Model Founder ML 316/316D Machine Code: B282/B283

SERVICE MANUAL

Safety Notices

Prevention of Physical Injury

- 1. Before disassembling or assembling parts of the copier and peripherals, make sure that the power cord is unplugged.
- 2. The wall outlet should be near the copier and easily accessible.
- 3. Note that some components of the copier and the paper tray unit are supplied with electrical voltage even if the main power switch is turned off.
- 4. If a job has started before the copier completes the warm-up or initializing period, keep hands away from the mechanical and electrical components because the starts making copies as soon as the warm-up period is completed.
- 5. The inside and the metal parts of the fusing unit become extremely hot while the copier is operating. Be careful to avoid touching those components with your bare hands.

Health Safety Conditions

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

Observance of Electrical Safety Standards

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

Safety and Ecological Notes for Disposal

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

Laser Safety

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



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

MARNING FOR LASER UNIT

WARNING: Turn off the main switch before attempting any of the procedures in the Laser Unit section. Laser beams can seriously damage your eyes.

CAUTION MARKING:



Symbols and Abbreviations

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

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

In this manual, Model "ML 316" is called "B283" and Model "ML 316D" is called "B282".

TABLE OF CONTENTS

Safety Notices	1
△ Important Safety Notices	1
Laser Safety	2
Symbols and Abbreviations	3
1. Installation	
Installation Requirements	13
Environment	13
Machine Level	14
Minimum Space Requirements	14
Power Requirements	15
Copier Installation	16
Power Sockets for Peripherals	16
Accessory Check	16
Installation Procedure	17
Platen Cover Installation	22
Accessory Check	22
Installation Procedure	22
ARDF Installation	23
Accessory Check	23
Installation Procedure	24
ADF Installation	27
Accessory Check	27
Installation Procedure	28
Two-tray Paper Tray Unit Installation	31
Accessory Check	31
Installation Procedure	31
One-tray Paper Tray Unit Installation	36
Accessory Check	36
Installation Procedure	36
Anti-condensation Heater Installation	40
Tray Heaters	41
Tray Heater	41
Tray Heaters For The Optional Paper Feed Units	43

Optional Paper Tray Grip Handle – Main Copier	47
Optional Paper Tray Grip Handle – Optional Paper Tray Unit	49
2. Preventive Maintenance	
PM Tables	51
How to Reset the PM Counter	54
3. Replacement and Adjustment	
General Cautions	57
PCU (Photoconductor Unit)	57
Transfer Roller	57
Scanner Unit	57
Laser Unit	58
Fusing Unit	58
Paper Feed	58
Special Tools and Lubricants	59
Exterior Covers & Operation Panel	60
Rear Cover	60
Copy Tray	60
Upper Covers	61
Left Cover	62
Front Cover	62
Front Right Cover	63
Right Rear Cover	63
Right Door (Duplex Unit (B282))	64
By-pass Tray	65
Platen Cover Sensor	66
Scanner Unit	67
Exposure Glass/DF Exposure Glass	67
Lens Block	68
Lamp Stabilizer Board And Exposure Lamp	69
Scanner Motor	70
Scanner Home Position Sensor	71
Adjusting Scanner Positions	71
Laser Unit	76

Location Of Caution Decal	76
Toner Shield Glass	77
Laser Unit	77
LD Unit	78
Polygonal Mirror Motor	79
Laser Unit Alignment Adjustment	79
PCU Section	82
PCU	82
Pick-off Pawls and Toner Density Sensor	83
OPC Drum	84
Charge Roller and Cleaning Brush	85
Cleaning Blade	85
Developer	86
After Replacement or Adjustment	87
Toner Supply Motor	89
Paper Feed Section	90
Paper Feed Roller	90
Friction Pad	91
Paper End Sensor	91
Exit Sensor	92
By-Pass Feed Roller and Paper End Sensor	93
Registration Roller	94
By-Pass Paper Size Switch	95
Registration Clutch	96
Registration Sensor	97
Upper Paper Feed Clutch and By-Pass Feed Clutch	97
Relay Clutch	98
Relay Sensor	99
Paper Size Switch	99
Image Transfer	101
Image Transfer Roller	101
Image Density Sensor	102
Fusing	103

Fusing Unit	103
Thermistor	103
Fusing Lamps	104
Hot Roller Stripper Pawls	105
Hot Roller	105
Thermostat	106
Pressure Roller and Bushings	106
NIP Band Width Adjustment	107
Cleaning Roller	108
Duplex Unit (Duplex Model B282 Only)	109
Duplex Exit Sensor	109
Duplex Entrance Sensor	109
Duplex Inverter Sensor	110
Duplex Transport Motor	111
Duplex Inverter Motor	111
Duplex Control Board	112
Other Replacements	113
Quenching Lamp	113
High-Voltage Power Supply Board	113
BICU (Base-Engine Image Control Unit)	114
Main Motor	115
Rear Exhaust Fan (B282 Only)	115
Left Exhaust Fan	116
PSU (Power Supply Unit)	117
Gearbox	118
Copy Adjustments Printing/Scanning	121
Printing	121
Scanning	123
ADF Image Adjustment	125
4. Troubleshooting	
Service Call Conditions	127
Summary	127
SC Code Descriptions	127

Electrical Component Defects	137
Sensors	137
Switches	139
Fuses	140
LED Display	141
BICU	141
5. Service Tables	
Service Program Mode	143
How to Enter the SP Mode	143
SP Mode Tables	145
SP1-XXX (Feed)	145
SP2-XXX (Drum)	149
SP4-XXX (Scanner)	154
SP5-XXX (Mode)	160
SP6-XXX (Peripherals)	162
SP7-XXX (Data Log)	164
SP8-XXX (History)	169
SP9-XXX (Etc.)	173
Using SP Modes	174
Adjusting Registration and Magnification	174
ID Sensor Error Analysis (SP 2221)	176
Memory Clear	176
Input Check (SP 5803)	178
Output Check (SP 5804)	181
Serial Number Input (SP 5811)	183
Firmware Update Procedure	184
Test Pattern Print (SP 5902 1)	188
Paper Jam Counters (SP 7504)	190
SMC Print (SP 5990)	191
Original Jam History Display (SP 7508)	192
6. Detailed Section Descriptions	
Overview	
Component Layout	193

Paper Path	194
Drive Layout	195
Board Structure	196
Block Diagram	196
BICU (Base Engine and Image Control Unit)	197
SBU (Sensor Board Unit)	197
Copy Process Overview	198
Scanning	200
Overview	200
Scanner Drive	201
Image Processing	203
Overview	203
SBU (Sensor Board Unit)	204
IPU (Image Processing Unit)	205
Video Control Unit (VCU)	215
Laser Exposure	217
Overview	217
Auto Power Control (APC)	218
LD Safety Switch	219
Photoconductor Unit (PCU)	220
Overview	220
Drive	221
Drum Charge	222
Overview	222
Charge Roller Voltage Correction	223
ID Sensor Pattern Production Timing	224
Drum Charge Roller Cleaning	225
Development	226
Overview	226
Drive	227
Developer Mixing	228
Development Bias	228
Toner Supply	229

Toner Supply Mechanism	230
Toner Density Control	231
Toner Supply in Abnormal Sensor Conditions	235
Toner Near End/End Detection and Recovery	235
Drum Cleaning and Toner Recycling	237
Drum Cleaning	237
Toner Recycling	238
Paper Feed	239
Overview	239
Paper Feed Drive Mechanism	240
Paper Feed and Separation Mechanism	240
Paper Lift Mechanism	241
Paper End Detection	242
Paper Size Detection	242
Side Fences	244
Paper Registration	245
Image Transfer and Paper Separation	246
Overview	246
Image Transfer Current Timing	247
Transfer Roller Cleaning	248
Paper Separation Mechanism	249
Image Fusing and Paper Exit	250
Overview	250
Fusing Unit Drive and Release Mechanism	251
Fusing Entrance Guide Shift	253
Pressure Roller	253
Fusing Temperature Control	254
Overheat Protection	256
Duplex Unit	257
Overall	257
Drive Mechanism	258
Basic operation	258
Food In and Evit Machanism	261

Energy Saver Modes	262
Overview	262
Timers	263
Recovery	263
7. Specifications	
General Specifications	265
Supported Paper Sizes	269
Paper Feed and Exit	269
Machine Configuration	272
Optional Equipment	273
ARDF	273
ADF	273
One-Tray Paper Tray Unit	274
Two-Tray Paper Tray Unit	275

1. Installation

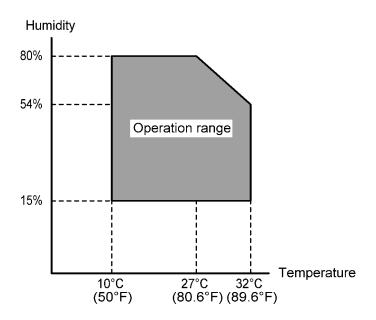
Installation Requirements

ACAUTION

- Before installing options, please do the following:
 - If there is a printer option in the machine, print out all data in the printer buffer.
 - Turn off the main switch and disconnect the power cord, the telephone line, and the network cable.

Environment

-Temperature and Humidity Chart-



Temperature Range:	10°C to 32°C (50°F to 89.6°F)
Humidity Range:	15% to 80% RH
Ambient Illumination:	Less than 1,500 lux (do not expose to direct sunlight)
Ventilation:	3 times/hr/person or more
Ambient Dust:	Less than 0.075 mg/m³ (2.0 x 10-6 oz/yd³)

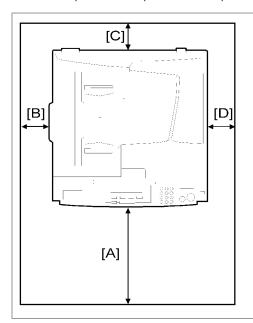
- 1
- Avoid areas exposed to sudden temperature changes:
 - 1) Areas directly exposed to cool air from an air conditioner.
 - 2) Areas directly exposed to heat from a heater.
- Do not place the machine in areas where it can get exposed to corrosive gases.
- Do not install the machine at any location over 2,000 m (6,500 ft.) above sea level.
- Place the machine on a strong and level base. (Inclination on any side should be no more than 5 mm.)
- Do not place the machine where it is subjected to strong vibrations.

Machine Level

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

Minimum Space Requirements

Place the copier near the power source, providing clearance as shown:



A (front): 750 mm (30")

B (left): 150 mm (6")

C (rear): 50 mm (2")

D (right): 250 mm (10")

The recommended 750 mm front space is sufficient to allow the paper tray to be pulled out. Additional front space is required to allow operators to stand at the front of the machine.

Power Requirements

ACAUTION

- 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.
- Avoid multi-wiring.
- Be sure to ground the machine

Input voltage:

China: 220 - 240 V, 50/60 Hz, 7 A

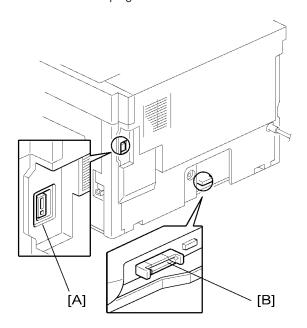
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Copier Installation

Power Sockets for Peripherals

ACAUTION

• Make sure to plug the cables into the correct sockets.



[A]: Socket for ADF/ARDF (Rated voltage output max. DC24 V)

[B]: Socket for paper tray unit (Rated voltage output max. DC24 V)

Accessory Check

Check that you have the accessories in this list.

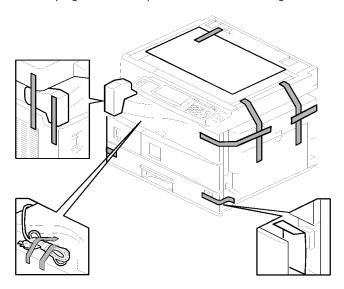
No.	Description	Q'ty
1	NECR-English / Multi-language	1
2	Operating Instructions-System (book)	1
3	Operating Instructions-Copy (book)	1
4	Operating Instructions –Printer/Scanner (CD-ROM)	1

No.	Description	Q'ty
5	Name/Tel -Sheet	1
6	Seal-Lifting Grip	1
7	Ferrite Core	1
8	Sheet-EULA	1
9	Seal-Caution	
10	Toner Bottle	
11	Developer	1

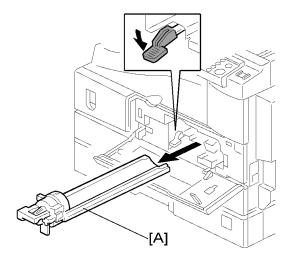
Installation Procedure

ACAUTION

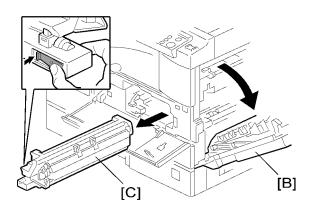
• Unplug the machine power cord before starting the following procedure.



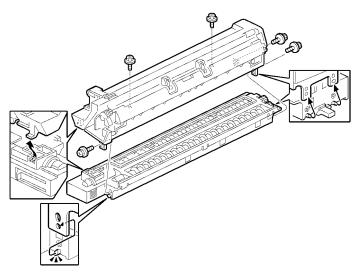
1. Remove filament tape and other padding.



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



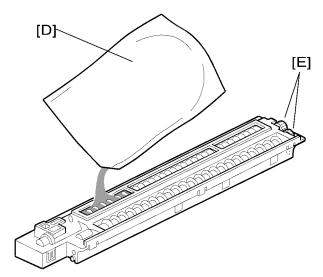
3. Open the right door [B], and remove the PCU (photoconductor unit) [C].



- 4. Separate the PCU into the upper part and the lower part ($\mathscr{F} \times 5$).
- 5. Put a sheet of paper on a level surface and place the upper part on it.



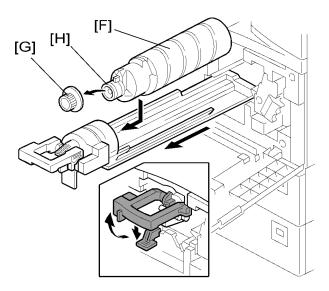
• This prevents foreign material from getting on the sleeve rollers



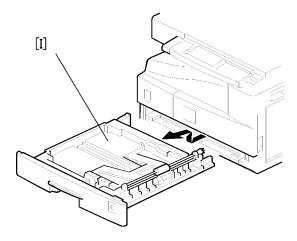
6. Distribute a pack of developer [D] to all openings equally.



- Do not spill the developer on the gears [E]. If you have spilled it, remove the developer by using a magnet or magnetized screwdriver.
- Do not turn the gear [E] too much. The developer may spill.



- 7. Reassemble the PCU and reinstall it.
- 8. Shake the toner bottle [F] several times. (Do not remove the bottle cap [G] before you shake the bottle.)
- 9. Remove the bottle cap [G] and install the bottle on the holder. (Do not touch the inner cap [H].)
- 10. Set the holder (with the toner bottle) in the machine.



11. Pull out the paper tray [I] and turn the paper size dial to the appropriate size. Adjust the positions of the end and side guides.



- To move the side guides, release the green lock on the rear side guide.
- 12. Install the optional ARDF, ADF, or platen cover.

- 13. Plug in the main power cord and turn on the main switch.
- 14. Activate the SP mode and execute "Devlpr Initialize" (SP 2214 1).
- 15. Wait until the message "Completed" shows (about 45 seconds).
- 16. Activate the User Tools and select the menu "Language."
- 17. Specify a language. This language is used for the operation panel.
- 18. Load the paper in the paper tray and make a full size copy, and make sure the side-to-side and leading edge registrations are correct.

Platen Cover Installation

Accessory Check

Check that you have the accessories indicated below.

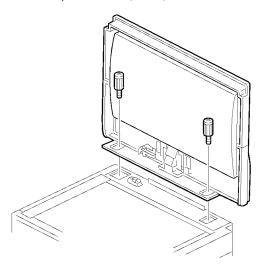
No.	Description	Q'ty
1	Stepped Screw	2

Installation Procedure

ACAUTION

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

Install the platen cover (x 2).

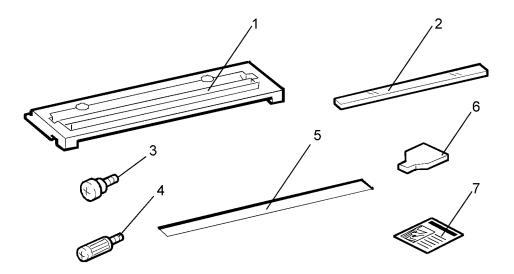


ARDF Installation

Accessory Check

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

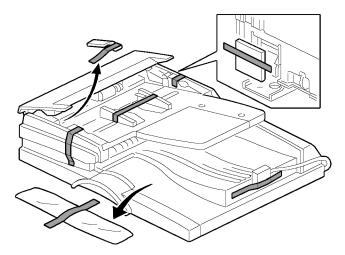
No.	Description	Q'ty
1	Scale Guide	1
2	DF Exposure Glass	1
3	Stud Screw	2
4	Knob Screw	2
5	Original Size Decal	2
6	Screwdriver Tool	1
7	Attention Decal—Top Cover	1
8	Stamp Cartridge	1
9	Installation Procedure	1



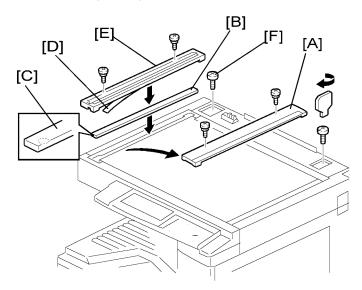
Installation Procedure

CAUTION

• Unplug the copier power cord before starting the following procedure.

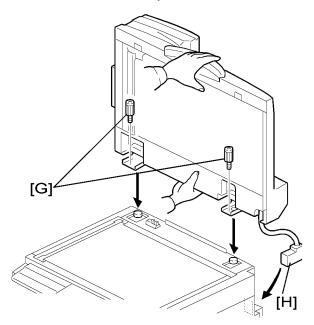


1. Remove the strips of tape.

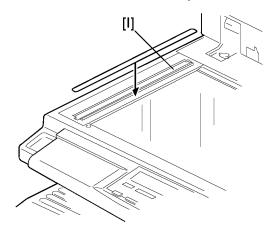


- 2. Remove the left scale [A] ($\widehat{\mathscr{F}}$ x 2).
- 3. Place the DF exposure glass [B] on the glass holder. Make sure that the white mark [C] is on the bottom at the front end.
- Peel off the backing [D] of the double-sided tape attached to the rear side of the scale guide [E], then install the scale guide (x 2 [removed in step 2]).

- 5. Install the two stud screws [F].
- 6. Mount the ARDF on the copier, and then slide it to the front.



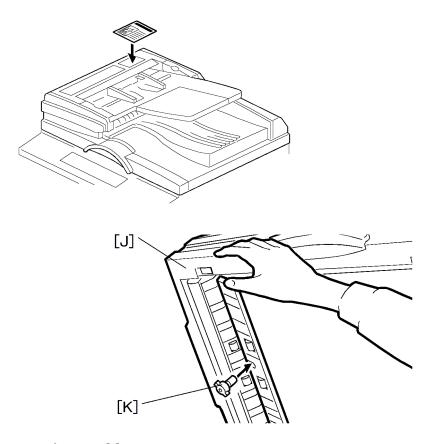
- 7. Secure the ARDF unit with the knob screws [G].
- 8. Connect the cable [H] to the copier.



- 9. Attach the appropriate original size decal [I] as shown.
- 10. Attach an attention decal to the top cover.



• The attention decals in the package are written in different languages.



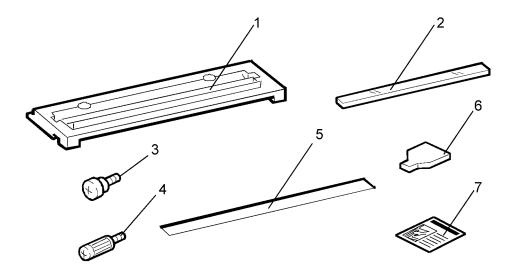
- 1. Open the ARDF [J].
- 2. Install the stamp cartridge [K] to the ARDF.
- 3. Make a full size copy, and check that the side-to-side and leading edge registrations are correct. If they are not, adjust the side-to-side and leading edge registrations. (*** ARDF Image Adjustment)

ADF Installation

Accessory Check

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

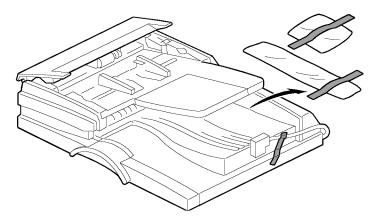
No.	Description	Q'ty
1	Scale Guide	1
2	DF Exposure Glass	1
3	Stud Screw	2
4	Fixing Screw	2
5	Original Size Decal	2
6	Screwdriver Tool	1
7	Attention Decal—Top Cover	1
8	Stamp Cartridge	1
9	Installation Procedure	1



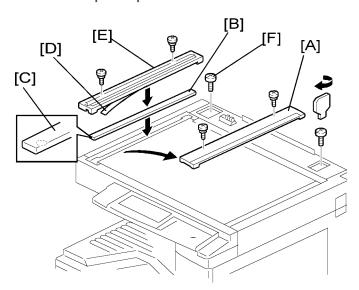
Installation Procedure

ACAUTION

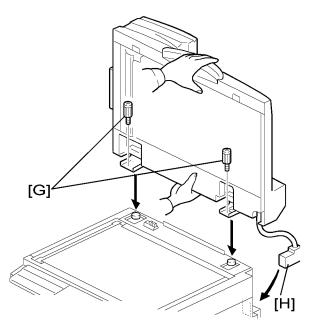
• Unplug the machine power cord before starting the following procedure.



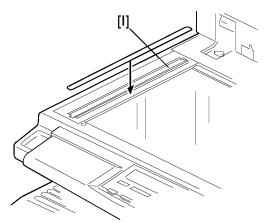
1. Remove the strips of tape.



- 2. Remove the left scale [A] (Fx 2).
- 3. Place the DF exposure glass [B] on the glass holder. Make sure that the white mark [C] is on the bottom at the front end.
- Peel off the backing [D] of the double-sided tape attached to the rear side of the scale guide
 [E], then install the scale guide (x 2 [removed in step 2]).
- 5. Install the two stud screws [F].
- 6. Mount the ADF on the copier, and then slide it to the front.



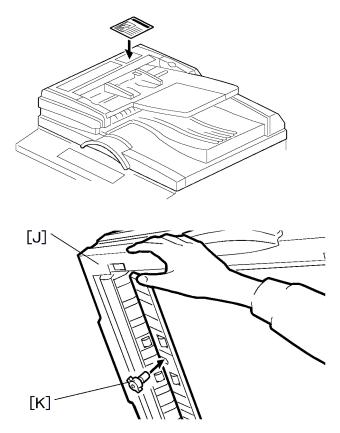
- 7. Secure the ADF unit with the fixing screws [G].
- 8. Connect the cable [H] to the copier.
- 9. Attach the appropriate scale decal [I] as shown.



10. Attach an attention decal to the top cover.



• The attention decals in the package are written in different languages.



- 11. Open the ADF [J].
- 12. Install the stamp cartridge [K] to the ADF
- 13. Turn the main power switch on. Then check if the document feeder works properly.
- 14. Make a full size copy, and check that the side-to-side and leading edge registrations are correct. If they are not, adjust the side-to-side and leading edge registrations. (ADF Image Adjustment)

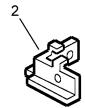
Two-tray Paper Tray Unit Installation

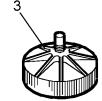
Accessory Check

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

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





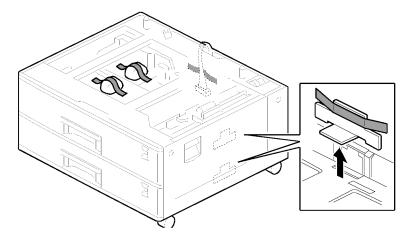




Installation Procedure

ACAUTION

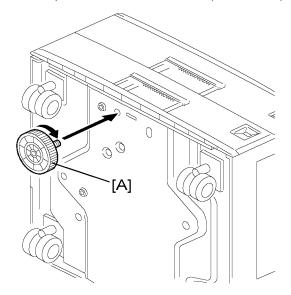
- If the optional printer unit is installed:
 - Print out all data in the printer buffer.
 - Disconnect the network cable.
 - Unplug the machine power cord before starting the following procedure.



1. Remove the strips of tape. Make sure that you have removed all the strips of tape and all the pieces of cardboard.



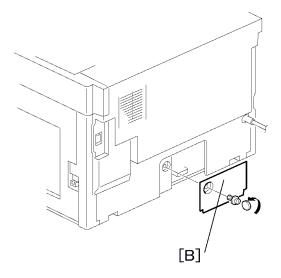
• After removing the tape that secures the peripheral components and cardboard to the paper tray, make sure that there is no tape and/or tape reside remaining on the tray.



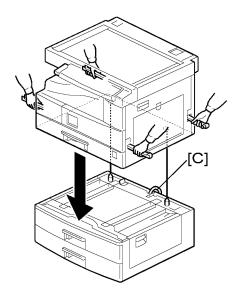
2. Attach the adjuster [A] to the base plate as shown.



• This step is not necessary if a cabinet is installed.



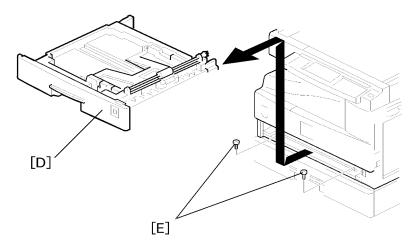
3. Remove the cover [B] (1 rivet).



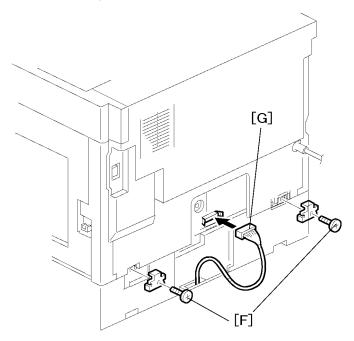
4. Set the copier on the paper tray unit.

ACAUTION

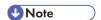
• Before placing the copier on the paper tray unit, make sure that the harness [C] is safe. The paper tray unit does not function properly if the harness is damaged.



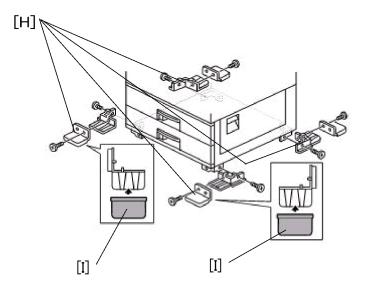
- 5. Remove the 1st tray cassette [D].
- 6. Install the two screws [E].
- 7. Reinstall the tray cassette.



- 8. Install the two brackets [F] (x 1 (each))
- 9. Connect the connecting harness [G] to the copier.



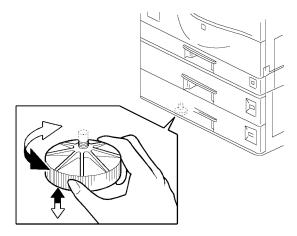
- There are cutouts for the plugs on both sides. The left side has one cutout, and the right side has two.
- 10. Reinstall the cover removed in step 3 (1 rivet).



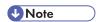
11. Install the four brackets with long supports [H] and covers [I] (2 screws each).



• These long supports prevent the unit from tipping over.



12. Rotate the adjuster (installed at step 2) to fix the machine in place.



- If a cabinet is installed, this step is unnecessary.
- 13. Load the paper in the paper trays and make full size copies from each tray. Check if the side-to-side and leading edge registrations are correct. If they are not, adjust the registrations (p.121)

Accessory Check

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

No.	Description	Q'ty
1	Screw - M4 x 10	2
2	Stepped Screw – M4 x 10	2
3	Unit Holder	2

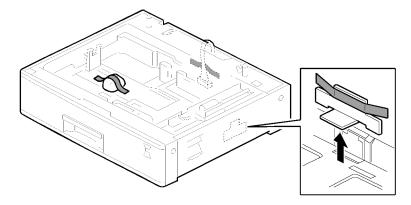




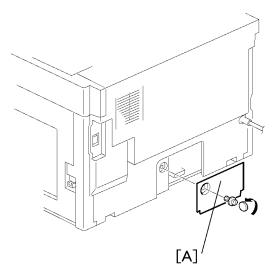
Installation Procedure

ACAUTION

- If the optional printer unit is installed:
 - Print out all data in the printer buffer.
 - Disconnect the network cable.
 - Unplug the machine power cord before starting the following procedure.



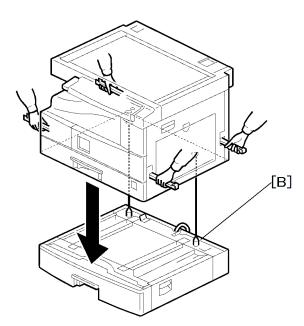
1. Remove the strips of tape. Make sure that you have removed all the strips of tape and all the pieces of cardboard.



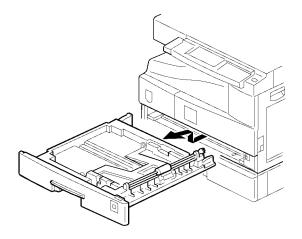
2. Remove the cover [A] (1 rivet).

ACAUTION

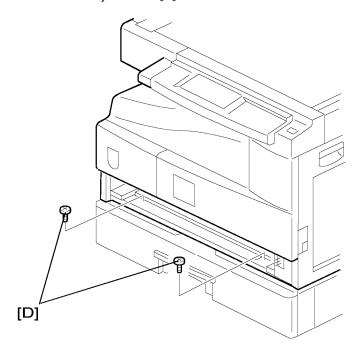
• Before placing the copier on the paper tray unit, make sure that the harness [B] is safe. The paper tray unit does not function properly if the harness is damaged.



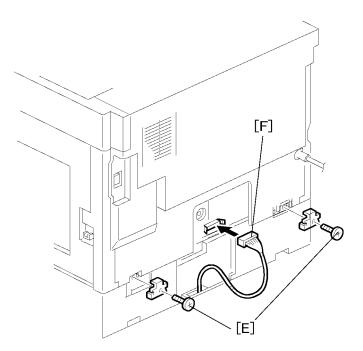
3. Set the copier on the paper tray unit.



4. Remove the tray cassette [C].



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



- 7. Install the two brackets [E]. (1 stepped screw each).
- 8. Connect the connecting harness [F] to the copier.

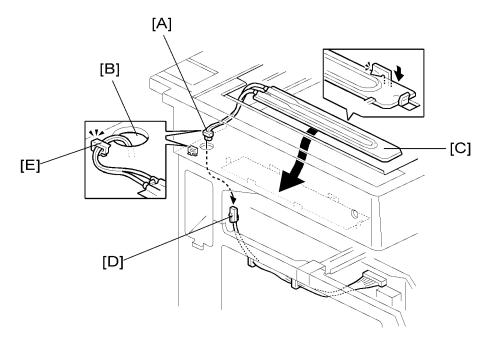


- There are cutouts for the plugs on both sides. The left side has one cutout, and the right side has two.
- 9. Reinstall the cover removed in step 2.
- Load the paper in the paper tray and make full size copies from tray. Check if the side-toside and leading edge registrations are correct. If they are not, adjust the registrations (p.121).

Anti-condensation Heater Installation

ACAUTION

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



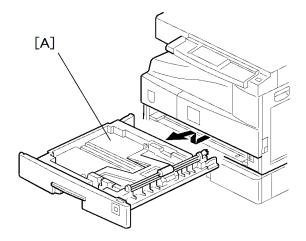
- 1. Remove the exposure glass.
- 2. Remove the left cover.
- 3. Pass the connector [A] through the opening [B].
- 4. Install the anti-condensation heater [C], as shown.
- 5. Join the connectors [A, D].
- 6. Clamp the harness with the clamp [E].
- 7. Reinstall the left cover and exposure glass.

Tray Heaters

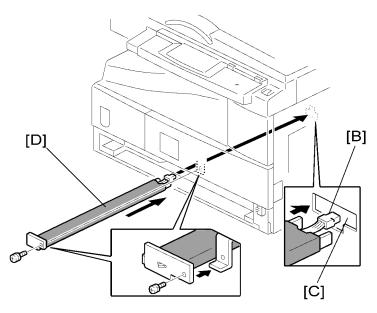
ACAUTION

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

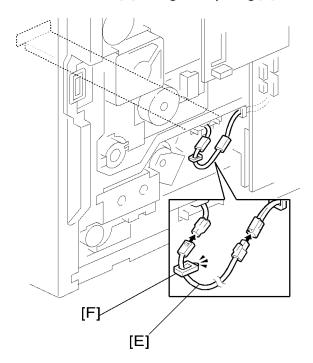
Tray Heater



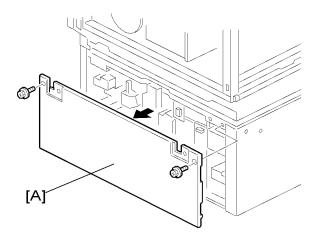
- 1. Remove the tray cassette [A].
- 2. Remove the rear cover.



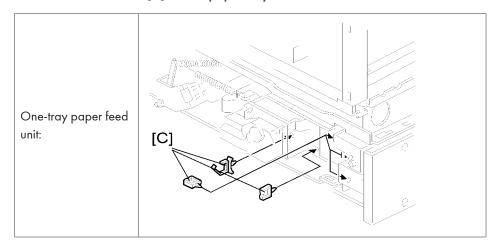
3. Pass the connector [B] through the opening [C] and install the tray heater [D] (\mathscr{F} x 1).

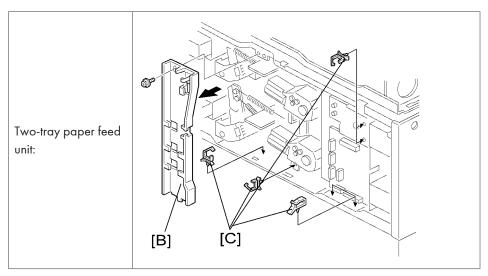


- 4. Install the relay harness [E].
- 5. Fix the harness with the clamp [F].
- 6. Reinstall the 1st tray cassette and the rear cover.

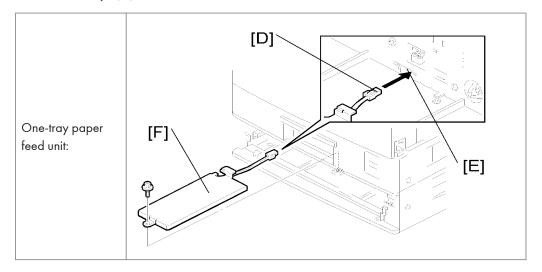


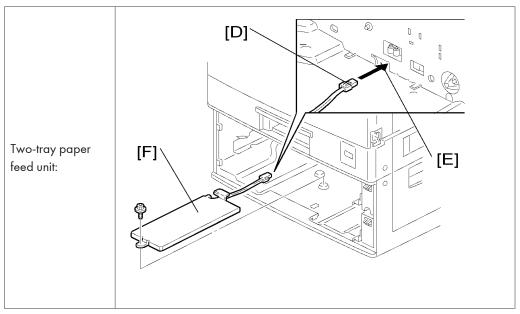
1. Remove the rear cover [A].for the paper tray unit



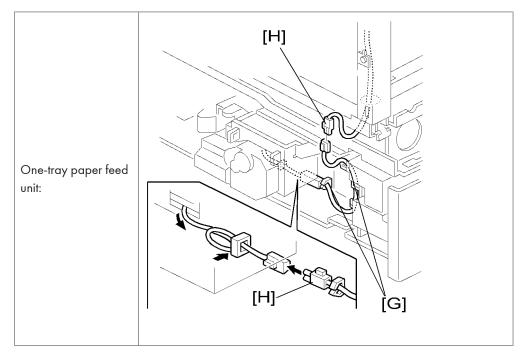


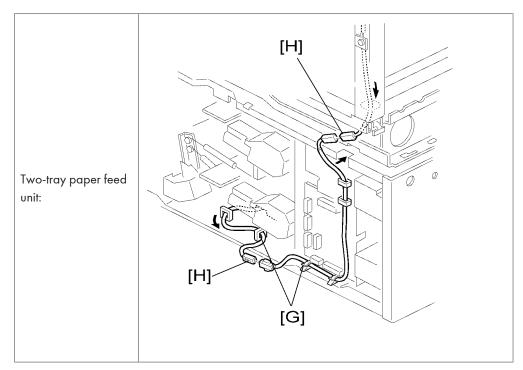
- 2. Two-tray unit only: Remove the cable guide [B].
- 3. Install the clamps [C].



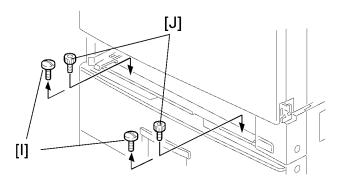


- 4. Pass the connector [D] through the opening [E].
- 5. Install the tray heater [F] ($\mathscr{F} \times 1$)





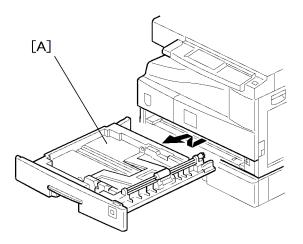
- 6. Clamp the cables [G], as shown.
- 7. Join the connectors [H].
- 8. Two-tray unit only: Reinstall the cable guide.
- 9. Remove the 1st tray cassette.



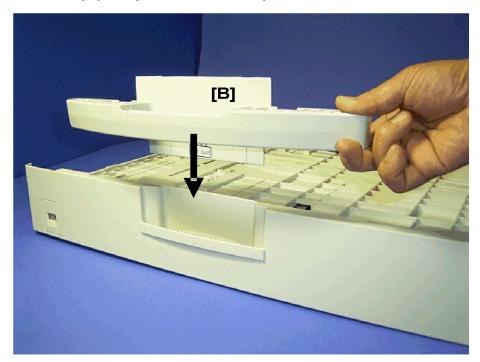
- 10. Remove the two screws [I] and install the two hexagonal socket screws [J].
- 11. Reinstall the 1st tray and the rear cover.

Optional Paper Tray Grip Handle – Main Copier

The following procedure is for the paper tray for the main copier only.

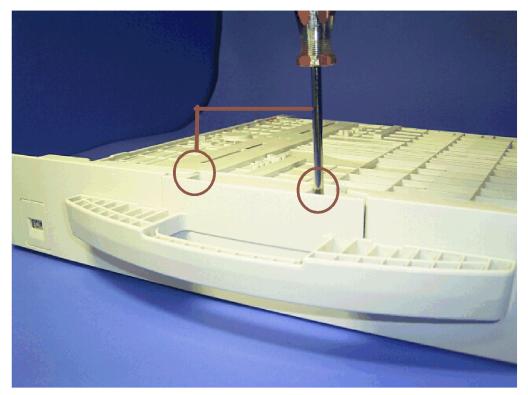


1. Remove the paper tray [A] from the main copier.



2. Turn the paper tray over to the opposite side.

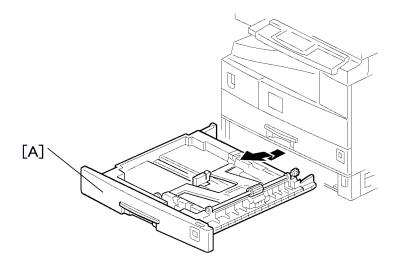
3. Lower the paper tray grip handle [B] into the paper tray slot as shown with the arrow in the above illustration.



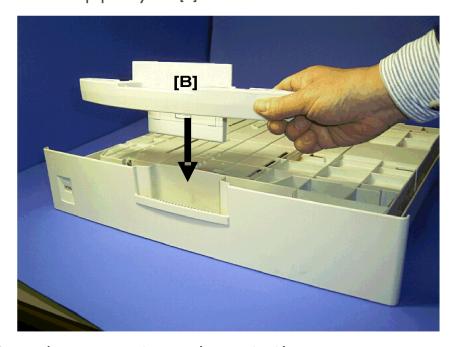
- 4. Attach the grip handle to the paper tray (2 x \mathscr{F}) as shown above.
- 5. Put the paper tray back into the machine.

Optional Paper Tray Grip Handle – Optional Paper Tray Unit

The following procedure is for the 1-tray and 2-tray optional paper feed units only.

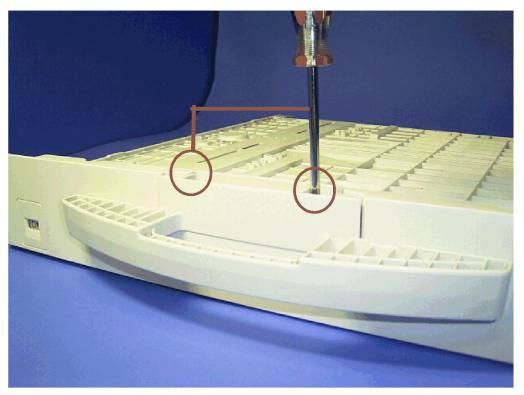


1. Remove the paper tray units [A] from the machine.



2. Turn the paper tray unit over to the opposite side.

3. Lower the paper tray grip handle [B] into the paper tray slot as shown with the arrow in the above illustration.



- 4. Attach the grip handle to the paper tray (2 x \mathscr{F}) as shown above.
- 5. Put the paper tray back into the machine.

2. Preventive Maintenance

PM Tables



- After preventive maintenance work, reset the PM counter (SP 7804 1).
- PM intervals (60k, 80k, and 120K) indicate the number of prints.

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

Optics

	EM	60k	120k	AN	NOTE
Reflector	С				Optics cloth
1 st mirror	С			С	Optics cloth
2nd mirror	С			С	Optics cloth
3rd mirror	С			С	Optics cloth
Scanner guide rails	С				Do not use alcohol.
Platen cover	I			С	Replace the platen sheet if necessary. Blower brush or alcohol
Exposure glass	С			С	Blower brush or alcohol
Toner shield glass	С				Blower brush

Drum Area

	EM	60k	120k	AN	NOTE
PCU		I			
Drum		R			
Developer		R			
Charge roller		R			
Cleaning brush (charge roller)		R			

	EM	60k	120k	AN	NOTE
Cleaning blade (OPC drum)		R			
Pick-off pawls (OPC drum)		R			
Transfer roller			R		
ID sensor	С			С	Blower brush

Paper Feed

	EM	60k	120k	AN	NOTE
Paper feed roller		С	R	С	Clean with water or alcohol.
Friction pad		С	R	С	Clean with water or alcohol.
Bottom-plate pad		С		С	Clean with water or alcohol.
Paper feed roller (bypass tray)		С		С	Clean with water or alcohol.
Friction pad (bypass tray)		С		С	Clean with water or alcohol.
Bottom-plate pad (by-pass tray)		С		С	Clean with water or alcohol.
Registration rollers		С		С	Clean with water or alcohol.
Relay rollers		С		С	Clean with water or alcohol.
Paper feed guides		С		С	Clean with water or alcohol.
Paper-dust Mylar		С		С	Clean with water or alcohol.

Fusing Unit

	EM	60k	120k	AN	NOTE
Hot roller			R		
Pressure roller			R		
Pressure roller cleaning roller			R		
Hot roller bushings			I		
Pressure-roller bushing			R		
Hot roller stripper pawls			R	С	Dry cloth

	EM	60k	120k	AN	NOTE
Thermistor		С		С	Dry cloth
Cleaning roller bushing			С	С	Dry cloth

ADF/ARDF

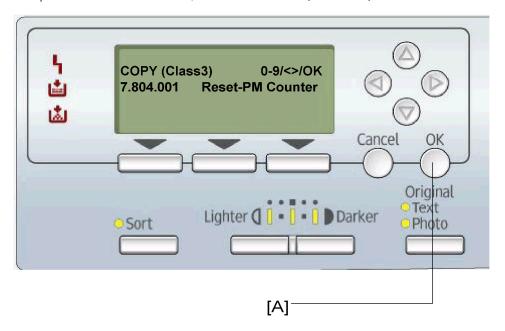
	80k	AN	NOTE
Feed belt	R	С	Clean with water or alcohol.
Separation roller	R	С	Clean with water or alcohol.
Pick-up roller	R	С	Clean with water or alcohol.
Stamp		R	Replace when necessary.
White plate		С	Clean with water or alcohol.
DF exposure glass		С	Clean with water or alcohol.
Platen cover		С	Clean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

Paper Tray Unit

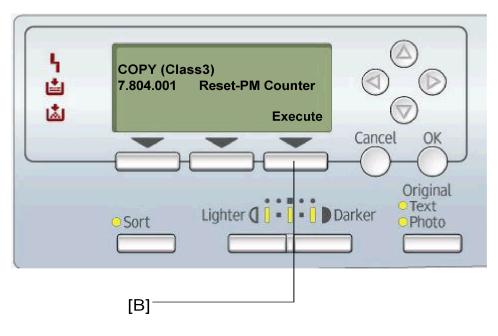
	60k	120k	AN	NOTE
Paper feed rollers		R	С	Dry or damp cloth
Bottom-plate pads	С		С	Dry cloth
Paper-feed guides	С		С	Clean with water or alcohol.
Friction pads		R	С	Dry or damp cloth
Relay clutch (B384 only)		I		
Feed clutches (B384 only)		I		
Relay roller (B384 only)		С	С	Dry cloth

How to Reset the PM Counter

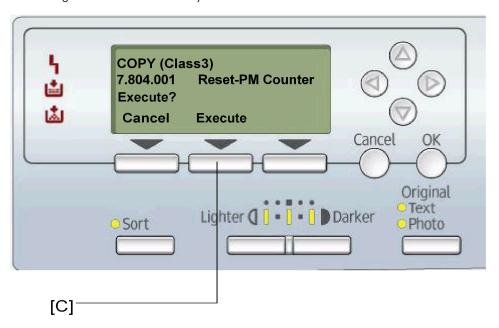
After preventive maintenance work, reset the PM counter (SP 7804 1) as follows.



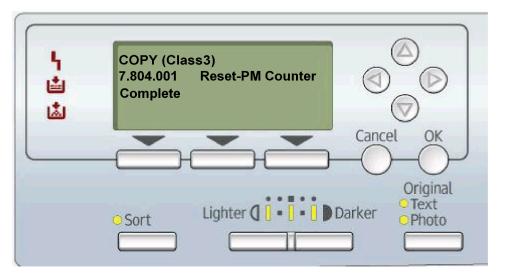
- 1. Activate the SP mode (p.143).
- 2. Select SP 7804 1 (Reset-PM Counter).
- 3. Press the OK key [A]. The message "Execute" shows.



- 4. Press the button [B] below the message "Execute."
- 5. The messages "Execute?" followed by "Cancel" and "Execute" show.



6. To reset the PM counter, press the button [C] below the message "Execute."



- 7. Wait until the message "Completed" shows.
- 8. Quit the SP mode.

3. Replacement and Adjustment

General Cautions

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

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.

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.

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. Make sure to not bend or crease the exposure lamp's ribbon cable.
- 4. Do not disassemble the lens unit. This will cause the lens and copy image to get out of focus.
- 5. Do not turn any of the CCD positioning screws. This will put the CCD out of position.

Laser Unit

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

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.

Paper Feed

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

♠ Important

- You must run SP 2214 to initialize the TD sensor after you install a new PCU. After starting initialization, be sure to wait for it to reach completion (wait for the motor to stop) before you re-open the front cover or turn off the main switch.
- If the optional tray heater or optics anti-condensation heater is installed, keep the machine's power cord plugged in even while the main switch is off, to keep the heater(s) energized.

3

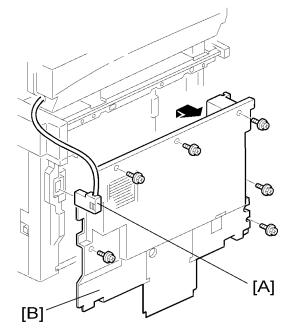
3

Special Tools and Lubricants

Part Number	Description	Q'ty
A0069104	Scanner Positioning Pins (4 pins/set)	1 set
A2929500	Test Chart S5S (10 pcs/set)	1 set
VSSM9000	FLUKE 87 Digital Multimeter	1
N8036701	4MB Flash Memory Card	1
A2579300	Grease Barrierta S552R	1
52039502	Grease G-501	1

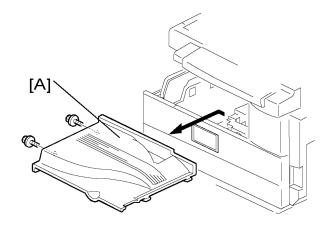
Exterior Covers & Operation Panel

Rear Cover



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

Copy Tray

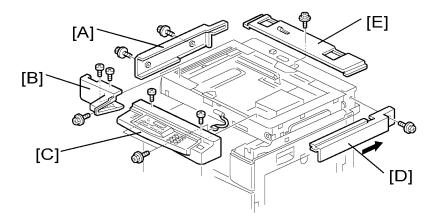


3

3

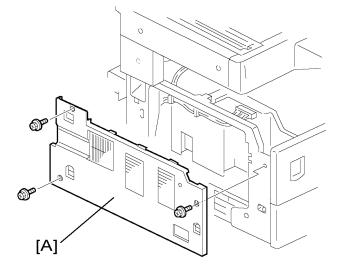
1. Copy tray [A] (* x 2)

Upper Covers



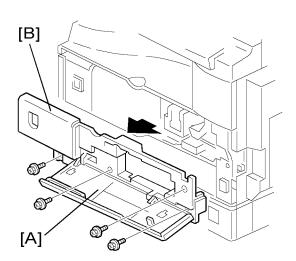
- 1. Platen Cover, ARDF, or ADF (if installed)
- 2. Rear cover
- 3. Left upper cover [A] (x 2)
- 4. Front upper left cover [B] (x 3)
- 5. Operation panel [C] (x 4, 🕮 x 1)
- 6. Right upper cover [D] (*x 1, 3 hooks)
- 7. Push the cover to the rear side to release the hooks.
- 8. Top rear cover [E] (* x 1)

Left Cover



1. Left cover [A] (🖟 x 3)

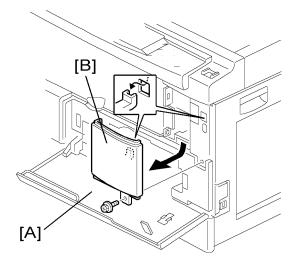
Front Cover



- 1. Pull out the (top) paper tray.
- 2. Open the front door [A].
- 3. Front cover [B] (* x 4)

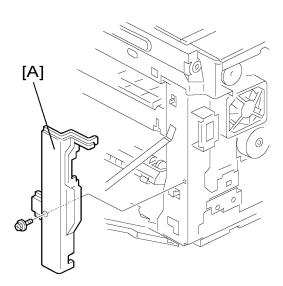
3

Front Right Cover



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

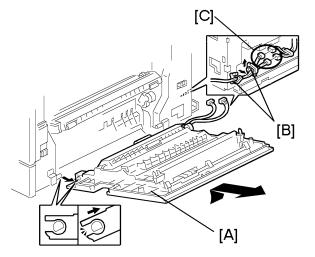
Right Rear Cover



Right upper cover (Upper Covers)

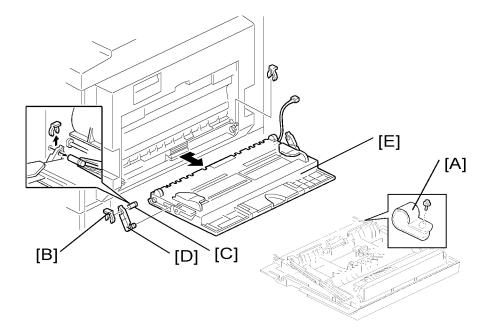
- 1. Open the duplex unit (B282 only).
- 2. Right rear cover [A] (*x 1)

Right Door (Duplex Unit (B282))



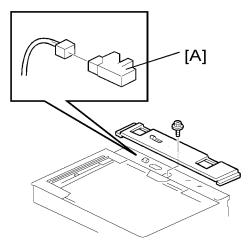
- 1. Right rear cover (see above)
- 2. Open the right door [A].
- 3. Open the clamps [B] and disconnect the two connectors [C] or three connectors (B282).
- 4. Right door

By-pass Tray



- 1. Right rear cover (above)
- 2. Open the right door.
- 3. Release the by-pass tray cable from the clamps (see [B] on the preceding procedure) and disconnect the connector (5-pin connector with colored wires).
- 4. Cable holder [A] (B282 only)
- 5. Front-side clip ring [B]
- 6. Front-side pin [C] (You can push the pin from behind the right door.)
- 7. Front-side tray holder arm [D]
- 8. Remove the rear-side clip ring, pin, and tray holder arm in the same manner.
- 9. By-pass tray [E]

Platen Cover Sensor



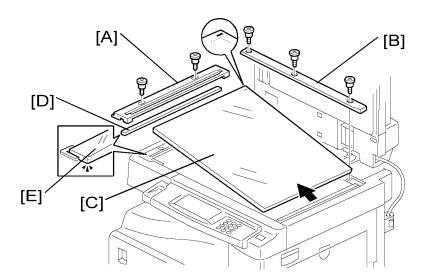
- 1. Top rear cover
- 2. Platen cover sensor [A] (🗐 x 1)

3

3

Scanner Unit

Exposure Glass/DF Exposure Glass



- Exposure Glass -

- 1. Front upper left cover (Upper Covers)
- 2. Left scale [A] (x 2)
- 3. Rear scale [B] (x 3)
- 4. Exposure glass [C]



Make sure that the mark is at the rear left corner, and that the left edge is aligned to the support
on the frame when you reinstall the exposure glass.

- DF Exposure Glass -

- 1. Front upper left cover (Upper Covers)
- 2. Left scale [A]
- 3. DF exposure glass [D]

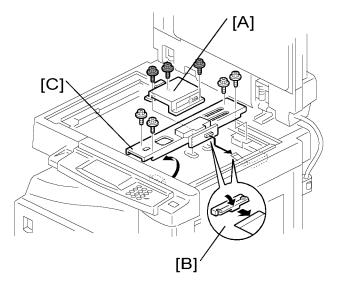


• Make sure that the mark [E] is on the bottom at the front end when reinstall the exposure glass.

Lens Block

ACAUTION

- Do not touch the paint-locked screws on the lens block. The position of the lens assembly (black part) is adjusted before shipment.
- Do not grasp the PCB or the lens assembly when you handle the lens block. The lens assembly may slide out of position.

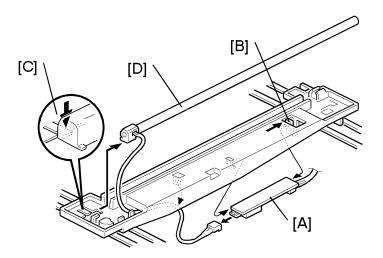


- 1. Exposure glass (Scanner Unit)
- 2. Lens cover [A] (x 5)
- 3. Disconnect the flat cable [B].
- 4. Lens block [C] (x 4).



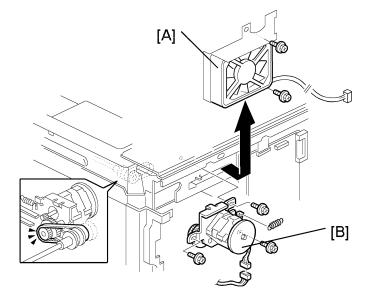
• Adjust the image quality (** p.121) after you install a new lens block.

Lamp Stabilizer Board And Exposure Lamp



- 1. Operation panel (Upper Covers)
- 2. Exposure glass (Exposure Glass / DF Exposure Glass)
- 3. Slide the first scanner to a position where the front end of the lamp is visible.
- 4. Place one hand under the lamp stabilizer board [A] and release the hook [B].
- 5. Lamp stabilizer board (x 2)
- 6. Press the plastic latch [C] and push the front end of the lamp toward the rear.
- 7. Lamp [D] (with the cable)

Scanner Motor

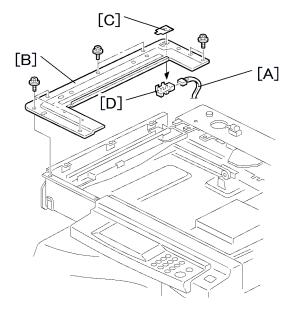


- Left upper cover, front upper left cover, operation panel, top rear cover (Exposure Glass/DF Exposure Glass)
- 2. Exposure glass (Exposure Glass / DF Exposure Glass)
- 3. Rear exhaust fan [A] (B282 only)
- 4. Scanner motor [B] (Fx 3, 💷 x 1, 1 spring, 1 belt)



- Install the belt first, and then set the spring when you reassemble. Fasten the leftmost screw (viewed from the rear), and fasten the other two screws.
- Adjust the image quality after you install the motor.

Scanner Home Position Sensor



- 1. Left upper cover, top rear cover
- 2. Exposure glass, DF exposure glass (if installed) (Exposure Glass / DF Exposure Glass)
- 3. Disconnect the connector [A].
- 4. Scanner left lid [B] (x 7)
- 5. Sensor tape [C].
- 6. Scanner home position sensor [D]

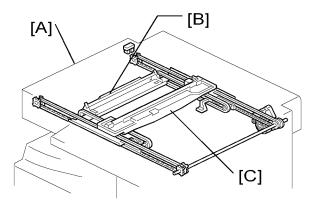
Adjusting Scanner Positions



· Grasp the front and rear ends (not the middle) of the first scanner when you manually move it. The first scanner may be damaged if you press, push, or pull its middle part.

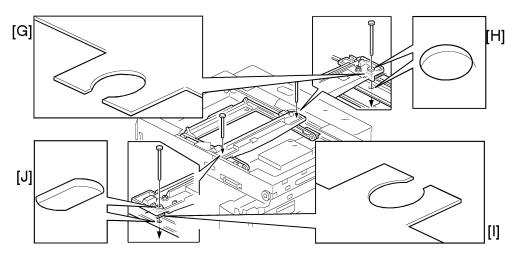
- Overview -

Adjust the scanner positions when the first scanner [C] and second scanner [B] are not parallel with the side frames [A], or, when you have replaced one or more of the scanner belts.



To adjust the scanner positions, do either of the following:

- To adjust the belt contact points on the first scanner (See " Adjusting the First Scanner Contact Points" below.)
- To adjust the belt contact points on the scanner bracket (See "Adjusting the Second Scanner Contact Points" below.)

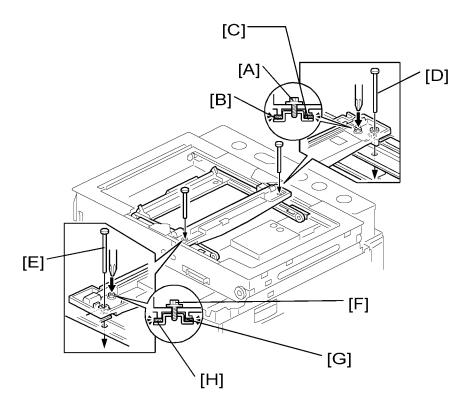


The two actions above have the same objectives--to align the following holes and marks:

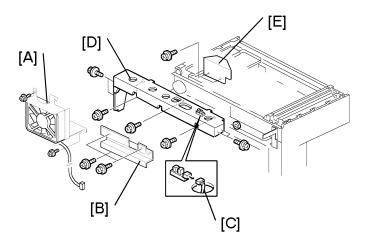
- The adjustment holes [H] [J] in the first scanner
- The adjustment holes [H] [J] in the second scanner
- The alignment marks [G] [I] on the frames

The scanner positions are correct when these holes and marks are aligned.

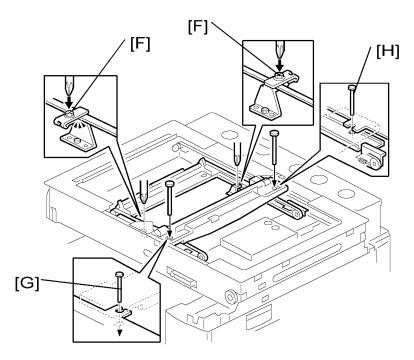
- Adjusting the First Scanner Contact Points -



- 1. A(R)DF or platen cover
- 2. Operation panel, top rear cover (Upper Covers).
- 3. Exposure glass (Exposure Glass / DF Exposure Glass)
- 4. Loosen the 2 screws [A] [F].
- 5. Slide the 1st and 2nd scanners, or one of them, to align the following holes and marks
- 6. The adjustment holes in the first scanner
- 7. The adjustment holes in the second scanner
- 8. The alignment marks on the frames
- 9. Insert the positioning tools [D] [E] through the holes and marks.
- Check that the scanner belts [B] [C] [G] [H] are properly set between the bracket and the 1st scanner.
- 11. Tighten the screws [A] [F].
- 12. Remove the positioning tools.
- 13. Reassemble the machine and check the operation.
- Adjusting the Second Scanner Contact Points -



- 1. A(R)DF or platen cover
- 2. Operation panel, top rear cover (Upper Covers).
- 3. Exposure glass (Exposure Glass / DF Exposure Glass)
- 4. Rear exhaust fan [A] (🖣 x 2)
- 5. Controller bracket [B] (*x 3)
- 6. Disconnect the platen-cover-sensor connector [C].
- 7. Rear frame [D] (x 7)
- 8. Scale bracket [E] (x 2)



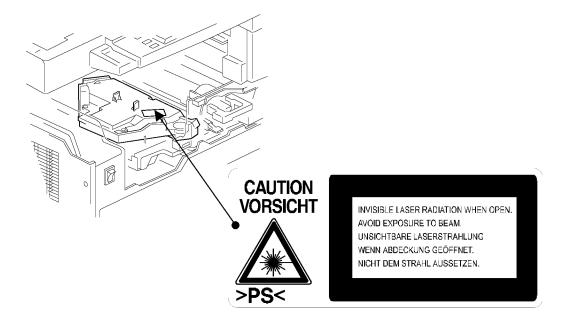
- 9. Loosen the 2 screws [F].
- 10. Slide the 2nd scanner to align the following holes and marks
- 11. The adjustment holes in the first scanner
- 12. The adjustment holes in the second scanner
- 13. The alignment marks on the frames
- 14. Insert the positioning tools [G] [H] through the holes and marks.
- 15. Check that the scanner belts are properly set in the brackets.
- 16. Remove the positioning tools.
- 17. Reassemble the machine and check the operation.

Laser Unit

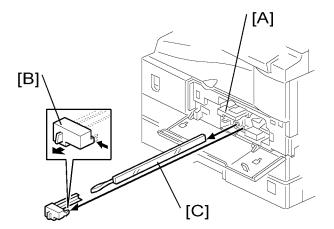
MARNING

• The laser beam can seriously damage your eyes. Be absolutely sure that the main power switch is off and that the machine is unplugged before you access the laser unit.

Location Of Caution Decal

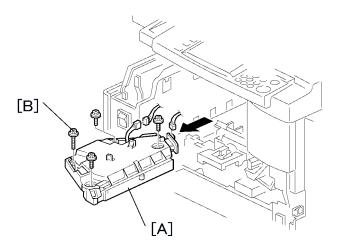


Toner Shield Glass



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

Laser Unit



- 1. Toner shield glass.
- 2. Copy tray

- 3. Pull out the (upper) paper tray.
- 4. Front cover
- 5. Laser unit [A] (x 2, F x 4)

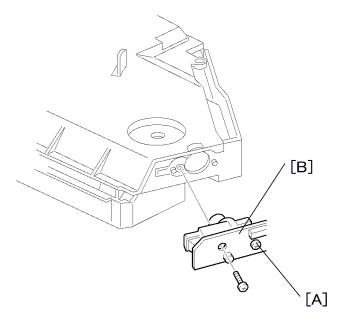


• The screw at the left front position [B] is longer than the other three.

LD Unit

ACAUTION

• Do not touch the paint-locked screw [A]. The LD position is adjusted before shipment.

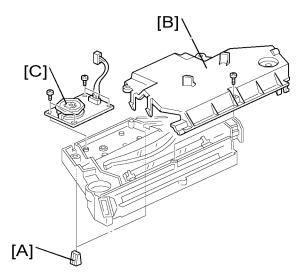


- 1. Laser unit
- 2. LD unit [B] (x 1)



• Do not screw the LD unit in too tightly when you install it.

Polygonal Mirror Motor



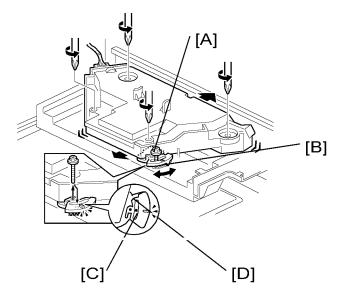
- 1. Laser unit
- 2. Two rubber bushings [A]
- 3. Laser unit cover [B] (x 1)
- 4. Polygonal mirror motor [C] (*x 4)
- 5. After reassembling, adjust the image quality (Copy Adjustments Printing/Scanning).

Laser Unit Alignment Adjustment



MARNING

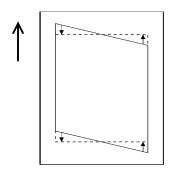
· Reinstall the copy exit tray before you turn the main switch on. The laser beam may go out of the copier when the copy exit tray is not installed. The laser beam can seriously damage your eyes.

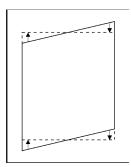


- 1. Start the SP mode.
- 2. Select SP 5902 1 and output the 'Trimming Area' pattern (pattern 10).
- 3. Make sure that the four corners of the pattern make right angles:
 - If they make right angles, you do not need to adjust the laser unit alignment.
 - If they do not make right angles, go on to the next step.
- 4. Check the screw position on the lever [B].
 - If the screw is in the hole [C], go on to the next step.
 - If the screw is in the slot [D], loosen the screw on the lever, loosen the four screws on the laser unit, and go on to step 9.



- The initial position of the screw is in hole [C].
- 5. Four screws in the laser unit (Laser Unit)
- 6. Remove the lever (x 1), confirm the position of the hole beneath the slot [D], and reinstall the lever.
- Install the screw (through the slot [D]) loosely into the hole beneath the slot (do not tighten the screw).
- 8. Install the four screws for the laser unit loosely (do not tighten the screws).
- 9. When you rotate the lever clockwise or counterclockwise by one notch of the lever, the corners of the pattern shift by ± 0.4 mm (from the leading and trailing edges). See the trim pattern made in step 2, and find how much the corners should be shifted.

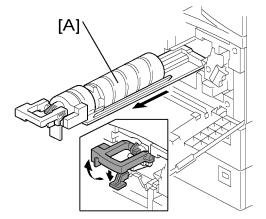




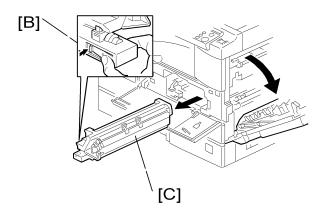
- 10. Tighten the screw [A].
- 11. Tighten the screws on the laser unit.
- 12. Reinstall the copy tray.
- 13. Print the trim pattern and check the result. Do the procedure again if further adjustment is required.

PCU Section

PCU



- 1. Toner bottle with the holder [A]
- 2. Open the right door.



3. Press the latch [B] and pull out the PCU [C].

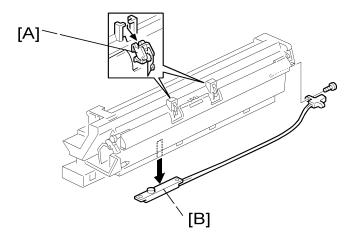


- Do not touch the OPC drum surface with bare hands.
- 4. Load new developer (Developer).
- 5. Do SP 2214 to reinitialize the TD sensor when you reassemble.

Pick-off Pawls and Toner Density Sensor

ACAUTION

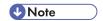
• Do not turn the PCU upside down. This causes toner and developer to spill out.



- 1. PCU (Previous procedure)
- 2. Pawl [A]

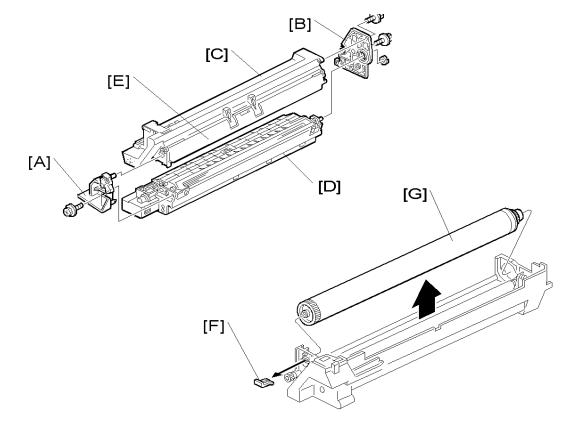


- Pull down the pawl and release the bottom end.
- 3. Toner density sensor [B] (Fx 1)



- The toner density sensor is taped to the bottom of the PCU. Pry it off with a regular screwdriver
- 4. After reinstalling the pick-off pawls or toner density sensor, adjust the image quality (After Replacement or Adjustment).

OPC Drum



- 1. PCU
- 2. Front side piece [A] (*x 1)
- 3. Rear side piece [B] (x 2, 1 coupling)
- 4. Separate the drum section [C] from the developer section [D].

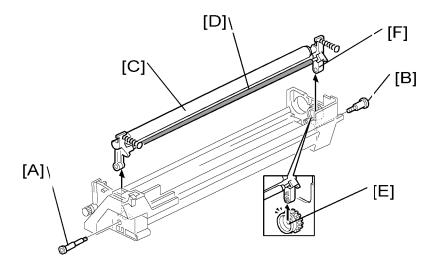


- To ensure that the left-side gears line up, keep the drum cover [E] closed when reinserting the front side piece.
- 5. Pry out the drum retaining clip [F].



- Install the clip in the same orientation (with the lip facing away from the drum shaft) when you
 reassemble.
- 6. OPC drum [G]
- 7. When reassembling, adjust the image quality (After Replacement or Adjustment).

Charge Roller and Cleaning Brush

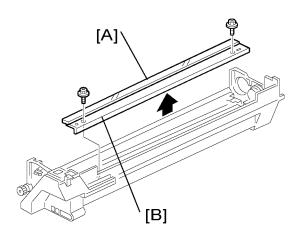


- 1. OPC Drum (Previous procedure)
- 2. Holding pin [A]
- 3. Stepped screw [B]
- 4. Charge roller [C] and cleaning brush [D] (with the holders and springs)



- Turn the gear [E] (as necessary) so that the rear holder [F] comes out.
- 5. When reassembling, adjust the image quality (After Replacement or Adjustment).

Cleaning Blade

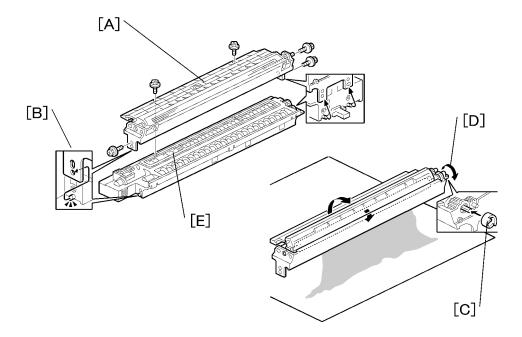


- 1. Drum charge roller (Charge Roller and Cleaning Brush)
- 2. Cleaning blade [B] (x 2)
- 3. When reassembling, adjust the image quality (After Replacement or Adjustment).



- Reassembling
- Apply toner to the edge of the new cleaning blade when you replace the cleaning blade. This prevents
 possible damage to the OPC drum and blade.
 - 1. After installing the cleaning blade, remove some of the toner from the old blade with your finger.
 - 2. Apply the toner to the edge [A] of the new cleaning blade. Make sure to apply the toner evenly along full length of the new cleaning blade.

Developer



- 1. PCU
- To let the toner fall to the development section, gently tap about eight different spots on the top of the PCU with a screwdriver. Each spot must be approximately at an equal distance from the next spot.
- 3. Reinstall the PCU in the copier.
- 4. Turn the main switch on.

- Open and close the front door and wait for the machine to rotate the development roller for about 10 seconds.
- 6. Repeat the previous step two more times.
- 7. PCU
- 8. Separate the developer section from the OPC drum section (OPC Drum).
- 9. Top part [A] of the development unit (F x 5)



- Release the hook [B].
- 10. Set the coupling [C] back to the shaft.
- 11. Turn the coupling in the direction of the arrow [D] to remove developer from the roller.
- 12. Turn the bottom part [E] over and rotate the gears to remove the developer.
- 13. Load new developer (Installation Procedure).
- 14. When reassembling, execute SP 2214 to reinitialize the TD sensor.



- Make sure no toner or developer stays on the gear. Clean the gears as necessary with a blower brush, etc.
- Be sure to replace the Mylar at the rear side in the correct position. (The Mylar protects the gears at the rear side from falling toner).

After Replacement or Adjustment



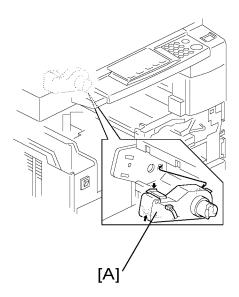
- Do the following procedure after replace or adjust any of the PCU components. This procedure is not necessary when you replaced the whole PCU with a new one.
- 1. Take 5 sample copies.
- If black dots (dropped toner) show on any of the copies, continue as follows. (If all copies are clean, you don't need to do the following steps.)
- 3. Remove the PCU from the mainframe.
- 4. Tap the top of the PCU with a screwdriver at eight evenly spaced locations (two or three taps at each spot), to knock the recycled toner down into the development section.
- 5. Put the PCU back into the mainframe.
- 6. Turn the main power on. Then open and close the door and wait for the machine to rotate the development roller for 10 seconds. Then open and close the door two more times, so that total rotation time is 30 seconds.
- 7. Make some sky-shot copies (or solid black prints).

- If using A4 or $8^{1}/_{2}$ " x 11" paper, make 4 copies/prints.
- If using A3 or 11" x 17" paper, make 2 copies/prints.
- To make solid black prints, use SP 5902 pattern 8.



 Step 7 is required only after parts replacement or adjustment. You do not need to make sky-shot (or solid black) copies after you replace the developer.

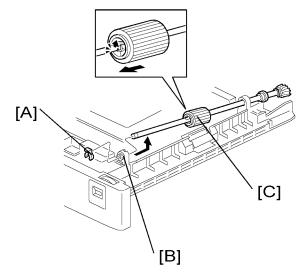
Toner Supply Motor



- 1. Copy tray (Upper Covers)
- 2. Open the front door.
- 3. Toner bottle holder (PCU)
- 4. Toner supply motor [A] (🗐 x 1)

Paper Feed Section

Paper Feed Roller

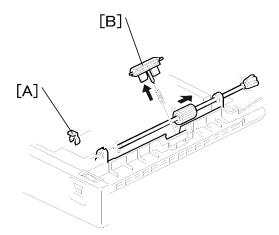


- 1. Paper cassette
- 2. Clip [A]
- 3. Push the shaft back through the opening, and tilt it up.



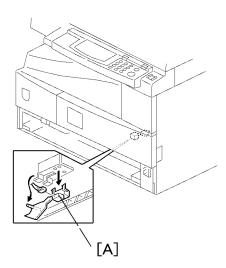
- If the black plastic bushing [B] comes off, make sure you remount it when reinstall the shaft.
- 4. Paper feed roller [C]

Friction Pad



- 1. Paper cassette
- 2. Clip [A]
- 3. Push the shaft back through the opening, so that the roller moves clear of the friction pad.
- 4. Friction pad [B]

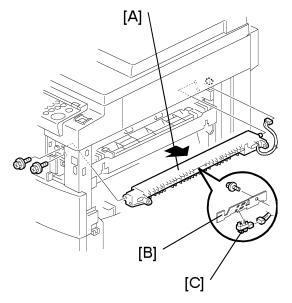
Paper End Sensor



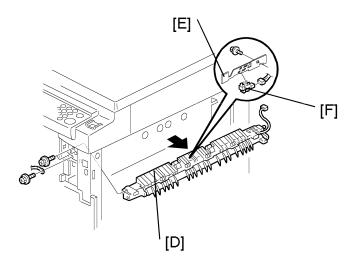
- 1. Paper cassette
- 2. Paper end sensor [A] (x 1)

Exit Sensor

- Non-Duplex Models -

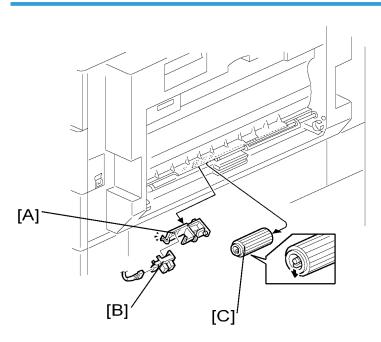


- 1. Open the right door.
- 2. Front right cover (Front Right Cover)
- 3. Guide [A] (F x 2)
- 4. Exit sensor bracket [B] (*x 1)
- 5. Exit sensor [C] (x 1)
- Duplex Models -



- 1. Open the right door.
- 2. Front right cover
- 3. Upper guide [D] (x 2)
- 4. Exit sensor bracket [E] (*x 1)
- 5. Exit sensor [F] (🕮 x 1)

By-Pass Feed Roller and Paper End Sensor

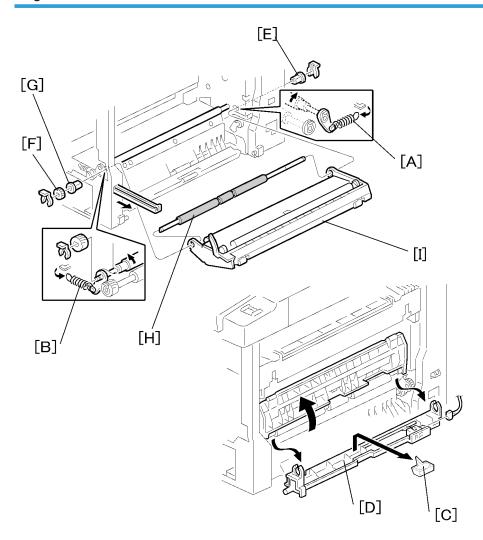


1. By-pass tray



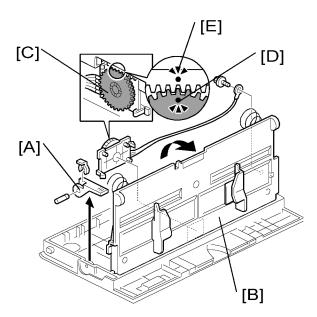
- If you have a support to keep the by-pass tray within the reach of the connector cable, you do
 not need to disconnect the connector. When you do so, use caution not to place too much load
 on the cable.
- 2. Sensor holder [A]
- 3. By-pass paper end sensor [B] (🗐 x 1)
- 4. By-pass feed roller [C]

Registration Roller



- 1. PCU
- 2. Front cover
- 3. Right door (Right Door (Duplex Unit (B282)))
- 4. Rear cover
- 5. High-voltage power supply (High-Voltage Power Supply Board)
- 6. Registration clutch
- 7. Unhook the springs [A] and [B] at the rear and front sides.
- 8. Guide support [C] and guide [D] (x 1, x 1)
- 9. Bushing [E] (帰 x 1)
- 10. Gear [F] and bushing [G] (♠ x 1)
- 11. Registration roller [H] with the image transfer unit [I]

By-Pass Paper Size Switch

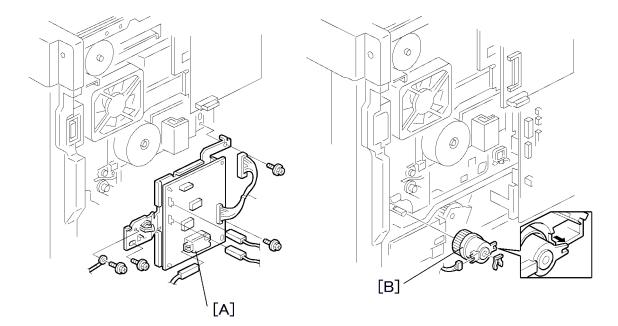


- 1. By-pass tray
- 2. Tray lever [A] (🛱 x 1, 1 pin)
- 3. Lift the upper tray [B]
- 4. By-pass paper size switch [C] (Px 1)



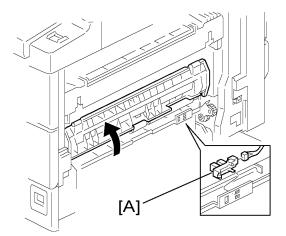
• When reinstalling the switch: Move the paper guides to their middle position (about halfway between fully open and fully closed), and install the round gear so that the hole in the gear [D] aligns with the peg [E] on the sliding gear.

Registration Clutch



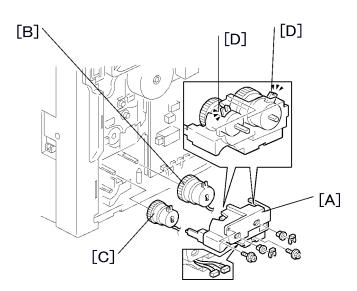
- 1. Rear cover
- 2. High-voltage power supply board (with the bracket) [A] (\mathscr{F} x 4, all connectors)
- 3. Registration clutch [B] (x 1, v x 1)

Registration Sensor



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

Upper Paper Feed Clutch and By-Pass Feed Clutch



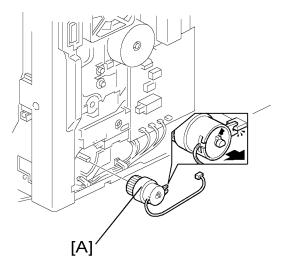
- 1. Rear cover
- 2. High-voltage power supply board
- 3. Clutch cover [A] (🛱 x 2, 2 bushings, 🖗 x 2)
- 4. Paper feed clutch [B] (🖺 x 1)

5. By-pass feed clutch [C] (⇔x 1)



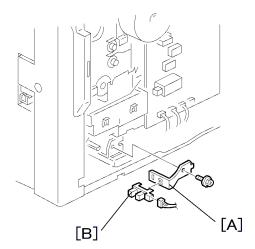
• Make sure that the rotation-prevention tabs [D] on the clutches fit correctly into the corresponding openings on the clutch cover when you reinstall.

Relay Clutch



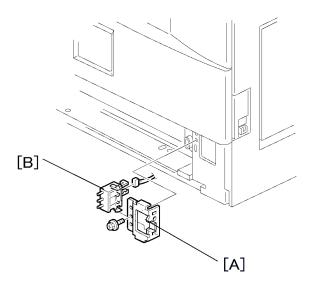
- 1. Rear cover
- 2. Relay clutch [A] (🕮 x 1)

Relay Sensor



- 1. Relay clutch (Previous procedure)
- 2. Sensor bracket [A] (x 1)
- 3. Relay sensor [B] (🕮 x 1)

Paper Size Switch



- 1. Paper cassette
- 2. Switch cover [A] (x 1)

3. Paper size switch [B] (x 1)

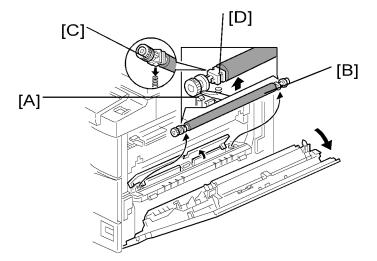
3

Image Transfer

Image Transfer Roller

ACAUTION

• Do not touch the transfer roller surface with bare hands

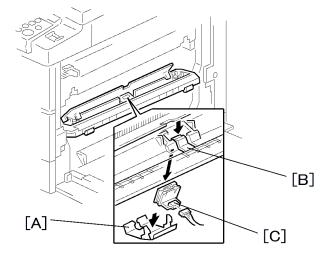


- 1. Open the right door.
- 2. Lift the plastic holders [A] with the image transfer roller [B].



• Leave the springs under the holders. Make sure that the pegs [C] on the holders [D] engage with the springs when you reassemble.

Image Density Sensor



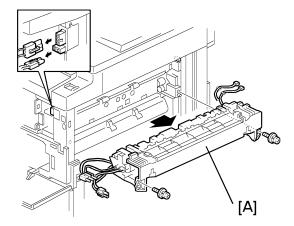
- 1. Open the right door.
- 2. Plastic cover [A]
- 3. Image transfer roller (Previous procedure)
- 4. Push down on the notch [B] to free the sensor.
- 5. Image density sensor [C] (🕮 x 1)

Fusing

Fusing Unit

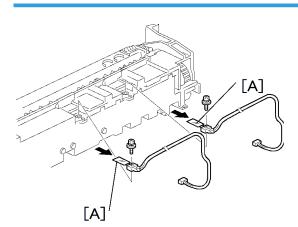
ACAUTION

• The fusing unit can become very hot. Make sure that it has cooled down sufficiently before you handle it.



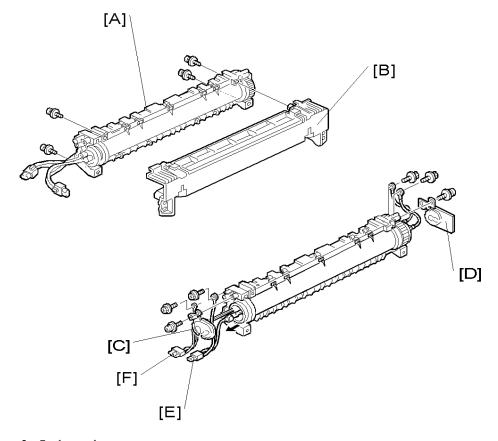
- 1. Turn off the main switch, and unplug the machine.
- 2. Front right cover
- 3. Open the right door.
- 4. Fusing unit [A] (*\begin{align*} x 2, \bullet \display x 4)

Thermistor



- 1. Fusing unit (see above)
- 2. Thermistors [A] (F x 1, 1 x 1)

Fusing Lamps

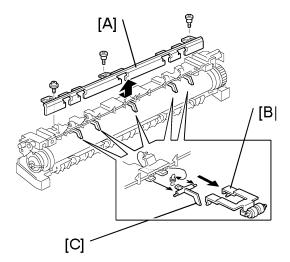


- 1. Fusing unit
- 2. Separate the hot roller section [A] from the pressure roller section [B] (\mathscr{F} x 4).
- 3. Front holding plate [C] (*x 1)
- 4. Rear holding plate [D] (*x 1)
- 5. Fusing lamp with the connector (600W) [E] (\mathscr{F} x 2)
- 6. Fusing lamp with the connector (550W) [F] (\mathscr{F} x 2)



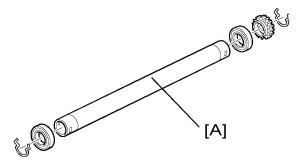
Check that the front ends of the two lamps fit in the front holding plate when you reassemble.
 They do not fit in there if you arrange the two lamps incorrectly.

Hot Roller Stripper Pawls



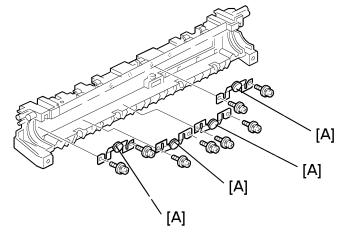
- 1. Hot roller section (See above)
- 2. Roller guard [A] (x 3)
- 3. Metal holders [B] (1 holder for each)
- 4. Hot roller stripper pawls [C] (1 spring for each)

Hot Roller



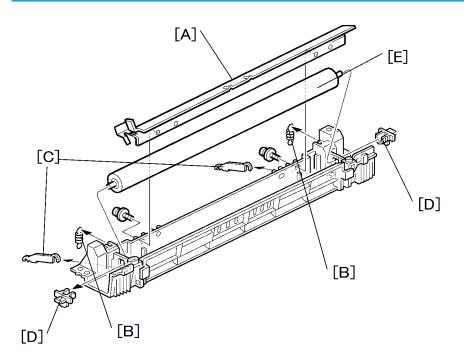
- 1. Hot roller stripper pawls (See above)
- 2. Hot roller [A] (2 C-rings, 1 gear, 2 bearings)

Thermostat



- 1. Hot roller (See above)
- 2. Thermostat [A] (Fx 2 for each)

Pressure Roller and Bushings

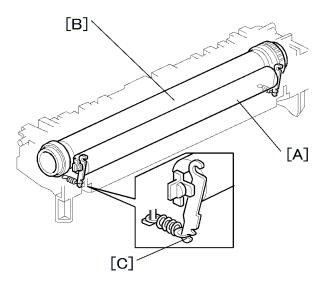


1. Separate the hot roller section from the pressure roller section (Fusing Lamps)

- 2. Fusing entrance guide [A] (Fx 2)
- 3. 2 springs [B]
- 4. 2 pressure arms [C]
- 5. 2 Bushings [D]
- 6. Pressure roller [E]

NIP Band Width Adjustment

Do this adjustment when the fusing unit is at its operating temperature. The size of the OHP sheet must be A4/LT LEF. Any other sizes may cause a paper jam.



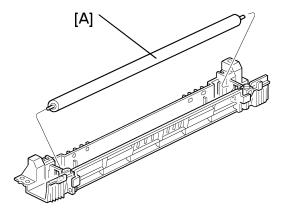
- 1. Pressure roller
- 2. Hot roller
- 1. Place an OHP sheet on the by-pass feed table.
- 2. Enter SP mode, and run SP 1109.
- 3. Press '1' (Yes)
- 4. Press ® twice. The machine feeds the OHP sheet into the fusing section, stops it there for 20 seconds, then ejects it to the copy tray.
- 5. Press the ® key.
- 6. Quit the SP mode.
- 7. Check that the nip band (the opaque stripe) across the ejected OHP sheet is symmetrical, with both ends slightly thicker than the center.

- There is no standard value for the nip band on this machine. Make the adjustment based on the band's appearance.
- 8. If the band is not as described above, change the position of the spring hooks [C] (one on each side), and then check the band again.



• The higher hook position produces greater tension.

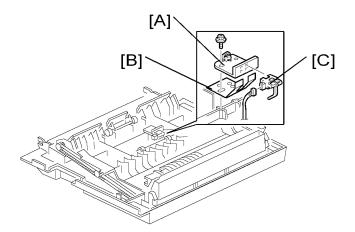
Cleaning Roller



- 1. Pressure roller and bushings (Pressure Roller and Bushings)
- 2. Cleaning roller [A]

Duplex Unit (Duplex Model B282 Only)

Duplex Exit Sensor

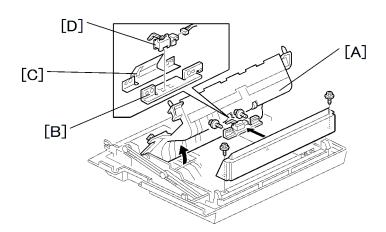


- 1. Open the right door.
- 2. Sensor bracket [A] (x 1)



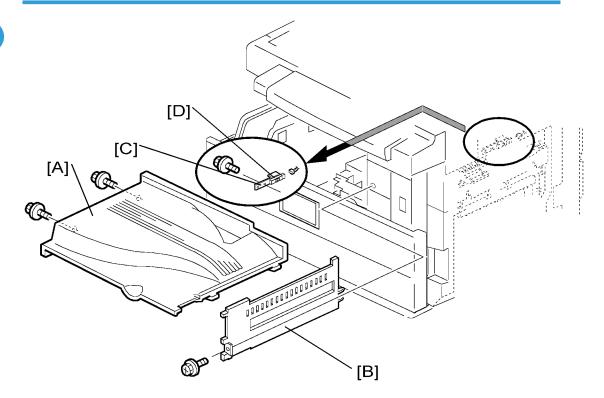
- Another bracket [B] comes off with the sensor bracket.
- 3. Duplex exit sensor [C] (🕮 x 1)

Duplex Entrance Sensor



- 1. Open the right door.
- 2. Lift the duplex guide [A].
- 3. Entrance sensor bracket [B] and bracket cover [C] (*x 2)
- 4. Duplex entrance sensor [D]

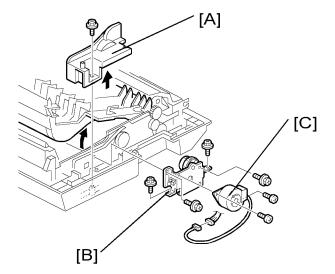
Duplex Inverter Sensor



- 1. Copy tray [A] (x 2)
- 2. Exit cover [B] (x 1)
- 4. Duplex inverter sensor [D] (*x 1)

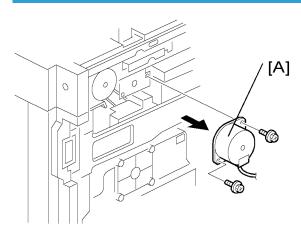
3

Duplex Transport Motor



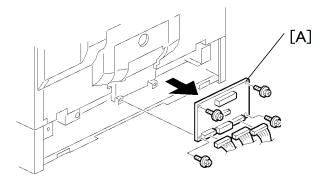
- 1. Open the right door.
- 2. Detach the chain and spring from the frame, and lower the right door.
- 3. Cover [A] (x 1)
- 5. Duplex transport motor [C] ($\mathscr{F} \times 2$)

Duplex Inverter Motor



- 1. Rear cover
- 2. Exhaust fan (Fran (B282 Only))

Duplex Control Board



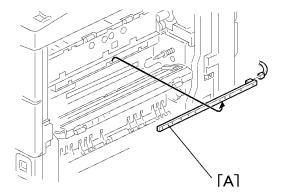
3. Duplex inverter motor [A] (x 2, x 1)

- 1. Rear lower cover
- 2. Duplex control board [A] ($\mathscr{F} \times 4$, all connectors)

3

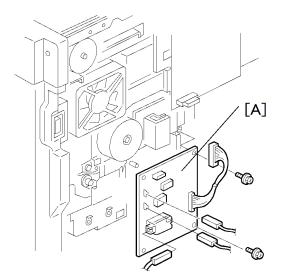
Other Replacements

Quenching Lamp



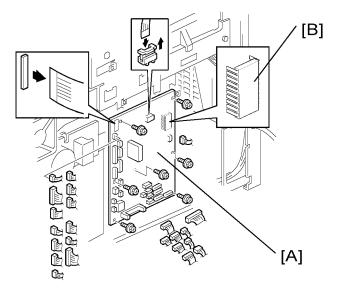
- 1. PCU
- 2. Quenching lamp [A] (x 1)

High-Voltage Power Supply Board



- 1. Rear cover (Rear Cover)
- 2. High-voltage power supply board [A] (F x 2, 3 standoffs, all connectors)

BICU (Base-Engine Image Control Unit)

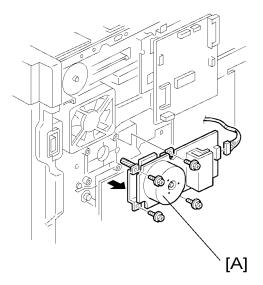


- 1. Rear cover (Rear Cover)
- 2. BICU [A] (*x 7, all connectors, 2 flat cables)



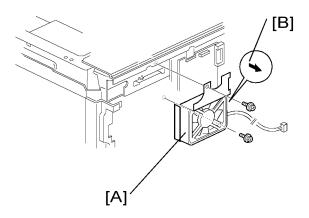
• Remove the NVRAM [B] from the old BICU and install it on the new BICU when you replace the BICU. The NVRAM keeps machine-specific data.

Main Motor



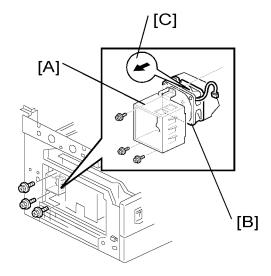
- 1. Rear cover (Rear Cover)
- 2. Main motor [A] (* x 4, * 1)

Rear Exhaust Fan (B282 Only)



- 1. Rear cover (Rear Cover)
- 2. Rear exhaust fan [A] (🖗 x 2, 📫 x 1)
- - Reassembling -

Make sure that the arrow on the fan [B] points the outside of the copier when you reassemble The
arrow indicates the direction of the air current.

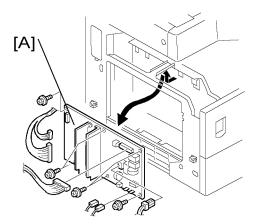


- 1. Rear cover (Rear Cover)
- 2. Left cover (Left Cover)
- 3. Fan cover [A] (x 3)
- 4. Fan [B] (♠ x 3, 🟴 x 1)

Mportant (

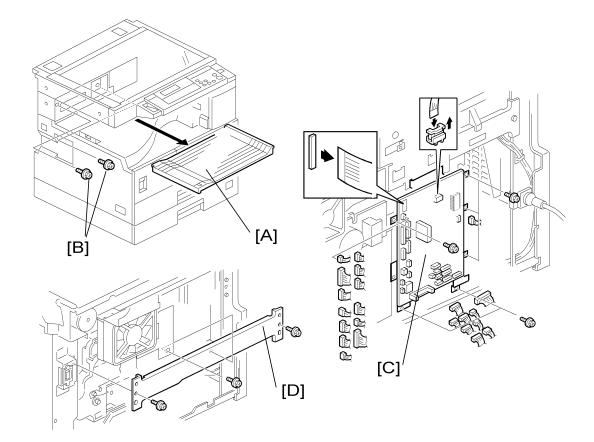
- Reassembling -
- Make sure that the arrow on the fan [C] points the outside of the copier when you reassemble. The
 arrow indicates the direction of the air current.

PSU (Power Supply Unit)



- 1. Left cover (Left Cover)
- 2. PSU [A] (All connectors, F x 6)

Gearbox



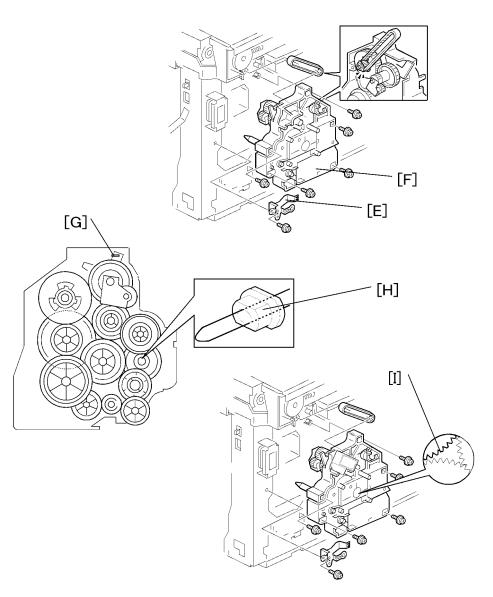
- Replacement Procedure -
 - 1. Inverter tray [A]
 - 2. Two screws [B] from the middle rear cover



- This step releases the topmost part of the BICU bracket.
- 3. High-voltage power supply board (with the bracket) (FR Registration Clutch) BICU (with the bracket) [C] (Fx 6)



- If you have difficulty to remove the bracket, remove the screw at the middle of the crosspiece (see step 6).
- 4. Main motor (Main motor)
- 5. Crosspiece [D] (x 3)
- 6. Registration clutch (Registration clutch)



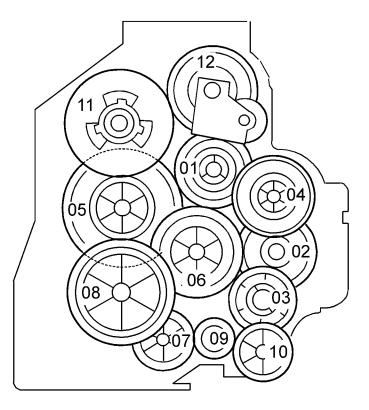
7. PCU



- This step releases the gear (on the gearbox) that drives the PCU.
- 8. Ground plate [E] (x 2)
- 9. Gearbox [F] (x 5, 1 belt)

Do not change the position of the spring [G] and make sure that the bushing [H] on the PCU drive shaft is in the correct position you when you reassemble. You can adjust its position by rotating the gear [I] seen from the opening of the gearbox.

- Gear Arrangement in the Gearbox -



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

3

Copy Adjustments Printing/Scanning

UNote

- You need to perform the adjustment after you do a Memory All Clear, and after you replace or adjust
 any of the following parts.
 - First or second scanner
 - Lens Block
 - Scanner Motor
 - Polygonal Mirror Motor
 - Paper Tray
 - Paper Side Fence
- For detailed explanations about how to access and use the SP modes, see Section 5.

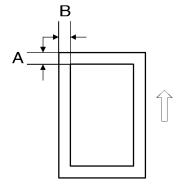
Printing



- Make sure the paper is installed correctly in each paper tray before you start these adjustments.
- Use the Trimming Area Pattern (SP 5902, No.10) to print the test pattern for the printing adjustments below.
- Set SP 5902 to 0 again after you complete these printing adjustments.
- Registration Leading Edge/Side-to-Side -
 - 1. Check the leading edge registration for each paper feed station, and adjust each of these registrations using SP 1001.
 - 2. Check the side-to-side registration for each paper feed station, and adjust these registrations using SP 1002. (Adjust the trays in order: the 1st tray first, then the 2nd tray, etc.)

Tray	SP mode	Specification
Any paper tray	SP 1001 1	
By-pass feed	SP 1001 2	
Duplex	SP 1001 3	
1 st tray	SP 1002 1	2 ± 1.5 mm
2nd tray (not used)	SP 1002 2	
3rd tray (Optional PFU tray 1)	SP 1002 3	

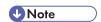
Tray	SP mode	Specification
4th tray (Optional PFU tray 2)	SP 1002 4	
By-pass feed	SP 1002 5	
Duplex	SP 1002 6	



A: Leading Edge Registration

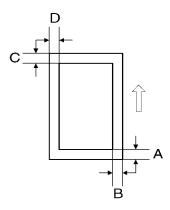
B: Side-to-side Registration

- Blank Margin -



- 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	SP 2101 2	2 +2.5/-1.5 mm	
Right edge	SP 2101 4	2 +2.5/ =1.5 111111	
Leading edge	SP 2101 1	2 ± 1.5 mm	
Left edge	SP 2101 3		



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 (SP 5902 1).
- 2. Check the magnification (the grid size should be 2.7×2.7 mm), and if necessary use SP 2998 to adjust it. The specification is $100 \pm 1\%$.

Scanning

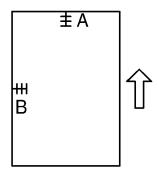


- Before doing the following scanner adjustments, check and adjust the printing leading-edge and sideto-side registrations and the printing blank margins (as described above).
- Use an A3 test chart to perform the following adjustments.

- Registration: Platen Mode -

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

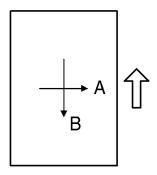
	SP mode	Specification
Leading edge	SP 4010	2 ± 1.5 mm
Side-to-side	SP 4011	2 ± 1.3 mm



A: Leading edge registration

B: Side-to-side registration

- Magnification -



A: Main scan magnification

B: Sub-scan magnification

- Main Scan Magnification -

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

	SP mode	Specification
Main Scan Magnification	SP 4009	± 1.0%

- Sub-Scan Magnification -

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

	SP mode	Specification
Sub-scan magnification	SP 4008	± 1.0%

- Standard White Density Adjustment -

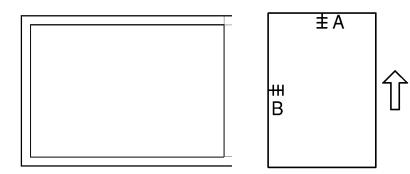
This procedure adjusts the standard white density level. Do this adjustment after you do any of the following:

- After you replace the standard white plate.
- After you replace the NVRAM on the BICU. (But note that you do not need to carry out this adjustment
 if you have replaced the BICU itself but retained the previous NVRAM board [by moving it over onto
 the new BICU].)
- After you perform a memory all clear (SP 5801 2)

Procedure:

- Place 10 sheets of new A4/LTR paper (sideways, LEF) or new A3/DLT paper on the exposure glass, and close the platen cover or the ADF.
- 2. Enter SP 4428 1 and select "1: YES". The machine automatically adjusts the standard white density.

ADF Image Adjustment



A: Leading edge registration

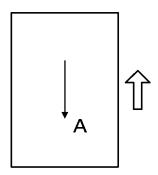
B: Side-to-side registration



- Make a temporary test chart as shown above, using A3/11" x 17" paper.
- 1. Place the temporary test chart on the ADF and make a copy from one of the feed stations.
- 2. Check the registrations, and adjust as necessary with the appropriate SP modes, as follows.

	SP mode
Side-to-side registration	SP 6006 1
Leading edge registration	SP 6006 2
Blank margin for the trailing edge	SP 6006 3

- Sub-scan Magnification -



A: Sub-scan magnification



- Make a temporary test chart as shown above, with A3/11" x 17" paper.
- 1. Place the temporary test chart on the ADF and make a copy from one of the feed stations.
- 2. Check the registration, and if necessary adjust it with SP 6006 5. The specification is $\pm 1.0\%$.

4. Troubleshooting

Service Call Conditions

Summary

There are four levels of service call conditions.

Level	Definition	Reset Procedure
A	To prevent damage to the machine, the main machine cannot be operated until the SC has been reset by a service representative (see the note below).	Enter SP mode, and then turn the main power switch off and on.
В	If the SC was caused by incorrect sensor detection, the SC can be reset by turning the main power switch off and on.	Turn the main power switch off and on.
С	The main machine can be operated as usual, excluding the unit related to the service call.	Turn the main power switch off and on.
D	The SC history is updated. The machine can be operated as usual.	The SC will not be displayed. Only the SC history is updated.



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

SC Code Descriptions

No.	Level	Symptom	Possible Cause
		Exposure Lamp Error	
101	В	The standard white level was not detected properly when scanning	Exposure lamp defectiveExposure lamp stabilizer defective
		the white plate.	 Exposure lamp connector defective

No.	Level	Symptom	Possible Cause
			Dirty scanner mirror or scanner mirror out of position
			SBU board defective
			SBU connector defective
			Lens block out of position
			Incorrect position or width of white plate scanning (SP4015)
		Scanner home position error 1	
			Scanner home position sensor defective
		TI 1	Scanner drive motor defective
120	В	The scanner home position sensor does not detect the off condition during initialization or copying.	Scanner home position sensor connector defective
		during initialization of copying.	Scanner drive motor connector defective
			BICU board defective
		Scanner home position error 2	
121	В	The scanner home position sensor does not detect the on condition during initialization or copying.	 Scanner home position sensor defective Scanner drive motor defective Scanner home position sensor connector defective Scanner drive motor connector defective BICU board defective
		SBU white/black level correction e	rror
143	D	The automatic SBU adjustment has failed to correct the black level. The automatic SBU adjustment has failed to correct the white level twenty times consecutively.	 Exposure lamp defective Dirty white plate Incorrect position or width of white plate scanning (SP4015) BICU board defective SBU board defective
		Communication Error between BIC	U and SBU
144	В	The BICU board cannot detect the SBU connect signal.	The flat cable between the BICU board and the SBU has a poor connection

No.	Level	Symptom	Possible Cause
			 The flat cable between the BICU board and the SBU is damaged BICU board defective SBU defective
		Automatic SBU adjustment error	
145	D	During the automatic SBU adjustment, the machine detects that the white level read from the white plate or paper is out of range. (SP4015)	 Exposure lamp defective Dirty white plate Incorrect position or width of white plate scanning (SP4015) BICU board defective SBU board defective
		Charge roller current leak	
302	В	A current leak signal for the charge roller is detected.	 Charge roller damaged High voltage supply board defective Poor connection of the PCU
		Polygonal mirror motor error	
320	В	The polygon mirror motor does not reach operating speed within 10 seconds after the motor ON signal is sent, or does not turn on within one of the 200 ms check intervals during operation.	 Polygon mirror motor defective Poor connection between the polygonal mirror motor driver and the BICU board Damaged cable between BICU and polygonal mirror motor driver BICU board defective
		No laser writing signal (F-GATE) er	ror
321	С	The laser-writing signal (F-GATE) fails to turn Low after the laser crosses 5 mm on the drum surface from the laser writing start position.	BICU board defective The fax controller or printer controller has a poor connection Fax controller or printer controller defective
		Laser synchronization error	
322	В	The main scan synchronization detector board cannot detect the la-	Poor connection between the LD unit and the BICU board

No.	Level	Symptom	Possible Cause
		ser synchronization signal for more than 5 consecutive 100 ms intervals.	 Damaged cable between BICU and LD unit LD unit out of position LD unit defective BICU board defective
		TD sensor error	
390	В	The TD sensor outputs less than 0.2 V or more than 4.0 V 10 times consecutively during copying.	TD sensor abnormal Poor connection of the PCU
		Development bias leak	
391	В	A development bias leak signal is detected.	Poor connection of the PCUHigh voltage supply board defective
		TD sensor initial setting error	
392	В	TD sensor initial setting is not performed correctly.	 ID sensor defective No developer Drum does not turn Development roller does not turn Poor connection of the PCU The voltage is not applied to charge roller
		Transfer roller leak error 1	
401	В	A current leak signal for the transfer roller is detected. A current feedback signal for the transfer roller is not detected.	 High voltage supply board defective Poor connection of the PCU Transfer/separation unit set incorrectly Transfer roller damaged
		Transfer roller leak error 2	
402	В	A current leak signal for the transfer roller is detected. A current feedback signal for the transfer roller is not detected.	 High voltage supply board defective Poor connection of the PCU Transfer/separation unit set incorrectly Transfer roller damaged
500	В	Main motor lock	

No.	Level	Symptom	Possible Cause
		A main motor lock signal is not detected for more than 7 consecutive checks (700 ms) after the main motor starts to rotate, or the lock signal is not detected for more than 7 consecutive checks during rotation after the last signal.	 Too much load on the drive mechanism Main motor defective
		Tray 2 lift motor malfunction (Optio	nal paper tray unit)
502	С	The paper lift sensor fails to activate twice continuously after the tray lift motor has been on for 18 seconds.	 Paper lift sensor defective Tray lift motor defective Too much load on the drive mechanism Poor tray lift motor connection
		Tray 3 lift motor malfunction (option	nal paper tray unit)
503	С	The paper lift sensor fails to activate twice continuously after the tray lift motor has been on for 18 seconds.	 Paper lift sensor defective Tray lift motor defective Too much load on the drive mechanism Poor tray lift motor connection
		Paper feed motor lock (optional pa	per tray unit)
506	С	A motor lock signal is not detected for more than 1.5 s or the lock signal is not detected for more than 1.0 s during rotation.	 Paper feed motor defective Too much load on the drive mechanism
		Fusing thermistor open (center)	
541	A	The fusing temperature detected by the thermistor is below 71°C and is not corrected after the main power switch is turned on.	 Fusing thermistor defective or out of position Power supply board defective Loose connectors
		Fusing temperature warm-up error	(center)
542	A	The fusing temperature rises less than 7 degrees in 2 seconds, and this continues 5 times consecutively.	 Fusing thermistor defective or out of position Fusing lamp open Power supply board defective

No.	Level	Symptom	Possible Cause		
		The fusing temperature is not detected in 25 or 35 seconds.			
		Fusing overheat error (center)			
543	A	The fusing temperature is over 230°C for 1 second (detected by the thermistor).	Fusing thermistor defectivePower supply board defective		
		Fusing overheat error (center) 2			
544	A	The fusing temperature is over 250°C for 1 second (detected by the fusing temperature monitor circuit). • Fusing thermistor defective • Power supply board defective			
		Fusing lamp overheat error (center)			
545	A	After the fusing temperature reaches the target temperature, the fusing lamp does not turn off for 12 consecutive seconds.	 Fusing thermistor defective or out of position Power supply board defective 		
		Unstable fusing temperature (center	-)		
546	A	The fusing temperature varies 50° C or more within 1 second, and this occurs 2 consecutive times.	Thermistor defective or out of positionPower supply unit defective		
		Zero cross signal malfunction			
547	В	Zero cross signals are not detected within 5 seconds after the main power switch is turned on, or are not detected within 1 second after operation begins.	Power supply board defectiveBICU defective		
		Fusing thermistor open (rear)			
551	A	The fusing temperature detected by the thermistor is below 71°C and is not corrected after the main power switch is turned on.	 Fusing thermistor defective or out of position Power supply board defective Loose connectors 		
552	А	Fusing temperature warm-up error ((rear)		

No.	Level	Symptom	Possible Cause
		The fusing temperature rises less than 7 degrees in 2 seconds, and this continues 5 times consecutively. The fusing temperature is not detected in 25 or 35 seconds.	 Fusing thermistor defective or out of position Fusing lamp open Power supply board defective
		Fusing overheat error (rear)	
553	Α	The fusing temperature is over 230°C for 1 second (detected by the thermistor).	Fusing thermistor defective Power supply board defective
		Fusing lamp overheat error (rear)	
555	A	After the fusing temperature reaches the target temperature, the fusing lamp does not turn off for 20 consecutive seconds.	 Fusing thermistor defective or out of position Power supply board defective
		Unstable fusing temperature (rear)	
556	А	The fusing temperature varies 50° C or more within 1 second, and this occurs 2 consecutive times.	Thermistor defective or out of position Power supply unit defective
		Jam error detected 3 times in succe	ssion
559	-	 The exit sensor and the duplex sensor detect a paper jam 3 times in succession This condition can occur when SP 1159 1 is set to 'on'. The default is 'off'. 	Paper jams can occur for the following reasons. Dampness Paper curl Incorrect paper setting in the paper tray Stripper pawls coming apart
		Left exhaust fan motor error	
590	В	The CPU detects an exhaust fan lock signal for more than 5 seconds.	Loose connection of the exhaust fan motor Too much load on the motor drive
591	В	Rear exhaust fan motor error	

No.	Level	Symptom	Possible Cause			
		The CPU detects an exhaust fan lock signal for more than 5 seconds.	Loose connection of the exhaust fan motor Too much load on the motor drive			
		Communication error between BIC	U and ADF			
620	В	The BICU does not receive a response from the ADF main board for 4 seconds or more. The BICU receives a break signal from the ADF main board.	 Poor connection between the BICU and ADF main board (DF connector) ADF main board defective BICU defective 			
		ADF connection error				
621	В	An incorrect ADF (an ADF for some other copier) is detected.	 ADF incorrect (The ADF for B039/B040/B043 or B121/B122/B123/B259/B260/B261 is installed on a B282/B283) The connector of the ADF is removed while the machine is in the energy saver mode. 			
		Accounting error 1				
632	С	An error is detected during the communication with the MF accounting device.	Accounting device defective Loose connection			
		Accounting RAM error				
634	С	An error is detected in the RAM that saves the information on the MF accounting.	Accounting device defective			
		Accounting battery error				
635	В	An error is detected in the battery that is in the MF accounting device.	Accounting device defective			
		Controller board communication al	onormal			
692	В	Communication error between the printer part of the controller board and BICU.	The connector is abnormal between the controller board and the BICU board.			
694	-	Controller board communication al	onormal			

No.	Level	Symptom	Possible Cause
		Communication error between the scanner part of the controller board and BICU.	The connector is abnormal between the controller board and the BICU board.
		ADF gate abnormal 1	
760	В	The ADF Gate signal line between the ADF main board and the BICU is disconnected.	 ADF main board defective Input/output board defective Poor connection (ADF Gate line) between the ADF main board and the BICU.
		ADF gate abnormal 2	
761	В	The FGATE signal is not issued from the ADF within 30 seconds after the ADF starts feeding.	ADF connector defective SBU board defective
		ADF gate abnormal 3	
762	В	The FGATE signal is not terminated by the ADF within 60 seconds after the ADF starts feeding.	ADF connector defective SBU board defective
		Engine total counter error	
903	В	The checksum of the total counter is not correct.	NVRAM on the BICU defective
		Memory error	
928	В	The machine detects a discrepancy in the write/read data during its write/read test (done at power off/on and at recovery from low power or night/off mode).	Memory defective BICU defective Poor connection between BICU and memory
		NVRAM error	
981	В	The machine detects a discrepancy in the NVRAM write/read data when attempting to save actual data to the NVRAM (i.e. during actual use).	 NVRAM defective Poor connection between BICU and NVRAM NVRAM is not connected BICU defective

No.	Level	Symptom	Possible Cause	
		Localization error		
982	В	The localization settings in the non-volatile ROM and RAM are different (SP5807).	 First machine start after the NVRAM is replaced Incorrect localization setting NVRAM defective 	

Electrical Component Defects

Sensors

Component	CN	Condition	Symptom
Degistration	111-2	Open	The Paper Jam message will appear whenever a copy is made (paper has not reached the sensor).
Registration	(BICU)	Shorted	The Paper Jam message appears even if there is no paper at the sensor.
Relay	111-5	Open	The Paper Jam message will appear whenever a copy is made except for 1st and by-pass tray feeding.
	(BICU)	Shorted	The Paper Jam message appears even if there is no paper at the sensor.
		Open	The Paper End indicator lights when the 1st paper tray is selected, even if there is paper in the tray.
Upper Paper End	114-2 (BICU)	Shorted	The Paper End indicator does not light when the 1st paper tray is selected, even if there is no paper in the tray. The Paper Jam message will appear whenever a copy is made from the 1st paper tray.
V 4 17	110-2	Open	The Paper Jam message will appear whenever a copy is made from an optional paper tray unit.
Vertical Transport	(BICU)	Shorted	The Paper Jam message appears even if there is no paper at the sensor.
		Open	The Paper End indicator lights when the bypass tray is selected, even if there is paper in the tray.
By-pass Paper End	136-7 (BICU)	Shorted	The Paper End indicator does not light when the bypass tray is selected, even if there is no paper in the tray. The Paper Jam message will appear whenever a copy is made from the bypass tray.
Exit	124-2 (BICU)	Open	The Paper Jam message will appear whenever a copy is made (paper has not reached the sensor).

Component	CN	Condition	Symptom
		Shorted	The Paper Jam message appears even if there is no paper at the sensor.
Toner Density	125-3	Open	CC200: It I
Toner Density	(BICU)	Shorted	SC390 is displayed.
Imaga Dansity	123-2	Open	The toner density control process is changed (see
Image Density	(BICU)	Shorted	the note below the table).
C II D	102-2	Open	SC120 shows.
Scanner H.P.	(BICU)	Shorted	SCIZU snows.
Duplex Entrance	222-2 (DCB)	Open	The Paper Jam message will appear whenever a duplex copy is made (paper has not reached the sensor).
		Shorted	The Paper Jam message appears even if there is no paper at the sensor.
Duplex Exit	222-5	Open	The Paper Jam message will appear whenever duplex copy is made (paper has not reached t sensor).
	(DCB)		The Paper Jam message appears even if there is no paper at the sensor.
Duplex Inverter	220-6 Open	Open	The Paper Jam message will appear whenever a duplex copy is made (paper has not reached the sensor).
	(DCB)	Shorted	The Paper Jam message appears even if there is no paper at the sensor.



• SC392 is activated when the CPU detects an ID sensor error during developer initialization (SP 2214). However, SC392 is not displayed on the LCD but simply logged in the SC log (SMC printout), unless the technician exits SP Mode as soon as an error message is displayed.

Switches

Component	CN	Condition	Symptom
	115	Open	The CPU cannot detect the proper paper size,
Upper Paper Size	1,2,4 (BICU)	Shorted	and misfeeds may occur when a copy is made from the 1st paper tray.
	110.5	Open	The Cover Open indicator is lit even if the vertical transport door is closed.
Vertical Transport Door	110-5 (BICU)	Shorted	The Cover Open indicator is not lit even if the vertical transport door is opened.
		Shorted	
By-pass Paper Size	136-1,2,4, 5 (BICU)	Open	The CPU misdetects or is not able to detect the size of the paper set in the bypass tray, causing possible misfeeds when feeding from this tray.
Diela Danie	124-5	Open	The Cover Open indicator is lit even if the right door is closed.
Right Door	(BICU)	Shorted	The Cover Open indicator is not lit even if the right door is open.
Form / Division Comme	130-1	Open	The Cover Open indicator is lit even if doors are closed.
Front/Right Cover	(BICU)	Shorted	The Cover Open indicator is not lit even if doors are open.
Main	281-3,4	Open	The machine does not turn on.
Main	(PSU)	Shorted	The machine does not turn off.

All the fuses in the following table are on the power supply board.

E	Rating
Fuse	220 – 240 V
FU1	8A/250V
FU2	2.5A/250V
FU3	1A/250V
FU4	4A/250V
FU5	4A/250V
FU6	4A/250V
FU7	4A/250V

4

LED Display

BICU

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

5. Service Tables

Service Program Mode

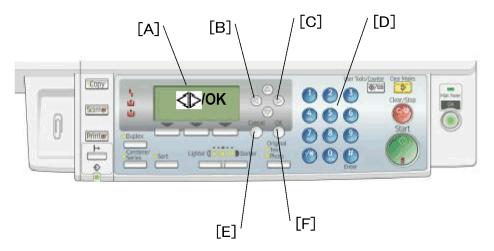


 Do not let the user access the SP mode. Only service representatives are allowed to access the SP mode. The machine quality or its operation is NOT guaranteed if persons other than service representatives accesses the SP mode.

How to Enter the SP Mode

The following two modes are available:

- SP Mode (Service Program Mode): The SP Mode includes the programs that are necessary for standard maintenance work.
- SSP Mode (Special SP Mode): The SSP Mode includes SP-Mode programs and some special programs. You need some extra knowledge to manipulate these special programs. For details, consult your supervisor.



Starting SP Mode

- 1. Type the keys as follows: [Clear Modes] > [1] > [0] > [7]
- 2. Press the [Clear/Stop] key and hold it down until the SP-mode menu is displayed (about 3 seconds).

Starting SSP Mode

- 1. Type the keys as follows: [Clear Modes] > [1] > [0] > [7]
- 2. Press the result is the SP-mode menu shows (about 3 seconds).

5

- 3. Press the [Enter] key and hold it down.
- 4. While holding down the [Enter] key, press the "OK" key.

Selecting Programs

- When a blinking underscore (or several blinking underscores) shows, you can type a number from the numeric keypad [D].
- When the sign "♣ /OK" [A] shows in the upper right corner, you can scroll through the menu by pressing the left-arrow key [B] or the right-arrow key [C]. To select a program, press the "OK" key [F].

Specifying Values

- 1. After locating a program, press the "OK" key. A blinking underscore (or several blinking underscores) indicates which value you can change. The value in parentheses is the default value of the menu.
- Type a necessary value from the numeric keypad. To switch between positive (plus) and negative (minus) values, press the [./*] (period/asterisk) key.
- 3. To validate the value, press the "OK" key. To cancel the value, press the cancel key [E].

Activating Copy Mode

You can activate the copy mode while the SP mode is running. When you do so, the copier outputs images or patterns that help you adjust the SP-mode program.

- 1. Press the 🕑 key. The copy mode is activated.
- 2. Specify copy settings and press the "OK" key.
- 3. To return to the SP mode, press the [©] key.



• You cannot end the SP mode while the copy mode is activated.

Quitting Programs/Ending (S)SP Mode

Press the [©] key or the "Cancel" key to quit the program. You can end the SP mode by pressing one of these keys several times.

SP Mode Tables

The following codes are used:

- Asterisk (*): The settings are saved in the NVRAM. Most of them return to the default values when you
 execute SP 5801 2
- The DFU menu is for design or factory use only. You must not change the settings.
- Brackets ([]): The brackets enclose the setting rage, default value, and minimum step (with unit) as follows: [Minimum ~ Maximum / Default / Step].
- SSP: The program is in the SSP Mode only. Consult your supervisor before you use this program.

SP1-XXX (Feed)

1001*	Leading Edge Registration	
1001	Adjusts the printing leading-edge registration from paper trays.	
1001 1	All Trays	
1001 2	By-pass	[-9.0 ~ 9.0 / 0.0 / 0.1 mm/step] (Copy Adjustments Printing/Scanning)
1001 3	Duplex	3, 3,

	Side-to-Side Registration	
1002*	Adjusts the printing side-to-side registration from each paper feed station, using the Trimming Area Pattern (SP 5902, No.10). Adjustments are supported for all 4 possible feed trays (including optional trays).	
	The SP 1002 1 setting is applied to all trays, not just the 1st tray. Settings for trays 2 to 4 are offsets relative to the SP 1002 1 setting.	
	For duplex copies, the value for the front side is determined by SP 1002 1 to 4, and the value for the rear side is determined by SP 1002 6.	
1002 1	1 st tray	
1002 2	2nd tray	
1002 3	1002 5 Sid lidy	[-9.0 ~ 9.0 / 0.0 / 0.1 mm/step] (Copy Adjustments Printing/Scanning)
1002 4	4th tray (not used)	
1002 5	By-pass	

10026	Duplex	
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	Paper Feed Timing	
1003*	Adjusts the amount of buckle the paper feed clutch applies to the paper after the registration sensor is activated. A higher setting applies greater buckling.	
1003 1	1 st tray	[0 ~ 10 / 5 / 1 mm/step]
1003 2	2nd tray (not used)	[0 ~ 10 / 5 / 1 mm/step]
1003 3	Optional tray	[0 ~ 10 / 5 / 1 mm/step]
1003 4	By-pass feed	[0~10/ 6 /1 mm/step]
1003 5	Duplex	[0 ~ 20 / 6 / 1 mm/step]

1007	Display By-pass	
1007 1	Display By-pass	Displays the by-pass paper width switch output.

1103*	"1," the contact/release control the fusing unit. As a result, the ma	of the Fusing Drive Release Mechanism. When you select is disabled and the drive power is always transmitted to achine takes a longer time to warm up the fusing unit. Use weven when the room temperature is not very low.
1103 1	Fusing Idling	[0 = No / 1 = Yes]

	Fusing Temperature Adjustment	
1105*	Adjusts the target fusing temperature. "Center" indicates the center of the roller; "End" indicates the front and rear ends.	
1105 1	Warm Up-Center	[140 ~ 180 / 160 / 1°C/step]
1105 2	Warm Up-End	[140 160 / 1 60 / 1 C/ siep]
1105 3	Standby-Center	[140 ~ 170 / 155 / 1°C/step]
1105 4	Standby-End	[140 ~ 165 / 150 / 1°C/step]
1105 5	Copying-Center	[140 ~ 185 / 160 / 1°C/step]

1105 6	Copying-End	
1105 7	Low Level 2-Center	[0 ~ 80 / 60 / 1 °C/step]
1105 8	Low Level 2-End	
1105 9	Thick-Center	[140 ~ 105 / 175 / 100 / .]
1105 10	Thick-End	[140 ~ 185 / 175 / 1°C/step]
1105 11	Warm Up Low-Center	[140 ~ 100 / 170 / 1°C /]
1105 12	Warm Up Low-End	[140 ~ 180 / 170 / 1°C/step]

1106	Display Fusing
1106 1	Displays the fusing temperature (center)
1106 2	Displays the fusing temperature (end)

Adjusts the number of zero-cross cycles of the fusing lamp AC supply needed to fusing lamp power to 100% while bringing the lamp up to the standby temperatur copying. Increase this value if the machine is experiencing sudden power drope (Fusing Temperature Control).		Fusing Soft Start	
		00% while bringing the lamp up to the standby temperature or while value if the machine is experiencing sudden power dropouts	
	11071	Warm Up Soft Start [0 = 10 cycles / 1 = 20 cycles / 2 = 50 cycles]	
	1107 2	Other Soft Start	[0 = 5 cycles / 1 = 10 cycles / 2 = 20 cycles]

1108*	Set-Fusing Start	[0 = 1s / 1 = 1.5s / 2 = 2s]
1108 1	Specifies the interval for fusing-temperature control (Fig. Fusing Temperature Control)	

1109	Nip Band Check	
1109 1	Checks the fusing nip band (NIP Band Width Adjustment).	

1110*	Fan Control Timer
11101	[30 ~ 60 / 30 / 1 s/step]

Inputs the fan control time. The fan maintains normal speed for the specified time after occurrence of an SC or following entry into Warm-up mode, Low Power mode, or Night/Off mode.

1159*	Fusing Jam SC Code Setting	0=No 1=Yes
1159 1	This SP mode detects SC559. Set this SP mode to 'Yes' if the machine experiences pape jam problems on a continual basis.	

1902	Display-AC Freq.	
1902 1	Displays the fusing lamp power control frequency (as detected by the zero cross signal generator). The displayed value is 1/5 the actual frequency: 10 = 50 Hz, 12 = 60 Hz.	

	Feed Clutch Boost	
1903*	Adjusts the amount of extra push that the feed clutch gives to the paper after the skew has been corrected at registration. This feature helps the registration roller feed certain types of paper (such as thick paper). Increase the value if thick paper is jamming after feeding from the registration roller.	
1903 1	By-pass tray [0 ~ 10 / 6 / 1 mm/step]	
1903 2	2nd, 3rd, 4th tray (4th tray not used)	[0 ~ 10 / 3 / 1 mm/step]

1908*	Optional Tray Adj.	
1908	Adjusts the reverse time for the upper and lower paper lift motors.	
1908 1	1 st optional	[-2 ~ +2 / 0 / 1/step]
1908 2	2nd optional	(Proptional Equipment)

1911*	By-pass Envelope
	[O = Disabled / 1 = Enabled
1911 1	The program dedicated to envelope printing runs when you enable this program (SP 1911 1) and you select "Thick Paper" as the paper type of the by-pass tray (System Settings > Tray Paper Settings > Paper Type: Bypass Tray).

SP2-XXX (Drum)

2001*	Charge Roller Bias Adjustment	
	Printing	[-2100 ~ -1500 / -1700 / 1 V/step]
2001 1	changes automatically as charg	e charge roller when printing. The actually applied voltage e roller voltage correction is carried out. The value you set n which this correction is carried out.
	ID sensor pattern	[0 ~ 400 / 300 / 1 V/step]
2001 2	Adjusts the voltage applied to the charge roller when generating the Vsdp ID sensor pattern (as part of charge roller voltage correction). The actual charge-roller voltage is obtained by adding this value to the value of SP 2001 1.	

2101*	Erase Margin Adjustment		
21011	Leading edge	[0.0 ~ 9.0 / 2.0 / 0.1 mm/step] (Copy Adjustments Printing/Scanning) Specification: 2 ± 1.5 mm	
	Adjusts the leading edge	Adjusts the leading edge erase margin.	
2101 2	Trailing	[0.0 ~ 9.0 / 3.0 / 0.1 mm/step] (Copy Adjustments Printing/Scanning) Specification: 2 +2.5/-1.5 mm	
	Adjusts the trailing edge erase margin. The rear trailing edge is this value plus 1.2 mm.		
21013	Left side	[0.0 ~ 9.0 / 2.0 / 0.1 mm/step] (Copy Adjustments Printing/Scanning) Specification: 2 ± 1.5 mm	
	Adjusts the left edge erase margin. The rear left edge is this value plus 0.3 mm.		
2101 4	Right side	[0.0 ~ 9.0 / 2.0 / 0.1 mm/step] (Copy Adjustments Printing/Scanning) Specification: 2 +2.5/-1.5 mm	
	Adjusts the right edge ero	ase margin. The rear right edge is this value plus 0.3 mm.	

2201*	Development Bias Adjustment
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2201 1	Printing	[-1500 ~ -200 / -650 / 1 V/step]
	Adjusts the voltage applied to the development roller when printing. This can be adjusted as a temporary measure if faint copies are being produced due to an aging drum.	
	ID sensor pattern	[-2 = LL (220 V) / -1 = L (260 V) / 0 = N (300 V) / 1 = H (340 V) / 2 = HH (380 V)]
2201 2	Adjusts the voltage applied to the development roller when generating the ID sensor pattern. The actual voltage applied is this setting plus the value of SP 2201 1. The setting affects ID sensor pattern density, which in turn affects the toner supply.	

221	3*	Outputs after Near End	
2	2213 1	[0 = 50 pages / 1 = 20 pages] Sets the number of copy/print pages that can be made after toner near-end has been detected. Reduce the number of pages if the user normally makes copies with a high image	
		ratio.	

2214	Developer Initialization	
22141	Initializes both the TD sensor toner supply target voltage and the TD sensor gain value. Carry this out after replacing the developer or the TD sensor.	

2220	TD Sensor Output Value Display	
2220 1	Displays: 1. Vt: the current TD sensor output value and 2. Vref: the target TD output value Vts (SP 2926) + correction for ID sensor output. The TD sensor output value changes every copy. If 1 > 2, toner is supplied to the development unit.	

2221	ID Sensor Error Analysis	
2221 1	Vsg	Displays the Vsg value.
2221 2	Vsp	Displays the Vsp value.
2221 3	PWM	Displays the PWM value.
2221 4	Vsdp	Displays the Vsdp value.
2221 5	Vt	Displays the Vt value.

2221 6 Vts Displays the Vts value.

2301*	Transfer Current Adjustment	
	Normal paper	[-2 = -4 mA / -1 = -2 mA / 0 = 0 mA / 1 = 2 mA / 2 = +4 mA]
2301 1	Adjusts the current applied to the transfer roller when feeding from a paper tray. Use a high setting if the user normally feeds relatively thick paper (within spec) from a paper tray [Image Transfer Current Timing]	
	Thick/Special paper	[-2 = -4 mA / -1 = -2 mA / 0 = 0 mA / 1 = 2 mA / 2 = +4 mA]
2301 2	Adjusts the current applied to the transfer roller when feeding from the by-pass tray. Use a high setting (a) if the user normally feeds relatively thick paper from the by-pass tray, or (b) if waste toner is re-attracted from the drum (which can occur when using transparencies).	
	Duplex	[-2 = -4 mA / -1 = -2 mA / 0 = 0 mA / 1 = 2 mA / 2 = +4 mA]
2301 3	Adjusts the current applied to the transfer roller when carrying out a duplex job. Use this SP if there is poor image transfer on the rear side of duplex copies (Image Transfer Current Timing)	
	Cleaning	[-10 ~ 0 / -1 / 1 mA/step]
2301 4		e transfer roller for roller cleaning. Increase the current if cleaning. (Remaining toner may cause dirty background Transfer Current Timing)

2802 Forced Developer Churning	
2802 1	Initializes the developer and checks the TD sensor output (Vt). The machine mixes the developer for 2 minutes while reading and displaying the Vt value. The machine does not initialize the TD sensor output. If the machine has not been used for a long period of time, prints may have a dirty background. In this case, use this SP mode to mix the developer. The message "Completed" is displayed when the program ends normally.

2906*	Tailing Correction	
2906 1	Shift value	[0.0 ~ 1.0 / 0.0 / 0.1 mm/step]

	Shifts the image writing position in intervals specified by SP 2906 2. When makin copies of an original that contains vertical lines (such as in tables), the paper may separate correctly. This can cause tailing images (ghosts of the vertical lines continuate past the bottom of the table). This SP can be used to prevent this.	
2906 2	Interval	[1 ~ 10 / 1 / 1 page/step]
2900 2	Changes the interval for the ima	ge shift specified by SP 2906 1.

2908	908 Forced Toner Supply	
2908 1	Forces the toner bottle to supply toner to the toner supply unit. Press "1" to start. The machine continues to supply toner until the toner concentration in the development unit reaches the standard level, or for up to 2 minutes (whichever comes first).	

2915*	Polygon Mirror Motor Idling Time
	[0 = None / 1 = 15 s / 2 = 25 s]
2915 1	Selects the polygon mirror motor idling time. To increase the speed of the first copy, the mirror motor begins idling when the user sets an original, touches a key, or opens the platen cover or DF. If this setting is left at the default (15 s), the motor will stop if the user does nothing for 15s. If the setting is "0", the motor will not switch off during standby. (But note that regardless of the setting, the motor will switch off when the machine enters energy saver mode.)

2921*	Toner Supply Mode
	[0 = Sensor 1 / 1 = Sensor 2 (DFU) / 2 = Fixed 1 (DFU) / 3 = Fixed 2]
2921 1	Selects the toner supply mode. Under normal conditions this should be set to "0". You can temporarily change this to "3" if the TD sensor is defective. Do not set to "1" or "2", as these are for design use only (" Toner Density Control)

2922*	Toner Supply Time
2922 1	[0.1 ~ 5.0 / 0.4 / 0.1 s/step] Adjusts the toner supply motor ON time for Sensor 1 and Sensor 2 toner supply mode. Accordingly, this setting is effective only if SP 2921 is set to "0" or "1" 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 (*** Toner Density Control)

2923* Toner Recovery Time	
2923 1	[3 ~ 60 / 30 / 1 s/step] Adjusts the toner supply motor ON time used during toner recovery from Toner Near End or Toner End. This setting is effective only if SP 2921 is set to "0" Since toner recovery is carried out in 3-second cycles, the input value should be a multiple of 3 (3, 6, 9).

2925*	Toner Supply Rate
	Adjusts the toner supply time for fixed toner supply mode. This setting is effective only if SP 2921 is set to "2" or "3". $[0 \sim 7 / 0]t = 200 \text{ms}$, and settings are as follows
	0 = t , 1 = 2t, 2 = 4t, 3 = 8t, 4 = 12t, 5 = 16t,
2925 1	6 = on continuously, 7 = 0 s
	Raising this value increases the toner supply motor ON time. Set to a high value if the user tends to make many copies having high proportions of solid black image areas (For Toner Density Control)

2926* Standard Vt	
2926 1	[0.00 $^{\sim}$ 5.00 / 2.50 / 0.01 V/step] DFU Adjusts Vts (the Vt value for new developer). The TD sensor output is adjusted to this value during the TD sensor initial setting process]. This SP is effective only when SP 2921 is "0", "1", or "2".

2927*	ID Sensor Control
	[0 = No / 1 = Yes]
2927 1	Selects whether the ID sensor is or is not used for toner density control. This value should normally be left at "1". If the value is "0", dirty background may occur after long periods of non-use.

2928	Toner End Clear	
2928 1	Clears the toner end condition without adding new toner. The following are cleared: Toner end indicator (goes out). Toner near-end counter Toner near-end level	

This function should generally not be used. If you clear the toner end condition without adding new toner, there is a risk that the drum may eventually begin to attract carrier after many more copies are made and toner runs out. This attracted carrier may damage the drum.

2929*	Vref Limits	
Adjust the upper or lower Vref limit.		mit.
2929 1	2929 1 Upper [0.50 ~ 3.50 / 3.20 / 0.01V/step] DFU	
2929 2	Lower	[0.50 ~ 3.50 / 0.70 / 0.01V/step] DFU

2994*	ID Sensor Detection Temperature	[30 ~ 90 / 30 / 1 °C/step]
2994 1	l e	an energy saver mode, or while the machine starts, nals if the fusing temperature is at the specified value

2996*	2996* Transfer Roller Cleaning	
299	96 1	Selects whether the transfer roller is cleaned before each copy job. Set this to "1" if dirty background is appearing on the reverse side of the first page of copy jobs. Note that this will increase the time required to generate the first copy. If the setting is "0", the transfer roller is never cleaned ("Transfer Roller Cleaning).

2997*	Toner Density Sensor Standard Voltage	[0 / 2.5 / 5 / 0.01 V / step] DFU
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2998*	Main Scan Magnification	[-0.5 ~ +0.5 / 0.0 / 0.1%/step]
2998 1	Adjusts the magnification along the main scan direction, for all print modes (copy, printing The specification is 100 ± 1.0% (For all printing Adjustments Printing Adjustments Printing)	

SP4-XXX (Scanner)

4008*	Sub-Scan Magnification (Scanner)	[-0.9 ~ +0.9 / 0.0 / 0.1%/step]
4008 1	Adjusts the actual sub-scan direction scanning magnification. The higher the setting, the lower the scanner motor speed.	

4009*	Main Scan Magnification (Scanner)	[-0.9 ~ +0.9 / 0.0 / 0.1%/step]
	Adjusts the magnification along the main scan direction, for scanning. The specification is 100 ± 1.0%	
4009 1	Main scan magnification is implemented in steps of 0.5. Accordingly, your input value should be a multiple of 0.5 (-1.0 , -0.5 , 0, $+0.5$, or $+1.0$)	

4010*	Leading Edge Registration (Scanner) [-5.0 ~ +5.0 / 0.0 / 0.1 mm/step]	
	Adjusts the leading edge registration for scanning in platen mode (Copy Adjustments Printing/Scanning)	
40101	(-): The image moves toward the leading edge.	
	(+): The image moves toward the trailing edge·	
	The specification is 2 ± 1.5 mm.	

4011*	Side-to-side Registration (Scanner)	[-4.2 ~ +4.2 / 0.0 / 0.1 mm/step]
40111	Adjusts the side-to-side registration for scanning in platen mode (Copy Adjustments Printing/Scanning)	
	Increasing the value shifts the image to	the right
	The specification is 2 ± 1.5 mm.	

	Scan Erase Margin	
Adjusts the scanning margin individually for each of the four edges. It is go adjust the scanning margin as little as possible, and use the printing margin adjustments.		,
4012 1	Leading edge	
4012 2	Trailing edge	[0~00/10/01/]
40123	Left	[0~9.0 / 1.0 / 0.1 mm/step]
4012 4	Right	

4013	Scanner Free Run	
4013 1	Performs a scanner free run with the exposure lamp on. Press ON or to start. Press OFF to stop.	

4015*	White Plate Scanning	
	Start position	[-3.0 ~ +6.0 / 0.0 / 0.1 mm/step]
Adjusts the scanning start position on the white plate for auto shading. stored in the machine is 15.2 mm toward the white plate from the scanner specifies the offset from this base value.		toward the white plate from the scanner HP. This SP setting
	Scanning length	[-3.0 ~ +6.0 / 0.0 / 0.1 mm/step]
Adjusts the length of the white plate scan, in the main scan direction. The scan beging the start position set above [in SP 4015 1] and extends for the specified length. The value stored in the machine is 4.76 mm. This SP setting specifies the offset from this levalue.		P 4015 1] and extends for the specified length. The base

4428	Scan Auto-Adjustment	
4428 1	Performs the automatic scanner adjustment. Use this SP mode after replacing the white plate.	

4901	SBU White Level Adjustment	
	Black Feedback-EVEN	[0~8191]
4901 2	Displays the feedback value of the even channels given by the SBU. Normally, the value is 1, 2, 3,, 8188, 8189, or 8190. However, machine may operate normally even when the value is 0 or 8191.	
	Black Feedback-ODD	[0~8191]
4901 3	Displays the feedback value of the odd channels given by the SBU. Normally, the value is 1, 2, 3,, 8188, 8189, or 8190. However, machine may operate normally even we the value is 0 or 8191.	
	Black Display-Target	[0 ~ 63 / 10 /step]
Displays the target value for the black-level adjustment executed during machine zation. Normally, the value is 10. Other values indicate that the adjustment has e unsuccessfully. White Target [0 ~ 511 / 511 / 1/step] Displays the target value for the white-level adjustment.		
		[0 ~ 511 / 511 / 1/step]
		white-level adjustment.
4901 6	White Result	[0 ~ 511 / 0 / 1/step]

	Displays the result of the white-level adjustment.	
	White Number of Attempt	[0 ~ 20 / 0 / 1/step]
4901 10	Displays how many times the white-level adjustment is retried. The value does not include the first execution of the white adjustment. For example, if the value is "2", this indicates that the white-level adjustment has been executed three times. The white-level adjustment can be executed 20 times or less. Therefore, if the value is "20," this indicates that the white-level adjustment has ended abnormally (as described, the value "20" does not include the first execution). If the white-level adjustment is unsuccessful, the machine uses the result of the latest, successful white-level adjustment.	
	Auto Adjustment Setting	[222 ~ 281 / 256 / 1/step]
490111	Displays the parameter of the white-level adjustment. The value is based on the result of SP 4901 12.	
	Auto Adjustment-Result	[0 ~ 600 / 0 / 1/step]
4901 12	Displays the result of the white-level adjustment. Normally, the value is between 228 and 281 (including the both values). When the value is normal, it is stored as the value of SP 4901 11.	

4902*	Exposure Lamp ON	
4902 1	Turns the exposure lamp on or off. To turn off the exposure lamp, select "OFF". (The exposure lamp shuts off automatically after 180 seconds.)	

4903*	ADS Level	[0 ~ 255 / 252 / 1/step]
4903 1	Adjusts the ADS level.	

4904*	ADS Lower Limit	[0 ~ 255 / 80 / 1/step]
4904 1	Adjusts the ADS lower limit.	

4905*	ADS Level	[0 = All / 1 = One]
4905 1	Checks the whole area (0 = All) (1 = One) to adjust the ADS lev	or the area between 15 mm and 90 mm from the left edge

4921*	Image Adj Selection
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	Image Adj Selection (Copy)	[0~10/ 0 /1]
Selects which mode the settings from SP 4922 to SP 4932 and are used for: 0 = None, 1 = Text 1, 2 = Text 2, 3 = Photo 1, 4 = Photo 2, 5 = Photo 3, 6 = Special 2, 8 = Special 3, 9 = Special 4, 10 = Special 5		om SP 4922 to SP 4932 and are used for:
		•

	Scanner Gamma		
4922*	Selects "text" or "photo" as the priority output mode. This setting is applied to all improcessing modes of SP 4921.		
4922 1	Scanner Gamma (Copy)	[0=System default/ 1=Text /2=Photo]	

	Notch Selection	
4923*	Selects the value of the center ID adjustment notch for the ID adjustment LEDs. Normally the center notch is 3 (range 1-5). If –1 is selected, each notch shifts down (becomes lighter). If +1 is selected, each notch shifts up (becomes darker).	
	This setting is applied to all imag	ge processing modes of SP 4921.
4923 1	Notch Selection (Copy)	[-1 = Light / O = Normal / +1 = Dark]

	Texture Removal	
4926*	Adjusts the texture removal level that is used with error diffusion. 0: The default value for each mode is used. Text 1, Photo 2, Special 2, and Special 5 have a default of 3 and Photo 1, 3 have a default of 1. 1: No removal applied.	
	2 – 5: Removal applied at the level specified here. The higher the setting (level), to clear the image will become (more texture removal). This setting is only applied to originals in SP 4921.	
4926 1	Texture Removal (Copy)	[0 ~ 6 / 1/step]

		Line Width Correction	
Adjusts the line width correction algorithm. Positive settings produce settings produce thinner lines. This setting is only applied to the original setting.			
	4927 1	Line Width Correction (Copy)	[-2 ~ 2 / 0 / 1/step]

	Independent Dot Erase	
4928*	Selects the dot erase level. Higher settings provide greater erasure. This setting is a applied to the originals in SP 4921.	
4928 1	Independent Dot Erase (Copy)	[-2 ~ 2 / 0 / 1/step]

	4929*	Positive/Negative	[0 = No, 1 = Yes]
	Inverts white and black. This setting is only applied to the originals in SP 4921.		
	4929 1	Positive/Negative (Copy)	

4930*	Sharpness-Edge	[-2 ~ 2 / 0 / 1/step]
	Adjust the clarity. This setting is only applied to the originals in SP 4921.	
4930 1	Sharpness-Edge (Copy)	

	4931*	Sharpness-Solid	[-2~2/ 0 /1/step]
4931"	Adjust the clarity. This setting is only applied to the originals in SP 4921.		
	49311	Sharpness-Solid (Copy)	

4932*	Sharpness-Low ID	[-2 ~ 2 / 0 / 1/step]
	Adjust the clarity. This setting is only applied to the originals in SP 4921.	
4932 1	Sharpness- Low ID (Copy)	

White Line Erase	[0 ~ 2 / 1 / 1/step]
Selects the white line erase level.	
0: None, 1: Weak, 2: Strong	
This setting is effective only Photo 1, Photo 3, Special 3 or Special 4 mode. O: White line erase is not used, and white level correction is used instead	
	Selects the white line erase leve 0: None, 1: Weak, 2: Strong This setting is effective only Phot 0: White line erase is not used,

4942*	Black Line Erase	[0 ~ 3 / 2 / 1/step]
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Selects the black line erase level. This setting is effective only when originals are scanned by the A(R)DF.

[0 = No / 1 = Very weak / 2 = Weak / 3 = Strong]

This setting is applied regardless of what mode has been selected in SP 4921.

SP5-XXX (Mode)

5001	All Indicators On
50011	All LEDs turn on. The LCD turns on or off every 3 seconds. Press the reset key to end this program.

5045*	[Accounting count]	[0 to 1 / 0 / -] 0: Developments, 1: Pages
5045 1	Selects the counting method to either total copies or prints.	

5104*	A3/DLT Double Count	[0 = Enabled / 1 = Disabled / 2 = Disabled if the size is undetected]	
51041		unts twice for each sheet of A3/11"x 17". If this is set to hanical) counter and the current user counter will both 11" x 17" sheet.	

5120*	Clr-OP Count Remv	[0=Yes / 1=Standby only / 2=No]
5120 1	removed. With 0, the settings and midway through a job. With 1, of a job. With 2, they are not cl	ons the copy job settings are reset when the key counter is re cleared if the counter is removed at the end of a job or they are only cleared if the counter is removed at the end eared at all, under either condition. With duplex copies, erved, regardless of the setting of this SP mode.

5121*	Count Up Timing	[O = Feed In / 1 = Exit]
5121 1	Selects whether the key counter exit.	increments at time of paper feed-in or at time of paper

5501*	PM Alarm Interval (Printout)	[0 ~ 9999 / 0 / 0K copies/step]
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5501 1	Specifies when the PM alarm occurs.	
5801	Memory Clear	
5801 2	Engine (Memory Clear)	
30012	Engine (Memory Clear)	
5802	Machine Free Run	
5802 1	Starts a free run of both the scanner and the stop.	printer. Press "ON" to start; press "OFF" to
5000	Input Check	
5803	(Input Check (SP 5803))	
5804	Output Check	
	(Output Check (SP 5804))	
5807*	Area Selection	
	Selects the display language group.	
	1 = Japan, 2 = North America , 3 = Europe, 4 = Taiwan, 5 = Asia,	
5807 1	6 = China, 7 = Korea	
	SP 5807 1 is not cleared by SP 5801 2 (Memory Clear).
5811*	Serial Num Input	
	·	Catalla and the catalana FA
5811 1	Setting	Sets the machine serial number. FA
5812*	Service TEL	
	Service TEL (Telephone)	
58121	Use this to input the telephone number of the played when a service call condition occurs.) telephone number, press.	e service representative. (The number is dis- To input a dash, press [®] . To delete the current

5824

NVRAM Upload

5824 1 (NVRAM Data Upload/Download (SP 5824/5825))

5825	NVRAM Download
5825 1	(NVRAM Data Upload/Download (SP 5824/5825))

5827	Program Download	
5827 1	Downloads programs to the machine	

5901 Printer Free Run		Printer Free Run
	59011	Executes the free run. Press "ON" to start; press "OFF" to stop.

5902		Test Pattern Print	
	5902 1	(Test Pattern Print (SP 5902 1))	

5907*	Plug & Play Setting
5907 1	Selects the brand name and production name for the Plug and Play function. These names are registered in the NVRAM. If the NVRAM becomes defective, these names should be re-registered. Use the right-arrow or left-arrow key to scroll through the list of brand names. To select a brand name, press the OK key. An asterisk (*) indicates which manufacture is currently selected. (Memory clear)

5990	SMC Print	
5990 1	All	
5990 2	SP	
5990 3	User Program	(SMC Print (SP 5990))
5990 4	Logging Data	
5990 5	Big font	

SP6-XXX (Peripherals)

6006*	ADF Adjustment (ADF Image Adjustment)]
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	NOTE: Available menus depend on the machine model and its configuration.		
	ADF Adjustment (StoS/Front Regist)	[-5.0 ~ +5.0 / 0.0 / 0.1 mm/step]	
6006 1	Adjusts the side-to-side registration for the front side of the original, for ADF mode. Use the key to select "+" or "-" before entering the value		
	ADF Adjustment (Leading Regist)	[-5.0 ~ +5.0 / 0.0 / 0.1 mm/step]	
6006 2	Adjusts the leading edge registration for ADF mode. Use the key to select "+" or "-" before entering the value.		
	ADF Adjustment (Trailing Erase)	[-3.0 ~ +3.0 / -1.0 / 0.1 mm/step]	
6006 3	Adjusts the trailing edge erase margin for ADF mode. Use the key to select "+" or "-" before entering the value.		
	ADF Adjustment (StoS/Rear Regist)	[-5.0 ~ +5.0 / 0.0 / 0.5 mm/step]	
6006 4	Adjusts the side-to-side registration for the rear side of duplex originals, for ADF mode. Use the key to select "+" or "-" before entering the value.		
4004 5	ADF Adjustment (Sub-scan Magnif)	[-0.9 ~ +0.9 / 0.0 / 0.1 %/step]	
6006 5	Adjust the sub-scan magnification for the	ADF.	
	ADF Adjustment (Original Curl Adj)	[0 = No / 1 = Yes]	
6006 6	Enables or disables the skew adjustment for the reverse sides of originals. When you enable SP6-006-6, adjust the distance of the skew adjustment (SP 60067).		
	ADF Adjustment (Skew Correction)	[-20 ~ +20 / 0 / 1 mm/step]	
60067	Specifies the distance of the skew adjustment. SP 6006 7 is effective when you enable SP 6006 6 (ADF Adjustment [Original Curl Adj]).		

6009 ADF Free Run		ADF Free Run	
	6009 1	Performs an ADF free run. Press "ON" to start; press "OFF" to stop.	

6901 Display ADF/APS (not used)	
69011	Displays the status of the ADF original size sensors (FT ADF APS Sensor Output Display (SP 6901))

6910* AD	OF Shading Time	[0 ~ 60 / 10 / 1 s/step]
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Adjusts the interval used for the shading processing in the ADF mode. Light and heat in the room may affect the scanner response. Reduce this setting if copy quality indicates that the white level is drifting during ADF copy jobs.

SP7-XXX (Data Log)

7001*	Total Operation
7001 1 Shows the total operation time (total drum rotation time).	

<i>7</i> 401*	Counter-SC Total	[0 ~ 9999 / 0 / 1/step]
74011	Shows how many times SC coo	les are generated.

7403*	SC History	
7403 1 Shows the histories of the latest 10 SC codes.		

7502*	Counter-Paper Jam	[0 ~ 9999 / 0 / 1/step]
7502 1	7502 1 Shows the total number of copy paper jams.	

<i>75</i> 03*	Counter-Orgn Jam	[0 ~ 9999 / 0 / 1/step]
7503 1	O3 1 Shows the total number of original jams,	

7504*	Counter-Each P Jam	[0 ~ 9999 / 0 / 1/step]	
7504	Displays the total number of the paper jams classified by timing and location.		
7504 1	Counter-Each P Jam (At power on)		
73041	Paper jam occurs at power on.		
7504 10	Counter-Each P Jam (Off-Regist NoFeed)		
/304 10	Paper does not reach the registration sensor (from a paper tray).		
7504 11	Counter-Each P Jam (Off-1 Vertical SN)		
730411	Paper does not reach the relay sensor.		

7504 12	Counter-Each P Jam (On-1 Vertical SN)
730412	Paper is caught at the relay sensor.
750421	Counter-Each P Jam (Off-2 Vertical SN) (Not Used)
7504 21	Paper does not reach the vertical transport sensor.
7504 22	Counter-Each P Jam (On-2 Vertical SN) (Not Used)
7304 22	Paper is caught at the vertical transport sensor.
7504 31	Counter Each P Jam (Off-3 Vertical SN) (Not Used)
730431	Paper does not reach the vertical transport sensor in the optional paper feed unit.
7504 32	Counter Each P Jam (On-3 Vertical SN) (Not Used)
730432	Paper is caught at the vertical transport sensor in the optional paper feed unit.
7504 50	Counter-Each P Jam (Off-Regist Bypass) (Not Used)
730430	Paper does not reach the registration sensor (from the by-pass tray).
	Counter-Each P Jam (Off-Regist Duplex)
7504 60	Paper does not reach the registration sensor during reverse-side printing (for duplex printing).
7504 70	Counter-Each P Jam (On-Regist SN)
/304/0	Paper is caught at the registration sensor.
7504 120	Counter-Each P Jam (On-Exit SN)
7504 120	Paper is caught at the exit sensor (previous page).
7504 121	Counter-Each P Jam (Off-Exit SN)
7504 121	Paper does not reach the exit sensor.
7504 100	Counter-Each P Jam (On-Exit SN)
7504 122	Paper is caught at the exit sensor.
7504 123	Counter-Each P Jam (Off-Dup Inverter)
/ 304 123	Paper does not reach the duplex inverter sensor (from the registration roller).
7504 125	Counter-Each P Jam (On-Dup Inverter)

	Paper is caught at the duplex inverter sensor.
7504 104	Counter-Each P Jam (Off-Dup Entrance)
7504 126	Paper does not reach the duplex entrance sensor.
7504107	Counter-Each P Jam (Off-Dup Entrance)
7504 127	Paper is caught at the duplex entrance sensor.
7504100	Counter-Each P Jam (Off-Duplex Exit)
7504 128	Paper does not reach the duplex exit sensor.
7504 100	Counter-Each P Jam (On-Duplex Exit)
7504 129	Paper is caught at the duplex exit sensor.

	Counter-Each O Jam	[0 ~ 9999 / 0 / 1/step]
7505*	Displays the total number of the original timing or at a certain location.	nal jams on the ADF that have occurred at a certain
7505 210	Counter-Each O Jam (Off-Regist SN)
7303 210	The original does not reach the regis	stration sensor.
7505 211	Counter-Each O Jam (On-Regist SN)
7303 211	The original is caught at the registrat	ion sensor.
7505 212	Counter-Each O Jam (Off-Relay SN	
7303 212	The original does not reach the exit	sensor.
7505 213	Counter-Each O Jam (On-Relay SN	
7303 213	The original is caught at the exit sens	sor.
7505 214	Counter-Each O Jam (Off-Inverter S	N)
7505 214	The original does not reach the reve	rse sensor.
7505 215	Counter-Each O Jam (On Inverter S	N)
7303 213	The original is caught at the reverse	sensor.
7505 216	Counter-Each O Jam (Insufficient ga	p)

The distance between originals is not sufficient. This jam can occur when the original is not of the standard size.

7507*	Dsply-P Jam Hist
	Displays the latest 10 paper-jam history. The list below shows the possible 22 codes:
7507 1	1, 10, 11, 12, 21, 22, 31, 32, 50, 60, 70, 120, 121, 122, 123, 125, 126, 127, 128, 129, 130, 131
	The codes correspond to the menus of SP 7504. For example, the code 1 corresponds to SP 7504 1, and the code 10 corresponds to SP 7504 10.

7508*	Dsply-O Jam Hist
	Displays the total number of the original-jams history. The following are the possible seven codes:
7508 1	210, 211, 212, 213, 214, 215, 216
	The codes correspond to the menus of SP 7505. For example, the code 210 corresponds to SP 7505 210, and the code 211 corresponds to SP 7505 211.

7801	Memory/Version/PN
7801 2	Memory/Version (BICU)
78012	Displays the version of the BICU board
7801.5	Memory/Version (ADF)
76013	Displays the P/N and suffix of the ADF ROM.
7001.15	Memory/Version (Printer/Scanner)
7801 15	Displays the P/N and suffix of the Printer/Scanner ROM.

7803*	Display-PM Count
7803 1	Displays the PM counter.

7804	Reset-PM Counter	
7804 1	Resets the PM counter (SP 7803 1). When the program ends normally, the message "Completed" is displayed.	

7807	Reset-SC/Jam Counters
7807 1	Resets the SC, paper, original, and total jam counters. When the program ends normally, the message "Completed" is displayed. SP 7807 1 does not reset the following logs: SP 7507 (Display-Paper Jam History) and SP 7508 (Display-Original Jam History).

7808	Reset-Counters
7808 1	Resets all counters except for the management counters. The management counters are the counters that are not changed by NVRAM Download (SP 5825 1) When the program ends normally, the message the message "Completed" is displayed.

7810	Reset-Key Op Code
78101	Resets the key operator code. Use SP 7810 1 when the customer has forgotten the key-operator code. When the program ends normally, the message "Completed" is displayed, if the program ends abnormally, an error message is displayed. If the customer forgets the key operator code. To specify a new key-operator code, use the User Tools: System Settings \rightarrow Key Operator Tools \rightarrow Key Operator Code.

7832*	Display-Self-Diag	
7832 1	Displays the SC codes and the number of their occurrences. Each number is in the range of 0 to 9999.	

	Dsply-Info Count	
7991*	Displays the total operating time or the total number of operations. The time is displaye in the following format: day:hour:minute:second.	
	Dsply-Info Count (Dsply-Timer Count)	
79911	The total of the time when the main switch is kept on (excluding the time when the safety switch is off (** LD Safety Switch).	
79913	Dsply-Info Count (Dsply-ID S Work)	
79913	The total of the time when the ID sensor is working.	
7991 4	Dsply-Info Count (Dsply-Dev Counter)	
/ / / 4	The total number of paper outputs.	
7991 5	Dsply-Info Count (Dsply-ID Er Count)	

7992*	Reset-Info Count	
7992 1	Reset-Info Count (Reset-Timer Count)	
79921	Clears the counter of SP 7991 1.	
7000 5	Reset-Info Count (Reset-ID Er Count)	
7992 5	Clears the counter of SP 7991 5.	

SP8-XXX (History)

8191*	T: Total Scan PGS	[0 ~ 9999999 / 0 / 1 sheet/step]
81911	Displays the total number of scanned pages. Both sides are counted when the front and reverse sides of an original (fed from the ADF) are scanned.	

8192*	C: Total Scan PGS	[0 ~ 9999999 / 0 / 1 sheet/step]
81921	Displays the total number of sc reverse sides of an original (fee	anned copies. Both sides are counted when the front and d from the ADF) are scanned.

8195*	S: Total Scan PGS	[0 ~ 9999999 / 0 / 1 sheet/step]
8195 1	Displays the total number of sco reverse sides of an original (fee	anned originals. Both sides are counted when the front and from the ADF) are scanned.

8221*	ADF Org Feed	[0 ~ 9999999 / 0 / 1 sheet/step]
8221 1	ADF Org Feed (Front)	
02211	Displays the total number of scanned front sides of originals fed from the ADF.	
0001.0	ADF Org Feed (Back)	
8221 2	Displays the total number of sco	anned reverse sides of originals fed from the ADF.

8381*	T: Total Prt PGS	[0 ~ 9999999 / 0 / 1 sheet/step]
8381 1	Displays the print count of all application programs.	

8382*	C: Total Prt PGS	[0 ~ 9999999 / 0 / 1 sheet/step]
8382 1	Displays the print count of the copier application program.	

8384*	P: Total Prt PGS	[0 ~ 9999999 / 0 / 1 sheet/step]
8384 1	Displays the print count of the printer application program.	

8391*	L size Prt PGS (A3/DLT, Larger)	[0 ~ 9999999 / 0 / 1 sheet/step]
83911	Displays the print count of the A3/DLT size or larger paper.	

8411*	Prints/Duplex	[0 ~ 9999999 / 0 / 1 sheet/step]
84111	Displays the total count of the duplex printing.	

	C: PrtPGS/Dup Comb	[0 ~ 999999	9 / 0 / 1 sheet/step]
8422*	Displays the total print count of copier application classified by combination/duple		ation classified by combination/duple type.
8422 1	C: PrtPGS/Dup Comb (Simplex > Duplex)		Original Print
8422 2	C: PrtPGS/Dup Comb (Duplex > Duplex)		Original Print
8422 4	C: PrtPGS/Dup Comb (Simplex Combine)		Original Print
8422 5	C: PrtPGS/Dup Comb (Duplex Combine)		Original Print
8422 6	C: PrtPGS/Dup Comb (2>)		Original Print
84227	C: PrtPGS/Dup Comb(4>)		Original Print



	T: PrtPGS/Ppr Size	[0 ~ 9999999 / 0 / 1 sheet/step]	
8441*	Displays the total print count classified by paper size. This is the total for all application programs.		
8441 1	(A3)		
8441 2	(A4)		
8441 3	(A5)		
8441 4	(B4)		
8441 5	(B5)		
8441 6	(DLT)		
84417	(LG)		
8441 8	(LT)		
8441 9	(HLT)		
8441 254	Other (Standard)		
8441 255	Other (Custom)		

8442*	C: PrtPGS/Ppr Size	[0 ~ 9999999 / 0 / 1 sheet/step]	
0442	Displays the number of pages printed by the copier application program.		
8442 1	(A3)		
8442 2	(A4)		
8442 3	(A5)		
8442 4	(B4)		
8442 5	(B5)		
8442 6	(DLT)		
8442 7	(LG)		

8442 8	(LT)
8442 9	(HLT)
8442 254	Other (Standard)
8442 255	Other (Custom)

8444*	P: PrtPGS/Ppr Size	[0 ~ 9999999 / 0 / 1 sheet/step]	
0444	Displays the number of pages printed by the copier application program.		
8444 1	(A3)	(A3)	
8444 2	(A4)		
8444 3	(A5)		
8444 4	(B4)		
8444 5	(B5)		
8444 6	(DLT)		
84447	(LG)		
8444 8	(LT)		
8444 9	ніт		
8444 254	Other (Standard)		
8444 255	Other (Custom)		

8451*	C: PrtPGS/Ppr Tray	[0 ~ 9999999 / 0 / 1 sheet/step]	
6451	Displays the total print count classified by paper source.		
84511	Bypass Tray		
84512	Tray 1		
84513	Tray 2		
8451 4	Tray 3		
8451 5	Tray 4 (not used)		

	T: PrtPGS/Ppr Type	[0 ~ 9999999 / 0 / 1 sheet/step]	
Displays the total print count c programs.		assified by paper size. This is the total for all application	
84611	Normal		
8461 4	Thick		
84617	OHP		
84618	Other		

8462*	C: PrtPGS/Ppr Type	[0 ~ 9999999 / 0 / 1 sheet/step]
6402	Displays the total print count classified by paper size.	
8462 1	Normal	
8462 4	Thick	
84627	ОНР	
8462 8	Other	

	P: PrtPGS/Ppr Type	[0 ~ 9999999 / 0 / 1 sheet/step]	
Displays the total print count classified by paper size. This is the total for all a programs.		assified by paper size. This is the total for all application	
8464 1	Normal		
8464 4	Thick		
84647	ОНР		
8464 8	Other		

8522*	C: PrtPGS/FIN (Sort)	[0 ~ 9999999 / 0 / 1 sheet/step]
8522 1	Displays the total number of printing classified by paper size.	

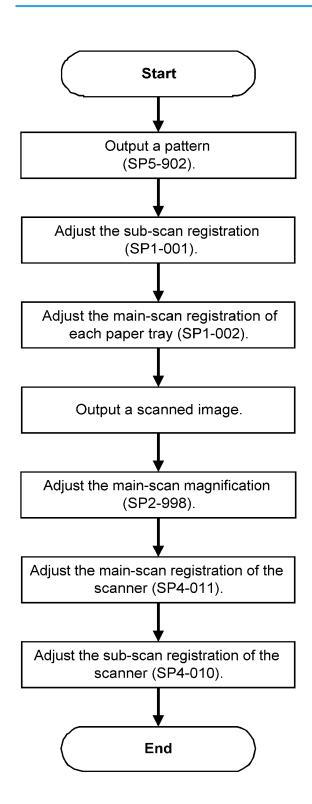
SP9-XXX (Etc.)

Not used in this machine.

Using SP Modes

Adjusting Registration and Magnification

To adjust the registration and magnification, you need to use several service programs. The chart shows an example of the procedure to adjust the machine in the basic configuration.



ID Sensor Error Analysis (SP 2221)

The image quality may become very bad when the ID sensor does not operate properly. However, there is no such SC code that indicates ID-sensor malfunction; instead, SP 2221 shows you some information on the ID sensor. Check this information when the image quality is not very good.

The table lists the information shown with SP 2221 (ID Sensor Error Analysis).

SP	Error condition	Possible cause	Remarks
SP 2221 1 Vsg (VG in the display)	Vsg < 2.5V or (Vsg – Vsp) < 1.00V	ID sensor defectiveID sensor dirtyDrum not charged	
SP 2221 2 Vsp (VP in the display)	Vsp > 2.5V or (Vsg – Vsp) < 1.00V	Toner density very lowID sensor pattern not created	
SP 2221 3 Power (PW in the display)	Vsg < 3.5V when maximum pow- er (979) is applied	ID sensor defectiveID sensor dirtyDrum not get charged	Power source for the ID- sensor light
SP 2221 4 Vsdp	No Error Conditions		
SP 2221 5 Vt	Vt > 4.5V or Vt < 0.2V	TD sensor defective	
SP 2221 6 Vts			

Memory Clear

The machine stores the engine data in the NVRAM in the BICU. The data in the BICU NVRAM (engine data) is cleared by SP 5801.

002	Main Motor Reverse
003	Quenching Lamp

Data	NVRAM	Cleared by
Engine data	BICU	SP 5801

- Exceptions -

SP 5998 1 clears most of the settings and counters stored in the NVRAM on the BICU (the values return to their default values). However, the following settings are not cleared:

- SP 5807 (Area Selection)
- SP 5811 1 (Serial Num Input [Code Set])
- SP 5811 3 (Serial Num Input [ID2 Code Display])
- SP 5812 1 (Service TEL [Telephone])
- SP 5907 (Plug & Play)
- SP 7 (Data Log)
- SP 8 (History)

Use SP 5801 2 after you have replaced the NVRAM or when the NVRAM data is corrupted. When the program ends normally, the message "Completed" shows.

- With Flash Memory Card

- Upload the NVRAM data to a flash memory card (NVRAM Data Upload/Download (SP 5824/5825)).
- 2. Print out all SMC data lists (SMC Print (SP 5990)).



- Be sure to print out all the lists. You have to manually change the SP settings if the NVRAM data
 upload ends abnormally.
- 3. Select SP 5801 2.
- 4. Press the OK key.
- 5. Select "Execute." The messages "Execute?" followed by "Cancel" and "Execute" shows.
- 6. Select "Execute."
- 7. When the program has ended normally, the message "Completed" shows. If the program has ended abnormally, an error message shows.
- 8. Press the cancel key.
- 9. Turn the main switch off and on.
- Download the NVRAM data from a flash memory card (NVRAM Data Upload/Download (SP 5824/5825)).
- Without Flash Memory Card -
 - 1. Print out all SMC data lists (SMC Print (SP 5990)).
 - 2. Select SP 5801
 - 3. Press the OK key.
 - 4. Select "Execute." The messages "Execute?" followed by "Cancel" and "Execute" show.
 - 5. Select "Execute."

- 6. When the program has ended normally, the message "Completed" is displayed. If the program has ended abnormally, an error message shows.
- 7. Turn the main switch off and on.
- Adjust the printer and scanner registration and magnification (Copy Adjustments Printing/Scanning).
- Refer to the SMC lists, and enter any values that differ from the factory settings. Doublecheck the values for SP 4901.
- 10. Adjust the standard white level (SP 4428).
- 11. Initialize the TD sensor (SP 2214).
- 12. Check the copy quality and the paper path.

Input Check (SP 5803)

- Conducting an Input Check -
 - 1. Select SP 5803.
 - 2. Select the number (see the table below) corresponding to the component.
 - 3. Select "Execute." The copy mode is activated.
 - 4. The sign "01H" or "00H" show (see the table below).

- Input Check Table -

Num.	Sensor/Switch	01H	ООН
001	Safety SW	Open	Closed
002	Safety SW-LD 5V	Open	Closed
003	Right Cover SW	Open	Closed
004	Right Low Cover SW	Open	Closed
005	Tray Cover SW	Open	Closed
006	Upper Relay S	Paper detected	Not detected
007	Lower Relay S (not used)	Paper detected	Not detected
800	Vertical Trans S	Paper detected	Not detected
009	Registration Sensor	Paper detected	Not detected
010	Exit Sensor	Paper detected	Not detected

Num.	Sensor/Switch	01H	00H
011	Duplex Inverter S	Paper detected	Not detected
012	Duplex Entrance S	Paper detected	Not detected
013	Duplex Exit S	Paper detected	Not detected
014	By-pass PE S	Paper detected	Not detected
015	By-pass P Size S	*1	
016	Upper PE S	Paper detected	Not detected
017	Lower PE S (not used)	Paper detected	Not detected
018	Upper P Size SW	*1	
019	Lower P Size SW (not used)	*1	
020	BK-Upper Paper End S	Paper detected	Not detected
021	BK-Lower Paper End S	Paper detected	Not detected
022	BK-Up P Size SW	*1	
023	BK-Low P Size SW	*1	
024	BK-Up P Height S	*2	
025	BK-Low P Height S	*2	
027	BK-Upper Lift S	At upper limit	Not at upper limit
028	BK type	*3	
030	Duplex Installed	Installed	Not installed
031	Lower Lift S	At upper limit	Not at upper limit
032	Main M Lock	Locked	Not locked
033	Polygon M Lock	Locked	Not locked
034	BK-Lift M Lock	Locked	Not locked
035	Total CO Install	Installed	Not installed
036	Key CO Install	Installed	Not installed
037	L-Synchronization	Detected	Not detected

Num.	Sensor/Switch	01H	00H
038	DF-Position S	Detected	Not detected
039	DF-Cover Open S	Detected	Not detected
040	DF-Original Set S	Detected	Not detected
041	DF-Registration S	Detected	Not detected
042	DF-Exit S	Detected	Not detected
043	DF-Trailing S	Detected	Not detected
044	DF-Reverse S	Detected	Not detected
045	Platen Cover S (not used)	Open	Closed
046	1 bin installed (not used)	Open	Closed
047	1 bin Exit S (not used)	Installed	Not installed
048	1 bin Paper S (not used)	Detected	Not detected
049	1 bin Tray S (not used)	Open	Closed
050	Fan Motor Lock	High speed	Not high speed
051	2 Tray BK Install	Installed	Not installed
053	HP Sensor	Detected	Not detected
054	Duplex Fan M Lock	Locked	Not locked

U Note

• *1 Paper Size

Copier	00	01	02	03	04	05	06	07
B282/ B283	Not set	A4 LEF	B5 LEF	A4 SEF	A5 LEF	B4 SEF		A3 SEF

Paper Feed Unit	00	01	03	04	05	OA	0C	OE	OF
B282/ B283	Not set	LT SEF	LG SEF	A4 LEF		DLT SEF	A4 SEF	LT LEF	A3 SEF

By-Pass Tray	04	0C	08	00	01	03	02	06	
B282/ B283	B6 SEF	B6 SEF	A5 SEF	A5 SEF	B5 SEF	A4 SEF	B4 SEF	A3 SEF	

- *2 Paper Amount -

10	Near end
11	About 25%
00	About 75%
00	About 100%

- *3 Available Paper Feed Unit -

00	None
20	2-tray paper feed unit
30	1-tray paper feed unit

Output Check (SP 5804)

- Conducting an Output Check -



- To prevent mechanical or electrical damage, do not keep an electrical component on for a long time.
- 1. Select SP 5804.
- 2. Select the number (see the table below) corresponding to the component.
- 3. Select "ON."
- 4. To stop the operation, select "OFF."
- Output Check Table -

Number 005, 006, 040, and 041 may not respond when the fusing temperature is high.

Num.	Component
001	Main Motor Forward

Num.	Component
002	Main Motor Reverse
003	Quenching Lamp
004	Toner Supply Motor Forward
005	Fan Motor High
006	Fan Motor Low
007	Registration Clutch
008	By-pass Feed Clutch
009	Upper Feed Clutch
010	Lower Feed Clutch (Not used)
011	BK-Low Lift Motor Up
012	BK-Low Lift Motor Down
013	Relay Clutch
014	BK-Relay Clutch
015	BK-Upper Feed Clutch
016	BK-Lower Feed Clutch
017	BK-Lift Motor
018	BK-Up Lift Motor Up
019	BK-Up Lift Motor Down
020	Duplex Inv Motor Reverse
021	Duplex Inv Motor Forward
022	Duplex Trans Motor
023	Duplex Gate Solenoid
024	Duplex Inv Motor Hold
025	Dup Trans Motor Hold
026	Polygon Motor

Num.	Component
027	Polygon M/LD
028	LD
029	DF-Transport Motor
030	DF-Feed Motor
031	DF-Feed Clutch
032	DF-Pickup Solenoid
033	DF-Stamp Solenoid
034	DF-Gate Solenoid
035	1 bin Gate Solenoid (not used)
036	1 bin Tray Motor (not used)
037	1 bin Tray Motor Hold (not used)
038	Fusing Solenoid
040	Duplex Fan Motor High
041	Duplex Fan Motor Low

Serial Number Input (SP 5811)

- Specifying Characters -

SP 5811 1 specifies the serial number. For the basic machine (the machine without the optional controller), you use the numeric keypad. For the GDI machine (the machine with the optional controller), you use the numeric keypad and the optional operation panel.

A serial number consists of 11 characters. You can change each character by pressing one of the first 11 keys on the numeric keypad ($\mathbf{0}$, $\mathbf{2}$, $\mathbf{3}$, ... $\mathbf{9}$, $\mathbf{0}$).

For example, when you press the $\mathbf{0}$ key, the first character of the serial number changes as follows:

$$0 \Rightarrow 1 \Rightarrow 2 \Rightarrow ... \Rightarrow 8 \Rightarrow 9 \Rightarrow A \Rightarrow B \Rightarrow ... \Rightarrow X \Rightarrow Y \Rightarrow Z.$$

When you press the **2** key, the second character changes likewise.

You can specify a digit ("0" to "9") or a capital letter ("A" to "Z") for the first four characters of a serial number, and you can specify a digit in the other seven characters (not capital letters).

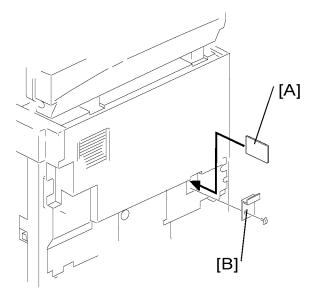
Firmware Update Procedure

This section shows how to update the firmware.

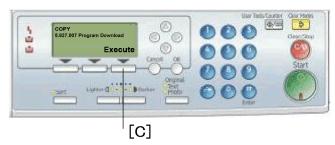
The machine has the following firmware programs

Firmware Type	SP Mode
Engine (BICU)	7801 2
GDI (Printer/Scanner)	7801 15

Engine (BICU) Firmware Update Procedure



- 1. Turn the main switch off.
- 2. Remove the card cover [B] (1 rivet).
- 3. Insert the flash memory card [A].



4. Press down the power switch on the operation panel and hold it, and turn on the main switch.

5. Select "Execute" [C].

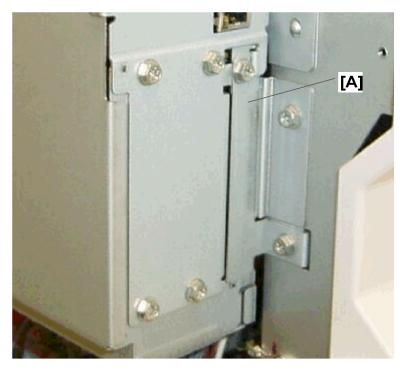


6. Do not touch any key while the message "Load Status..." shows. This message indicates that the program is running.

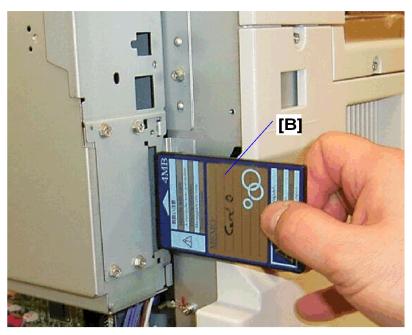


- 7. Make sure the message "End Sum..." shows. This message indicates that the program has ended normally.
- 8. Turn off the main switch.
- 9. Remove the flash memory card.
- 10. Replace the card cover [B] (1 rivet).
- 11. Turn the main switch on.
- 12. Check the operation.





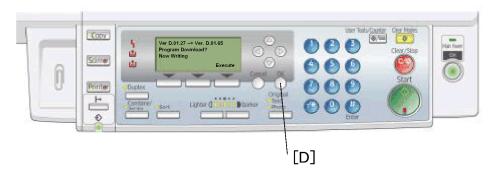
- 1. Turn the main switch off.
- 2. Remove the slot cover [A] (1 x P)



3. Insert the flash memory card [B] as shown above



- 4. Turn on the main power switch
- 5. Push the printer application key [C]



6. Push the OK key [D] and then push Execute.





- Do not turn the machine off while the message "Now Writing" shows. This message indicates the program is running.
- Make sure the message "Completed" shows. This message indicates the program has successfully ended.
- 7. Turn off the main switch
- 8. Remove the flash memory card

9. Replace the slot cover [A] (1 x 🔊)

Test Pattern Print (SP 5902 1)

- Executing Test Pattern Printing -
 - 1. Specify the pattern number and press the OK key.
 - 2. Press the copy start key. The copy mode is activated
 - 3. Specify copy settings and press the ® key.
 - 4. To return to the SP mode, press the ® key.
- Test Patterns -

	Test Patterns Using VCU				
No.	Pattern				
0	(No print)				
1	Vertical Lines (Single Dot)				
2	Horizontal Lines (Single Dot)				
3	Vertical Lines (Double Dot)				
4	Horizontal Lines (Double Dot)				
5	Grid Pattern (Single Dot)				
6	Grid Pattern (Double Dot)				
7	Alternating Dot Pattern				
8	Isolated one dot				
9	Black Band (Horizontal)				
10	Trimming Area				
11	Argyle Pattern (Single Dot)				
12	Grayscales (Horizontal)				
13	Grayscales (Vertical)				
14	Grayscales (Vertical/Horizontal)				

	Test Patterns Using VCU				
15	Grayscales (Vertical/Horizontal Overlay)				
16	Grayscales With White Lines (Horizontal)				
17	Grayscales with White Lines (Vertical)				
18	Grayscales with White Lines (Vertical/Horizontal)				

	Test Patterns Using IPU
No.	Pattern
30	Vertical Lines (Single Dot)
31	Horizontal Lines (Single Dot)
32	Vertical Lines (Double Dot)
33	Horizontal Lines (Double Dot)
34	Isolated Four Dots
35	Grid Pattern (Double Dot)
36	Black Band (Vertical, 1024 Dots)
37	Grayscales (Horizontal, 512 Dots)
38	Grayscales (Vertical, 256 Dots)
39	ID Patch
40	Cross
41	Argyle Pattern (128-Dot Pitch)
42	Square Gradation (64 Grades)
43	Square Gradation (256 Grades)
44	Grayscales (Horizontal, 32-Dot Width)
45	Grayscales (Vertical, 32-Dot Width)
46	Trimming Area (A3)
47	A4 Gradation Patches 1 (128 Grades)

	Test Patterns Using SBU
No.	Pattern
51	Grid Pattern (double dot)
52	Gray scale 1 (256 grades)
53	Gray scale 2 (256 grades)

Paper Jam Counters (SP 7504)

The table lists the menu numbers (the last three digits of SP 7504 XXX) and the paper jam timings and locations.

Code	
001	Paper jam occurs at power on.
010	Paper does not reach the registration sensor (from a paper tray).
011	Paper does not reach the relay sensor.
012	Paper is caught at the relay sensor.
021	Paper does not reach the vertical transport sensor.
022	Paper is caught at the vertical transport sensor.
031	Paper does not reach the vertical transport sensor in the optional paper feed unit.
032	Paper is caught at the vertical transport sensor in the optional paper feed unit.
050	Paper does not reach the registration sensor (from the by-pass tray).
060	Paper does not reach the registration sensor during reverse-side printing (for duplex printing).
070	Paper is caught at the registration sensor.
120	Paper is caught at the exit sensor (previous page).

Code	
121	Paper does not reach the exit sensor.
122	Paper is caught at the exit sensor.
123	Paper does not reach the duplex inverter sensor (from the registration roller).
125	Paper is caught at the duplex inverter sensor.
126	Paper does not reach the duplex entrance sensor.
127	Paper is caught at the duplex entrance sensor.
128	Paper does not reach the duplex exit sensor.
129	Paper is caught at the duplex exit sensor.
130	Paper does not reach the one-bin tray.
131	Paper is caught at the one-bin tray.

SMC Print (SP 5990)

SP 5990 outputs machine status lists.

- 1. Select SP 5990.
- 2. Select a menu:
 - 001 All (Data List), 002 SP (Mode Data List), 003 User Program, 004 Logging Data, 005
 Diagnostic Report, 006 Non-Default, 007 NIB Summary, 008 Net File Log, 021 Copier User
 Program, 022 Scanner SP, 023 Scanner User Program, 040 Parts Alarm Counter Print, 064
 Normal Count Print, 065 User Code Counter, 066 Key Operator Counter, 067 Contact List
 Print, 069 Heading 1 print, 071 Heading 3 print, 072 Group List Print, 128 ACC Pattern, 129
 User Color Pattern, or 160:ACC Pattern Scan



- The output given by the menu "Big Font" is suitable for faxing.
- 3. Press the "Execute" key.
 - Basic machine: The copy mode is activated
 - Specify copy settings and press the ¹ key. The machine status lists is output.
 - GDI machine: The machine status list is output.
- 4. To return to the SP mode, press the ® key.

Original Jam History Display (SP 7508)

- Viewing the Copy Jam History -

You can view the information on the most recent 10 events. The information on older events is deleted automatically.



- The information on jam history is saved in the NVRAM.
- 1. Select SP 7508.
- 2. Select one of the menu items ("Latest 1" through Latest 10").
- 3. Press the OK key. The summary of the jam history shows.
- 4. To view more information, select "Detail."

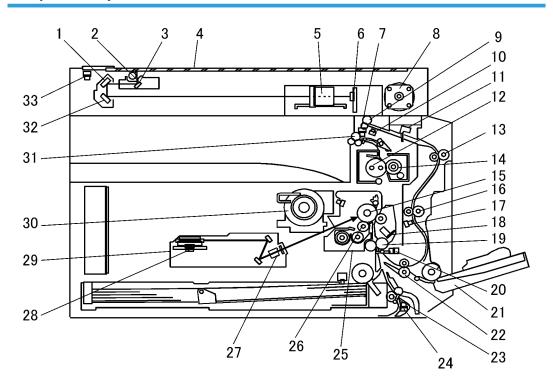
Jam History Codes

Code	Meaning
210	Original does not reach the registration sensor.
211	Original caught at the registration sensor.
212	Original does not reach the original exit sensor.
213	Original caught at the original exit sensor.
214	Original does not reach the original reverse sensor.
215	Original caught at the original reverse sensor.

6. Detailed Section Descriptions

Overview

Component Layout





- The above illustration is the B282 model.
- The B283 model does not have the duplex unit

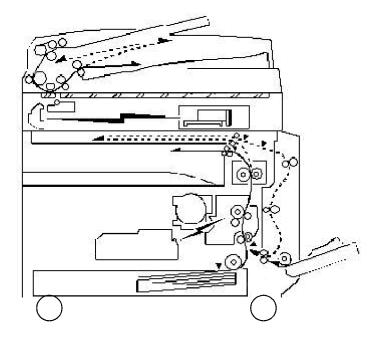
1. 2nd Mirror	19. Registration Roller
2. Exposure Lamp	20. Registration Sensor
3. 1st Mirror	21. By-pass Tray
4. Exposure Glass	22. Lower Transport Roller (B282)
5. Lens Block	23. Upper Relay Roller
6. SBU	24. Relay Sensor

- 8. Scanner Motor
- 9. Inverter Roller (B282)
- 10. Duplex Inverter Sensor (B282)
- 11. Duplex Entrance Sensor (B282)
- 12. Hot Roller
- 13. Upper Transport Roller (B282)
- 14. Pressure Roller
- 15. OPC Drum
- 16. Middle Transport Roller (B282)
- 17. Duplex Exit Sensor (B282)
- 18. Image Density Sensor

- 25. PCU
- 26. Development Roller
- 27. WTL
- 28. Polygon Mirror Motor
- 29. Laser Unit
- 30. Toner Supply Bottle Holder
- 31. Exit Roller
- 32. 3rd Mirror
- 33. Scanner HP Sensor

6

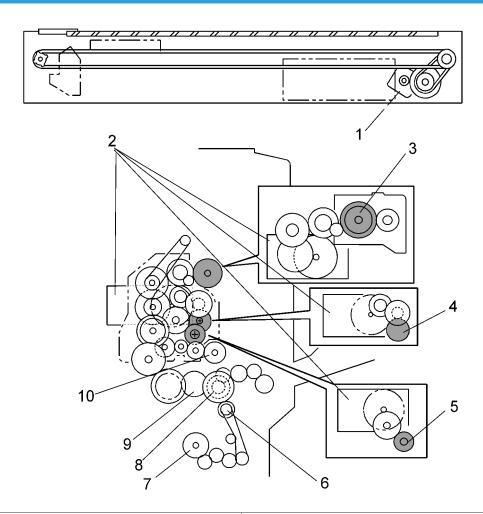
Paper Path



The B282 model has a duplex unit mounted on the right side of the machine.

All models have a by-pass tray.

Drive Layout

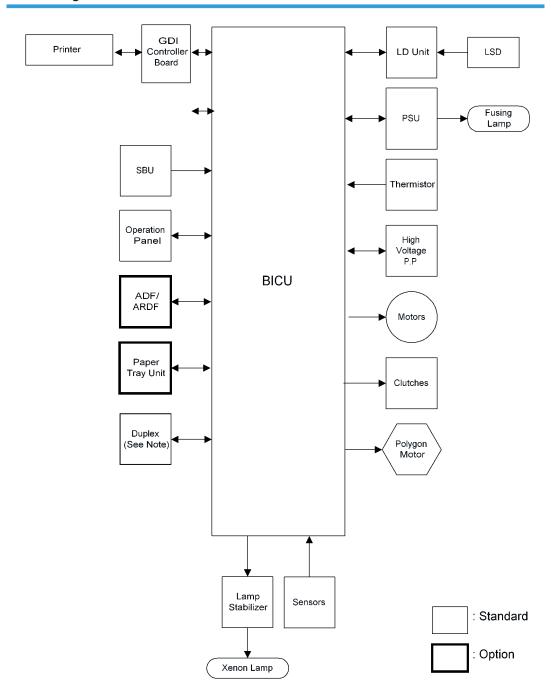


- 1. Scanner Motor
- 2. Main Motor
- 3. Hot Roller
- 4. OPC Drum
- 5. Development Roller

- 6. Relay Clutch
- 7. Lower Paper Feed Clutch
- 8. By-pass Feed Clutch
- 9. Upper Paper Feed Clutch
- 10. Registration Clutch

Board Structure

Block Diagram



6

Only B282 model contain the duplex unit.

BICU (Base Engine and Image Control Unit)

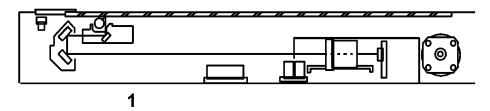
The main board controls the following functions:

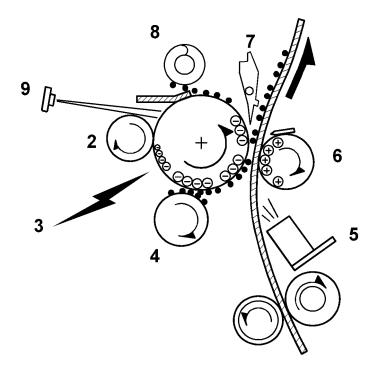
- Engine sequence
- Timing control for peripherals
- Image processing, video control
- Operation control, system control (Basic machine only)
- Machine control
- Drive control for the sensors, motors, and clutches of the printer and scanner
- High voltage supply board control
- Serial interfaces with peripherals
- Fusing control

SBU (Sensor Board Unit)

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

Copy Process Overview





1. Exposure

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

2. Drum Charge

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

3. Laser Exposure

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

4. Development

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

5. ID Sensor

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

6. Image Transfer

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

7. Paper Separation

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

8. Cleaning

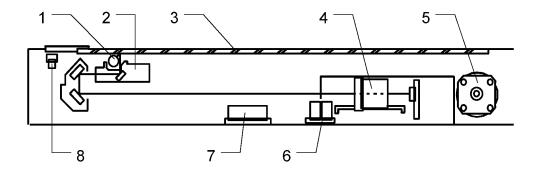
The cleaning blade removes any toner remaining on the drum surface after the image transfers to the paper.

9. Quenching

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

Scanning

Overview



- 1. Exposure Lamp
- 2. 1st Scanner
- 3. Exposure Glass
- 4. Lens Block

- 5. Scanner Motor
- 6. Original Length Sensor
- 7. Original Width Sensors
- 8. Scanner HP Sensor

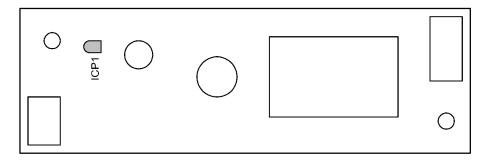
The original is illuminated by the exposure lamp (a xenon lamp). The image is reflected onto a CCD (charge coupled device) on the lens block via the 1st, 2nd, and 3rd mirrors, and through the lens on the lens block.

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

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

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

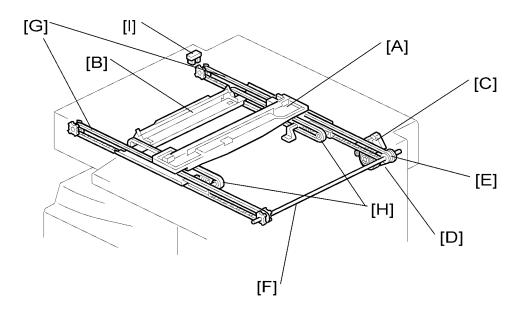
Lamp Stabilizer Fuse



Rating	Manufacturer	Туре No.

ICP1 DC50 V/1.5 A ROHM C	O.,LTD ICP-N38
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Scanner Drive



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

- Book mode -

The BICU controls and operates the scanner drive motor. In full size mode, the 1st scanner speed is 100 mm/s during scanning. The 2nd scanner speed is half that of the 1st scanner.

In reduction or enlargement mode, the scanning speed depends on the magnification ratio. The returning speed is always the same, whether in full size or magnification mode. The image length change in the sub scan direction is done by changing the scanner drive motor speed, and in the main scan direction it is done by image processing on the BICU board.

Magnification in the sub-scan direction can be adjusted by changing the scanner drive motor speed using SP 4008. Magnification in the main scan direction can be adjusted using SP 4009.

- ADF mode -

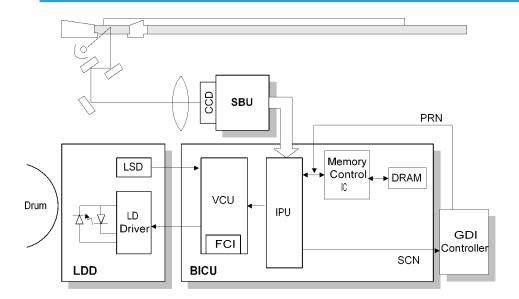
The scanners are always kept at their home position (the scanner HP. sensor [I] detects the 1st scanner) to scan the original. The ADF motor feeds the original through the ADF. In reduction/enlargement mode, the image length change in the sub-scan direction is done by changing the ADF motor speed. Magnification in the main scan direction is done in the BICU board, like for book mode.

0

Magnification in the sub-scan direction can be adjusted by changing the ADF motor speed using SP 6006 5. In the main scan direction, it can be adjusted with SP 4009, like for book mode.

Image Processing

Overview



The CCD generates an analog video signal. The SBU (Sensor Board Unit) converts the analog signal to an 8-bit digital signal, then it sends the digital signal to the BICU board.

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

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



• The IPU and VCU are contained in the same IC called SCRATCH on the BICU.

The CCD converts the light reflected from the original into an analog signal. The CCD line has 7,400 pixels and the resolution is 600 dpi (23.6 lines/mm).

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

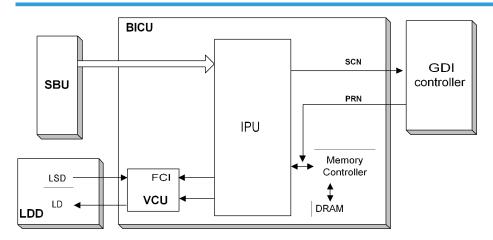
- Z/C (Zero Clamp):
 Adjusts the black level reference for even pixels to match the odd pixels.
- Signal Amplification:
 The analog signal is amplified by operational amplifiers.

After the above processing, the analog signals are converted to 8-bit signals by the A/D converter. Each pixel will be assigned a value on a scale of 256 grades. Then, the digitized image data goes to the BICU board.

6

IPU (Image Processing Unit)

Overview



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

Auto shading

White/black line correction

ADS

Scanner gamma correction

Magnification (main scan)

Filtering (MTF and smoothing)

ID gamma correction

Binary picture processing

Error diffusion

Dithering

Video path control

Test pattern generation

The image data then goes to the GDI controller.



• The IPU and VCU are contained in the same IC (called SCRATCH) on the BICU.

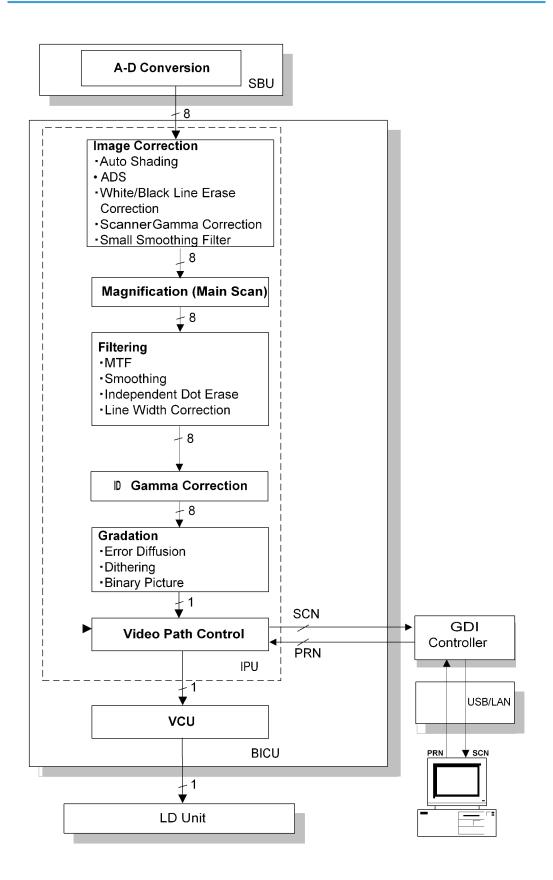
The user can select Text, Photo and Special original types. However, each of these original types has a range of different choices (such as "sharp", "photographs", etc), which are listed in the table below.

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

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

Image Processing Path

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



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

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

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

If the user wishes to customize one of the original modes, the technician can change the settings using SP 4922 to SP 4942. Refer to "SP Modes for Each Image Processing Step". However, only one of the original modes can be customized at any one time.

SP Modes for Each Image Processing Step

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

- 4921: Selects which original mode the settings from SP 4922 to SP 4932 will be applied to.
- 4922: Selects the scanner γ curve. You can select either a curve for text-based originals (brings out text) or a curve for photo originals (better distinctions between shades of dark colors).
- 4923: Selects the central notch position for the ID adjustment LEDs.
- 4926: Adjusts the texture removal level (used with error diffusion).
- 4927: Adjusts the line width.
- 4928: Selects the dot erase level.
- 4929: Converts white to black, and black to white
- 4930: Adjusts the clarity of line images and the edges of solid images.
- 4931: Adjusts the clarity of solid image areas.
- 4932: Adjusts the clarity of low ID lines.
- 4941: Selects the white line ergse level.
- 4942: Selects the black line erase level.

If a fax and/or scanner/printer option is installed, you can make separate settings for copier, fax, and scanner/printer mode with these SPs.

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

		Ţ	Text		Photo				Special			
		Normal	Sharp	Photo Priority	Text Priority	Photographs	Unneeded	Colored	ě	Coarse Pixel Photo	Preserved Background	Note
SBU	ADS	Y Y	ADS		ADS		ADS					
ı												
Shading Correction	Shading Line Correction	Ena	Enabled		Enabled				Enabled			
	White Line Correction	Ena	Enabled		Enabled				Enabled			SP4-941
	Black Line Correction	Enabled	Enabled (DF only)	Ш	Enabled (DF only)	0			Enabled (DF only)	0		SP4-942
	Scannerg Correction	T _t (Reflection Re	Text (Reflection Ratio ID Linear)	Photo (Density Linear)	Text (Refrelcion Ratio ID Linear	Text (Refrelcion Photo (Density Ratio ID Linear)	Text (Reflection Ratio ID Linear)	on Ratio ID	Text (Reflection Ratio ID Lineare	Photo (Density Linear)	Text (Reflection Ratio ID Linear)	SP4-922
	Small Smoothing Filter	Weak			Normal			Normal	Strong	Strong	Weak	Connected with MTF filter (Edge)
ı												
Magnification	Main Scan Magnification	Ena	Enabled		Enabled				Enabled			
	Mirroring	Enabled	Enabled (DF only)	Ш	Enabled (DF only)	0		_	Enabled (DF only)	()		
	Side-to-side Registration (Left Side)	Ena	Enabled		Enabled				Enabled			
I												
Filtering	MTF Filter (Edge)	Normal	Strong	Weak (All Area)	Normal	Weak (All Area)	Strong	Normal			Normal	SP4-930
	MTF Filter (Solid)		Normal				Normal					SP4-931
	MTF Filter (Low ID)	Normal	Normal		Normal		Normal	mal			Normal	SP4-932
	Smoothing Filter								Nor	Normal		
	Independent Dot Erase	Wŧ	Weak		Weak		Strong	Weak			Меак	SP4-928
	Line Width Correction	Disa	Disabled		Disabled		Disabled	Thick			Disabled	SP4-927
I												
Graduation	IDg Correction	Normal	Sharp	Photo Priority	Text Priority	Photographs	Sharp	Normal	Normal Pixel Photo	Coarse Pixel Photo	Preserved Background	SP4-923
ſ												
Image Correction	Graduation	Error Diffusion	Binary		Error Difusion		Binary	Error Diffusion	Dithering (105 Lines)	Dithering (53 Lines)	Error Diffusion	SP4-926 (Error diffusion only)
ı												
Path Control	Path Control Video Path Control	Ena	Enabled		Enabled				Enabled			
Ι												
vcu	FCI		Enabled				Enabled					
	Edge Correction	Enabled			Enabled				Ena	Enabled		
	Printerg Correction	Ena	Enabled		Enabled				Enabled			

6

Auto Shading

Overview

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

Black and white level correction is always done.

Black Level Correction

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

White Level Correction

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

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

The video signal information for each pixel obtained during image scanning is corrected by the IPU (SCRATCH) chip. If the maximum value of the video level is 64 or less, SC101 (exposure lamp error) is generated.

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

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

White Line Erase

The white line erase feature is validated (default) when you specify a value other than "0" in SP 4941 1. This feature works as follows:

- 1. The copier scans the original.
- 2. The density level of each pixel is compared with its adjacent pixels.
- 3. If the density level of a pixel is extremely lower then adjacent pixels, the level is corrected. The density levels of the adjacent pixels are considered.

When you validate the white line erase feature, the feature works for all originals. This feature erases the white lines of 1- through 6-pixel width (approximately, up to 0.25 mm). The white lines that exceed this width are not erased.

When you specify "2," instead of "1," in SP 4941 1, the feature erases darker white lines (namely, less whiter lines). Note that this SP does not affect the width of white lines to be erased.

Black Line Erase

The black line erase feature is the function that erases black lines made by the dust or dirt on the exposure glass. The feature is validated (default) when you specify a value other than "0" in SP 4942 1.

When you specify a larger value in this SP, the feature erases weaker black lines (namely, less blacker lines). This SP also affects the width of black lines to be erased. If you specify "1" or "2," the feature erases the black lines of 1- through 4-pixel width (approximately, up to 0.17 mm); if you specify "3," the feature erases the black lines of 1- through 6-pixel width (approximately, up to 0.25 mm). Note that some black lines on the original may be erased when you specify a larger value in the SP.

Auto Image Density (ADS)

In the SBU

ADS prevents the background of an original from appearing on copies. As the scanner scans down the page, the IPU on the BICU detects the peak white level for each scan line. The IPU determines the reference value for the A/D conversion for a particular scan line using the peak white level for that scan line. Then, the IPU sends the reference value data to the reference controller on the SBU.

When an original with a gray background is scanned, the density of the gray area is the peak white level density. Therefore, the original background will not appear on copies. Because peak level data is taken for each scan line, ADS corrects for any changes in background density down the page.

As with previous digital copiers, the user can select manual image density when selecting ADS, and the machine will use both settings when processing the original.

By Original Type

ADS mode is only enabled when the user has selected:

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

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

Scanner Gamma Correction

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

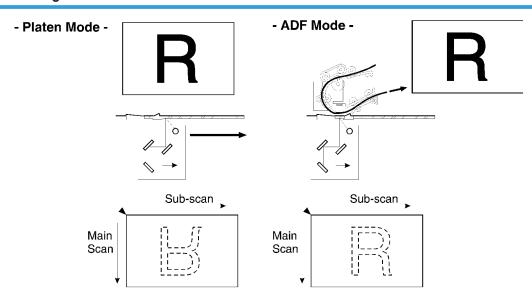
The machine has two possible scanner gamma curves: Text and Photo. When selecting Text, the machine does not use scanner gamma correction. As a result, the output is darker than the image density on the original. The advantage of this is that the machine can bring out gradations in paler areas. The disadvantage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

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

Main Scan Magnification

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

Mirroring for ADF Mode



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

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

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

Filtering

Overview

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

The strength levels for the MTF are controlled by SP 4932. The levels for line width correction and independent dot erase are controlled by SP 4927 and 4928, respectively.

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

MTF Filter Adjustment - Edge

In order to determine whether a given dot is part of an edge or not, the IPU checks all surrounding dots (vertical, horizontal, and diagonal). If the IPU determines that the dot is part of an edge, the machine applies the MTF filter for edges, using the value set in SP 4930. The higher the setting, the sharper the image. However, this is only used when the customer uses Text 1, Text 2, Photo 1-3, Special 1, Special 2, or Special 5.

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

MTF Filter Adjustment - Solid

If the IPU detects that the dot is not part of an edge, the machine applies the MTF filter for solid areas using the value set in SP 4931. The higher the setting, the sharper the image. However, this is only used when the customer uses Text 2.

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

MTF Filter Adjustment - Low ID Line

The IPU also checks the image density of all dots. If a succession of low-density dots is detected, the machine interprets this as a low ID line and applies the MTF filter for low ID lines, using the value set in SP 4932. The higher the setting, the sharper the image. However, this is only used when the customer uses Text 1, Text 2, Photo 2, Special 1, Special 2, or Special 5.

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

Independent Dot Erase

When the user selects Text 1 and 2, Photo 2, and Special 1, 2, and 5 modes, independent dots are detected using a matrix and erased from the image. The detection level can be adjusted with SP 4928.

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

Line Width Correction

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

Line width correction is done by the IPU (SCRATCH) chip.

ID Gamma Correction

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

In all modes, ID gamma correction can be adjusted with SP 4923.

Gradation Processing

Overview

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

- Binary picture processing
- Error diffusion
- Dithering

Binary Picture Processing

The 8-bit image data is converted into 1-bit data (black and white image data). This is done when the user selects Text 2 or Special 1. The threshold for deciding whether a pixel is black or white cannot be adjusted.

Error Diffusion

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

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

As the final step in error diffusion, a process called Texture Removal is applied to Text 1, Photo 2, Special 2, and Special 5 by default, but can also be applied to Photo 1 and 3 by changing the value of SP 4926.

Texture removal uses 256 threshold values in an 8 x 8 matrix. The value of SP 4926 controls the application of Texture Removal for each of the 6 modes listed above. The settings are as follows:

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

1: No removal applied.

2 – 6: Removal applied at the level specified here. The higher the setting (level), the less clear the image will become (more texture removal).

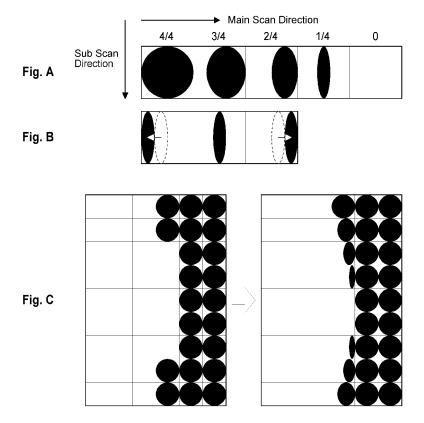
Dithering

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

Video Control Unit (VCU)

Fine Character and Image (FCI)

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



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

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

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

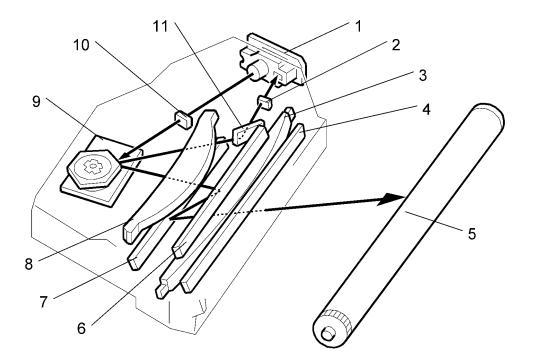
Printer Gamma Correction

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

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

Laser Exposure

Overview



- 1. LD unit
- 2. Synchronization detector lens
- 3. Double toroidal lens
- 4. Shield glass
- 5. OPC drum
- 6. 1st mirror

- 7. 2nd mirror
- 8. F-theta lens
- 9. Polygon mirror
- 10. Cylindrical lens
- 11. Synchronization detector mirror
- The LD drive board controls both the laser output and laser synchronization mechanism.
- The machine cuts off the power supply to the LD drive board if the front or right cover is opened.

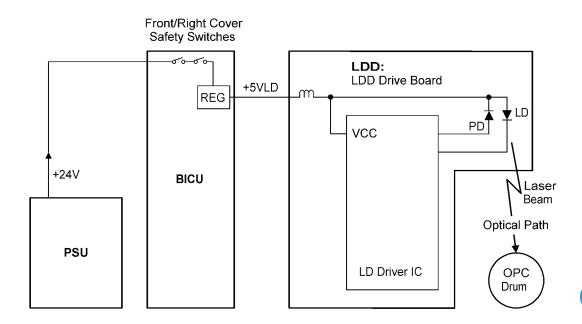
The LD driver IC drives the laser diode. To prevent the intensity of the laser beam from changing because of the temperature, the machine monitors the current passing through the laser diode (LD). The machine adjusts the current to the laser diode by comparing it with the reference level from the reference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

The laser diode power is adjusted on the production line.



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

LD Safety Switch

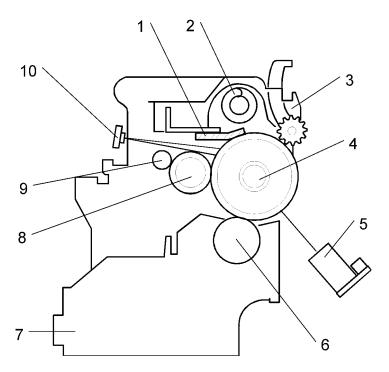


To ensure technician and user safety and to prevent the laser beam from inadvertently switching on during servicing, there are safety switches at the front and right covers.

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

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

Overview



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

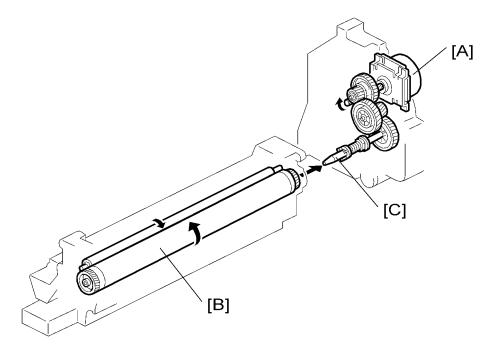
- 1. Cleaning Blade
- 2. Toner Collection Coil
- 3. Pick-off Pawl
- 4. OPC Drum
- 5. ID Sensor (see note)

- 6. Development Roller
- 7. Development Unit
- 8. Charge Roller
- 9. Charge Roller Cleaning Brush
- 10. Quenching Lamp (see note)



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

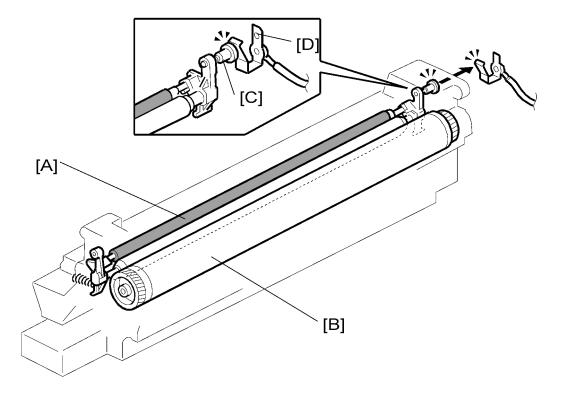
Drive



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

Drum Charge

Overview

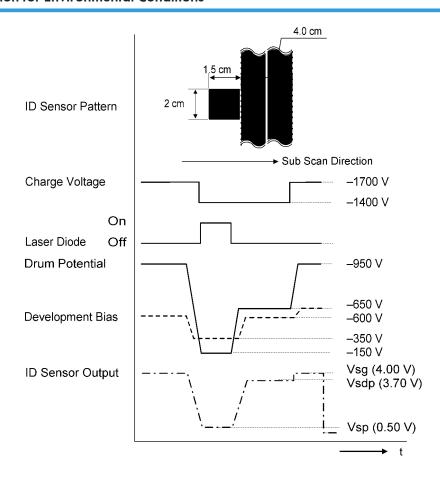


This copier uses a drum charge roller to charge the drum. The drum charge roller [A] always contacts the surface of the drum [B] to give it a negative charge of -950 V.

The high voltage supply board gives a negative charge of -1700 V to the drum charge roller through the screw [C] and terminal plate [D]. This voltage can be changed using SP 2001 1.

Charge Roller Voltage Correction

Correction for Environmental Conditions



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

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

This measurement is made immediately after the ID sensor pattern for toner density control. Immediately after making ID sensor pattern [A], the charge roller voltage stays the same, but the development bias goes up to $-600 \, \text{V}$; as a result the drum potential is reduced to $-650 \, \text{V}$. The laser diode is not switched on, and the drum potential is now slightly higher than the development bias, so a very small amount of toner transfers

to the drum. The ID sensor measures the density of this pattern [B], and the output voltage is known as Vsdp. This voltage is compared with Vsg (read from the bare drum at the same time).

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

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

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

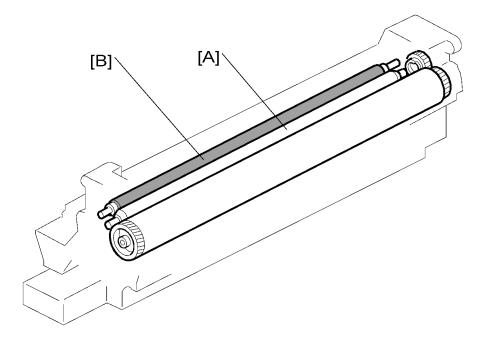
ID Sensor Pattern Production Timing

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

It is only made in the following conditions:

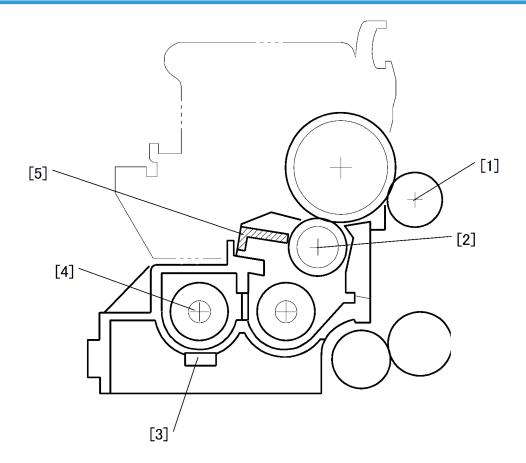
- During warm-up at power on
- When the machine starts warming up from energy saver mode and the temperature is less than the target temperature as set with SP Mode.
- When the machine starts warming up from energy saver mode and the machine prints more than 100 prints after generating the p-pattern.

Drum Charge Roller Cleaning



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

Overview

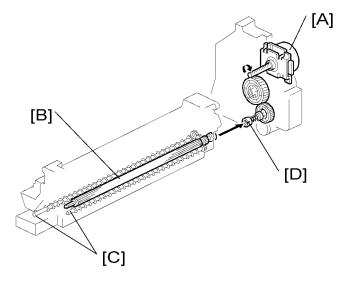


The development unit consists of the following parts.

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

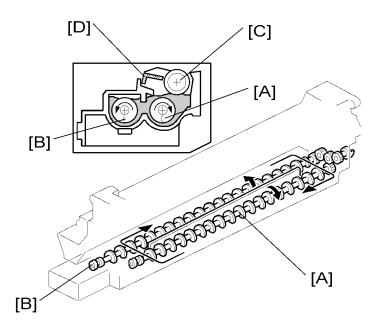
This machine uses a single-roller development system. Two mixing augers mix the developer. The toner density (TD) sensor and image density (ID) sensor (see the illustration in the PCU section) are used to control the image density on the copy.

Drive



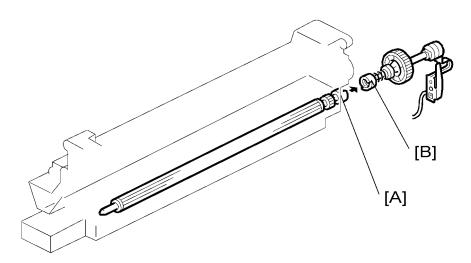
The main motor [A] drives the development roller [B] and mixing augers [C] through a train of gears and the development drive shaft [D]. When the PCU is pushed in, the development drive shaft engages the development roller gear.

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



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

Development Bias



6

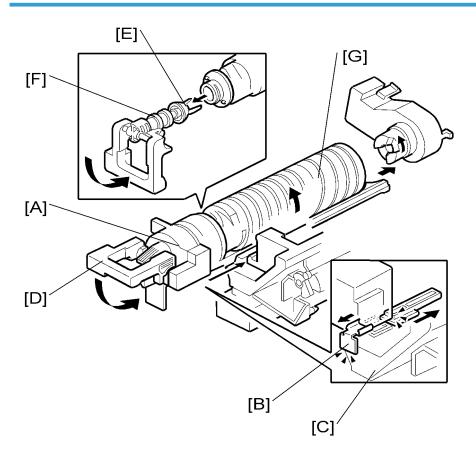
This machine uses a negative-positive development system, in which black areas of the latent image are at a low negative charge (about -154 ± 50 V) and white areas are at a high negative charge (about -950 V).

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

The development bias voltage (-650 V) can be adjusted with SP 2201 1.

Toner Supply

Toner Bottle Replenishment Mechanism



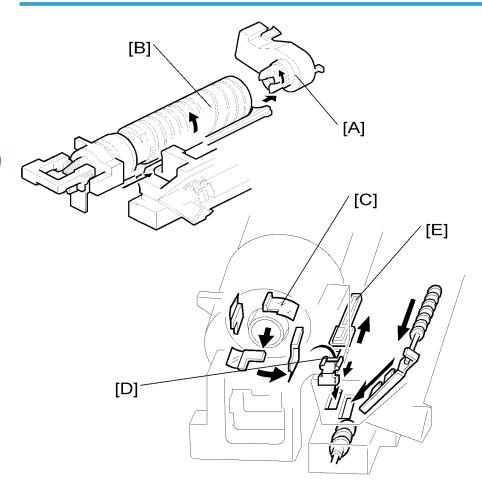
When a toner bottle is placed in the bottle holder unit [A] and the unit is pushed in completely, toner shutter [B] moves against the side [C] of the PCU. When the toner bottle holder lever [D] is put back in the original position, the cap [E] on the toner bottle is pulled away and kept in place by the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

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

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

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

Toner Supply Mechanism



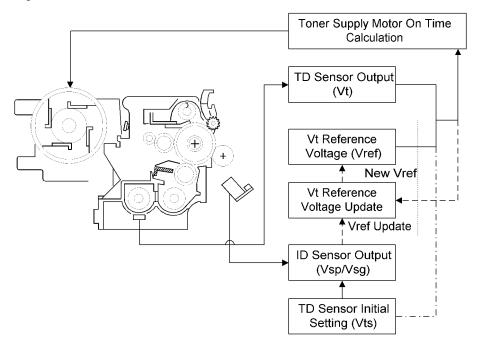
The toner supply motor [A] drives the toner bottle [B] and the mylar blades [C]. First, the toner falls down into the toner bottle holder. The toner supply mylar blades transfer the toner to the slit [D]. When the PCU is installed in the machine, the shutter [E] above the PCU is opened by the toner bottle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

Toner Density Control

Overview

There are four modes for controlling toner supply as shown in the following tables, which can be changed with by SP 2921. The factory setting is sensor control 1 mode.

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



The four-toner density control modes are as follows.

Sensor control 1

Mode	Sensor control 1 (SP 2921, "0"): Normally use this setting only	
Toner supply decision	Compare Vt with a reference voltage (Vts or Vref)	
Toner control process	Toner is supplied to the development unit when Vt is higher than the reference voltage (Vts or Vref). This mode keeps the Vref value for use with the next toner density control.	
	Vts is used for the first toner density control after a new PCU has been installed, until it has been corrected with the ID sensor output.	

Vref is used after Vts has been corrected with the ID sensor output voltage

Sensor control 2

Mode	Sensor control 2 (SP 2921, "1"): For designer's use only; do not use in the field
Toner supply decision	Compare Vt with a reference voltage (Vts)
Toner control process	This toner control process is the same as sensor control 1 mode. However, the reference voltage used is always Vts.
Toner supply amount	Varies
Toner end detection	Performed

Fixed control 1

Mode	Fixed control 1 (SP 2921, "2"): For designer's use only; do not use in the field
Toner supply decision	Compare Vt with a reference voltage (Vts or Vref)
Toner control process	This toner control process is the same as sensor control 1 mode.
Toner supply amount	Fixed (SP 2925)
Toner end detection	Performed

Fixed control 2

Mode	Fixed control 2 (SP 2921, "3"): Use temporarily if the TD sensor needs to be replaced
Toner supply decision	None
Toner control process	Toner is supplied every printed page regardless of Vt.
Toner supply amount	Fixed (SP 2925)
Toner end detection	Not performed

Toner Density Sensor Initial Setting

The TD sensor initial setting (SP 2214: Developer Initialize) procedure must be done after replacing the developer. During TD sensor initial setting, the TD sensor is set so that the TD sensor output is the value of SP 2926 (default: 2.4 V). This value will be used as the standard reference voltage (Vts) of the TD sensor.

Toner Concentration Measurement

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

Vsp/Vsg Detection

The ID sensor detects the following voltages.

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

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

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

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

• During warm-up at power on

If the machine starts warming up when the fusing temperature is 30°C or less (default) after entering night mode or low power mode (SP 2994 specifies the temperature setting).

Toner Supply Reference Voltage (Vref) Determination

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

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

Toner Supply Determination

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

This can be checked using SP 2220.

Toner Supply Motor On Time Determinations

For fixed control mode, the toner supply motor on time is specified by the setting of SP 2925, and does not vary. The default setting is 200 ms for each copy. The toner supply motor on time for each value of SP 2925 is as follows.

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

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

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

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

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



- The value of "t" can be changed using SP 2922 (default: 0.4 second)
- The value of "T" can be changed using SP 2923 (default: 30 seconds)
- T (30) means that toner is supplied intermittently in a 1/3 duty cycle (1 s on, 2 s off) for 30 seconds

Toner Supply in Abnormal Sensor Conditions

ID Sensor

Readings are abnormal if any of the following conditions occur:

- Vsg ≤ 2.5V
- Vsg < 3.5V when maximum power (979) is applied
- Vsp ≥ 2.5V
- (Vsg Vsp) < 1.0V
- $Vt \ge 4.5V$ or $Vt \le 0.2V$

The above ID sensor values can be checked using SP 2221.

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

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

TD Sensor

The TD sensor output is checked every copy. If the readings from the TD sensor become abnormal, the machine changes the toner density control mode to fixed supply mode 2, and the toner supply amount per page is always 200 ms, regardless of the value of SP 2925. If the machine detects the TD sensor error condition 10 times consecutively, an SC code is generated (SC390) and the machine must be repaired.

Toner Near End/End Detection and Recovery

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

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

Toner Near End Detection

If Vt is at level 6 (see the table on the previous page) five times consecutively, the machine enters the toner near end condition and the toner end indicator starts blinking. Then the machine supplies toner for a certain time, which depends on the setting of SP 2923 (see the previous page).

Toner Near End Recovery

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

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

Toner End Detection

There are two situations for entering the toner end condition.

- When Vt is level 7 three times consecutively, the machine enters the toner end condition.
- When 50 copies have been made since entering the toner near end condition. The number of copies between toner near-end and toner end can be changed using SP 2213.

Toner End Recovery

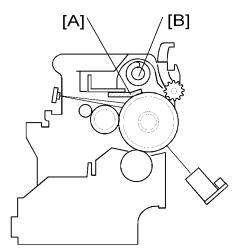
While turning on the main switch, if the front cover is opened for 10 seconds or more and then closed while a Toner End condition exists (following toner bottle replacement), the machine clears the Toner End condition. The recovery procedure is the same as for toner near end. It takes about two minutes.



6

Drum Cleaning and Toner Recycling

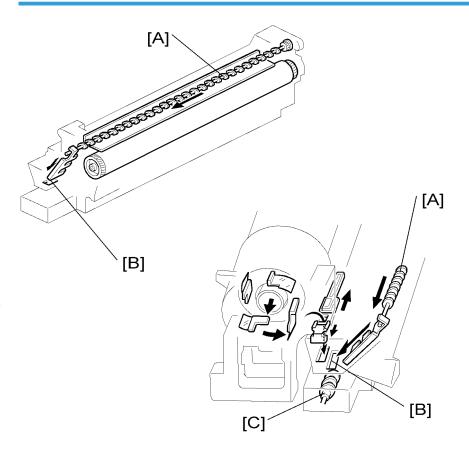
Drum Cleaning



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

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

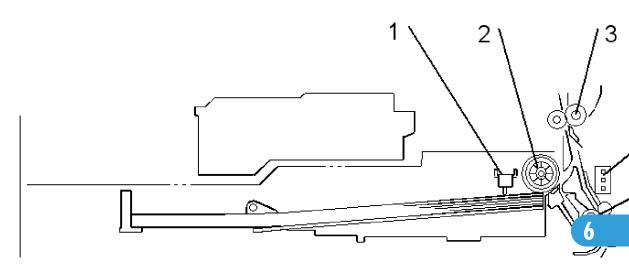
To remove the toner and other particles that are accumulated at the edge of the cleaning blade, the drum turns in reverse for about 5 mm at the end of every copy job.



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

Paper Feed

Overview



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

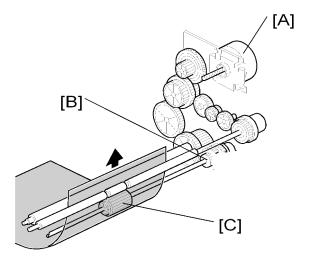
The paper tray feed stations use a friction pad system. To prevent paper from getting caught inside the machine when the tray is pulled out, the paper feed roller and shaft do not separate from the tray when the tray is pulled out.

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

The components of the paper feed station are as follows.

1. Paper End Sensor	
2. Paper Feed Roller	5. Upper Relay Roller
3. Registration Roller	6. Upper Relay Sensor
4. Paper Size Switch	

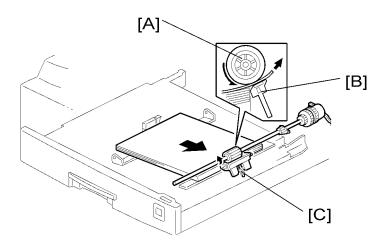
Paper Feed Drive Mechanism



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

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

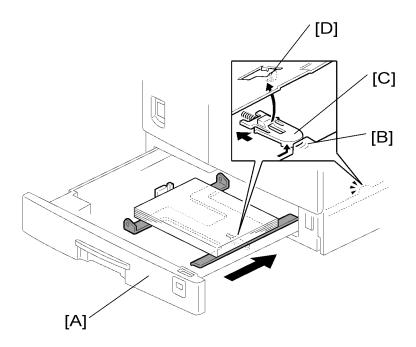
Paper Feed and Separation Mechanism



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

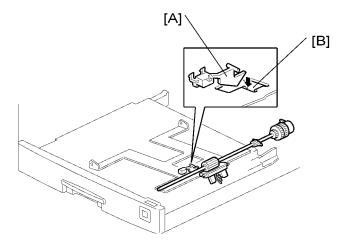
The friction pad pressure cannot be adjusted.

Paper Lift Mechanism



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

Paper End Detection



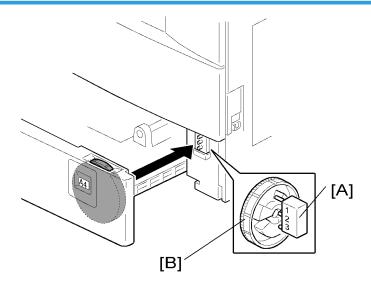
If there is any paper in the paper tray, the paper stack lifts the feeler, the paper end sensor [A] is deactivated.

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

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

Paper Size Detection

Paper Tray



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

ON=Not pushed, OFF=Pushed

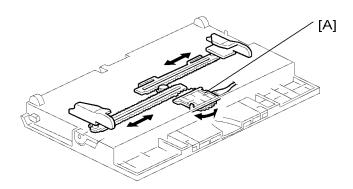
There are three paper size micro-switches [A] on the front right plate of the paper tray unit. The switches are actuated by a paper size actuator [B] behind the paper size indicator plate, which is on the front right of the tray.

Each paper size has its own actuator, with a unique combination of notches. To determine which size has been installed, the CPU reads which micro-switches the actuator has switched off.

The CPU disables paper feed from a tray if the paper size cannot be detected. If the paper size actuator is broken, or if there is no tray installed, the Add Paper indicator will light.

When the paper size actuator is at the "*" mark, the paper tray can be set up to accommodate one of a wider range of paper sizes by using User Tools. If the paper size for this position is changed without changing the User Tool setting, a paper jam will result.

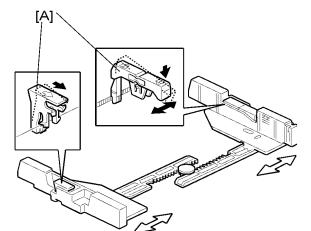
By-pass Tray



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

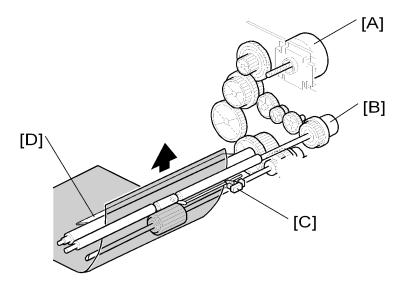
CN No. (BICU)	A3	A4 SEF	8" x 13"	A5 SEF
CN136-1	ON/OFF	OFF	OFF	OFF
CN136-2	OFF	OFF	OFF	ON/OFF
CN136-3 (GND)	OFF	OFF	OFF	OFF
CN136-4	OFF	ON	ON	OFF
CN136-5	ON	ON	OFF	OFF

Side Fences



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

Paper Registration



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

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

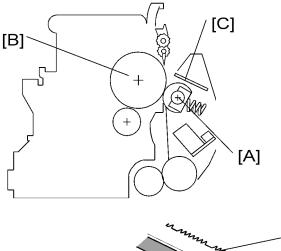
The cleaning mylar [D] contacts the registration roller. It removes paper dust from the registration roller so that this dust will not transfer into the development unit through the drum-cleaning unit.

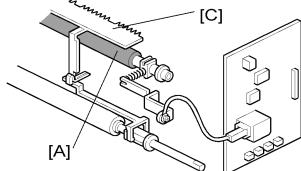
The amount of paper buckle at the registration roller to correct skew can be adjusted with SP 1003.

If jams frequently occur after registration, SP 1903 can be used to activate the relay clutch so that the relay roller assists the registration roller in feeding the paper along. When feeding from the by-pass tray, the by-pass feed clutch is activated, turning the by-pass feed roller. This feature may be needed when feeding thick paper, and cannot be used for the first paper feed tray.

Image Transfer and Paper Separation

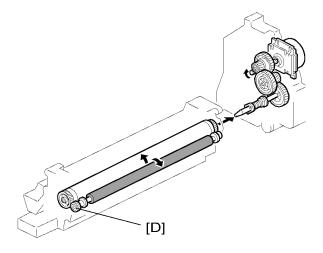
Overview





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

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



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

Image Transfer Current Timing

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

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

The high transfer current levels (default) are as shown in the following table. With SP 2301, the high transfer current level used for the paper feed trays, duplex tray, by-pass tray, and cleaning an be adjusted.

	By-pass Tray (Thick/OHP)	Paper Tray/ By-pass Tray (Normal)	By-pass Tray (Special/ Envelope)	Duplex (1st Side)	Duplex (2nd Side)
A3/A4 LEF	11 µA	12 µ A	13 μΑ	12 µ A	17μΑ
DLT	12 µ A	18 µ A	15 µ A	18 µ A	17μΑ
B4 SEF	12 µ A	12 µ A	15 μΑ	12 µ A	18 μΑ
LT SEF	17 μΑ	17 μΑ	15 μΑ	17 μΑ	24 μΑ
A4 SEF	21 µA	15 µ A	28 μΑ	15 µ A	24 μΑ

	By-pass Tray (Thick/OHP)	Paper Tray/ By-pass Tray (Normal)	By-pass Tray (Special/ Envelope)	Duplex (1st Side)	Duplex (2nd Side)
B5 SEF	22 µ A	19 μΑ	28 μΑ	19 μΑ	22 μΑ
A5 SEF	22 μΑ	19 µ A	28 μΑ	19 µ A	28 μΑ
HLT SEF	22 μΑ	19 μΑ	28 μΑ	_	_
B6 SEF	22 μΑ	19 μΑ	28 μΑ	_	_
A6 SEF	22 μΑ	19 μΑ	34 µ A	_	_
Post card/ Envelope	22 μΑ	19 μΑ	34 μΑ	_	_

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

Transfer Roller Cleaning

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

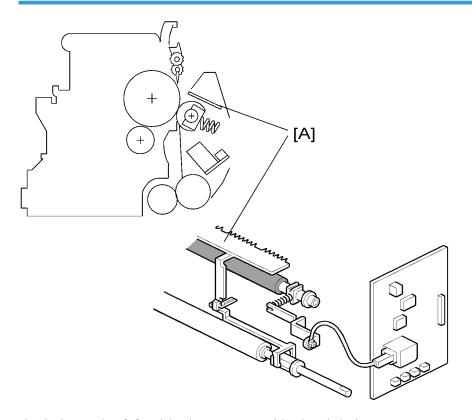
During transfer roller cleaning, the high voltage supply unit supplies a negative cleaning voltage (about – 1 kV) to the transfer roller. Any negatively charged toner on the transfer roller is then transferred back to the drum. Then a positive cleaning current (+10 microamperes) is applied to the transfer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

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

- Before starting the printing job (only if enabled with SP 2996; note that the default setting is off).
- Just after the power is switched on.
- After a copy jam has been cleared.
- After 10 or more sheets of paper have been copied and the copy job has finished.

Also, the transfer roller cleaning current can be adjusted using SP 2301 4.

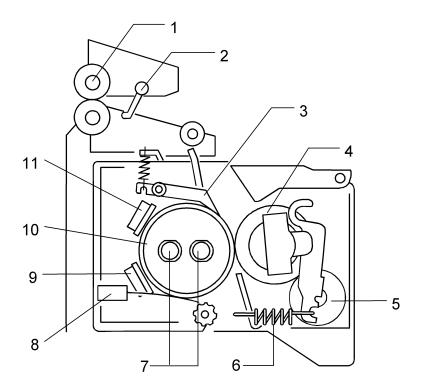
Paper Separation Mechanism



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

Image Fusing and Paper Exit

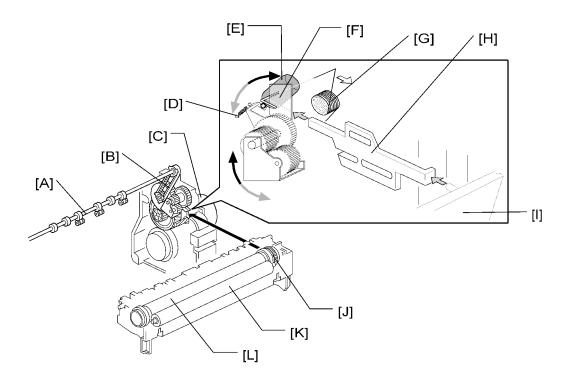
Overview



- 1. Paper exit roller
- 2. Exit sensor
- 3. Hot roller strippers
- 4. Pressure roller
- 5. Cleaning roller
- 6. Pressure spring

- 7. Fusing lamps
- 8. Thermistor
- 9. Thermostat
- 10. Hot roller
- 11. Thermostat

Fusing Unit Drive and Release Mechanism



Fusing Unit Drive

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

Drive Release Mechanism

When the right door [I] is open, the spring [G] pushes the top end of the gear holder [F] to the right. The drive gear is released from the fusing-unit drive gear [J]. When you close the right door, the mechanical link [H] pushes the spring [G]. The gear holder turns counterclockwise by the force of another spring [D], and engages with the fusing-unit drive gear.

Contact/Release Control

The drive power is not transmitted to the fusing unit during warming up when the fusing temperature (at the start) is 18°C or higher. The drive power is transmitted when the fusing temperature is less than 18°C. This contact/release control is based on the following conditions.

The hot roller [L] takes a shorter time to become hot enough if it is not turning during warming up. When, however, the fusing temperature (at the start) is low, the temperature of the hot-roller surface may become uneven.

You can disable this control (SP1103 1).

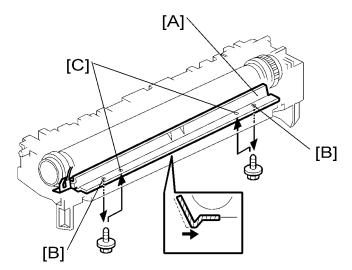
Drive Release Solenoid

Solenoid	Drive gear
Off	Engaged
On	Released

The fusing drive release solenoid [E] is on the rear end of the gear holder. When the solenoid is off, the spring [D] pulls the gear holder, and the drive gear engages with the fusing unit drive gear. When the solenoid is on, it pulls the top end of the gear holder to the right, and the gear holder turns clockwise. As a result, the drive gear is released from the fusing unit drive gear.

The release solenoid comes on when you turn on the main switch if the fusing temperature is 18°C or higher. The solenoid releases the drive gear from the fusing unit drive gear. The fusing lamps heat the hot roller [L] more effectively since the heat is not conducted to the pressure roller [K]. When the hot roller becomes hot enough, the release solenoid turns off, letting the drive gear engage with the fusing unit drive gear.

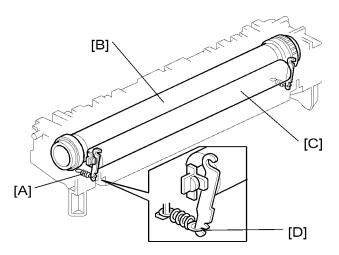
Fusing Entrance Guide Shift



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

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

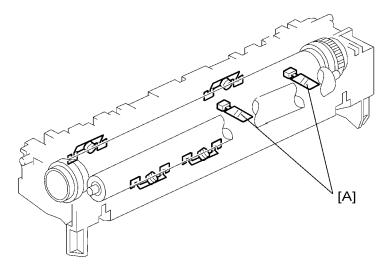
Pressure Roller



The pressure springs [A] constantly apply pressure between the hot roller [B] and the pressure roller [C]. Applied pressure can be changed by adjusting the position of the pressure springs. The spring is positioned at the end [D] as the default setting.

Fusing Temperature Control

Overview



There are two fusing lamps (not identical), two thermistors, and four thermostats.

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

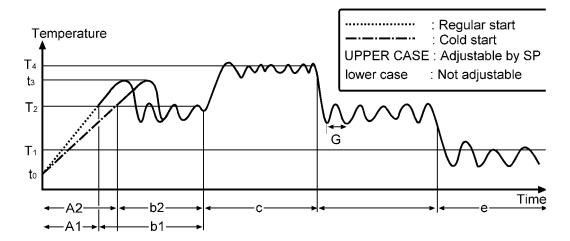
The CPU checks the output from the fusing thermistor once every 1.5 seconds. The CPU decides how long the lamps must be switched on during the next 1.5 seconds by comparing the following temperatures:

- The center thermistor temperature and the target center temperature
- The end thermistor temperature and the target end temperature

The fusing lamp works to maintain a target fusing temperature of 160°C during copying.

Temperature Control

According to the operation mode, the fusing temperature is controlled. The diagram illustrates the transition of fusing temperature. After you turn the main switch on, the fusing temperature rises from the room temperature (t0) to one of the specified temperatures. You can adjust some of the temperatures.



A1: Regular Start Mode/A2: Cold Start Mode (SP 1107 1-2)

Turning the fusing lamp on and off may affect the voltage of the power source in the room, causing the fluorescent lights in the room to flicker. To lighten this problem, you can reduce the checking repetition to 20 times.

When machine initialization ends, the fusing temperature is set to one of the following temperatures:

- The Standby Temperature (T2: SP 1105 3-4) when there is no print job.
- The First Print Temperature when the copier has received a print request during machine initialization.

You cannot directly adjust the First Print Temperature. This temperature is 10°C higher (up to 185°C) than the Copying Temperature (print p.121).

C: Copying Mode

When the copier is making copies, the fusing temperature is set to one of the following temperatures:

- The Warm Up Temperature (SP 1105 1-2) to output the first print after the Low Power Mode (Pp. 121)
- The Copying Temperature (T4: SP 1105 5-6) to output the second print (and after the second)

You can raise the Warm Up Temperature to make better the fusing quality of the first print. While the copier is adjusting the fusing temperature to the Warm Up Temperature, the message "Copy starts after warm up" is displayed.

c: Thick Paper Mode

When the machine is making copies on thick paper, the fusing temperature is set to the Thick Paper Temperature (SP 1105 9-10). When thick paper reaches the registration sensor, the copier checks the fusing temperature, and executes one of the following processing:

Stops feeding the thick paper (and keeps it at the registration sensor) and waits for the fusing temperature to reach the predefined temperature—the temperature 5°C lower than the Thick Paper Temperature. (The fusing temperature keeps rising until it reaches the Thick Paper Temperature while the thick paper travels from the registration sensor to the fusing unit.)

b1/b2: Standby Mode

When the copier is not making copies, the fusing temperature is set to the Standby Temperature (T2: SP 1105 3-4). You can adjust this temperature. However, if you have raised this temperature, the BICU may be unable to generate a SC code in the event of fusing lamp error.

While in the Standby Mode, the copier checks the fusing temperature every 1.5 seconds (G: SP 1108 1). Turning on and off the fusing lamp may affect the voltage of the power source (in the room), causing the fluorescent lights (in the room) to flicker. To lighten such trouble, you can adjust the control period. However, if you elongate this period (to two seconds or longer), the BICU may be unable to generate a SC code in the event of a fusing lamp error.

e: Low Power Mode

When the Energy Saver Timer (System Settings > Timer Settings > Energy Saver Timer) expires, the fusing temperature is set to the Low Power Temperature (T1: SP 1105 7-8).

Overheat Protection

This machine protects its hardware from overheat by three features. Normally, the first feature can fully protect the hardware. The second feature works as the fail-safe feature for the first one. The third feature works as the fail-safe feature for the second one.

First Feature:

If the fusing temperature reaches 230°C (or higher) and stays so for one second, the controller turns the fusing lamp off. In a case like this, SC543 or SC553 shows.

Second Feature:

If the fusing feature reaches 250°C, the controller cuts off the 24V line. (The fusing lamps are on the 24V line.)

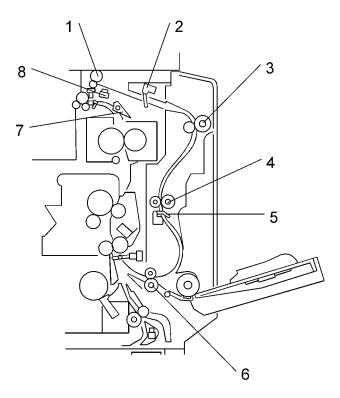
Third Feature:

Two thermostats are attached on each line of the two fusing lamps. (four thermostats in total). One of the two thermostats cuts the power supply to the fusing lamp at 179°C, and the other cuts the power supply at 180°C. (Note that the thermostat temperature is somewhat lower than the fusing temperature.)



Duplex Unit

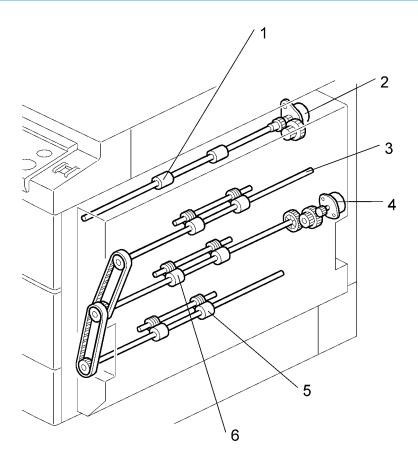
Overall



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

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

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



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

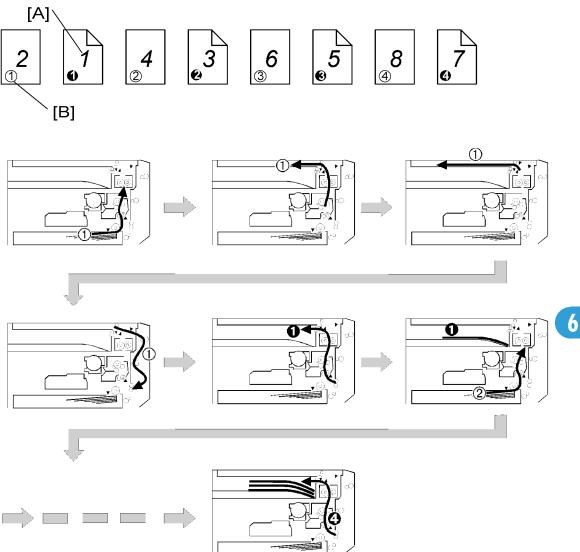
Basic operation

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

- Larger than A4 Short-edge/LT Short-edge -

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

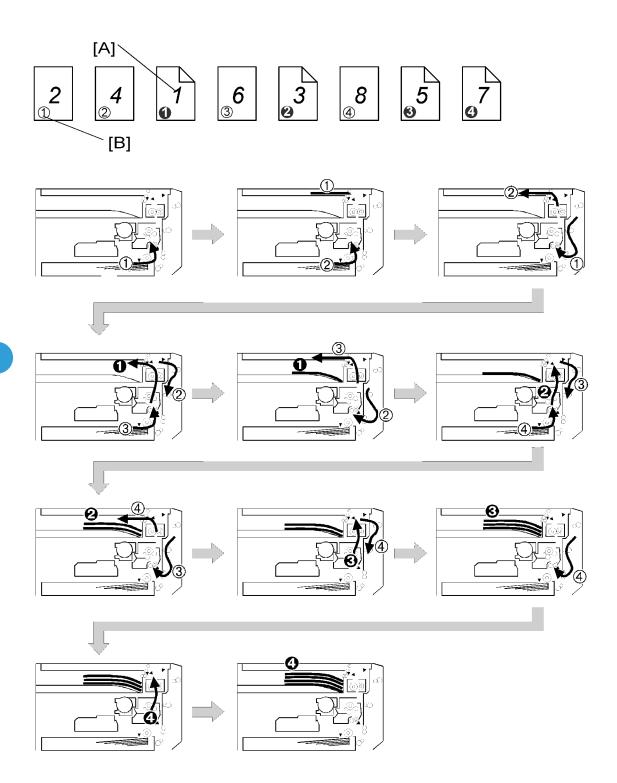
Example: 8 pages. The number [A] in the illustration shows the order of pages. The number [B] in the illustration shows the order of sheets of copy paper (if black, this indicates the second side).



- Up to A4 Short-edge/LT Short-edge -

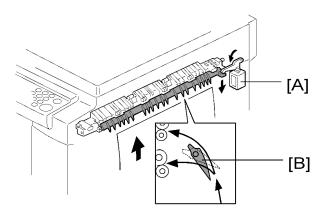
The paper feed path can hold two sheets of copy paper.

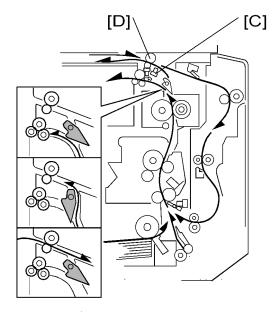
Example: 8 pages. The number [A] in the illustration shows the order of pages. The number [B] in the illustration shows the order of sheets of copy paper (if black, this indicates the second side).



6

Feed In and Exit Mechanism





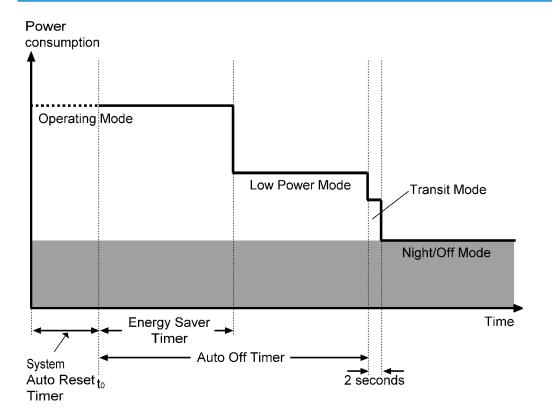
During duplex copying, the inverter gate solenoid [A] switches on and the junction gate [B] switches over to direct the paper to the inverter. When the paper trailing edge reaches the duplex inverter sensor [C], the inverter roller [D] reverses its rotation direction and the paper goes to the duplex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

If there are two or more copies being made with $A4/8^{1}/2^{n} \times 11^{n}$ SEF (or smaller), the next sheet waits at the registration sensor for the current sheet to exit the inverter.

Energy Saver Modes

This section illustrates the energy saver modes of the machine with the controller.

Overview



The machine has three energy-saver modes: the Low Power Mode, the Transit Mode, and the Night/Off Mode. The Transit Mode continues for about two seconds (probably, the user does not recognize this mode when it occurs). The table lists the status of several components. For the fusing temperature, see the section of "Fusing Temperature Control".

	Operation panel	Engine	Exhaust fan
Operating Mode*	On	On	On
Low Power Mode	Off	On	Off
Transit Mode	Off	On	Off
Night/Off Mode	Off	Off**	Off

6

Timers

The Energy Saver Timer and Auto Off Timer start at the same time (t0) when the machine ends all jobs, when the user ends all manual operations, or when the controller starts the default application program (the program specified by the user [System Settings > General Features > Function Priority]). The default application program starts when the System Auto Reset Timer expires (System Settings > System Settings > System Auto Reset Timer).

For more information, see "s" in the section of "Energy Saver Modes of Basic Machines".

Recovery

Any of the following operations brings the machine back to the Operating Mode:

- The power switch is pressed.
- Originals are set on the document feeder.
- The platen cover (or document feeder) is opened.
- The controller receives a job through the USB
- An SC code is generated.

^{*} The "Operating Mode" here refers to all the modes (or status) other than the Low Power Mode and Night/ Off Mode. Actual power consumption (during the Operating Mode) depends on job status and environmental conditions.

^{**} The SRAM is alive and backs up the engine controller.

7. Specifications

General Specifications

Configuration:	Desktop			
Copy Process:	Dry electrostatic transfer system			
Originals:	Sheet/Book/	'Object		
Original Size:	Maximum A3/11" x 17"			
	Maximum:	A3/11" x 17"		
	Minimum:	A5 LEF/8 ¹ / ₂ " x 5 A6 SEF/5 ¹ / ₂ " x 8		
Copy Paper Size:	Custom sizes in the bypass tray:	Width: 90 – 297 mm (3.55" – 11.69"), Length: 148 – 600 mm (5.83" – 23.62")		
	NOTE: Physically, the by-pass tray can handle the following size (but this size is not recognized by the application software):			
	Width: 305 mm			
Copy Paper Weight:	Length: 1,260 mm Paper Tray: 60 – 90 g/m², 16 – 24 lb. Bypass: 52 – 162 g/m², 14 – 43 lb.			
Reproduction Ratios:	3 enlargemer	nt and 4 reduction		
		A4/A3 Version	LT/DLT Version	
		200%	155%	
	Enlarge- ment	141%	129%	
		122%	121%	
	Full Size	100%	100%	
		93%	93%	
	Reduction	82%	78%	
		71%	65%	

		50	0%	50%
Zoom:	50% to 200%, in 1% steps			
	China		220 – 240 V, 50/60 Hz, 7 A	
	Full System:		Not above 1.28 kW	
D C	Off Mode:		Not above 10 W	
Power Source:	• Full system - Maximum possible power consumption (any combination of mainframe and options), excluding optional heaters, key counter, fax unit, and printer controller.			
	Standby (Mai Full system):	nframe/	Not above 40 dB(A)	
	Operating (M frame only):	ain-	Not abo	ve 62 dB(A)
Noise Emission:	Operating (Full System):		Not abo	ve 66 dB(A)
	cordance	e with ISC	7779. N	ere made in ac- leasurements were on of the operator.
D: : (M/ D III)	B283: 550 x 568 x 420 mm (21.7" x 22.4" x 16.5") B282: 587 x 568 x 460 mm (23.1" x 22.4" x 18.1")			
Dimensions (W \times D \times H):	With bypass feed table closed Without the A(R)DF			
Weight:	B283: 35 kg (78 lb.) B282: 39.3 kg (88 lb.) (Excluding A(R)DF, platen cover, toner, and developer)			

Copying Speed in Multicopy Mode (copies/minute):

Mode			
1-sided		A3 SEF/11"×17"	10
↓ 1-sided	Memory copy	A4 LEF/11" x 8 ¹ / ₂ "	16
	DF 1-to-1	A3 SEF/11"×17"	8
_	DF 1-10-1	A4 LEF/11" x 8 ¹ / ₂ "	16
1-sided		A3 SEF/11"×17"	_
↓ 2-sided	Memory copy	A4 LEF/11" x 8 ¹ / ₂ "	_



- Measurement Conditions:
 - Figures are for one-sided original to one-sided copy except where stated otherwise
 - 100% size

Warm-up Time:	Less than 10 seconds (at 20°C [68°F])		
	Not more than 6.5 seconds Measurement Conditions		
First Copy Time:	1. From the ready state, with the polygonal mirror motor operating.		
тизі сору тіпе.	2. A4/LT copying		
	3. 100%size		
	4. Paper feed from the upper tray		
Copy Number Input:	Numeric keypad, 1 to 99 (increment, decrement)		
Manual Image Density:	5 steps		
Automatic Reset:	Default is 60 seconds. Can be set from 10 to 999 seconds with user tools.		
Automatic Shut-off:	Default is 1 minute. Can be set from 1 to 240 minutes with user tools.		
	Paper Tray:		
	• 250 sheets		
Copy Paper Capacity:	Optional Paper Tray Unit:		
	• 500 sheets x 1, or 500 sheets x 2		
	Bypass Tray:		

	• 100 sheets (sheets up to 432 mm [17"])
	• 40 postcards
	• 10 envelopes
	Copy weight: 80 g/m ² (20 lb.)
Toner Replenishment:	Cartridge replacement (260 g/cartridge)
	Platen cover
	Auto document feeder
	Auto-reverse document feeder (B282 only)
Optional Equipment:	Paper tray unit (1 tray)
	Paper tray unit (2 trays)
	Tray heater
	Optics anti-condensation heater
Toner Yield:	9k copies (A4 LEF, 6% full black, 1 to 2 copying, normal text mode)
Copy-Tray Capacity	250 sheets
Memory	16 MB (BICU) + 32 MB Controller
Duplex Unit (B282 only)	
Copy Paper Size:	Maximum ¬ A3/11" x 17" Minimum ¬ A5/8 ¹ / ₂ " x 11"
Copy Paper Weight:	64 - 90 g/m² (20 - 24 lb.)

7

Supported Paper Sizes

Paper Feed and Exit

Main Frame, Duplex

Paper	Size (W x L)	Main Frame Tray	Duplex	Optional Paper Tray	By-pass Tray
A3 SEF	297 x 420 mm	Х	Х	Х	Х
A3 LEF	420 x 297 mm	0	0	0	0
B4 SEF	257 x 364 mm	Х	Х	М	Х
B4 LEF	364 x 257 mm	0	0	0	0
A4 SEF	210 x 297 mm	Х	Х	Х	Х
A4 LEF	297 x 210 mm	Х	Х	Х	М
B5 SEF	182 x 257 mm	М	Х	М	Х
B5 LEF	257 x 182 mm	Х	Х	М	М
A5 SEF	148 x 210 mm	0	Х	М	Х
A5 LEF	210 x 148 mm	Х	Х	0	М
B6 SEF	128 x 182 mm	0	0	0	Х
B6 LEF	182 x 128 mm	0	0	0	0
A6 SEF	105 x 148 mm	0	0	0	К
A6 LEF	148 x 105 mm	0	0	0	0
DLT SEF	11" x 17"	М	Х	Х	М
DLT LEF	17" x 11"	0	0	0	0
LG SEF	8 ¹ / ₂ " x 14"	М	Х	Х	М
LG LEF	14" x 8 ¹ / ₂ "	0	0	0	0
Gov. LG SEF	8 ¹ / ₄ " x 14"	М	Х	М	К

Paper	Size (W x L)	Main Frame Tray	Duplex	Optional Paper Tray	By-pass Tray
Gov. LG LEF	14" x 8 ¹ / ₄ "	0	0	0	0
LT SEF	8 ¹ / ₂ " x 11"	М	Х	Х	М
LT LEF	11" x 8 ¹ / ₂ "	М	Х	Х	М
HLT SEF	$5^{1}/_{2}$ " x $8^{1}/_{2}$ "	0	0	М	М
HLT LEF	$8^{1}/_{2}$ " x $5^{1}/_{2}$ "	М	0	0	0
Executive SEF	$7^{1}/_{4}$ " x $10^{1}/_{2}$ "	М	Х	М	М
Executive LEF	10 ¹ / ₂ " x 71/4"	М	Х	М	М
F SEF	8" x 13"	М	Х	М	М
F LEF	13" x 8"	0	0	0	0
Foolscap SEF	8 ¹ / ₂ " x 13"	М	Х	Х	М
Foolscap LEF	13" x 8 ¹ / ₂ "	0	0	0	0
Folio SEF	8 ¹ / ₄ " x 13"	М	Х	М	М
Folio LEF	13" x 8 ¹ / ₄ "	0	Х	0	0
8K SEF	267 x 390 mm	М	Х	М	М
8K LEF	390 x 267 mm	0	0	0	0
16K SEF	195 x 267 mm	М	Х	М	М
16K LEF	267 x 195 mm	М	Х	М	М
C5 Env. SEF	162 x 229 mm	0	0	0	М
C6 Env. SEF	114 x 162 mm	0	0	0	М
DL Env. SEF	110 x 220 mm	0	0	0	М
Com 10 SEF	$4^{1}/_{8}$ " x $9^{1}/_{2}$ "	0	0	0	М
Monarch SEF	$3^7/8$ " x $7^1/2$ "	0	0	0	М
Custom		0	0	0	Х

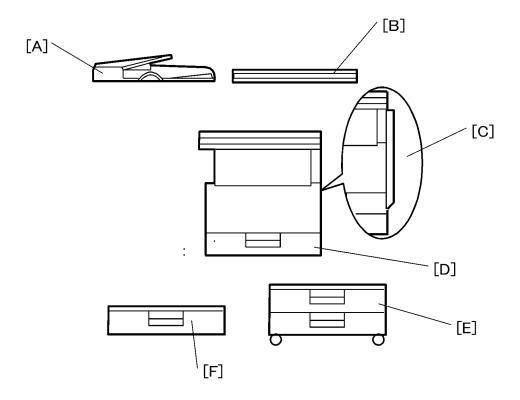
Key:

X:	Detected (Main frame tray)/Processed (Duplex)
O:	Not detected (Main frame tray)/Not processed (Duplex)
M:	Selected manually
K:	Specified from the key pad



• Custom W: 90 to 297 mm L: 148 to 600 mm

Machine Configuration



Unit/Component		Machine Code	Diagram
	Copier (1-tray non-duplex model)	B283	[D]
	Copier (1-tray with duplex)	B282	[C] + [D]
	Platen cover (optional)	B406	[B]
Copier	ADF (optional)	B813	[A]
	ARDF (optional)	B814	[A]
	Paper tray unit-1 tray (optional)	B385	[F]
	Paper tray unit-2 trays (optional)	B384	[E]



• The GDI controller comes with a dedicated controller box and printer/scanner panel.

7

Optional Equipment

ARDF

	Standard sizes		
	 Single-sided mode: A3 to A5, 11" x 17" to 5¹/₂" x 8¹/₂" 		
	• Double-sided mode: A3 to A5, 11" x 17" to $5^1/_2$ " x $8^1/_2$ "		
Original Size:	Non-standard sizes (Single-sided mode only)		
	Max. width 297 mm		
	Min. width 105 mm		
	Max. length 1260 mm		
	Min. length 128 mm		
Original Weight:	Single-sided mode: 40 – 128 g/m², 10 – 34 lb Double-sided mode: 52 – 105 g/m², 14 – 28 lb		
Table Capacity:	50 sheets (80 g/m², 70 kg)		
Original Standard Position:	Center		
Separation:	FRR		
Original Transport:	Roller transport		
Original Feed Order:	From the top original		
Reproduction Range:	50 to 200% (Sub scan direction only)		
Power Source:	24 and 5 Vdc from the copier		
Power Consumption:	50 W		
Dimensions (W x D x H):	550 x 470 x 130 mm		
Weight:	10 kg (22 lb)		

ADF

Original Size:	Standard sizes (Single-sided mode only):
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	 A3 to A5, 11" x 17" to 5¹/₂" x 8¹/₂" Non-standard sizes (Single-sided mode only): Max. width 297 mm Min. width 105 mm Max. length 1,260 mm Min. length 128 mm 	
Original Weight:	52 - 105 g/m² (14 - 28 lb)	
Table Capacity:	30 sheets (80 g/m², 22 lb)	
Original Standard Position:	Center	
Separation:	FRR	
Original Transport:	Roller transport	
Original Feed Order:	From the top original	
Reproduction Range:	50 – 200%	
Power Source:	24 and 5 Vdc (from the main frame)	
Power Consumption:	25 W	
Dimensions (W x D x H):	550 mm x 470 mm x 90 mm	
Weight:	Not above 7 kg (15 lb)	

One-Tray Paper Tray Unit

Paper Size:	A5 to A3, $5^{1}/_{2}$ " x $8^{1}/_{2}$ " SEF to 11" x 17"		
Paper Weight:	60 - 105 g/m², 16 - 28 lb		
Tray Capacity:	500 sheets (80 g/m², 20 lb) x 1 tray		
Paper Feed System:	Feed roller and friction pad		
Paper Height Detection:	4 steps (100%, 70%, 30%, Near end)		
Power Source:	 24 Vdc and 5Vdc (from the copier/printer): 120 Vac (120 V version) from the copier/printer when the optional tray heater is installed 		

	220 – 240 Vac (230 V version) from the copier/printer when the optional tray heater is installed		
D C	Max:	20 W (Copying/printing) 23 W (Optional Tray Hea	
Power Consumption:	Average:	13 W (Copying/printing) 15 W (Optional Tray Heater On)	
Weight:	12 kg (26.4 lb)		
Size (W x D x H):	550 mm x 520 mm x 134 mm		

Two-Tray Paper Tray Unit

Paper Size:	A5 to A3, $5^{1}/_{2}$ " x $8^{1}/_{2}$ " SEF to 11" x 17"		
Paper Weight:	60 – 105 g/m², 16 – 28 lb		
Tray Capacity:	500 sheets (80	g/m ² , 20 lb) x 2 trays	
Paper Feed System:	Feed roller and friction pad		
Paper Height Detection: 4 steps (100%, 70%, 30%		, 70%, 30%, Near end)	
Power Source:	 24 Vdc and 5Vdc (from the copier/printer): 120 Vac (120 V version) from the copier/printer when the optional tray heater is installed 220 – 240 Vac (230 V version) from the copier/printer when the optional tray heater is installed 		
Davies Consumption	Max:	30 W (Copying/printing) 23 W (Optional Tray Heater On)	
Power Consumption:	Average:	17 W (Copying/printing) 15 W (Optional Tray Heater On)	
Weight:	25 kg (55 lb)		
Size (W x D x H):	550 mm x 520 mm x 271 mm		

MEMO