon mirror motor (400 x 400 dpi)
2	Polygon mirror motor (600 x 600 dpi)
3	Main motor
4	Fan motor (slow)
5	Fan motor (fast)

5.1.5 SMC PRINTING (SP5-992)

1. Access SP5-992.
2. Select the type of data you wish to print: "1" to print SP settings only, "2" to print all system parameters (including SP settings), or "3" to dump a selected memory range.
3. If you selected "3", press the *OK* key and then use the cursor and numeric keys to enter the address range to be dumped.
4. Press ⓘ to access the copy mode display.
5. Select the print conditions (paper size, print density, etc).
6. Press ⓘ again to print the list.
7. Press ⎋ to exit from copy mode.
8. Press ⎋ as necessary to exit this SP.

5.1.6 MEMORY ALL CLEAR (SP5-801)

Executing a Memory All Clear will reset all SRAM-resident SP and UP settings and values to their defaults—with the exception of the serial number setting (SP5-811), the plug-and-play settings (SP5-907), and the total print counters (SP7-003). This procedure is not for normal use, but may be appropriate if the copier has malfunctioned as a result of a problem with its SRAM.

1. Before clearing the memory clear, you should do both of the following to save current SRAM data (if possible).
   - Print a complete SMC printout using SP5-992. Be sure to select all "2" ("All") for the printout type. (☛ 5.1.5)
   - Upload the data to a flash memory card using SP5-824. (☛ 5.1.9)
2. Access SP5-801.
3. Hold down the *Original Type* key and press the *OK* key (or #) key) to execute the clear. If the clear is successful, the display shows “Action completed”. If it fails, the display shows “Error!!!”.
4. Turn the main switch off and back on.
5. If you save SRAM data to a flash-memory card, try downloading the data back into the machine (☛ 5.1.9). If the download is successful, this completes the procedure.

If you did not save SRAM data to a flash memory card, or if you were unable to download the saved data, then continue as follows.

6. Carry out printer and scanner registration and magnification adjustments. (☛ 3.13)
7. Carry out auto-scanner (white-level) adjustment, using SP4-908.
8. Refer to the SMC printout, and re-enter any values that differ from the factory settings.
9. Check the copy quality, and carry out any necessary adjustments.

5.1.7 FREE RUNS

SP mode offers a variety of free-run operations, as indicated below. Please keep in mind that prolonged or unnecessary use of free runs can cause machine wear or other problems. Select the free run that drives only those parts that you specifically need to check.

Name	SP	Scanner / ADF			Plotter		*Remark*
		Book Motor	ADF feed	Exposure Lamp	Paper printout	Fusing Lamp	
Fusing Nip Band Check	SP1-109	Off	Off	Off	Runs	Runs	**Factory use only**
Scanner Free Run	SP4-013	Runs	Off	Runs	Off	Off	
Free Run	SP5-802	Runs	Off	Runs	Runs	Runs	These two free runs are identical.
Printer Free Run	SP5-901	Runs	Off	Runs	Runs	Runs	
ADF Free Run	SP6-009	Off *	Runs	Runs	Off	Off	
ADF/Printer Free Run	SP6-910	Off *	Runs	Runs	Runs	Runs	

*The motor comes on briefly to move the scanner to the scanning position.

5.1.8 PROGRAM UPLOAD/DOWNLOAD

The program (firmware) for this machine is upgraded using a 4MB flash memory card. The machine provides the following two SPs to support program porting and upgrade:

- SP5-826: Uploads the program from the machine's flash ROM to a flash memory card.
- SP5-827: Downloads the selected program from a flash memory card to the machine's flash ROM.

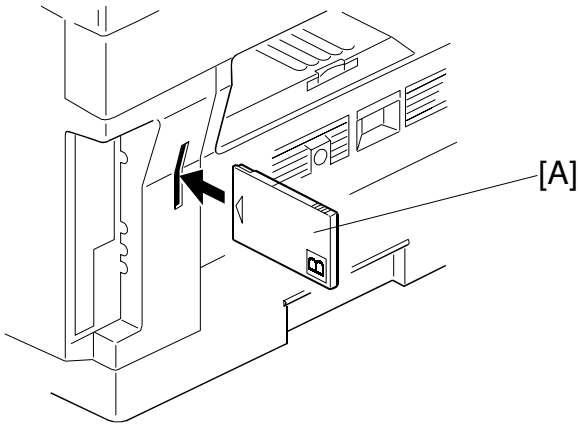
Since the program size is only 2MB, it is possible to carry two different program versions on a single card, and selectively download either one of these. If you wish to carry two different programs on the same card, write one of these programs into card address space 000000h to 1FFFFFh, and write the other one into address space 200000h to 3FFFFFh.

Program Download (SP5-827)

This SP is effective only if you boot the machine from the flash memory card as described below. If the download is unsuccessful, or if you decide that you do not wish to start the download, please turn the machine off and back on before resuming normal operation.

NOTE: Be sure to turn off the main switch before inserting or removing the flash memory card. Installing or removing a card while the main switch is on may damage the FCU.

1. Turn off the main switch.
2. Insert the flash memory card [A] into the card slot, with the card's "B" side facing the rear of the machine.



B046M012.WMF

3. Hold down the *Operation Switch* and turn on the main switch.
   NOTE: If the card does not contain a valid program, the machine will not start.
4. The machine boots from the card, automatically enters SP5-827, and displays the following.

```
Program Download
(1:1st 2:2nd)       0
```

B046M004.WMF

5. If you wish to load the program stored in first half of the card (in card space 000000h to 1FFFFFh), enter "1". If you wish to load the program stored in second half of the card (space 200000h to 3FFFFFh), enter "2". Then press *OK* to start the download.
   NOTE: If you enter "0" (the default) instead of "1" or "2", the machine moves back to the top-level SP5-827 screen. If you enter "1" or "2" but the corresponding card space does not contain a valid program, the machine displays "Loading error!!!".
6. The machine erases the current firmware, then begins downloading the new firmware from the card. The "ON" lamp flashes, and the screen counts down the progress. The download takes about 3 minutes.
   NOTE: If downloading fails, the "Loading error!!!" message appears. If this occurs, try repeating the procedure.
7. After completing the download, turn off the main switch and remove the memory card.
8. Turn the switch back on, and run SP5-837 to check the checksums for the new firmware. Then run SP7-801-1 to confirm that it correctly displays the new firmware version.
   NOTE: Be sure to remove the card and turn the main switch off and back on before running the above SPs.

Display during download:

```
Program Download
 1 :  2089024
```

B046M006.WMF

[A]: "0" = erasing flash ROM
"1" or "2" = writing to flash ROM
("1" if you selected "1st";
"2" if you selected "2nd".)

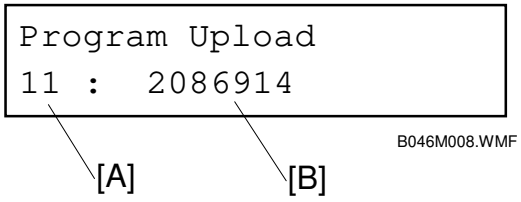
[B]: Amount (bytes) remaining to be written

Program Upload (SP5-826)

NOTE:
1) Be sure to turn off the main switch before inserting or removing the flash memory card. Installing or removing a card while the main switch is on may damage the FCU.
2) This operation will erase any data already stored in the flash memory card.

1. Turn off the main switch.
2. Insert the flash memory card into the card slot, with the card's "A" side facing the front of the machine. (See illustration on preceding page.)
3. Turn on the main switch.
4. Access SP 5-826.
5. Enter "1" at the keypad, and then press *OK.*
6. The machine erases the card, and then writes the program into it. The "ON" lamp flashes, and the screen counts down the progress. Uploading takes about 2 minutes. On successful completion, the screen displays "Loading completed."
   NOTE: If uploading fails, the "Loading error!!!" message appears. If this occurs, try repeating the procedure.
7. Turn off the main switch, then remove the memory card.

Display during upload:



[A]: "10" = erasing card
"11" = writing to card
[B]: Amount (bytes) remaining to be written

5.1.9 SRAM DATA UPLOAD/DOWNLOAD

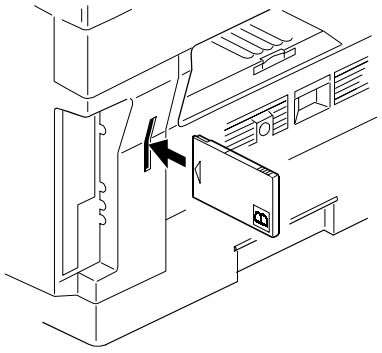
Before installing a new FCU, and before executing a "memory all clear," you should upload all current SRAM data into a flash memory card. You can then download the data back after completing the FCU replacement or memory clear.

- SP5-824: Upload from the machine's SRAM to a flash memory card.
- SP5-825: Download from a flash memory card to the machine's SRAM

SRAM Data Upload (SP5-824)

NOTE: 1) Be sure to turn off the main switch before inserting or removing the flash memory card. Installing or removing a card while the main switch is on may damage the FCU.
2) This operation will erase any data already stored in the flash memory card.

1. Turn off the main switch.
2. Insert the flash memory card [A] into the card slot, with the card's "B" side facing the rear of the machine.

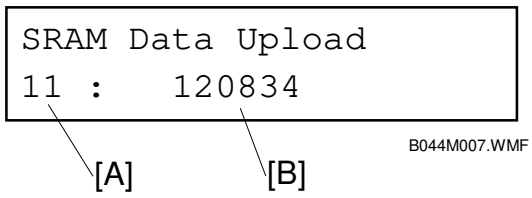


B046I125.WMF

3. Turn on the main switch.
4. Access SP 5-824.
5. Enter "1" at the keypad, and then press *OK* or #.
6. The machine erases the card, and then saves its SRAM data into it. The "ON" lamp flashes, and the screen counts down the progress. Uploading takes about 30 seconds. On successful completion, the screen displays "Loading completed."
   NOTE: If uploading fails, the "Loading error!!!" message appears. If this occurs, try repeating the procedure.
7. Turn off the main switch, then remove the memory card.

Display during upload:

[A]: "10" = erasing card
"11" = saving to card
[B]: Amount (bytes) remaining



B044M007.WMF

SRAM Data Download (SP5-825)

NOTE: 1) Be sure to turn off the main switch before inserting or removing the flash memory card. Installing or removing a card while the main switch is on may damage the FCU.
2) This operation will overwrite all of the machine's current SRAM data.

1. Turn off the main switch.
2. Insert the flash memory card [A] into the card slot, with the card's "B" side facing the rear of the machine. (See illustration on preceding page.)
3. Turn on the main switch.
4. Access SP 5-825.
5. Enter "1" at the keypad, and then press *OK.*
6. The machine executes the download. This operation takes about 2 seconds. On successful completion, the screen displays "Loading completed."
   NOTE: If uploading fails, the "Loading error!!!" message appears. If this occurs, try repeating the procedure.
7. Turn off the main switch, then remove the memory card.

5.1.10 SERIAL NUMBER INPUT (SP5-811)

Use this SP to input the machine's 11-digit serial number. (This is normally done at the factory). Each key of the numeric keypad controls a different digit of the serial number: the first key controls the first digit, the second key controls the second digit, and so on. (The R/# key is not used.) Press each key as many time as necessary to set the corresponding digit. To set the second digit to "X", for example, press the 2 key as many times as necessary to bring up "X" on the screen.

Note that the first four digits of the serial number may be either letters or numbers. Digits 5 to 11 are always numbers.

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

5.1.11 ID SENSOR ERROR ANALYSIS (SP2-221)

```
Vg4.05,Vp0.56,PW59
Vg-Vp3.49,Vt2.16
```

B044M009.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 SP2-221. (☛ 6.11.15)

1. Vsg ("Vg" in the display)
   Error Condition: Vsg < 1.65

   Possible causes:
   - ID sensor defective
   - ID sensor dirty
   - Drum does not get charged

2. Vsp ("Vp" in the display)
   Error Condition: Vsp > 1.65

   Possible causes:
   - Toner density is very low
   - ID sensor pattern is not being generated

3. Power ("PW" in the display)

   This is the power for the light source of the ID sensor.
   Error Condition: Vsg < 2.31 at maximum power

   Possible causes:
   - ID sensor defective
   - ID sensor dirty
   - Drum does not get charged

4. Vsdp ("Vg-Vp" in the display)
   No Error Conditions

5. Vt
   Error Condition: Vt > 2.64 or Vt < 0.20

   Possible cause:
   - TD sensor defective

5.1.12 MEMORY READ/WRITE

You can use SP7-955 to read byte values from arbitrary RAM addresses, and to write values to arbitrary RAM addresses.

When you enter this SP, the screen looks likes this:

```
Mem R/W (1byte)
Adr=800000  Data=00
```

B046M005.WMF

You can now operate the SP as follows.

- To manually enter an address or data value: Use the cursor keys to move to the desired column in the Adr field. Use numeric keys to input number values 1 to 9, and [*Original Type* + numeric keys "1" to "6"] to input number values A to F.
- After entering an address value, press OK (or R/#) to set the value. The Data field will then display the current content of the entered address. The cursor will jump to the Data field.
- To increment or decrement the address, use the density keys (or Original Type + cursor keys). The Data value will change to show the content of the selected address.
- When the cursor is in the Data field, you can enter a new value to be stored into the selected address. Press OK (or R/#) to write the new value into the address. The cursor will then return to the Address field.
- If you are in the Data field, pressing Cancel will move you to the address field. If you are in the address field, pressing Cancel will exit this SP.
- To cancel an entry in progress (and restore the previous value), press C/©. To exit the SP, press the *Clear Modes* key.

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, or to view counter values.

5.2.1 HOW TO ENTER AND EXIT USER TOOLS

Press the User Tools button, then select the User Tools program. When you are finished the User Tools program, press the User Tools button to exit.

5.2.2 USER TOOLS TABLE

System Settings 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. Tray Paper Size	1. Tray 1
		2. Tray 2
		3. Bypass
	9. Paper Tray Priority	
	10. Auto Tray Switch (B044/6 only)	
	11. Display Contrast	
	12. Measurement Unit	

NOTE: For information about the "AOF (Keep It On.)" setting, see System Settings in Section 6.

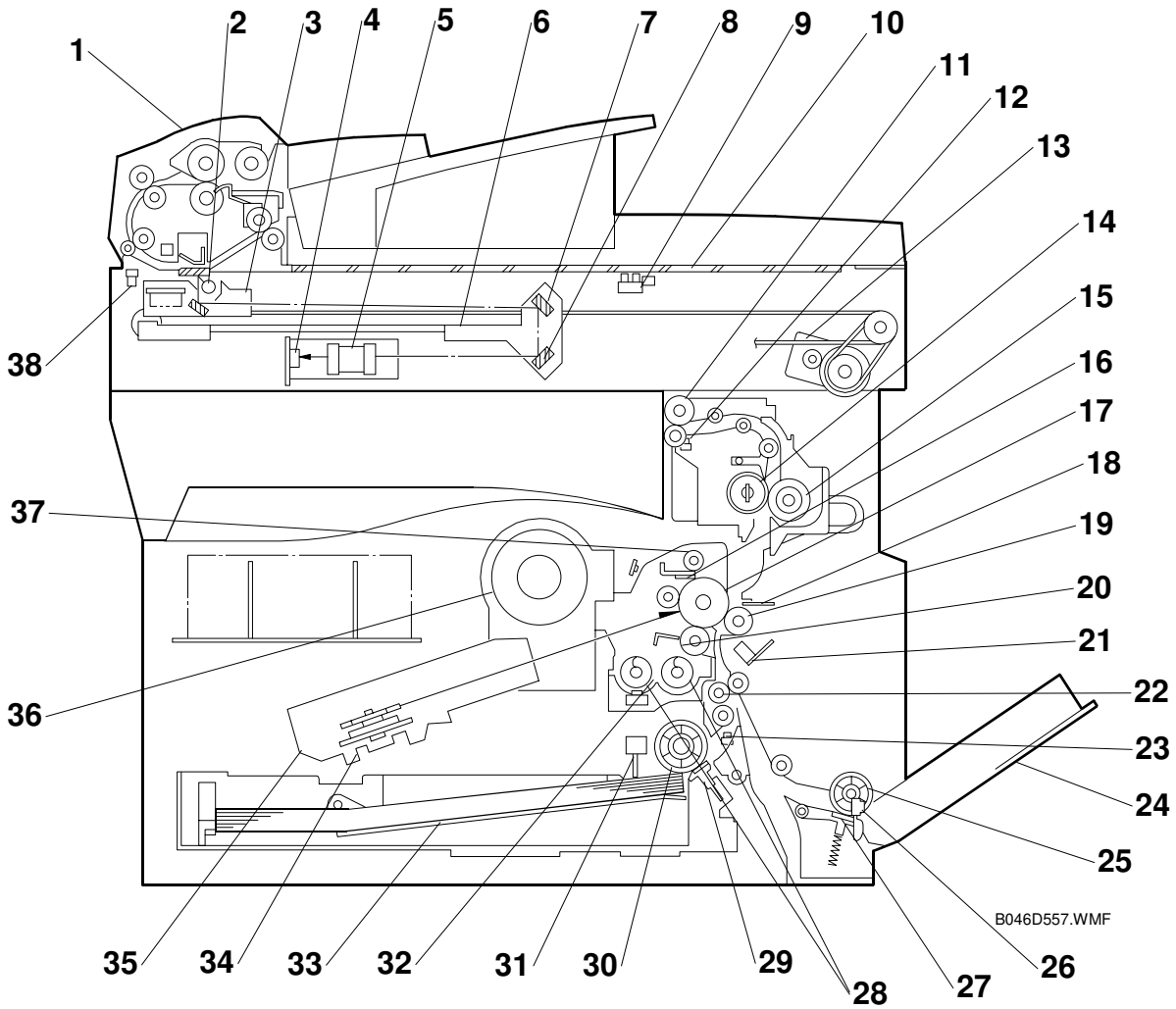
Copy Features Table

2. Copy Features	1. Max. Copy Q'ty	
	2. Image Adjustment	1. Text
		2. Photo
	3. Set Ratios	
	4. Copy Reset Timer	
	5. Original Orientation	
	6. Bypass Paper Type	
	7. 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

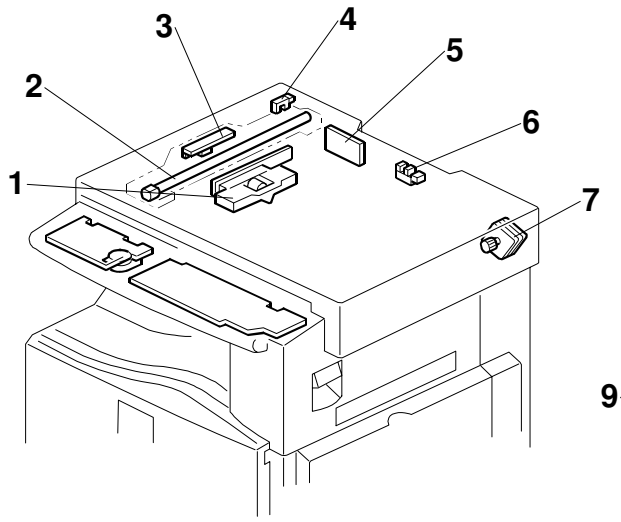
6.1.1 COMPONENT LAYOUT



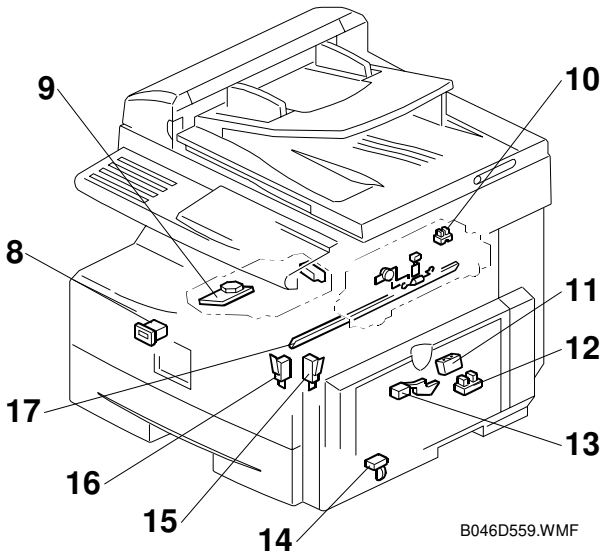
B046V502.WMF

NOTE: The above illustration shows model B046. Models B045 and B049 have 1-sheet bypass only (no bypass paper feed roller and bypass friction pad). Models B044 and B045 do not include the ADF as standard.

1. ADF
2. Exposure Lamp
3. 1st Scanner
4. CCD (on SBU)
5. Lens Block
6. 2nd Scanner
7. 2nd Mirror
8. 3rd Mirror
9. Platen Cover Sensor
10. Exposure Glass
11. Exit Roller
12. Exit Sensor
13. Scanner Motor
14. Hot Roller
15. Pressure Roller
16. Cleaning Blade
17. OPC Drum
18. Discharge Plate
19. Transfer Roller
20. Development Roller
21. ID (Image Density) Sensor
22. Registration Roller
23. Registration Sensor
24. Bypass Tray
25. Bypass Paper Feed Roller
26. Bypass Paper End Sensor
27. Bypass Friction Pad
28. Mixing Augers
29. (Main) Friction Pad
30. Paper Feed Roller
31. Paper End Sensor
32. TD (Toner Density) Sensor
33. Bottom Plate
34. Polygon Mirror Motor
35. Laser Unit
36. Toner Supply Bottle (or THM)
37. Toner Collection Coil
38. Scanner HP Sensor



B046D558.WMF



B046D559.WMF

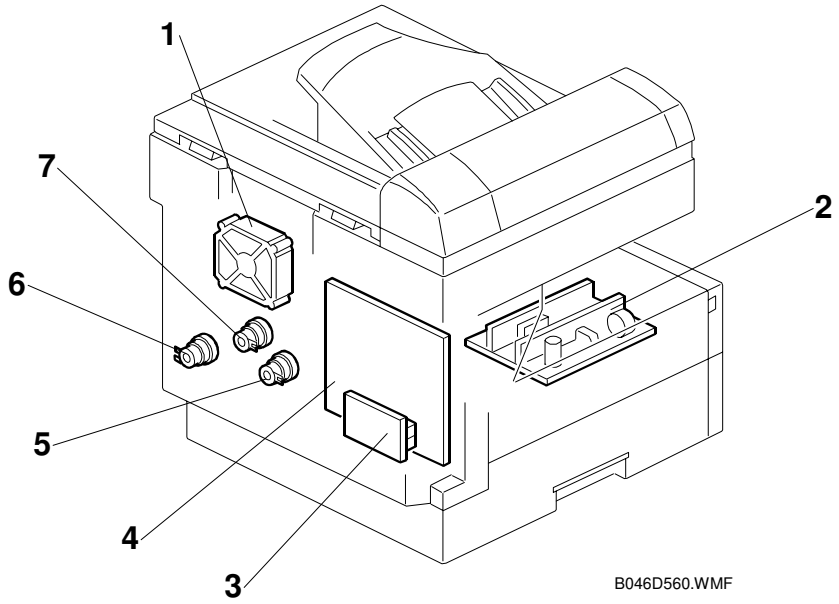
1. Lens Block
2. Exposure Lamp
3. Lamp Stabilizer Board
4. Scanner HP Sensor
5. DF Connection Board*1
6. Platen Cover Sensor
7. Scanner Motor
8. Mechanical Counter*2
9. Polygon Mirror Motor
10. Exit Sensor
11. ID (Image Density) Sensor
12. Registration Sensor
13. Paper End Sensor
14. Bypass Paper End Sensor*3
15. Right Door Safety Switch
16. Front Door Safety Switch
17. Quenching Lamp

Detailed Descriptions

*1: DF connection board is standard on B046 and B049 only.

*2: Mechanical counter is standard on B044 and B046 only.

*3: Bypass paper end sensor is included on 100-sheet bypass models only (B044 and B046).

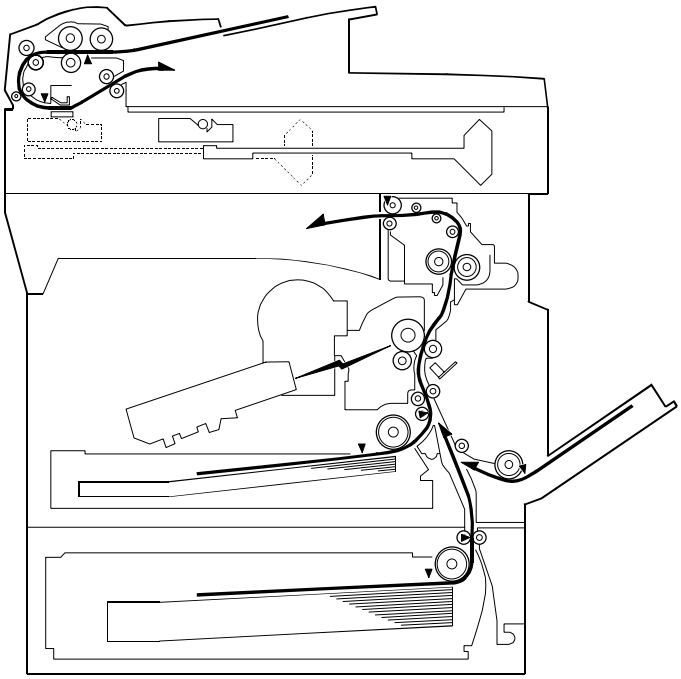


1. Exhaust Fan
2. PSU
3. NCU*1
4. FCU
5. Paper Feed Clutch
6. Bypass Feed Clutch*2
7. Registration Clutch

*1: NCU is standard on fax-equipped models only (B046 and B049).

*2: Bypass feed clutch is included on 100-sheet bypass models only (B044 and B046).

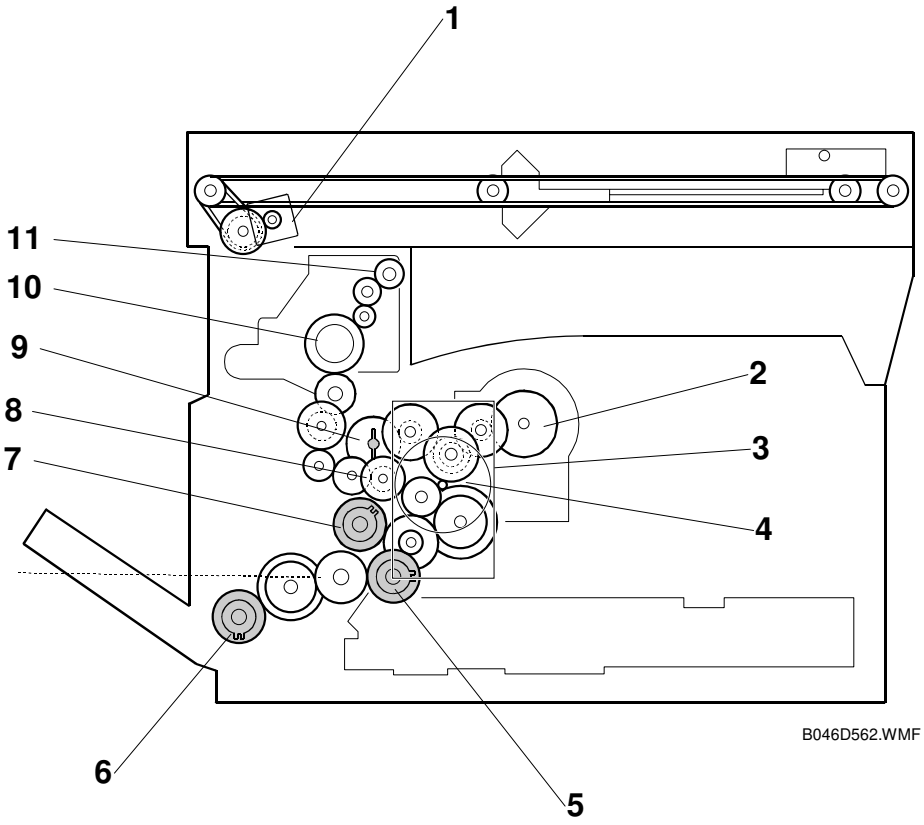
6.2 PAPER PATH



B046D561.WMF

NOTE: The illustration shows model B046. Models B045 and B049 have 1-sheet bypass only (no bypass paper feed roller and no bypass friction pad). The paper tray unit shown above is an option for B044 and B046, and is not available on B045 and B049.

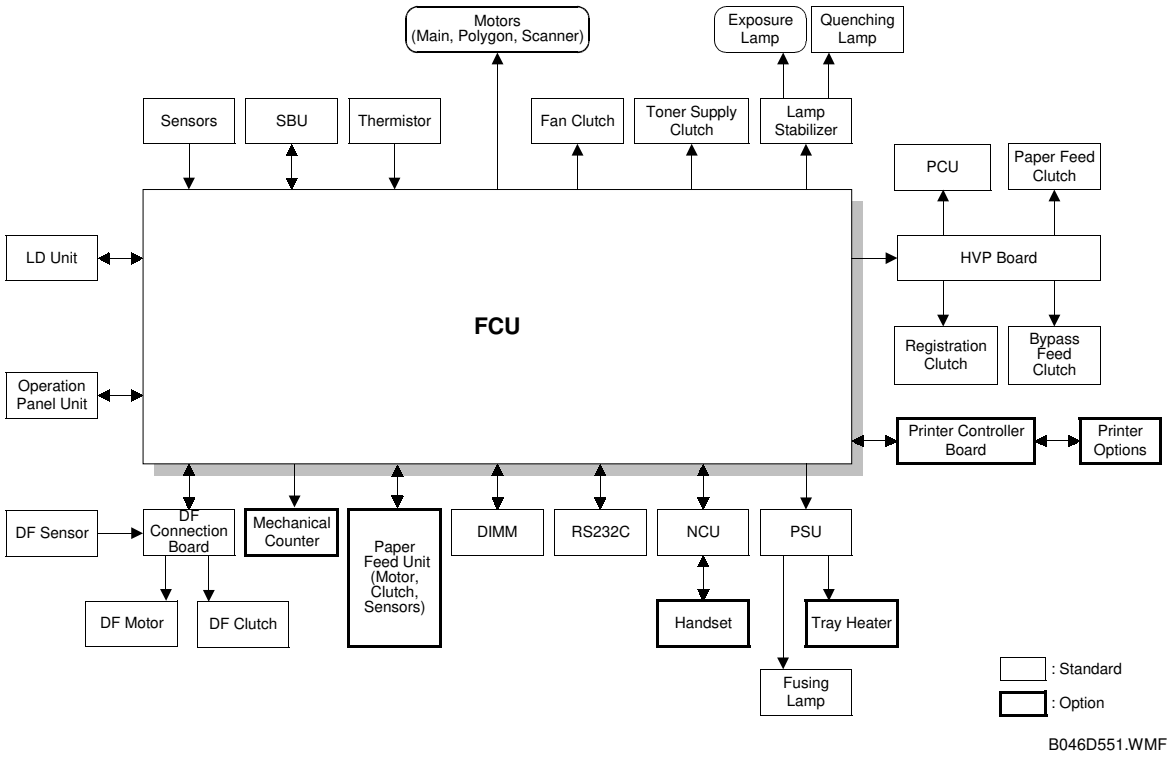
6.3 DRIVE LAYOUT



1. Scanner Motor
2. Toner Bottle (or THM) Clutch
3. Main Motor (board)
4. Main Motor (drive shaft)
5. Paper Feed Clutch
6. Bypass Feed Clutch*[1]
7. Registration Clutch
8. Developer Driver Gear
9. Drum Drive Gear
10. Fusing Drive Gear
11. Exit roller

*1: Bypass feed clutch is included on 100-sheet bypass models only (B044 and B046).

6.4 BLOCK DIAGRAM: PCBs AND COMPONENTS

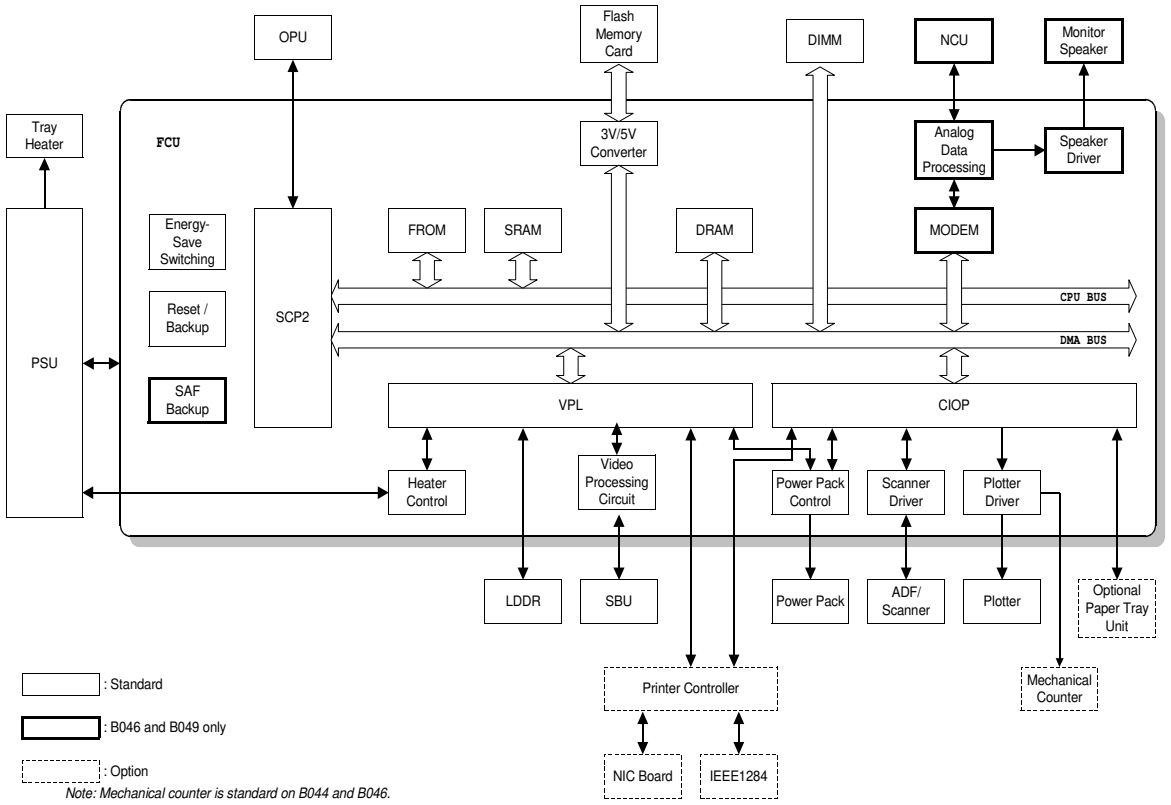


NOTE: The DF connection board, NCU, and speaker are standard on fax-equipped models (B046 and B049), and optional on B044 and B045.

6.5 MAIN PCBs

6.5.1 FCU (FUNCTION/FACSIMILE CONTROL UNIT)

The FCU is the machine's main controller. It controls scanning, printing, fax operations (B046/9 only), image processing, power-mode switching, and it interfaces with standard and optional peripherals and with the user. It holds the machine's FROM, SRAM, and DRAM, and provides the slot for the optional DIMM. Note that fax-related components are not included on FCUs that ship on models B044 and B045.



B046D553.WMF

SPC2

The machine's CPU. Utilizes a dual bus structure (CPU bus and DMA bus), and includes DMA, DCR, JBIG, and energy-save control circuits.

VPL (Video Processing LSI)

This chip implements video processing, utilizing the following internal blocks.

- VPM (Video Processing Module)
  Implements scanning control and image processing.
- LIF (Laser Interface)
  Implements printing control and image processing

CIOP (Communications and I/O Processing)

Implements communication and I/O control circuits. Runs at 9.83MHz (clock signal supplied by the SPC2).

FROM (Flash ROM) – 2MB

The machine's program memory. Packaged in a 48-pin TSOP; 75ns access time; runs at +2.7 to +3.6 V (+3VE). The memory content can be overwritten from a flash memory card.

DRAM – 8MB

The machine's standard operating RAM. Packaged in a 54-pin TSOP; 100MHz maximum clock speed; operates at +3.3V (+3VD). Allocated as follows: 6.0K for page memory and (if applicable) ring buffer; 1M for fax SAF; 576K working RAM; 256K line buffer, 128K ECM buffer, 128K OS, 64K text SAF. On B046 and B049 machines, the SAF backup circuit will maintain DRAM content for up to about 12 hours if power outage occurs while SAF data is being stored.

NOTE: If optional DIMM is installed, the allocations for page memory, ring buffer, and fax SAF are different from the above, and 2.5 to 5.4K may be allocated for sort SAF.

SRAM – 128K

Stores users settings and usage data. Packaged in a 32-pin TSOP; 70ns access time; runs at +2.7 to +3.6 V (+3V BAT). On-board battery backup maintains memory content while power is off.

3V/5V Converter

Interface between the 3V output by the FCU and the 5V used by service flash card.

Energy-Save Switching

Controls low-power mode switching

Reset/Backup Circuit

Monitors +5VE power, and issues system reset and RTC reset signals. When the main power is off, supplies power from the primary battery to SRAM and parts of the SPC2.

SAF Backup

Backs up DRAM for up to 12 hours if power outage occurs while SAF data is being held. (Included only on B046/B049.)

Analog Processing Circuit

Implements modem filtering, 2/4-line switching, and RITONE switching. (Included only on B046/B049.)

Modem

Implements a V34 modem and code. Includes a 24.6MHz modem clock. (Included only on B046/B049.)

Speaker Driver

Drives the speaker for the buzzer and monitor sounds. (Included only on B046/B049.)

Heater Control

Processes signals from the thermistor controlling the fusing heater.

Video Processing Circuit

Interface with the SBU.

Power Pack Control

Interface with the high-voltage power supply unit. (Implements PWM control and receives feedback.)

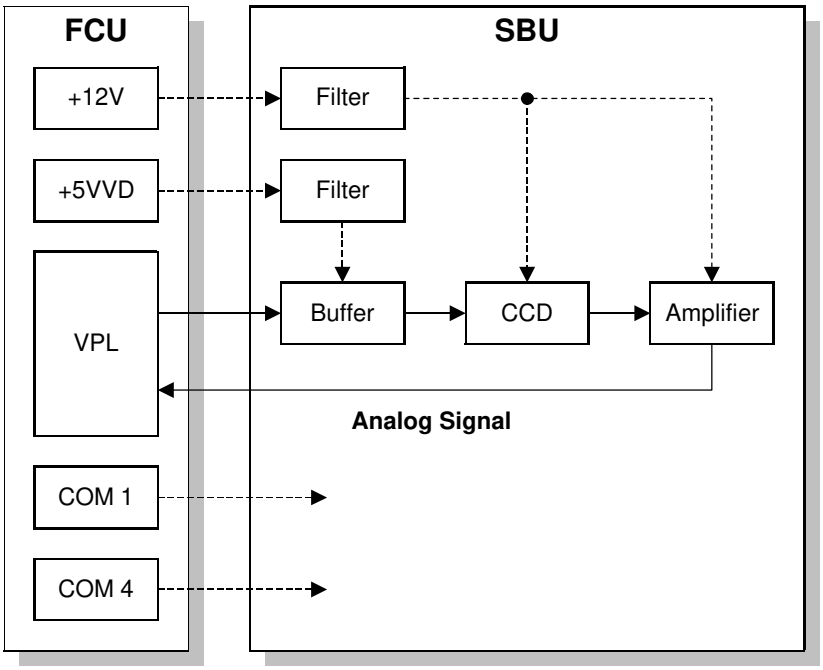
Scanner Driver

Drives the scanner and ADF motors and xenon lamp, interfaces with the HP sensor and the ADF.

Plotter Driver

- Drives the main and polygon motors; the feed, bypass, registration, and toner-supply clutches; the quenching lamp; and the fan.
- Interfaces with the exit, paper-end, registration, ID, and TD sensors.

6.5.2 SBU (SENSOR BOARD UNIT)



B046D554.WMF

The SBU receives analog signals from the CCD and converts these into digital signals used for image processing.

Buffer

Used for driving the CCD. Includes a 3V/5V converter (converts the VPL's 3V drive signal to 5V).

CCD

Converts light reflected from the original into an electrical signal. This machine uses a Sony ILX553A (5150 pixel) CCD. Scan density is 600 dpi (for letter-size originals). Pixel size is 7 x 7 microns. Maximum pixel rate is 15Mhz.

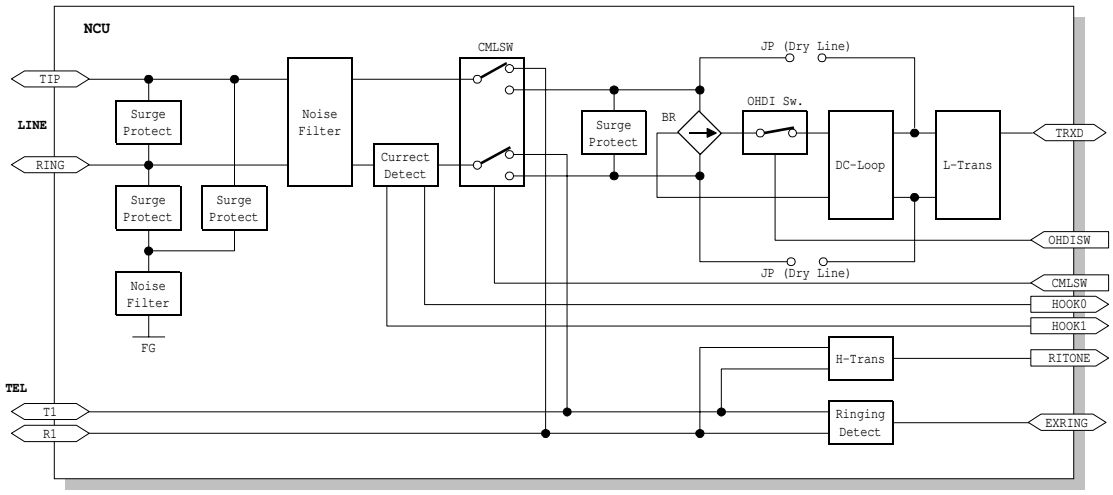
Amplifier

Inverts and amplifies the electrical signal from the CCD.

6.5.3 NCU (NETWORK CONTROL UNIT)

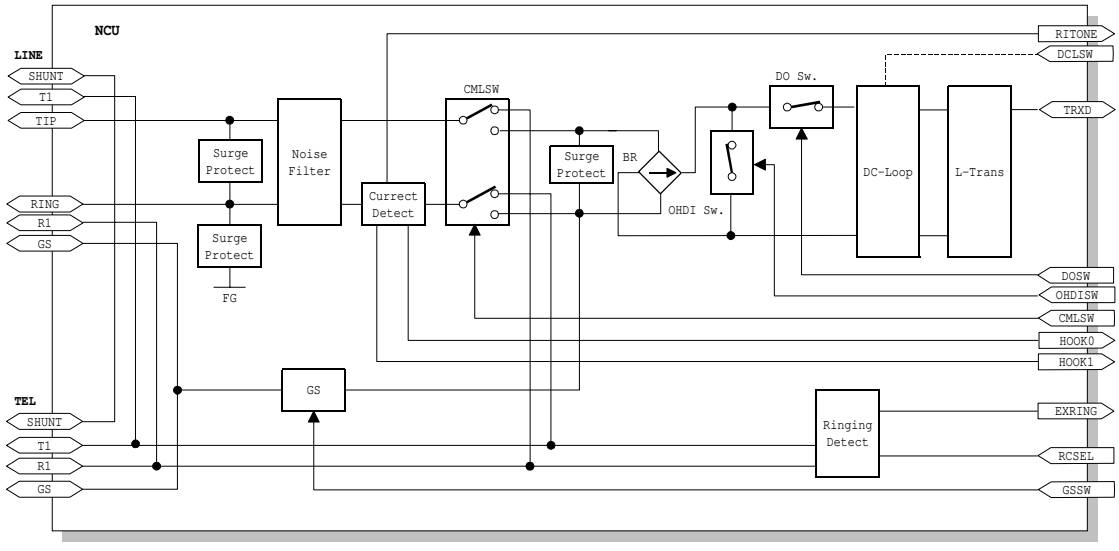
The NCU implements the interface between the fax system and the telephone network. An NCU is standard on models B046 and B049, and is included as part of the fax option for B044 and B045.

North America version



B046D555.WMF

Europe/Asia version

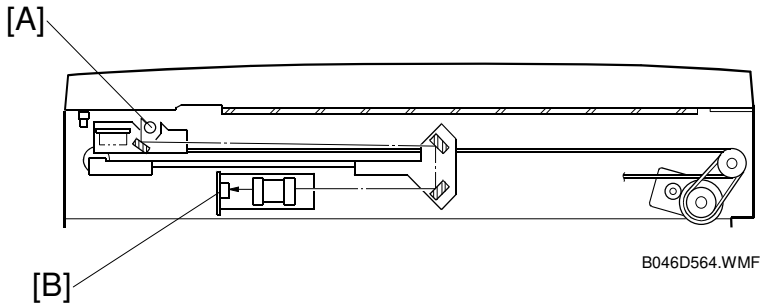


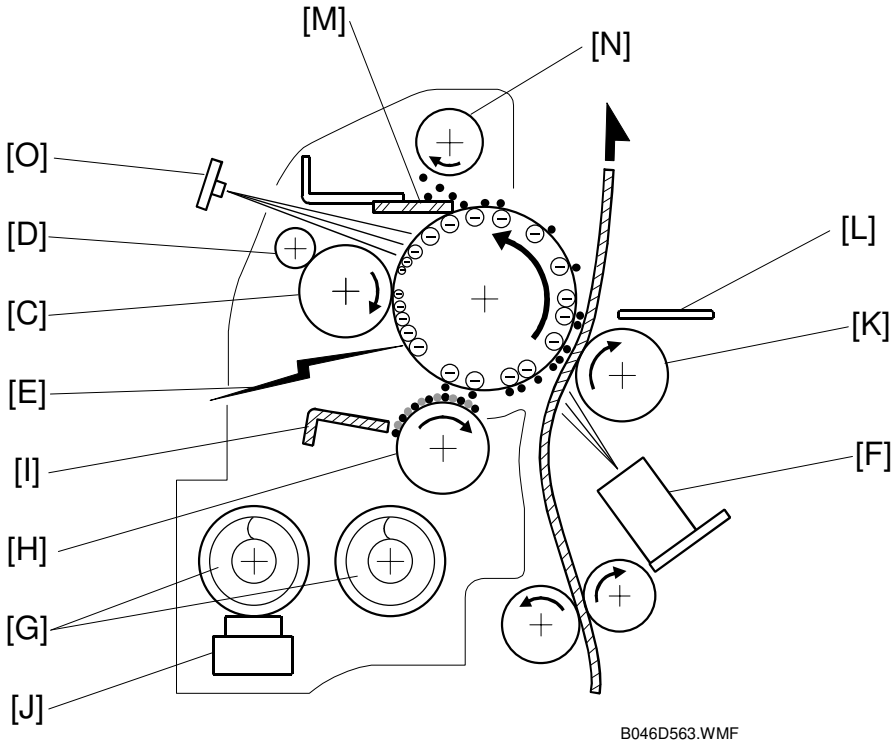
B046D556.WMF

Jumper on Europe/Asia version

TB1	Jumper TB1 must be opened on machines installed in Hong Kong.

6.6 COPY PROCESS OVERVIEW





The following is a brief overview. For more detailed information about each process, refer to the *Core Technology* manual.

1. EXPOSURE

A xenon lamp [A] exposes the original –>the CCD [B] converts reflected light to analog data signal → the FCU converts analog signal into digital data, processes it, stores it in memory → the FCU retrieves the data from memory and uses it to drive the laser. (Each original is scanned once only.)

2. DRUM CHARGE

In the dark, the drum charge roller [C] imparts a negative charge to the OPC drum. (The roller is kept clean by cleaning roller [D].)

3. LASER EXPOSURE

The laser unit, controlled by the FCU, fires a beam [E] at the drum, drawing the latent electrostatic image on the drum surface. (Exposure by laser dissipates the local negative charge.)

4. ID (IMAGE DENSITY) SENSOR

The ID sensor [F] periodically measures (a) drum surface reflectivity, and (b) reflectivity of a test pattern image drawn on the drum. The FCU uses ID sensor data to adjust charge-roller voltage, and uses both ID sensor data and TD sensor [J] data to adjust the toner density.

5. DEVELOPMENT

Augers at [G] carry developer (carrier/toner mix) to the magnetic development roller [H]. The roller creates a developer "brush" that rubs against the drum, causing toner to adhere to the electrostatic image. (The doctor blade [I] restricts the height of the "brush." The TD (toner density) sensor [J] measures the ratio of toner in the developer.)

6. IMAGE TRANSFER

Paper moves between the drum and the transfer roller [K]. A positive charge applied to the transfer roller pulls toner off the drum and onto the paper—while also attracting the paper itself.

7. PAPER SEPARATION

Paper is separated from the drum as a result of (a) electrostatic attraction of paper toward transfer roller, and (b) a high AC voltage applied to the discharge plate [L].

8. CLEANING

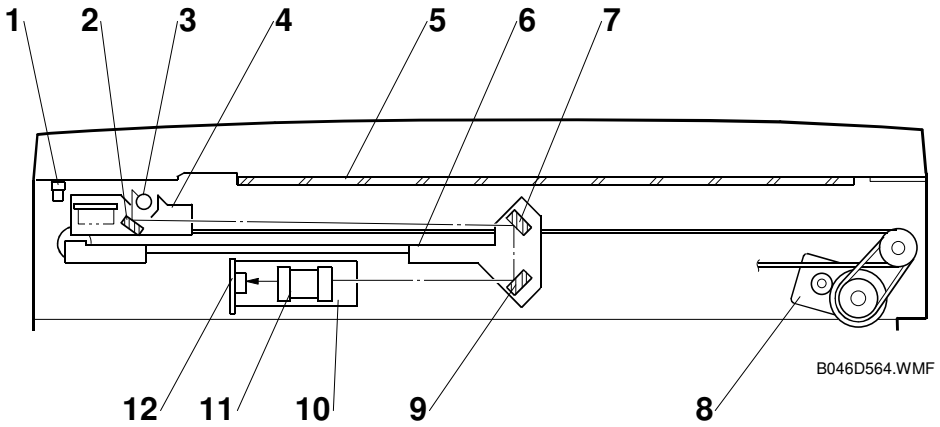
The cleaning blade [M] scrapes remaining toner from the drum, and the toner collection coil [N] retrieves this toner.

9. QUENCHING

Light from the quenching lamp [O] neutralizes the charge on the drum surface.

6.7 SCANNING

6.7.1 OVERVIEW



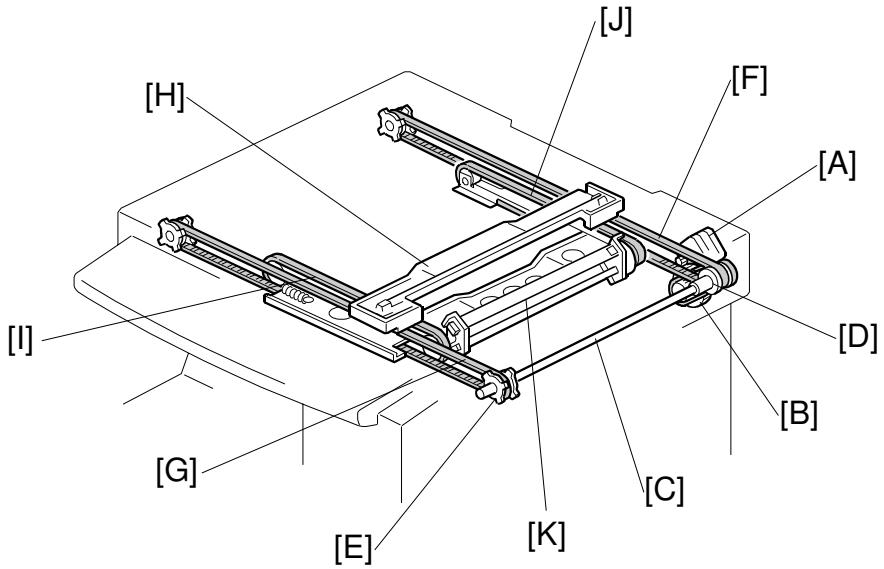
1. Scanner HP Sensor
2. 1st Mirror
3. Exposure Lamp
4. 1st Scanner
5. Exposure Glass
6. 2nd Scanner
7. 2nd Mirror
8. Scanner Motor
9. 3rd Mirror
10. Lens Block
11. Lens
12. CCD

The HP sensor [1] senses when the scanner is at home position, ready to begin a scan.

To copy: the original is illuminated by the xenon exposure lamp [2]. The 1st, 2nd, and 3rd mirrors direct the reflected light to the lens block, where the lens directs it to the CCD.

The 1st scanner includes a reflector (not shown) that helps reduce shadows on pasted originals.

6.7.2 SCANNER DRIVE



B046D001.WMF

The scanner motor [A] (a stepper motor) drives a gear that turns a small drive belt [B], driving the scanner drive shaft [C]. Pulleys [D, E] on the ends of the shaft drive timing belts [F] and [G], driving the 1st scanner [H]. The first scanner is secured to timing belts [I] and [J], which drive the 2nd scanner [K] through the 2nd scanner's pulleys.

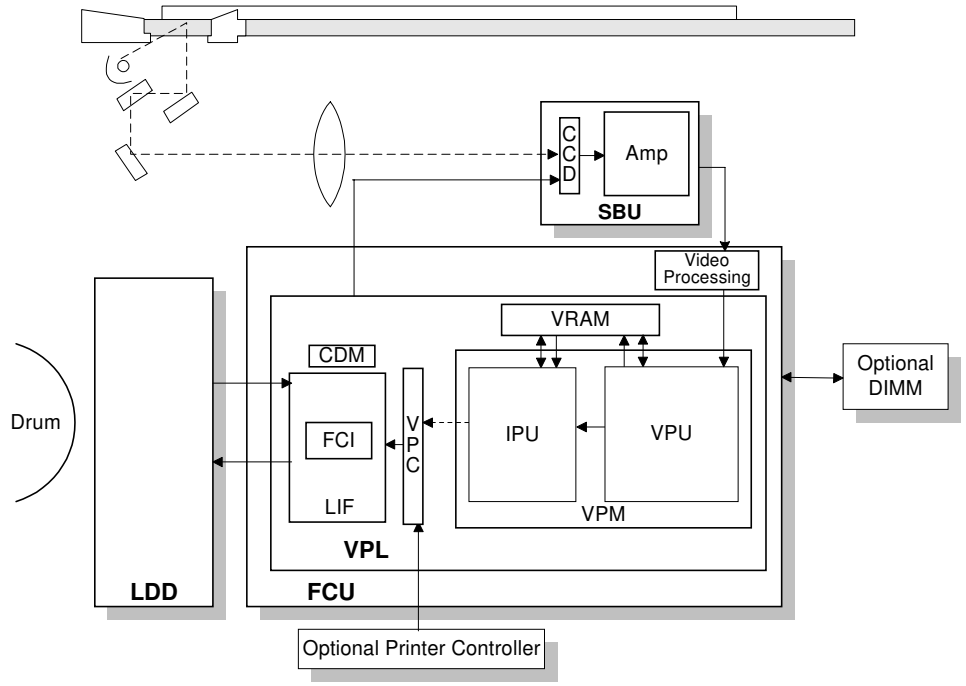
During scanning in book mode, the 2nd scanner moves at half the speed of the 1st scanner. Scanner speed increases for reduction printing, and drops for enlargement printing—generating reduction or enlargement in the sub-scan dimension. (The FCU uses image processing to generate the corresponding reduction or enlargement in the main-scan dimension.)

You can adjust magnification in the sub-scan direction using SP4-101 (which will adjust the motor speed). You can adjust in the main scan direction using SP4-008.

For information about scanning in DF mode, refer to the ADF manual.

6.8 IMAGE PROCESSING

6.8.1 OVERVIEW



B046D100.WMF

The scanned image is processed by the following modules.

In the SBU

- CCD: Converts the reflected light from the image into an analog signal. Driven by the CDM (CCD Drive Module) on the VPL**.**
- Amp: Amplifies the analog signal and sends it to the VPL on the FCU.

In the VPL chip on the FCU

- VPU: Video correction (black level, shading, peak tracking and correction), image correction (gamma correction), and reduction processing (in main-scan direction). (☛ 6.8.2)
- IPU: Magnification processing (in main scan direction), filtering, second gamma correction (for fax only), etc. (☛ 6.8.2))
- LIF Smoothing, edge correction, FCI (fine character adjustment) (☛ 6.8.2)

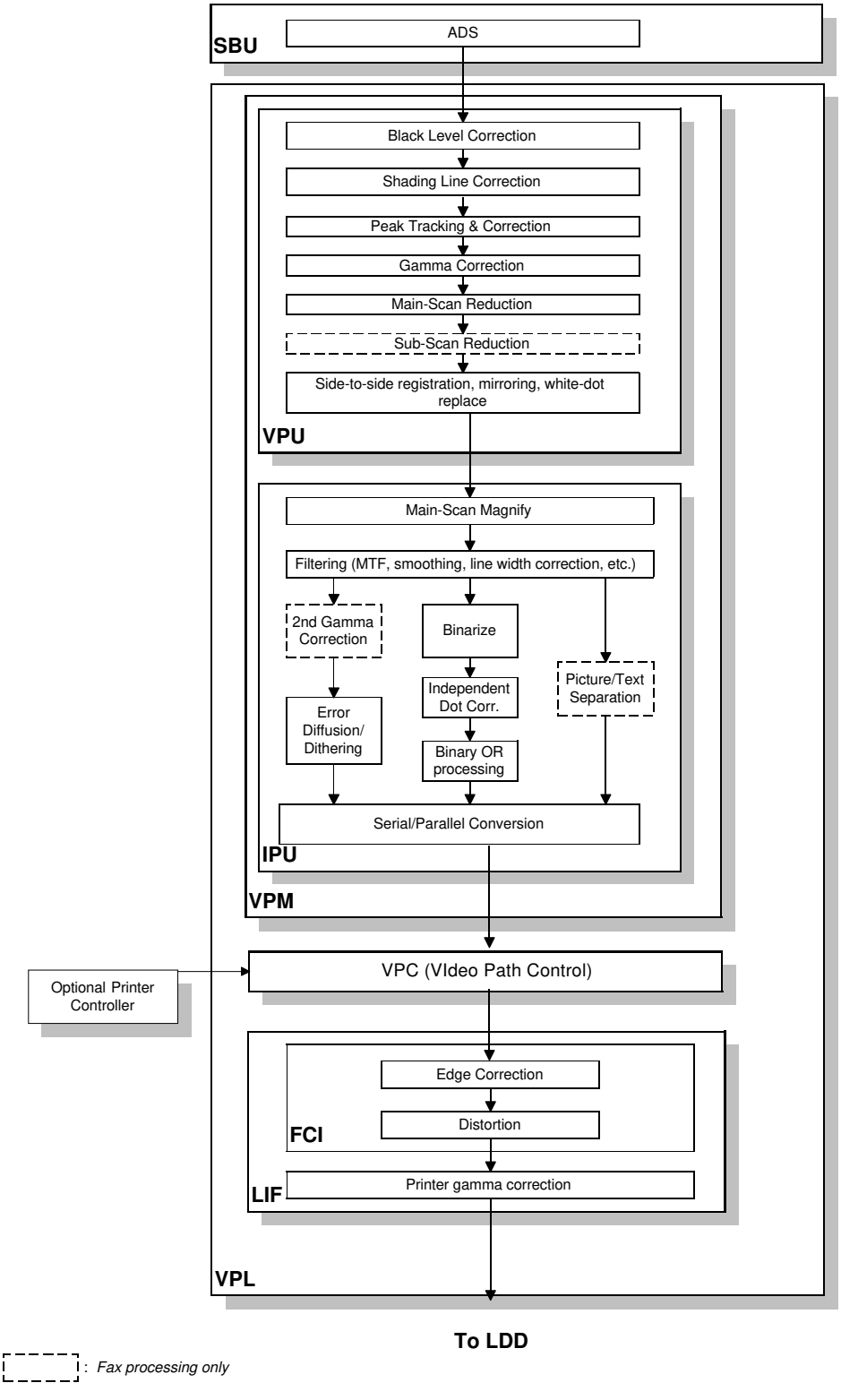
The data then moves to the LD drive board in accordance with timing controlled by the FCU.

Note the following:

- The VPU and IPU are submodules of a larger module, the VPM (Video Processing Module). The VPM includes interface components (not shown) that interface these submodules to the VRAM processing memory.
- The VPC (Video Path Control circuit) controls which signal is sent to the LIF.
- Abbreviations: SBU = Sensor Board Unit; LIF = Laser Interface; VPU = Video Processing Unit; IPU = Image Processing Unit.

6.8.2 IMAGE PROCESSING PATH

The diagram below shows the image processing steps. The steps that are actually carried depend on the selected original processing modes (☛ 6.8.3) and on adjustments made with the relevant SPs (☛ 6.8.5).



B046D998.WMF

6.8.3 ORIGINAL MODES

The machine offers seven "original" modes for copy operation. Fax-equipped machines (B046 and B049) also offer four original modes for fax operation.

Selection of Original Modes, for Copying

The user selects the mode using User Tools ("3: Copier Features" → "2. Adjust Original Mode"). The user can also assign any two of these modes to the two "mode indicators" on the panel, so that they can be accessed with a single button press. (Although the upper indicator is nominally for "Text" and the lower is for "Photo," in fact the user can assign any mode to either indicator.)

Selection of Original Modes, for Fax

Before scanning, the user selects Text or Photo at the operation panel.

- *If Text:* The machine uses Text 1 (Sharp), unless a serviceperson has changed the mode to Text 2 (Dropout).
- *If Photo:* The machine uses the photo mode selected by User Parameter switch 10 bit 7 (where "0" selects Photo Normal and "1" selects Photo Smooth).

If the user is having a problem with text-mode quality, please try to resolve the problem by adjusting the settings for Text Mode 1. Do *not* try to solve the problem by changing the mode to Text Mode 2. Text Mode 2 is designed for very specific uses only (for machines that are almost exclusively used to send preprinted forms with unneeded background color), and is rarely appropriate outside of Japan.

The text mode used by the machine is determined by the value of SRAM address 410D48h. To change the text mode, you must use SP7-955 (☛ 5-1-12) to manually change the value at this address. To change to Text Mode 2 (Dropout), write 0Ah into this address. To change back to Text Mode 1 (Sharp), write 07h into this address.

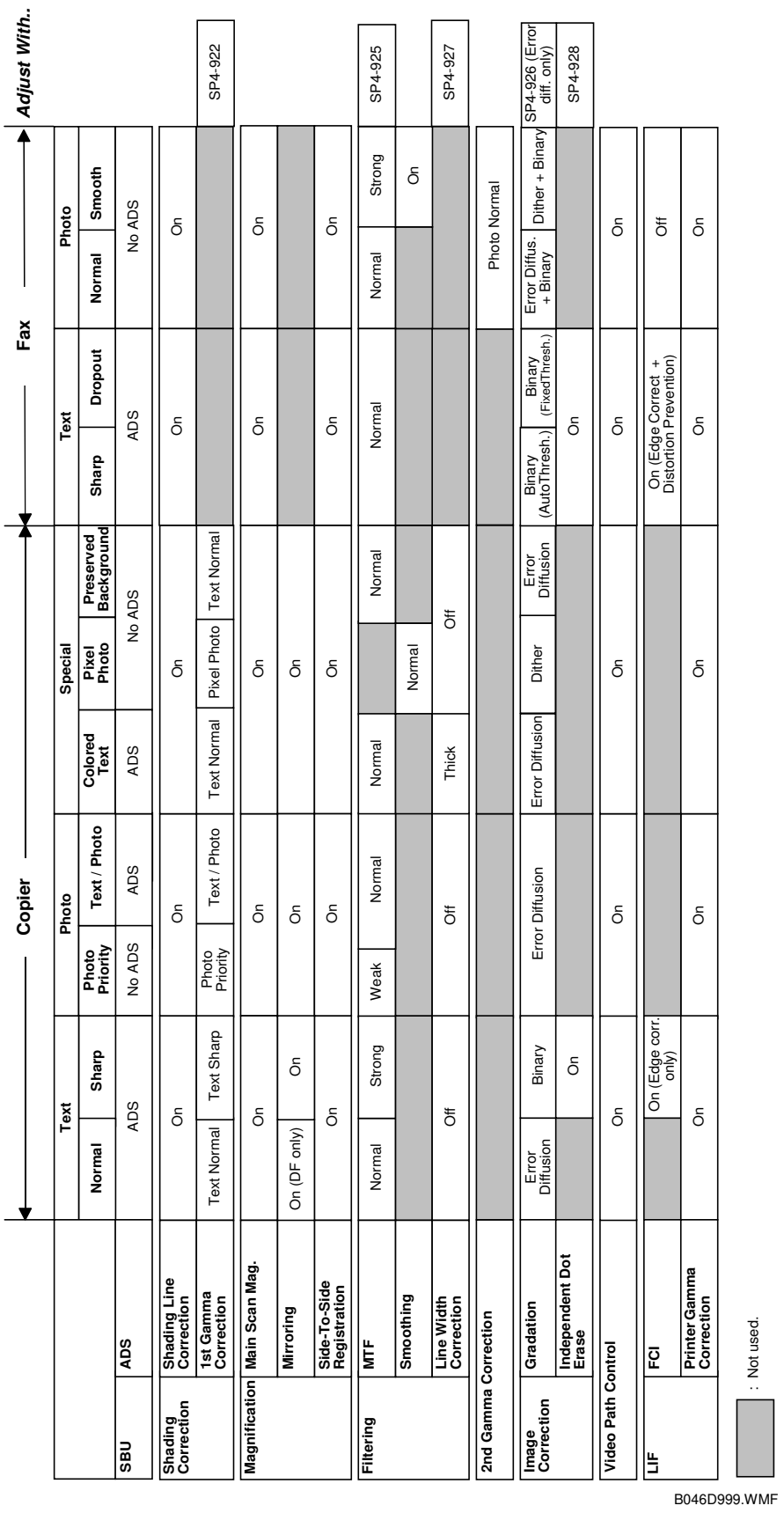
Original Modes: Copying

Original Type	Mode	Also Called	Intended For...
Text	Text Mode 1	*Text Normal*	Normal text originals
	Text Mode 2	*Text Sharp*	For newspapers or other originals through which text on the rear side is moderately visible.
Photo	Photo Mode 1	*Photo Priority*	For photos, and for text/photo images that are primarily photographic.
	Photo Mode 2	*Text / Photo*	For images with both text and photos
Special	Special 1	*Colored Text*	For originals with colored text and lines
	Special 2	*Pixel Photos*	For photo images with visible dots, such as newspaper photos. (This mode employs dithering.)
	Special 3	*Preserved Background*	This mode disables automatic density adjustment. It is intended for text originals, in cases where the user wishes to retain the background. (For example, if embedded white area is causing the copier to eliminate background that the user wishes to retain.)

Original Modes: Fax

Original Type	Mode	Also Called	Intended For...
Text	Fax Text 1	*Text Sharp*	For newspapers or other originals through which text on the rear side is moderately visible.
	Fax Text 2	*Dropout*	Stronger removal of dropout colors.
Photo	Fax Photo 1	*Photo Smooth*	Photos with visible pixels (newspaper photos, etc.)
	Fax Photo 2	*Photo Normal*	Normal photos

6.8.4 IMAGE PROCESSING STEPS FOR EACH MODE



Detailed Descriptions

6.8.5 MODE ADJUSTMENTS

As a service person, you can use SPs 4-922 to 4-966 to further customize each of these original modes to meet specific user requirements. If the user is experiencing a problem with copy or fax quality, however, SP-based adjustment should be the last step. Always proceed as follows:

1. First, try changing the density notch setting.

   If that doesn't resolve the problem, then...

2. Try selecting a different original mode.

   If that also doesn't resolve the problem, then...

3. Try customizing the relevant original mode with SPs.

To customize...

First use SP4-921 to select the original mode that you wish to customize. Then enter the relevant customizations using SP4-922 to SP4-966. Refer to Section 5 for general information about the adjustments you can make .

Note the following points:

- All SP settings are relative to the selected original mode. If you set the SP value to "0", the machine will use the default processing for that mode.
- If you enter an SP customization setting for an original mode that does not support that customization, the entry will have no meaning.

Default plotter customization settings for each mode...

The following table shows the default plotter customization settings for each original mode. For information about adjustments, refer to the SP explanations in Section 5.

Customization:		Plotter Mode	Marking-Image Density Correction	Marking-Image Density Setting	Spot (Lone) Dot Enhance	Toner Save Level	Smoothing
Adjust with:		SP4-961	SP4-962	SP4-963	SP4-964	SP4-965	SP4-966
Image Mode		Defaults					
Copy	Text Normal	No Correction	OFF	Normal	None[2]	Mask 1	OFF
	Text Sharp	FCI	OFF	Both[1]	None[2]	Mask 1	OFF
	Photo Priority	No Correction	OFF	Normal	None[2]	Mask 2	OFF
	Text/Photo	No Correction	OFF	Normal	None[2]	Mask 2	OFF
	Colored Text	No Correction	OFF	Normal	None[2]	Mask 1	OFF
	Pixel Photo	No Correction	OFF	Normal	None[2]	Mask 2	OFF
	Preserved Background	No Correction	OFF	Normal	None[2]	Mask 1	OFF
Fax	Text	FCI	OFF	Both[1]	Level 2[3]	Thin Lines	ON
	Photo	FCI	OFF	Light edge correction	Level 2[3]	Thin Lines	OFF
Printer	Text	FCI	OFF	Dense edge correction	Level 2[3]	Mask 3	ON
	Photo	FCI	OFF	Normal	Level 2[3]	Mask 3	OFF

[1]Both = Distortion prevention + edge correction

[2]For copy-mode patterns, SP4-964 adjustments operate as follows.

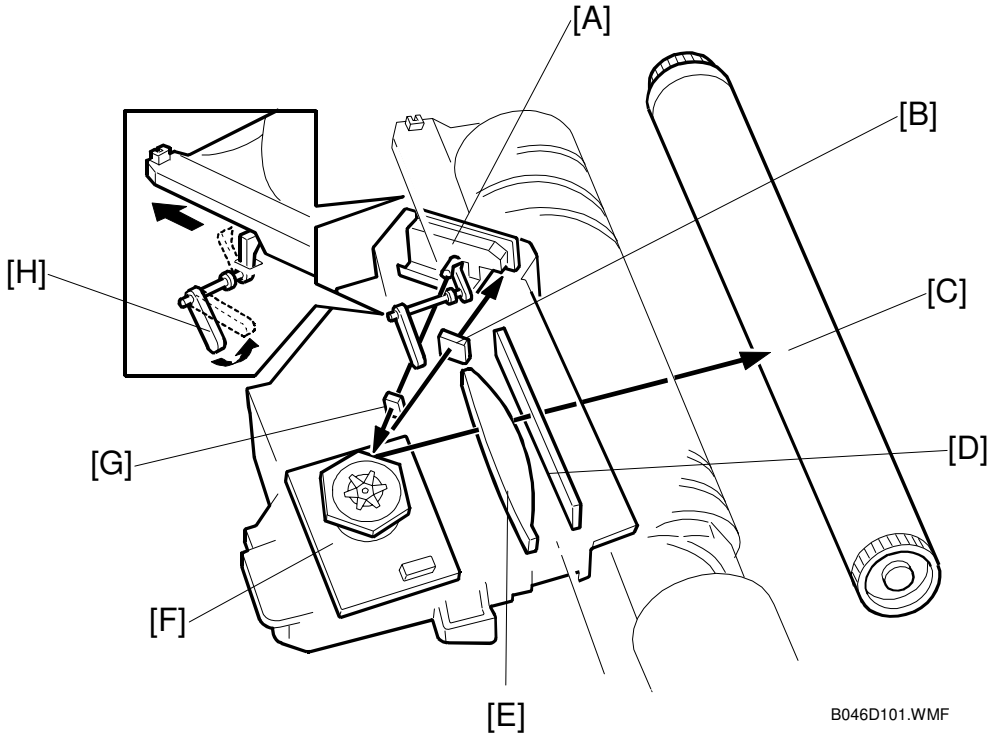
SP4-964 setting	Applied enhancement
-2	None
-1	None
0	None
+1	Level 1
+2	Level 2

[3]For printer and fax patterns, SP4-964 adjustments operate as follows.

SP4-964 setting	Applied enhancement
-2	None
-1	Level 1
0	Level 2
+1	Level 3
+2	Level 4

6.9 LASER EXPOSURE

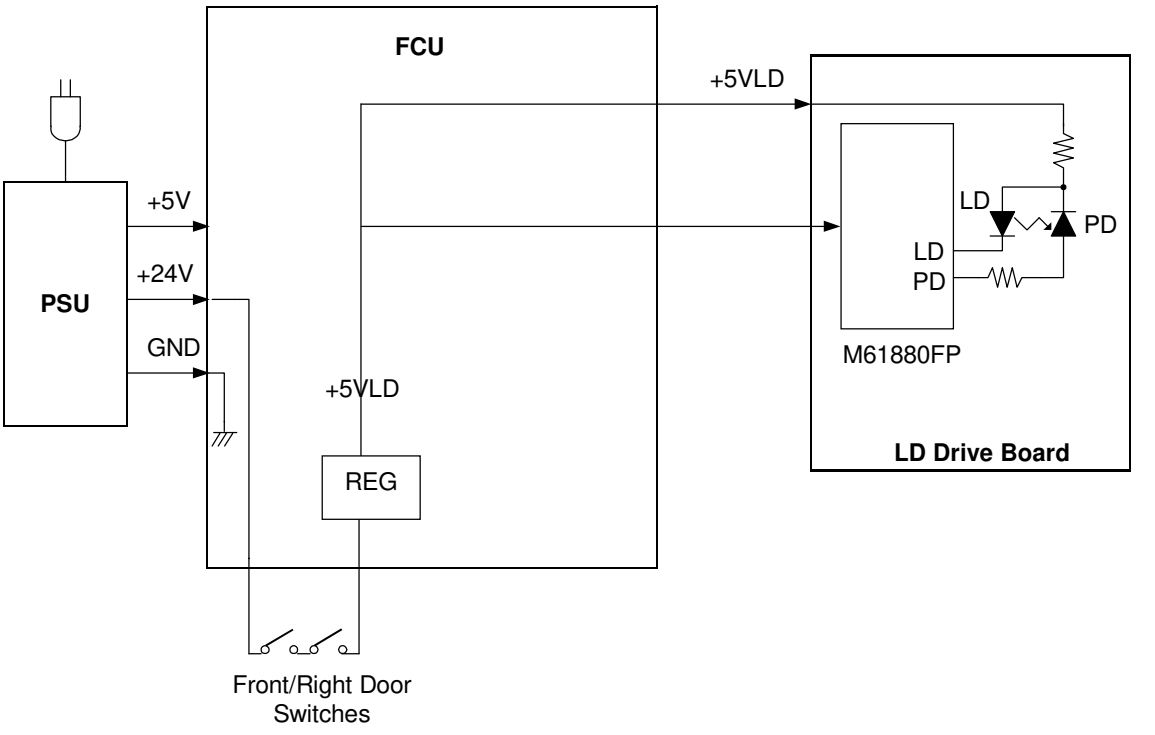
6.9.1 OVERVIEW



[A]: LD Unit
[B]: Synchronization Detector Lens
[C]: OPC Drum
[D]: Shield Glass
[E]: Toroidal Lens
[F]: Polygon Mirror Motor
[G]: Cylindrical Lens
[H]: LD Shutter

- The LD unit controls both the laser output and the laser synchronization mechanism.
- The machine cuts the power to the LD drive board when the front door or right door is opened.
- The LD shutter blocks the laser-beam path if the toner bottle holder or THM (toner hopper magazine) is unlatched.

6.9.2 LD SAFETY SWITCHES



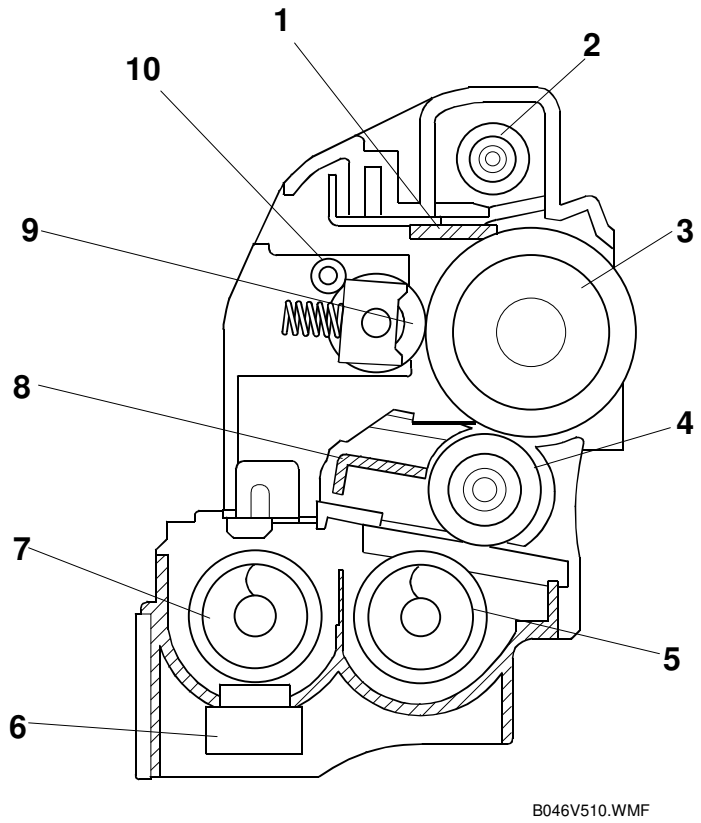
B046LDX.WMF

Safety switches are installed at the front and right doors to ensure technician and user safety and to prevent the laser beam from accidentally switching on during servicing. Opening of the front or right door opens the corresponding switch, cutting the power supply (+5VLD) to the laser diode.

The safety switches are installed on the +24V line coming from the power supply unit (PSU). The +24V supply must pass through these switches before converting into the +5VLD power that drives the laser.

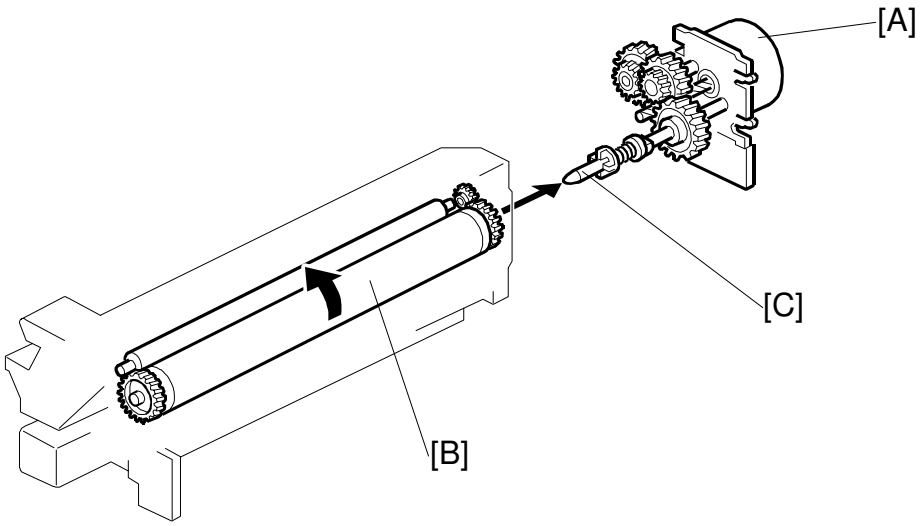
6.10 PHOTOCONDUCTOR UNIT (PCU)

6.10.1 OVERVIEW



1. Cleaning Blade
2. Toner Collection Coil
3. OPC Drum
4. Development roller
5. Mixing Auger 2
6. TD (toner density) Sensor
7. Mixing Auger 1
8. Doctor Blade
9. Charge Roller
10. Cleaning Roller

6.10.2 DRUM DRIVE

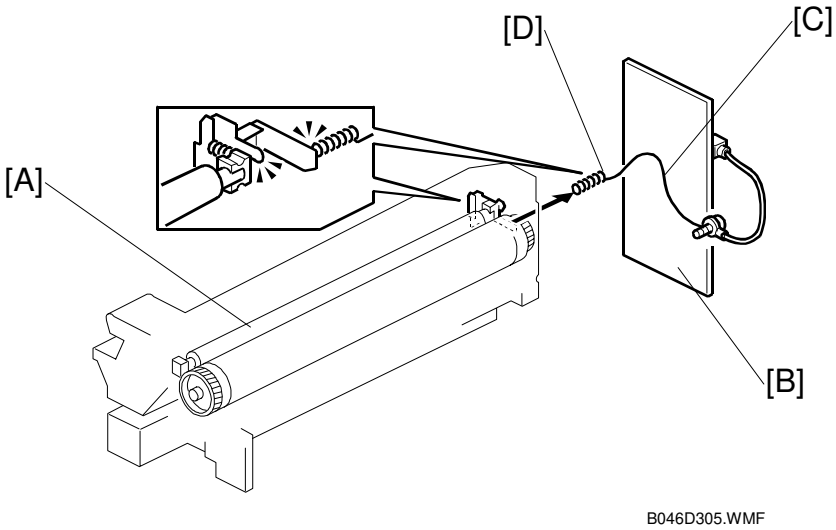


B046D303.WMF

The main motor [A] drives the drum [B] through a series of gears and the drum drive shaft [C].

6.11 DRUM CHARGE

6.11.1 OVERVIEW



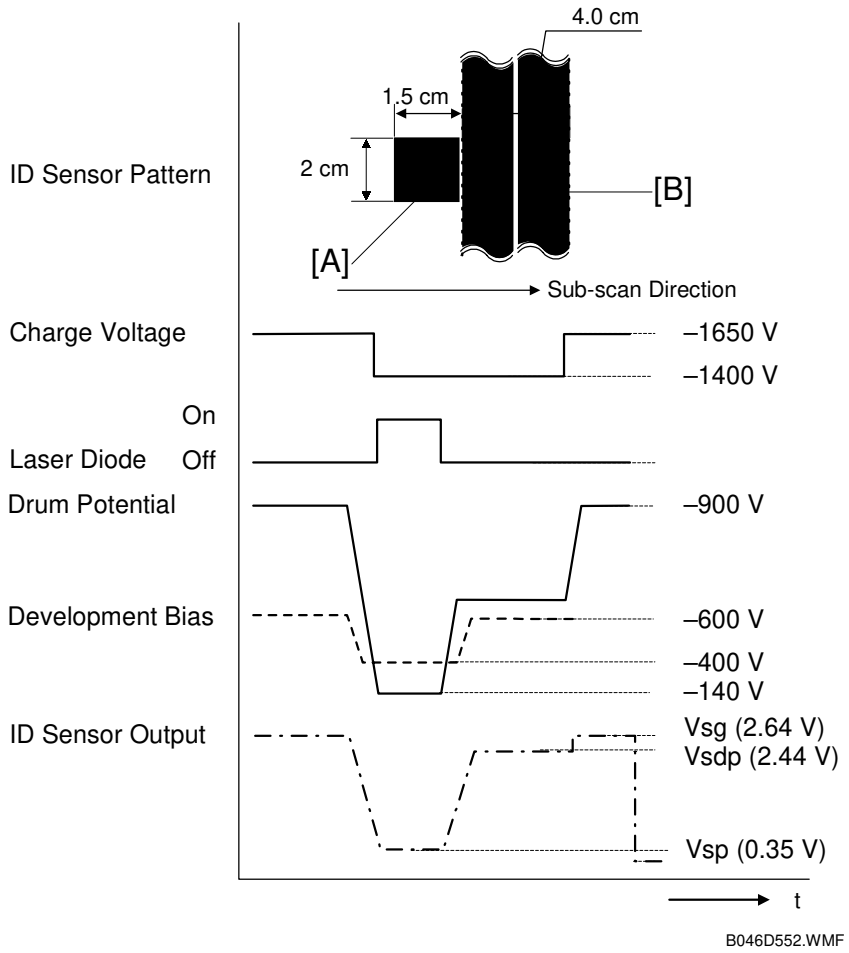
B046D305.WMF

The drum charge roller [A] remains in contact with the drum, producing a charge of –900 V on the drum surface.

The high voltage supply board [B] supplies a negative charge to the charge roller via wire [C] and spring [D]. The default base (uncorrected) charge is –1650V. You can adjust this base charge using SP2-001-1. The actual charge is corrected in accordance with the ambient environment, as described in the next section.

6.11.2 CHARGE ROLLER VOLTAGE CORRECTION

Correction for Ambient Environment



Efficiency of voltage transfer from the charge roller to the drum decreases as ambient temperature and humidity rise. Accordingly, the charge roller voltage must be made more negative at higher temperature and humidity.

When Correction is Made

- At initial warm-up (following power-on by main switch)
- During warm-up on exit from low-power or auto-off mode, if that mode has been in effect for at least 4 hours

NOTE: Correction can be disabled with SP2-927.

Detailed Descriptions

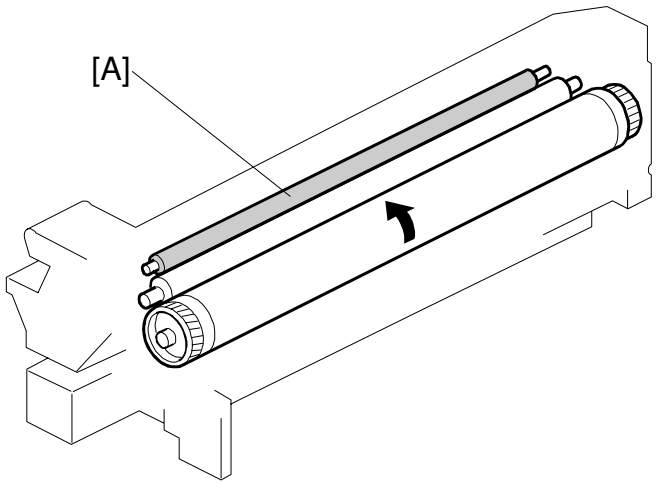
How Correction is Made

Immediately after creating the ID sensor pattern [A] used for toner density control (☛ 6.12.4), the machine generates another pattern [B] for charge voltage correction by intensifying the development bias (☛ 6.12.2) to –600 V. The laser remains off, but a small amount of toner moves to the drum because of the slight charge difference between the drum and development roller. The ID measures the pattern's density (Vsdp) and the bare drum voltage (Vsg); the FCU compares the difference and adjusts the roller voltage accordingly.

- If Vsdp/Vsg > 0.95: Change charge roller voltage by +50 V (less negative).
- If Vsdp/Vsg < 0.90 = Change charge roller voltage by –50 V (more negative).

NOTE: The current ID sensor readings can be viewed using SP2-221.

6.11.3 CHARGE ROLLER CLEANING



B046D304.WMF

A cleaning roller [A] removes toner and debris that the roller picks up from the drum.

6.11.4 DETECTION OF A NEW PCU

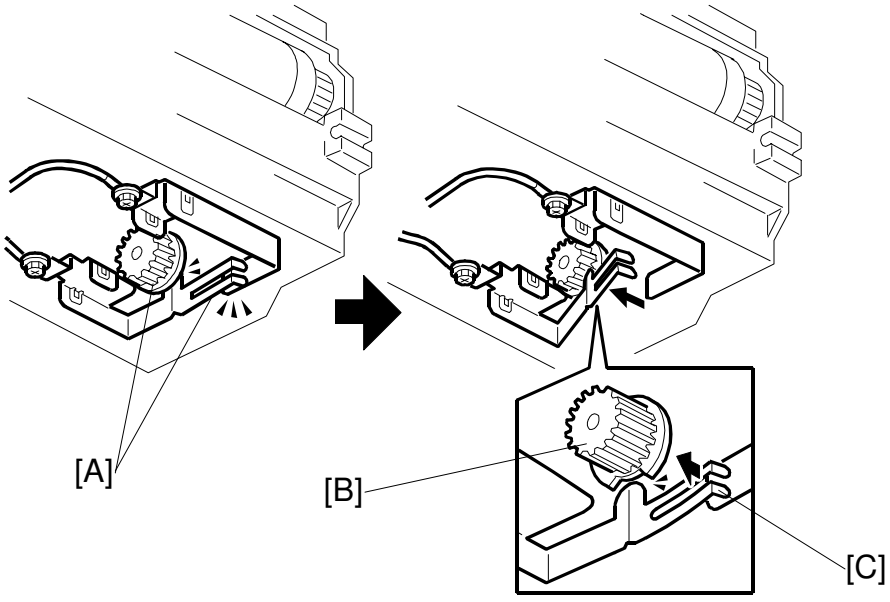
Before starting to use a new PCU, the machine must (a) agitate the toner/developer mix, (b) initialize the TD sensor, and (c) initialize the PCU counter. This machine automatically detects the presence of a new PCU and carries out these operations.

At time of copier installation

The first time the machine is turned on following installation, a factory-set flag informs the machine that the PCU has not yet been initialized. The machine carries out the necessary initialization automatically.

When a replacement PCU is installed

Replacement PCUs have a special mechanism that trips when they first start, informing the machine that a new PCU has been installed. (Preinstalled PCUs do not include this mechanism, and have two empty pins in their connector.)

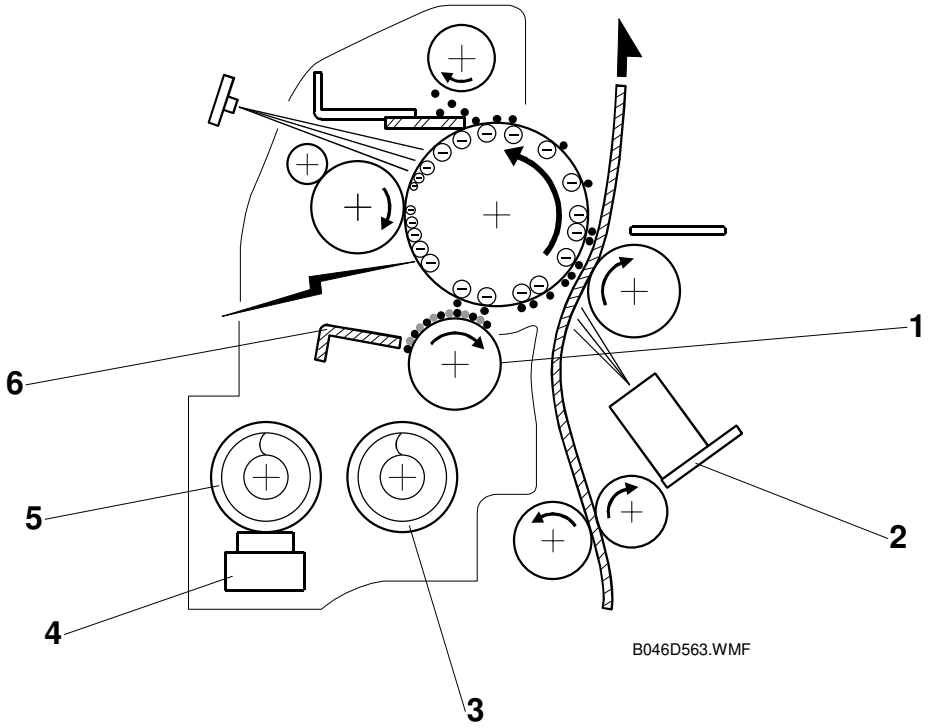


B046D301.WMF

Replacement PCU ships in state [A]. Slight rotation of PCU gear [B] at power-on releases plate [C], breaking the circuit and informing the FCU that the new PCU is a replacement unit.

6.12 DEVELOPMENT

6.12.1 OVERVIEW

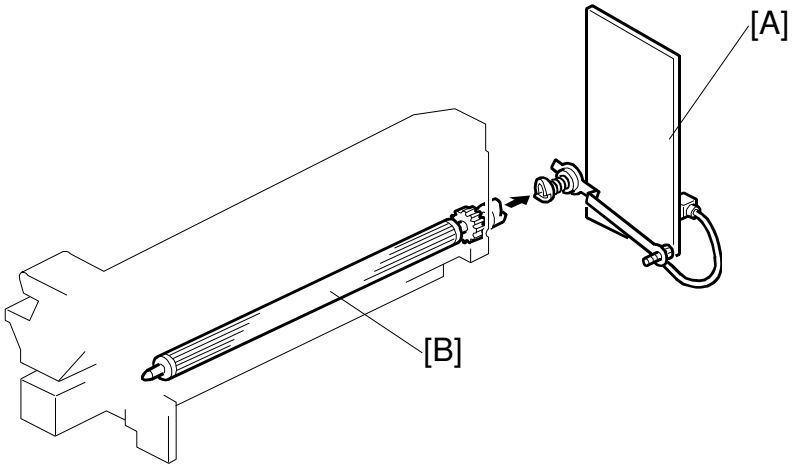


The development section consists of the following parts.

1. Development Roller
2. ID Sensor
3. Mixing Auger 2
4. TD Sensor
5. Mixing Auger 1
6. Doctor Blade

The two mixing augers mix the developer (carrier/toner mix). The TD (toner density) sensor and the ID (image density) sensor are used to control the copy image density.

6.12.2 DEVELOPMENT BIAS



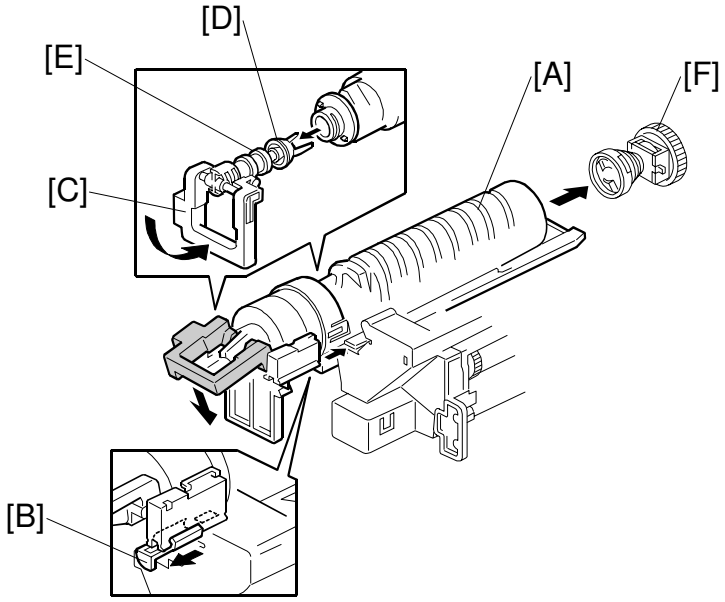
B046D309.WMF

Black areas of the latent image on the drum are at low negative charge (about -140 $\pm$ 50 V), with white areas at high negative charge (about –900 V).

To attract negatively charged toner to black areas, the high voltage supply board [A] applies a (default) bias of –600 V to the development roller [B]. The bias voltage can be adjusted with SP2-201-1.

6.12.3 TONER SUPPLY

Toner-Bottle Models (B044 and B046)



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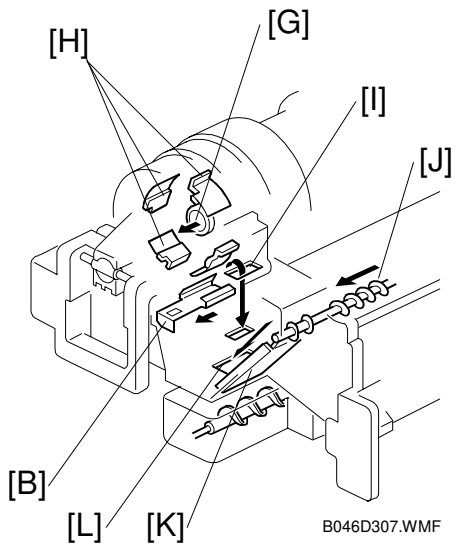

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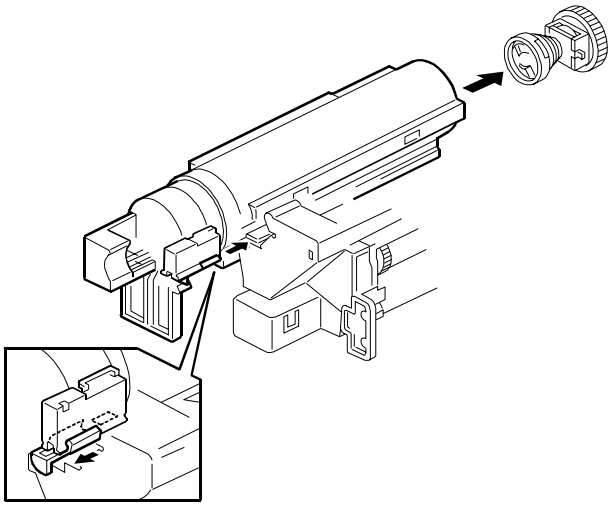
When toner bottle [A] is pushed in, shutter [B] is pushed open by the PCU body. Pressing in lever [C] pulls off toner bottle cap [D], which is held by chuck [E]. When clutch [F] turns the bottle, the spiral grooves push toner out at [G], and the turning Mylar blades [H] push this toner through slit [I] into the developing unit. Toner collection coil [J] simultaneously recycles toner retrieved from the OPC drum. The recycled toner slides down chute [K] and enters the developing unit through slit [L].

Toner Hopper Magazine (B045 and B049)

The magazine houses a grooved bottle similar to that shown above (except that it has no cap). The shuttering and rotation mechanisms are the same as on toner-bottle models (see above).



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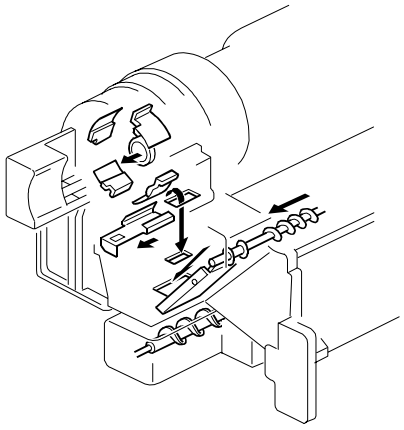

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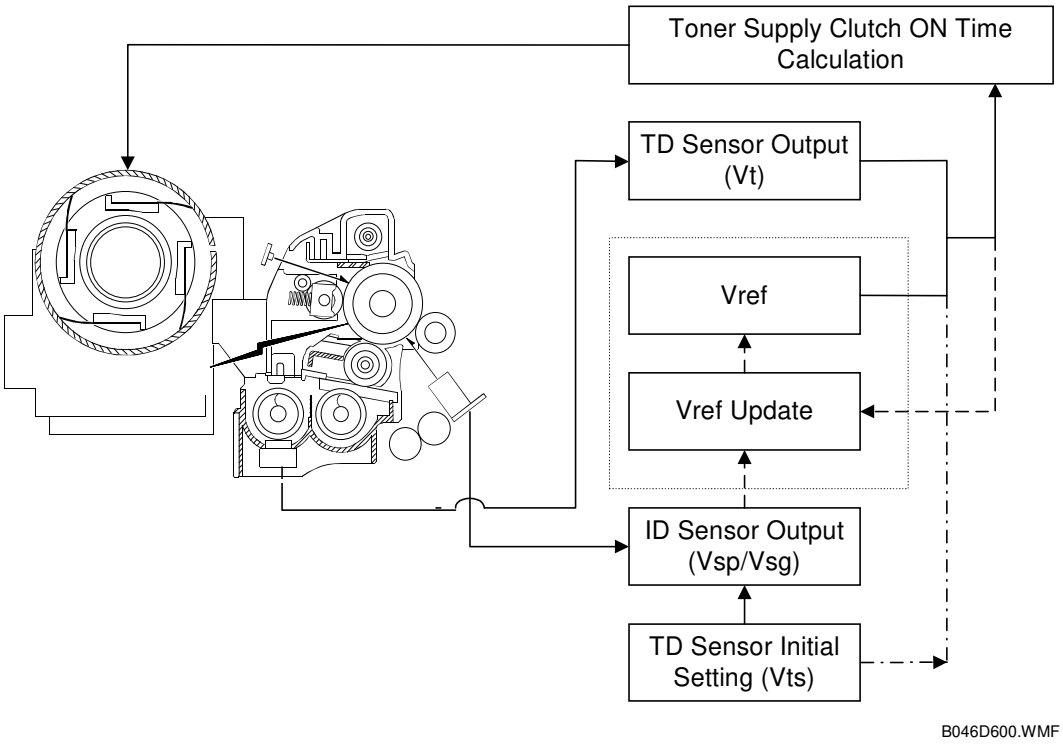
6.12.4 TONER DENSITY CONTROL

Overview

Toner concentration in the developer is controlled using the following values:

- Vts: TD sensor initial setting (1.25V). (Used as reference voltage when Vref is not available.)
- Vref: Toner supply reference voltage (calculated value; periodically updated)
- Vt: Actual output from TD sensor
- Vsg/Vsp: Values from ID sensor, where Vsp is the voltage of a test pattern (the "ID sensor pattern"), and Vsg is the voltage of the bare drum



Toner is added to the development unit if Vt is higher than the reference voltage.

Reference Voltage

Vts is used as the reference if the PCU has just been installed (since Vref has not yet been calculated) or if ID sensor correction has been disabled with SP2-927. In all other cases, Vref is used as the reference.

Toner Density Sensor Initial Setting

The Vts for this machine is 1.25 V. During TD sensor initialization (after installation of new PCU), the machine adjusts the sensor so that it reads out 1.25V.

Toner Concentration Measurement

The machines checks concentration every copy cycle, by comparing Vt against the reference voltage.

Vsp/Vsg Detection

An ID sensor pattern is made on the drum by the charge roller and laser diode. The ID sensor detects the pattern density (Vsp) and the density of the bare drum (Vsg).

Detection is carried out at the same time as (and immediately before) charge-roller voltage detection (☛ 6.11.2).

NOTE: Use of ID sensor control can be disabled with SP2-927.

Calculation of Vref

Vref is calculated based on:

- ID sensor output (Vsp/Vsg)
- Existing reference voltage (Vref or Vts) – Vt

Toner Supply Determination

The machine supplies toner if Vt exceeds the reference voltage.

NOTE: Current Vt and reference voltage values can be viewed using SP2-220. Other ID sensor values can be viewed using SP2-221.

Toner Clutch ON Time

Calculation is based on:

- Vt
- Reference voltage RV (= Vref or Vts)
- S (TD sensor's sensitivity coefficient)

Level	Decision	Motor On Time (seconds)
1	$RV < Vt \leq RV + S/16$	t
2	$RV + S/16 < Vt \leq RV + S/8$	$1.5t$
3	$RV + S/8 < Vt \leq RV + S/4$	$2t$
4	$RV + S/4 < Vt \leq RV + S/2$	$3t$
5	$RV + S/2 < Vt \leq RV + 4S/5$	$4t$
6	$RV + S > Vt \geq RV + 4S/5$	$5t$
7	$Vt \geq RV + S$	$6t$

NOTE: The default value for *t* is 0.6. The value can be changed using SP2-922.

6.12.5 TONER SUPPLY IF SENSOR READING IS ABNORMAL

ID Sensor

Any of the following is considered abnormal:

- Vsg ≤ 1.65 (when Vsg is read)
- Vsg < 2.31 (at maximum power)
- Vsp ≥ 1.65
- Vt ≥ 2.64 or Vt < 0.20

Current readings can be viewed using SP2-221.

TD Sensor

The reading is considered abnormal if TD < 0.20 V or TD > 2.64 V. Abnormal readings 10 times in succession will generate SC 390. The current reading can be viewed using SP2-220.

6.12.6 DETECTION OF TONER NEAR END AND TONER END

Toner Near End detected when either of the following occurs...

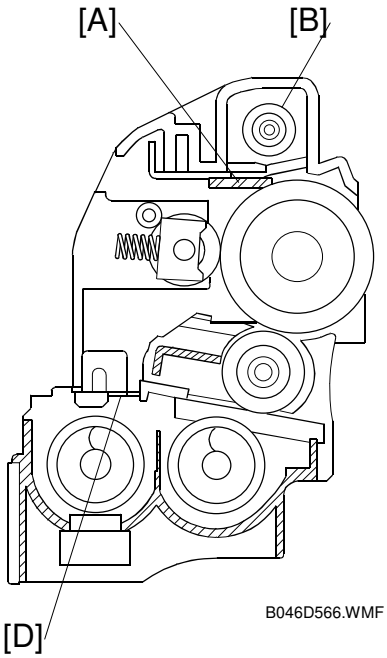
- Vt is at level 6 (see above table) five times in succession
- Vt > 1.85 five times in succession

Toner End detected when any of the following occurs....

- (Vt is ≥level 6 *and* Vt > 1.85) *n* time in succession, where *n* is 50 by default but can be changed to 20 using SP2-213. (Note that *n* corresponds to the number of sheets that can be printed before Toner Near End changes to Toner End.)
- Vt is at level 7 three times in succession.
- Vt > 2.00 three times in succession

6.13 DRUM CLEANING AND TONER RECYCLING

- Cleaning blade [A] scrapes remaining toner from the drum after image transfer. Toner piles up on the blade.
- Toner collect coil [B] transports toner from pile and drops it onto chute [C], where it slides down into the development unit through a slit located at [D].
- At the end of each copy job, the drum turns about 3 mm in reverse to help clear toner and other debris from the edge of the cleaner blade.



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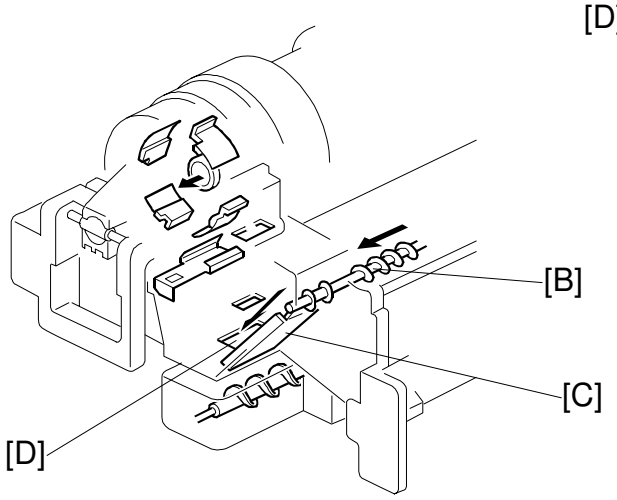

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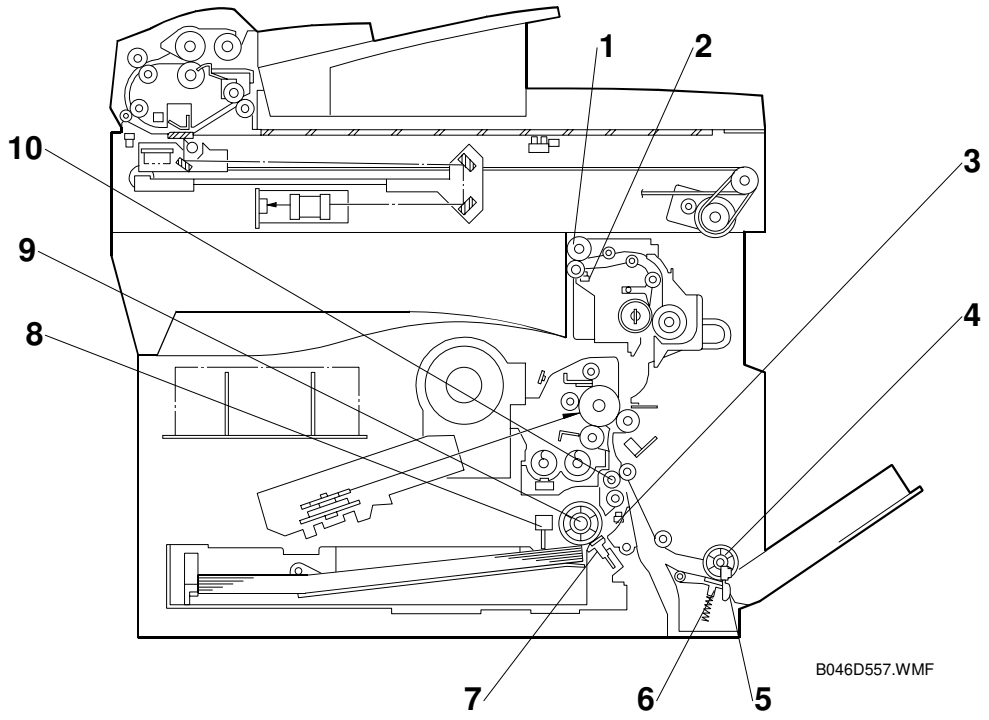
6.14 PAPER FEED

6.14.1 OVERVIEW



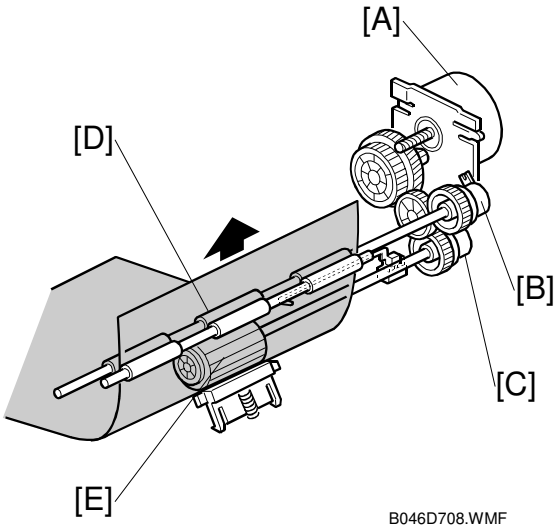
1. Exit Roller
2. Exit Sensor
3. Registration Sensor
4. Bypass Feed Roller*
5. Bypass Paper End Sensor*[1]
6. Bypass Friction Pad*[1]
7. (Main) Friction Pad
8. (Main) Paper End Sensor
9. Paper Feed Roller
10. Registration Roller

*1: Only on 100-sheet bypass machines (B044, B046).

6.14.2 PAPER FEED DRIVE MECHANISM

From Paper Tray

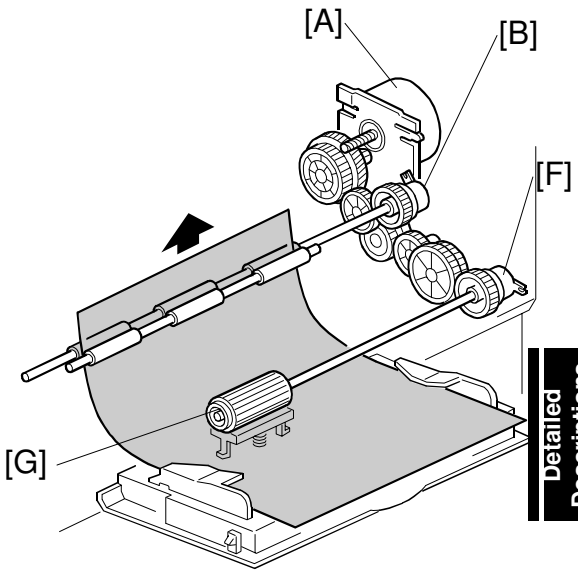
Main motor [A] drives gears on the registration clutch [B] and the paper feed clutch [C]. These clutches transfer drive to the registration roller [D] and paper feed roller [E]. The FCU controls clutch timing based on input from the registration sensor.



B046D708.WMF

From 100-Sheet Bypass Tray (B044, B046)

Main motor [A] drives gear on registration clutch [B] and bypass feed clutch [F]. The bypass feed clutch drives the bypass feed roller [G]. Again, the FCU controls clutch timing based on input from the registration sensor.



B046D709.WMF

From 1-Sheet Bypass Tray (B045, B049)

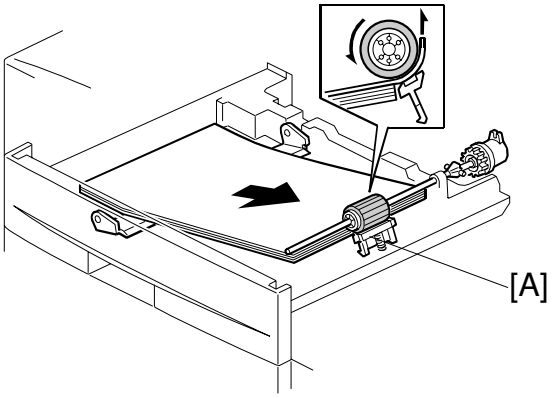
The user inserts the sheet directly up to the registration roller [D]. Main motor [A] drives the gear on registration clutch [B], causing the registration roller to turn and feed the sheet.

6.14.3 PAPER FEED AND SEPARATION

The machine uses a friction-pad feed system.

[A]: Friction pad (in paper tray)

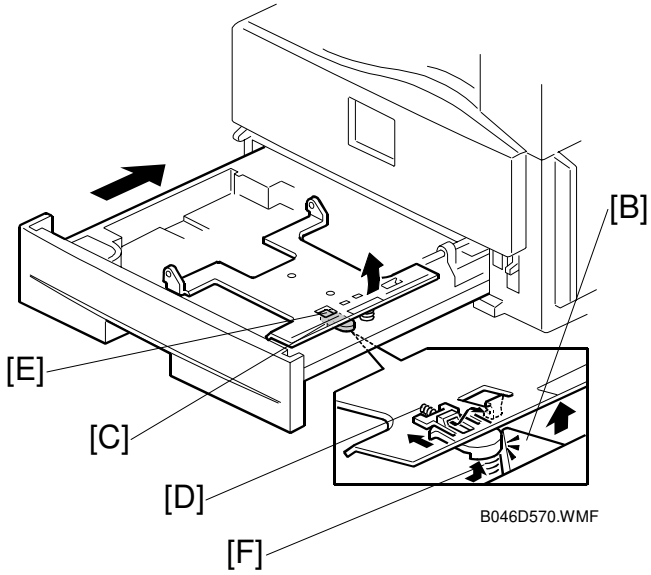
NOTE: On 100-sheet bypass models (B044 and B046), friction-pad separation is also provided for the bypass feed.



B046D569.WMF

6.14.4 PAPER LIFT MECHANISM

When tray is pushed in: Projection [B] on frame pushes rounded slider [C] in against spring [D], retracting the latch [E]. Spring [F] pushes the plate up.

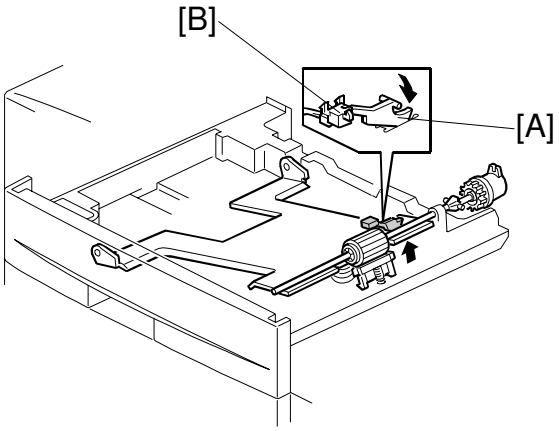


B046D570.WMF

PAPER END DETECTION

Main Tray

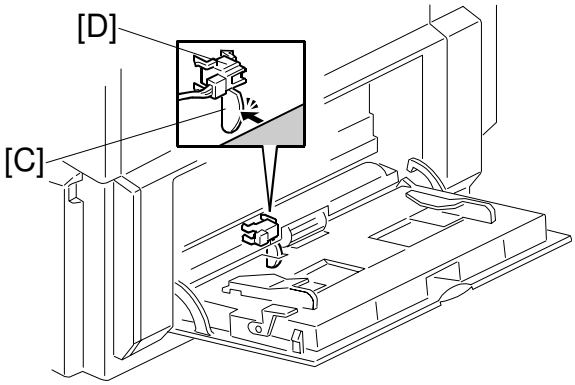
When paper runs out, feeler [A] drops into cutout, activating paper end sensor [B].



B046D571.WMF

100-Sheet Bypass Tray (B044, B046)

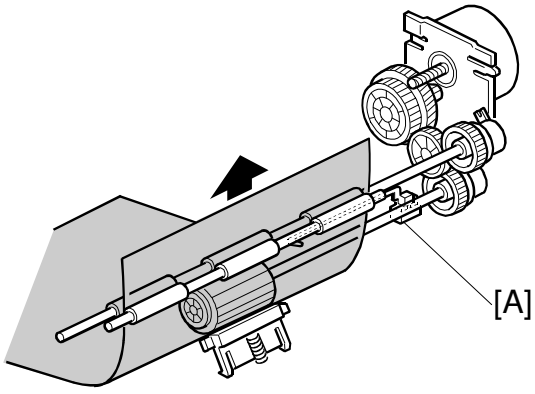
When paper runs out, feeler [C] drops into cutout, activating the bypass paper end sensor [D].



B046D710.WMF

6.14.5 PAPER REGISTRATION

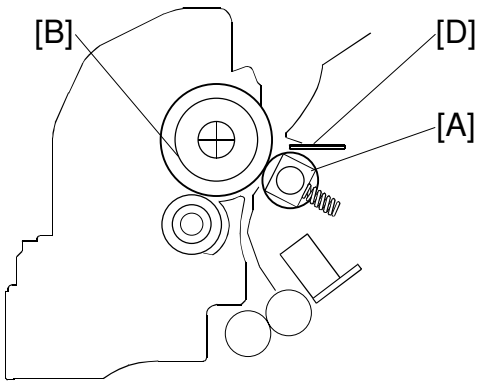
The FCU uses input from registration sensor [A] to control clutch timing and detect misfeeds. Registration clutch timing is controlled to eliminate skew (by stopping the paper briefly as it reaches the roller, so that it buckles). The amount of buckle can be adjusted with SP1-003.



B046D708.WMF

6.15 IMAGE TRANSFER AND PAPER SEPARATION

6.15.1 OVERVIEW



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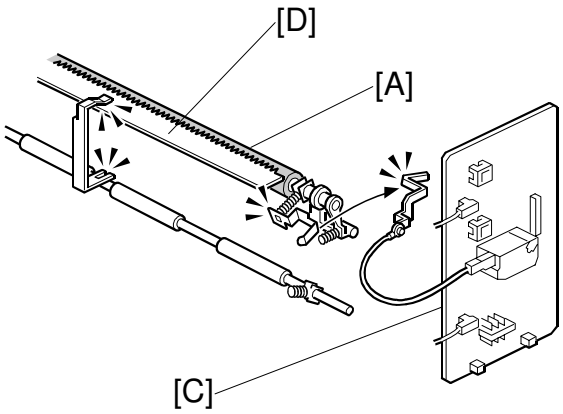

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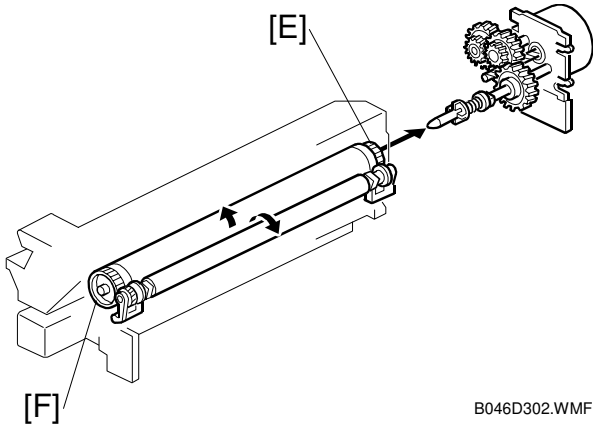


B046D302.WMF

The transfer roller [A] is pressed against the OPC drum [B]. The high-voltage power supply board [C] supplies a positive current to the transfer roller, attracting the toner from the drum onto the paper. The current is set in accordance with the paper's type, size, and feed tray.

Separation of the paper from the drum is aided by the drum's own curvature and by a high AC voltage applied to the discharge plate [D].

The drum drives the transfer roller directly by gears [E], [F].

6.15.2 IMAGE TRANSFER CURRENT TIMING

There are two current levels used during the transfer sequence: low and high.

1. At time of write-start signal, the high voltage supply board generates low current (5 A) to the roller. This prevents positive toner on the drum from moving to the roller.
2. After a certain time the high voltage supply board generates high current to the roller, causing toner to move from drum to paper. (See table below.)
3. After the sheet has passed the roller, current goes off (if printing is finished) or returns to low (if multicopy job with nonstop feed).

The table below shows the default high current levels. You can adjust these levels with SP2-301. But please note that setting the current too high can cause a ghosting effect (where the image at the top of the sheet repeats as a ghost lower down on the page) and in the worst case may damage the drum.

"High" Transfer Current (μA)

Paper Size	Main Tray / Optional Tray	Bypass		
		Normal	Thick	Special (OHP)
A4, LT	6	6	8	8
B5	—	8	6	—
A5	—	10	6	—
A6	—	12	6	—

6.15.3 TRANSFER ROLLER CLEANING

Toner may transfer to the roller surface following a paper jam or if the paper is smaller than the image. Periodic cleaning of the roller is required to prevent this toner from migrating back to the rear of new printouts.

The machine cleans the roller at the following times:

- After initial power on.
- After clearing of a copy jam
- At the end of a job, if at least 10 sheet have been printed since the last cleaning

The high voltage supply unit first supplies a negative cleaning current (about –4 μA) to the transfer roller, causing negatively charged toner on the roller to move back to the drum. It then applies a positive cleaning current (+5 μA) to the roller, causing any positively charged toner to migrate back to the drum.

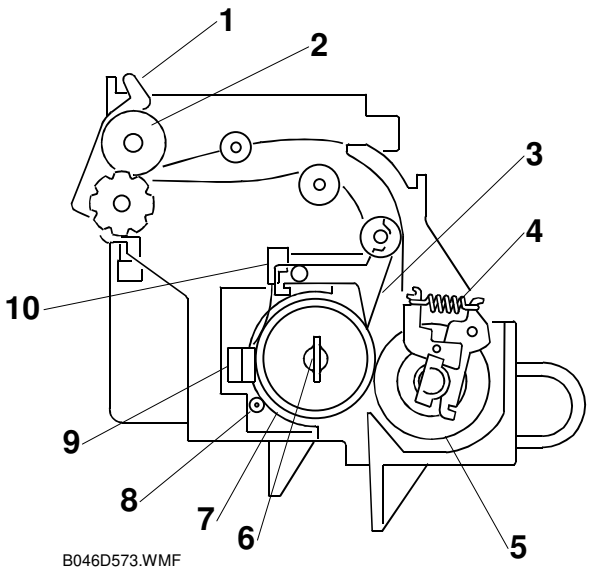
The cleaning current can be adjusted using SP2-301-4.

6.16 IMAGE FUSING AND PAPER EXIT

6.16.1 OVERVIEW

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

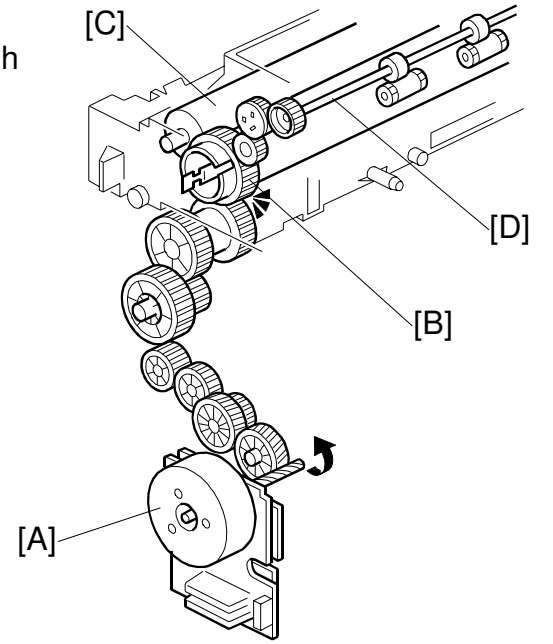
1. Exit sensor
2. Exit roller
3. Hot roller strippers
4. Pressure spring
5. Pressure roller
6. Fusing lamp
7. Hot roller
8. Thermofuse
9. Thermoswitch
10. Thermistor



B046D573.WMF

6.16.2 FUSING DRIVE AND RELEASE MECHANISM

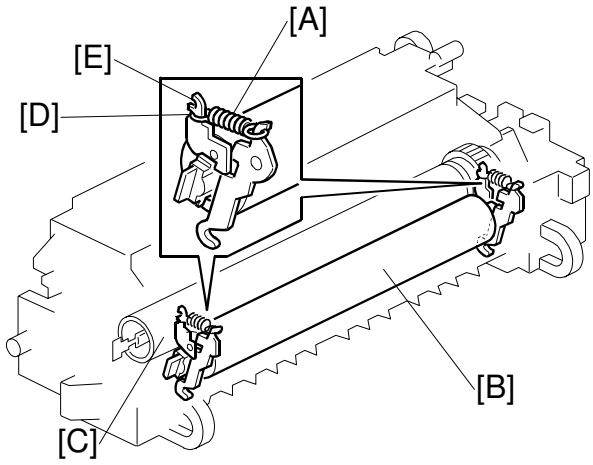
The main motor [A] drives the hot roller [B], pressure roller [C], and exit roller [D] through a gear train.



B046D504.WMF

6.16.3 PRESSURE ROLLER

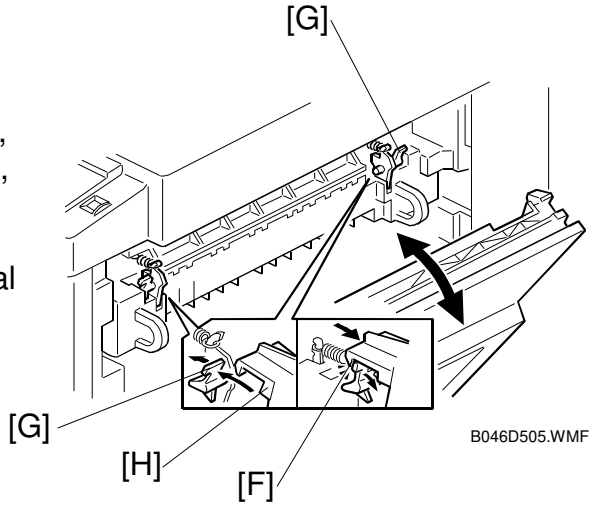
The pressure springs [A] constantly press the pressure roller [B] against the hot roller [C]. As the default, the springs are positioned at the end [D]. If necessary, pressure can be decreased by changing the springs to position [E].



B046D501.WMF

6.16.4 PRESSURE RELEASE

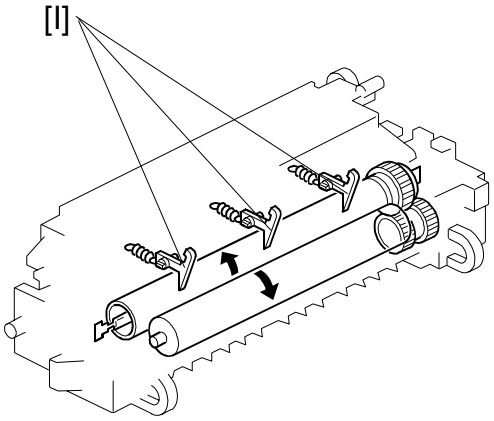
When right door opens, part [F] (on each side) pulls open catch [G] (on each side), releasing pressure on the pressure roller, so that it can turn freely to allow removal of jams. When right door closes, part [H] pushes catch [G] closed, restoring normal pressure.



B046D505.WMF

6.16.5 SEPARATION

The hot roller stripper pawls [I] prevent paper from sticking to the hot roller.

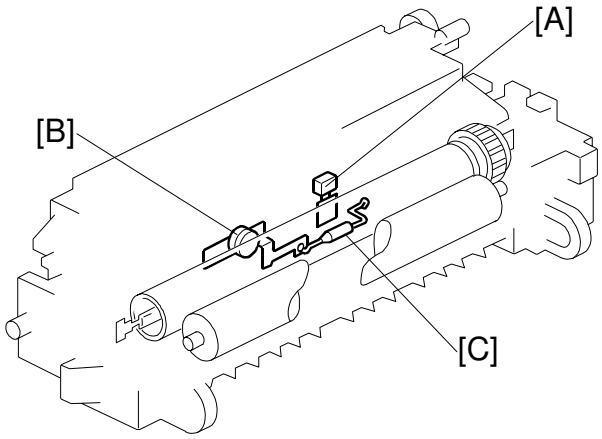


B046D503.WMF

6.16.6 FUSING TEMPERATURE CONTROL

Overview

[A]: Thermistor
[B]: Thermoswitch
[C]: Thermofuse



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The CPU checks the thermistor [A] output once per second, and calculates the power-on ratio for the next second based on (a) current temperature, (b) the temperature 1 second earlier, and (c) the target temperature.

The target fusing temperature drops somewhat over time, as the machine's overall state changes with continued use. For normal copying, the target starts at 180°C, then drops to 170°C after one minute.

Fusing Temperature Control for Thick Paper

Target temperature goes up 10°C if the user selects thick-paper mode.

6.16.7 OVERHEAT PROTECTION

Primary protection is provided by the thermistor and CPU, with backup by a thermoswitch and secondary backup by a thermofuse. (See illustration above.)

Protection 1: If the CPU determines from the thermistor that the hot roller has stayed above 230°C for more than 1 second, it cuts the power to the fusing lamp and issues SC543.

Protection 2: The thermoswitch (connected in series with the fusing lamp's common ground) opens if it reaches 190°C, cutting power to the lamp. If you restart the machine without correcting the problem, the machine will issue SC541.

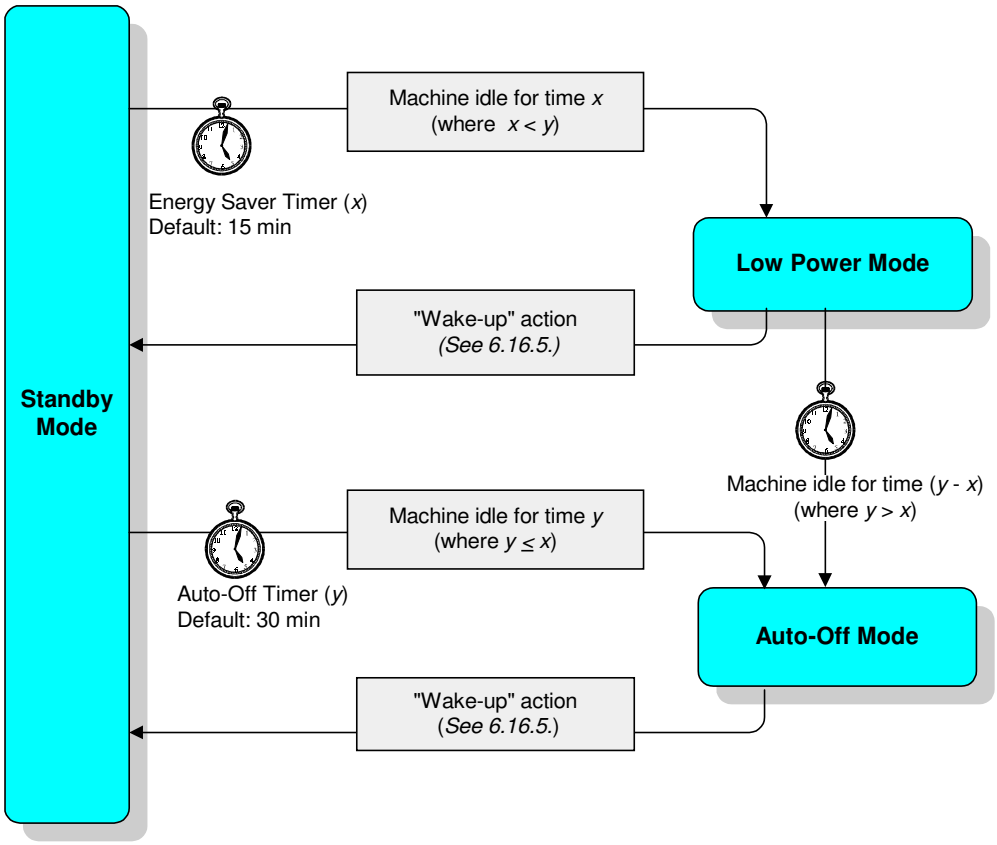
Protection 3: The thermofuse (which is farther from the lamp than the thermoswitch) opens at 131°C, cutting power to the lamp.

6.17 ENERGY SAVER MODES

6.17.1 MODE TRANSITIONS

When the machine is idle, the energy saver function reduces power consumption by lowering the fusing temperature. As shown below, the machine can be set to transition to two different reduced power states, in the following order:

1) Low power mode
2) Auto-off mode



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Above, if the Energy Saver Timer setting is *x* and the Auto Off Timer setting is *y*, then the following operation applies:

- If $x < y$: The machine moves into selected low-power mode if all sensors and components remain inactive for time *x*, then moves into auto-off mode if all sensors and components continue inactive for time *y-x*.
- If $x \geq y$: The machine skips low-power mode and moves directly into auto-off mode if all sensors and components remain inactive for time *y*.

Note that during countdown to *x* or *y*, the machine may automatically switch into the preferred application mode (copier/fax) in accordance with the User Tool's Function Priority and System Reset settings. This has no effect on the power-mode transition timing.

6.17.2 SYSTEM SETTINGS

The user sets up energy-saving operation using the following User Tool settings.

User Tool – System Setting	Operation
Energy Saver timer	Sets time at which machine moves from standby to the low-power mode. • The default is 15 minutes.
Energy Saver level	Selects the low-power mode that the system uses. The default is Level 2. (See below.)
Auto-Off Timer	Sets time at which machine transitions to auto-off mode. The default is 30 minutes.
AOF	Allows user to disable auto-off. The default setting is on (enabled). *See Note below*.

NOTE: If the customer requests that you disable auto-off, please inform the customer that disabling of this feature will void Energy Star conformance and is not recommended.

6.17.3 LOW POWER MODE LEVELS

The Energy Saver Level setting determines which power level is used when the machine enters Low Power mode.

Mode	Fusing Temp.	Approx. Recovery Time
Low Power—Level 1	165°C	5 s
Low Power—Level 2	90°C	10 s
Low Power—Level 3	Room Temp.	20 s

6.17.4 AUTO-OFF LEVEL

Identical to low power mode level 3.

6.17.5 TRANSITION OPERATION

On entry into low-power or auto-off:

- Main power LED stays ON, operation switch and all other indicators OFF.
- System +5V power remains on.

The machine returns to standby power mode when any of the following "wake-up" actions occurs:

- Pressing of operation switch
- Opening of platen cover
- Placing sheet in DF
- Wake-up signal from a PC
- Error or SC condition

SPECIFICATIONS

1. GENERAL SPECIFICATIONS

Configuration:	Desktop
Copy Process:	Dry electrostatic transfer system
Originals:	Sheet/Book
Original Size:	Maximum A4 / 8 1/2" x 11" A4 / 8 1/2" x 14" (ADF)
Copy Paper Size:	Maximum A4 SEF / 8 1/2" x 11" SEF (Copier's paper tray) A4 SEF / 8 1/2" x 14" SEF (Bypass) A4 SEF / 8 1/2" x 14" SEF (Optional paper tray) Minimum A5 LEF / 8 1/2" x 5 1/2" LEF (Copier's paper tray) A6 SEF/ 8 1/2" x 5 1/2" (Bypass) A4 SEF / 8 1/2" x 11" SEF (Optional paper tray unit) Custom sizes in the bypass tray: Width: 90 – 216 mm (3.5" – 8.5") Length: 140 – 356 mm (5.5" – 14.0")
Copy Paper Weight:	Copier's paper tray; optional paper tray: 60 – 90 g/m^2, 16 – 24 lb. Bypass: 60 – 157 g/m^2, 16 – 42 lb.
Reproduction Ratios:	2 enlargement and 3 reduction

	A4 Version	LT Version
Enlargement	200% 141%	155% 129%
Full Size	100%	100%
Reduction	93% 71% 50%	93% 78% 65%

Zoom:	50% to 200%, in 1% steps
Power Source:	120 V, 60 Hz or 220 – 240 V, 50/60 Hz

Spec.

Power Consumption:

Maximum	Not above 1 kW
Standby (mainframe only)	Approx. 90 W
Standby (with ADF, PTU)	Approx. 100 W
When printing	Approx. 480 W
Low Power Level 1	Not above 50W
Low Power Level 2	Note above 12W
Auto-Off	Not above 2 W

Noise Emission

Sound Power Level

Standby (Mainframe / Full system):	Not above 40 dB(A)
Operating (Mainframe only, non-impulse):	Not above 62 dB(A)
Operating (Full System):	Not above 66 dB(A)

Sound Pressure Level

Standby (Mainframe / Full system):	Not above 27 dB(A)
Operating (Mainframe only, non-impulse):	Not above 54 dB(A)
Operating (Full System):	Not above 54 dB(A)

Dimensions (W x D x H)

Without ADF: 468 x 450 x 371 mm (18.4" x 17.7" x 14.6")
With ADF: 468 x 450 x 461 mm (18.4" x 17.7" x 18.2")

Weight

Mainframe: Not above 20 kg (44.1 lb.)
With ADF: Not above 22 kg (48.5 lb.)

Resolution: 600 dpi

Copying Speed in Multicopy Mode (copies/minute):

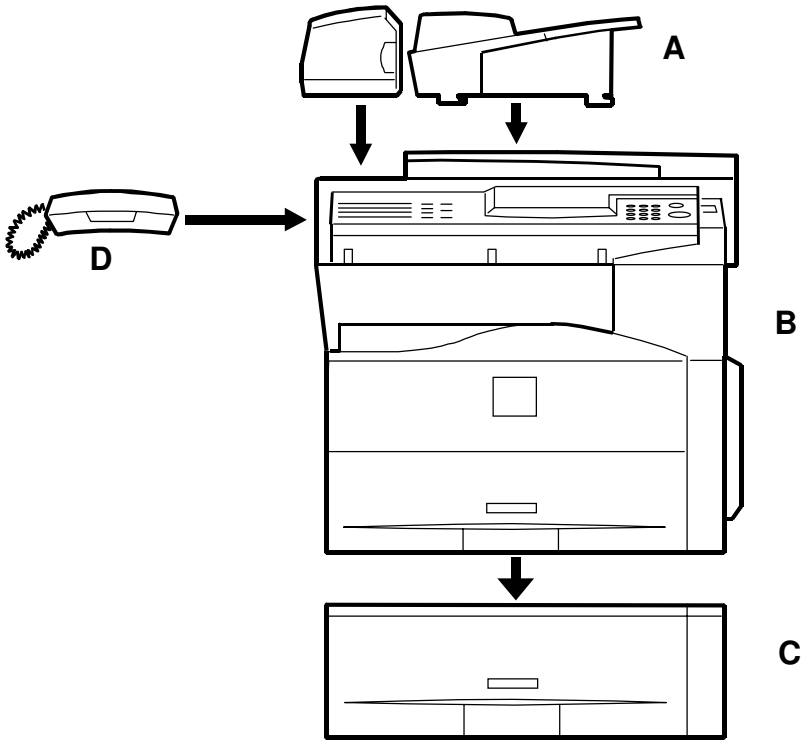
B044, B046:	13
B045, B049:	12

NOTE: Measurement Conditions:
1) A4 / 8 1/2" x 11"
2) 100% size

Warm-up Time:	Less than 20 seconds (at 20°C [68°F])
First Copy Time:	Not more than 8 seconds **NOTE:** Measurement Conditions 1) From the ready state, with the polygonal mirror motor spinning. 2) A4/LT copying 3) From copier's paper tray 4) 100% size
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.
Auto-Off:	Default is 30 minutes. Can be disabled or set from 1 to 240 minutes with user tools.

Copy Paper Capacity:	Paper Tray: 250 sheets Optional Paper Tray Unit (B044/B046): 500 sheets x 1 Bypass Tray: 100 sheets (B044/B046) 1 sheet (B045/B049)
Copy-Tray Capacity	250 sheets
Toner Replenishment:	
• B045/B049:	THM (Toner Hopper Magazine) replacement (260 g/ magazine)
• B044/B046:	Cartridge replacement (230 g/cartridge)
Toner Yield	
• B045/B049:	7k copies /THM (A4, 6% full black)
• B044/B046:	7k copies /toner bottle (A4, 6% full black)
Optional Equipment:	• Auto document feeder • Paper tray unit (available for B044, B046 only) • Anti-condensation heater for paper tray unit
Memory Capacity	8MB standard; 32MB DIMM as option

2. MACHINE CONFIGURATION



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Version	Item	Machine Code	Letter
Copier	Copier (100-sheet bypass, no fax, no ADF)	B044	B
	Copier (1-sheet bypass, no fax, no ADF)	B045	B
	Copier (100-sheet bypass, fax, ADF)	B046	B
	Copier (1-sheet bypass, fax, ADF)	B049	B
	ADF (option for B044/B045)	B444	A
	Paper Tray Unit (option for B044/B046)	B421	C
	32MB Memory (option)	G578	
	Anti-condensation heater for Paper Tray Unit	B421	
Fax Unit	Fax Controller (option for B044/B045)	B465	
	Handset (option)	B433	D
Printer	Printer Controller (option)	B441	
	NIB (option)	B430	
	32MB Memory (option)	G578	
	64MB Memory (option)	G579	
	128MB Memory (option)	G580	
	PS2 (option)	B431	

3. OPTIONAL EQUIPMENT

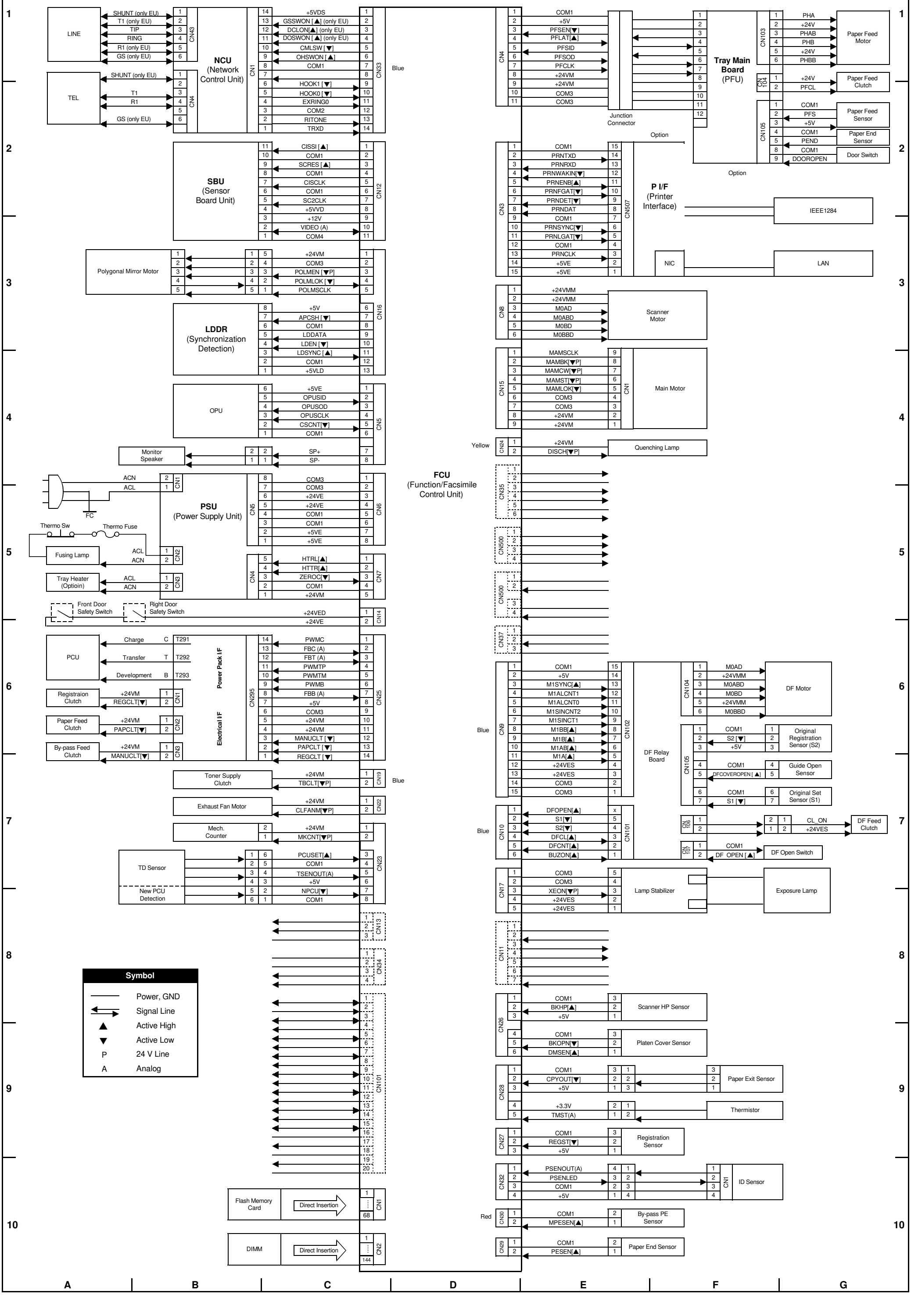
ADF

Original Size:	Standard sizes: A4 to A5; 8 1/2" x 14" to 8 1/2" x 5 1/2" Non-standard sizes: Max. width: 216 mm Min. width: 140 mm Max. length: 356 mm Min. length: 140 mm
Original Weight:	52 – 105 g/m^2 (14 – 28 lb.)
Table Capacity:	30 sheets (80 g/m^2, 21 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:	Not above 50 W when running Not above 1.2 W when standing by
Dimensions (W x D x H):	110 x 360 x 95 mm (4.3" x 14.2" x 3.7")
Weight:	2 kg (4.4 lb)

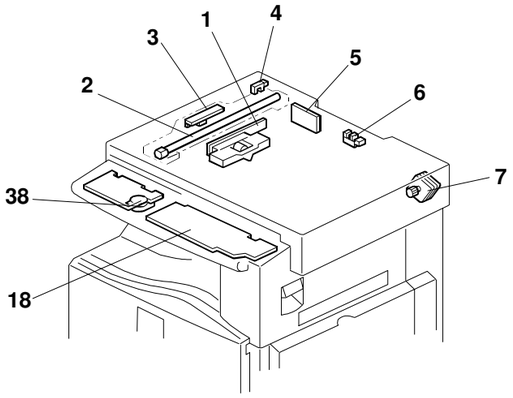
PAPER TRAY UNIT

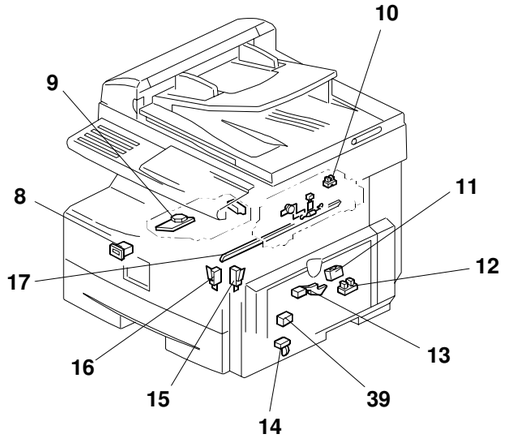
Paper Sizes:	A4 SEF, 8 1/2" x 11" SEF, 8 1/2" x 13" SEF, 8 1/2" x 14" SEF
Paper Weight:	60 – 90 g/m^2, 16 – 24 lb.
Tray Capacity:	500 sheets (80 g/m^2, 21 lb.) x 1 tray
Paper Feed System:	Feed roller and friction pad
Power Source:	24 Vdc and 5 Vdc, from copier. If optional tray heater is installed, the copier also supplies Vac (120 Vac or 220 – 240 Vac).
Power Consumption:	Maximum: 15 W (excluding optional tray heater) Average: 14 W (excluding optional tray heater)
Weight:	Not above 6 kg (13.2. lb.)
Size (W x D x H):	430 x 414 x 140 mm (16.9" x 16.3" x 5.5")

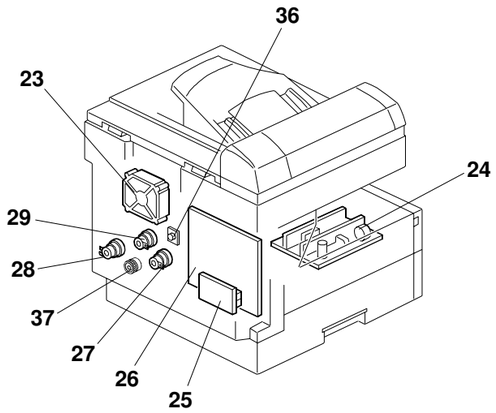
POINT TO POINT DIAGRAM MODEL: S-C1 (B044/B045/B046/B049)

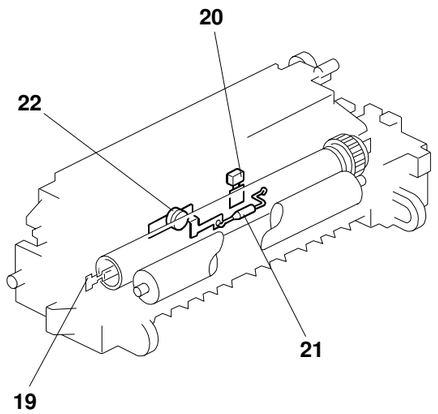


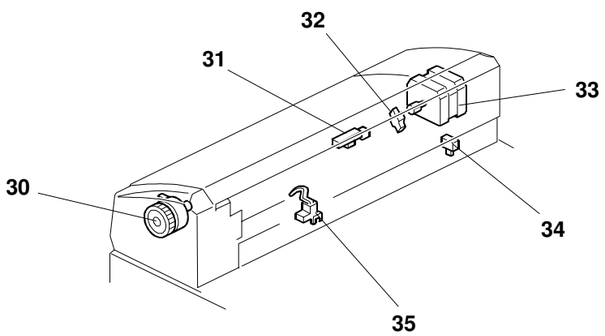
ELECTRICAL COMPONENT LAYOUT (B044/B045/B046/B049)







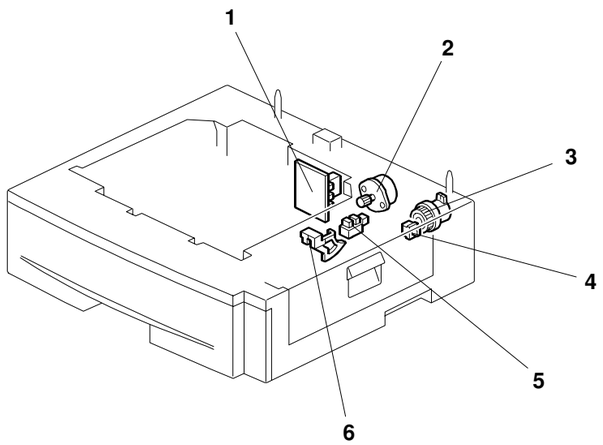




Description	Index No.	P to P
Sensors		
Scanner HP	4	E-8
Platen Cover	6	E-9
Paper Exit	10	F-9
ID (Image Density)	11	F-10
Registration	12	E-9
Paper End	13	E-10
Bypass Paper End	14	E-10
Original Registration	31	G-6
Guide Open	32	G-7
Original Set	35	G-7
TD (Toner Density)	39	B-7
Switches		
Right Door Safety	15	B-5
Front Door Safety	16	A-5
DF Open	34	G-7
PCBs		
SBU (Sensor Board Unit)	1	B-2
Lamp Stabilizer	3	E-7
DF Relay Board	5	E-7
OPU (Operation Panel Unit)	18	B-4
PSU	24	B-5
NCU	25	B-1
FCU	26	D-5

Description	Index No.	P to P
Lamps		
Exposure	2	G-8
Quenching	17	E-4
Fusing	19	A-5
Motors		
Scanner	7	E-3
Polygon Mirror	9	A-3
Exhaust Fan	23	B-7
DF	33	G-6
Main	36	F-4
Clutches		
Paper Feed	27	A-6
Bypass Feed	28	A-6
Registration	29	A-6
DF Feed	30	G-7
Toner Supply	37	B-7
Others		
Mechanical Counter	8	B-7
Thermistor	20	F-9
Thermo Fuse	21	A-5
Thermo Switch	22	A-5
Monitor Speaker	38	B-4

ELECTRICAL COMPONENT LAYOUT (B421)



Description	Index No.	P to P
Tray Main Board	1	F-1
Paper Feed Motor	2	G-1
Paper Feed Clutch	3	G-1
Door Switch	4	G-2
Paper Feed Sensor	5	G-2
Paper End Sensor	6	G-2