Model A-C2
(Machine Code: B003/B004/B006/B007)

SERVICE MANUAL

January 26th, 2001
Subject to change

IMPORTANT SAFETY NOTICES

PREVENTION OF PHYSICAL INJURY

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

HEALTH SAFETY CONDITIONS

1. Never operate the copier without the ozone filters installed.
2. Always replace the ozone filters with the specified ones at the specified intervals.
3. Toner and developer are non-toxic, but if you get either of them in your eyes by accident, it may cause temporary eye discomfort. Try to remove with eye drops or flush with water as first aid. If unsuccessful, get medical attention.

OBSERVANCE OF ELECTRICAL SAFETY STANDARDS

1. The copier and its peripherals must be installed and maintained by a customer service representative who has completed the training course on those models.
2. The NVRAM on the system control board has a lithium battery which can explode if replaced incorrectly. Replace the NVRAM only with an identical one. The manufacturer recommends replacing the entire NVRAM. Do not recharge or burn this battery. Used NVRAM must be handled in accordance with local regulations.

1. **SAFETY AND ECOLOGICAL NOTES FOR DISPOSAL**
   Do not incinerate toner bottles or used toner. Toner dust may ignite suddenly when exposed to an open flame.
2. Dispose of used toner, developer, and organic photoconductors in accordance with local regulations. (These are non-toxic supplies.)
3. Dispose of replaced parts in accordance with local regulations.
4. When keeping used lithium batteries in order to dispose of them later, do not put more than 100 batteries per sealed box. Storing larger numbers or not sealing them apart may lead to chemical reactions and heat build-up.

LASER SAFETY

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

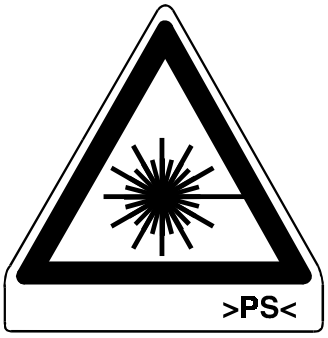
⚠WARNING

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

⚠WARNING

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

CAUTION MARKING:



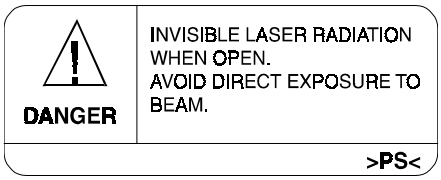


TABLE OF CONTENTS

PERIPHERALS

ARDF (B351)

LCT (A683)

PTU (A682)

BRIDGE UNIT (B688)

1 BIN TRAY (B376)

1,000 SHEET FINISHER (A681)

TWO TRAY FINISHER (B352)

1. INSTALLATION PROCEDURE

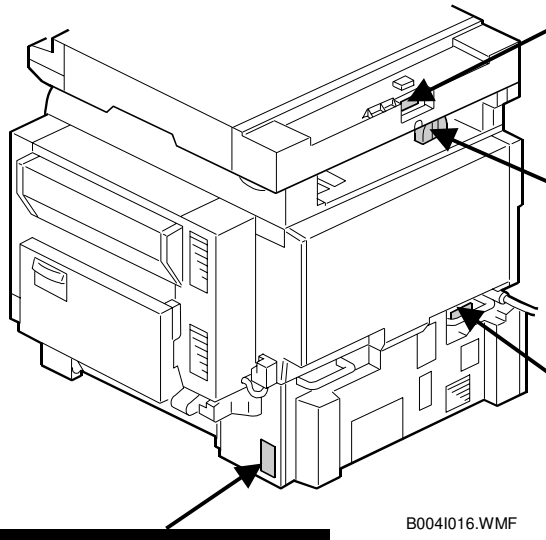
⚠CAUTION

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

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

1.1 INSTALLATION REQUIREMENTS

⚠CAUTION



ARDF

"Rating Voltage of Output Connector. Max. DC24 V"

Scanner Unit

"Rating Voltage of Output Connector. Max. DC24 V"

Finisher

"Rating Voltage of Output Connector. Max. DC24 V"

LCT

"Rating Voltage of Output Connector. Max. DC24 V"

1.1.1 ENVIRONMENT

1. Temperature Range: 10°C to 30°C (50°F to 86°F)
2. Humidity Range: 15% to 80% RH
3. Ambient Illumination: Less than 1,500 lux (do not expose to direct sunlight.)
4. Ventilation: Room air should turn over at least 30 m^3/hr/person
5. Ambient Dust: Less than 0.10 mg/m^3 (2.7 x 10/6 oz/yd^3)
6. Avoid areas exposed to sudden temperature changes:
   1) Areas directly exposed to cool air from an air conditioner.
   2) Areas directly exposed to heat from a heater.
7. Do not place the machine where it will be exposed to corrosive gases.
8. Do not install the machine at any location over 2,000 m (6,500 ft.) above sea level.
9. Place the main machine on a strong and level base. Inclination on any side should be no more than 5 mm (0.2").
10. Do not place the machine where it may be subjected to strong vibrations.

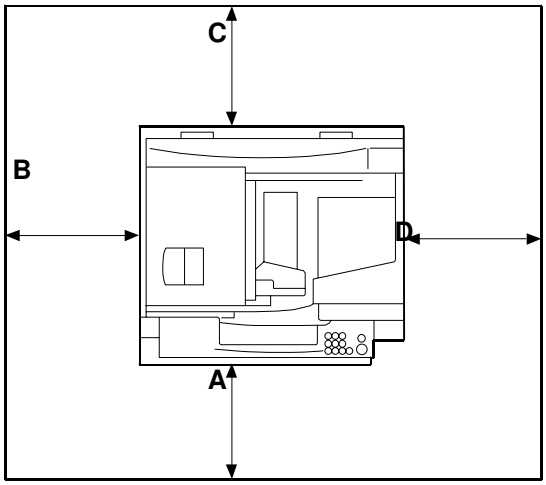
1.1.2 MACHINE LEVEL

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

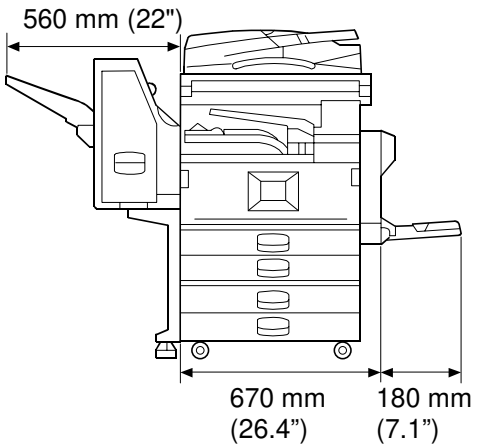
Right to left: Within 5 mm (0.2") of level

1.1.3 MINIMUM SPACE REQUIREMENTS

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

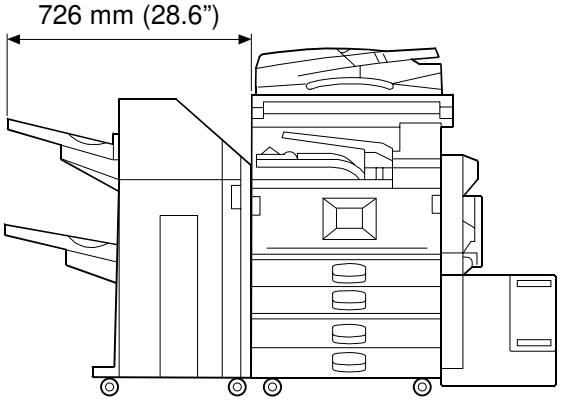


B004I010.WMF



B004I012.WMF

A: Front: >75 cm (29.,6 “)
B: Left: > 10 cm (4”)
C: Rear: > 10 cm (4”)
D: Right > 10 cm (4”)



B004I014.WMF

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

1.1.4 POWER REQUIREMENTS

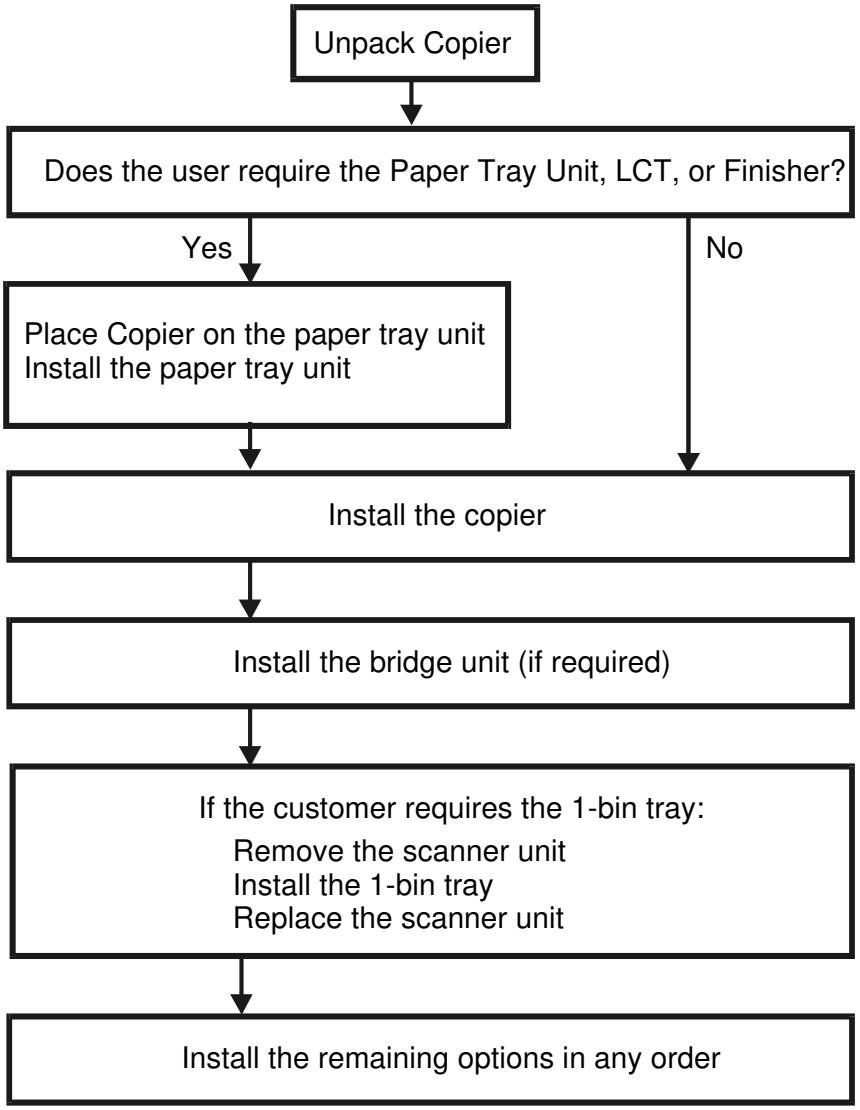
⚠CAUTION

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

1. Input voltage level:
   North America 120 V, 60 Hz: More than 12 A
   Europe/Asia 220V~240V, 50Hz/60Hz: more than 8A
2. Permissible voltage fluctuation: ±10 %
3. Never set anything on the power cord.

1.2 INSTALLATION FLOW CHART

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



Bridge Unit:	Needed for the finishers and external output tray.
Paper Tray Unit:	Needed for LCT and finishers.
Other requirements:	See Overall Machine Information – Installation Option Table.

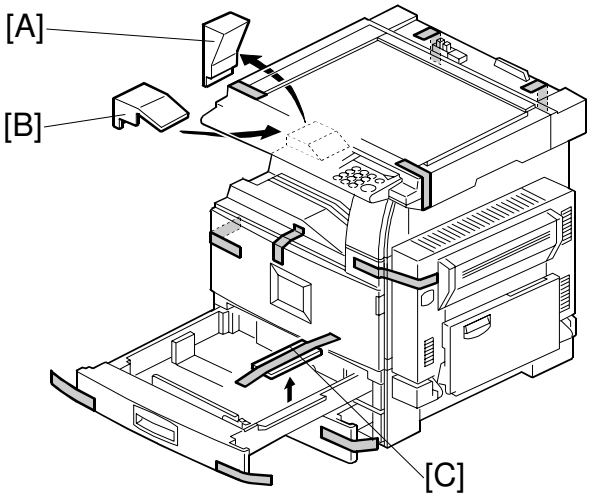
1.3 MAIN MACHINE INSTALLATION

1.3.1 ACCESSORY CHECK

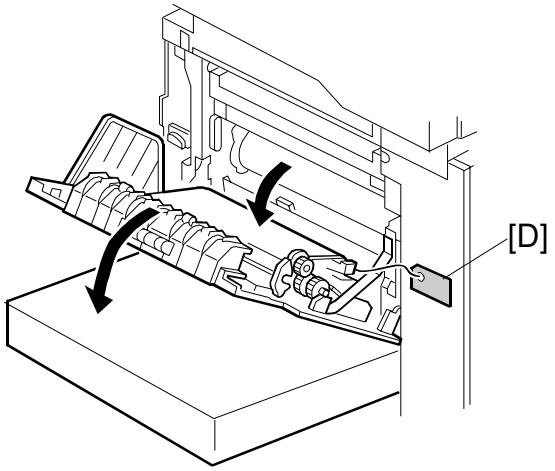
Check the quantity and condition of the accessories in the box against the following list:

Description	Q'ty
1. Operation Panel Decal (-22 machine)	1
2. Paper Size Decal	1
3. Model Name Decal (-15, -22 machines)	1
4. NECR – English (-17, -57 machines)	1
5. NECR – Multi Language (-19, -21, -27, -29, -67 machines)	1
6. Energy Star Sticker (-26, -66 machines)	1
7. Operation Instructions – System Setting (-15, -17, -19, -21, -26, -29, -55, -57, -66 machines)	1
8. Operation Instructions – Copy Reference (-14, -15, -17, -19, -21, -26, -29, -55, -57, -66 machines)	1
9. EU Safety Information (-22, -27, -26, -24)	1

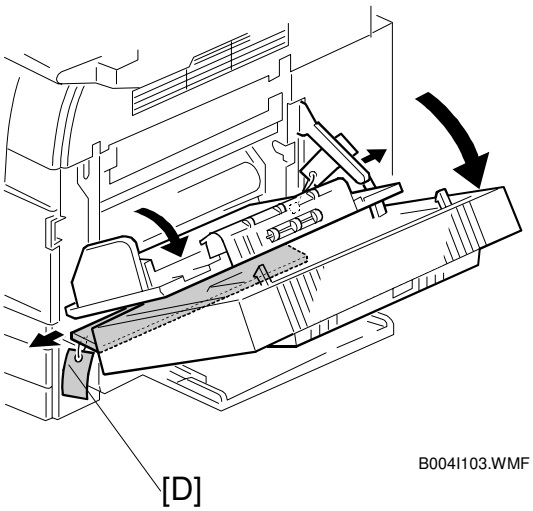
1.3.2 INSTALLATION PROCEDURE



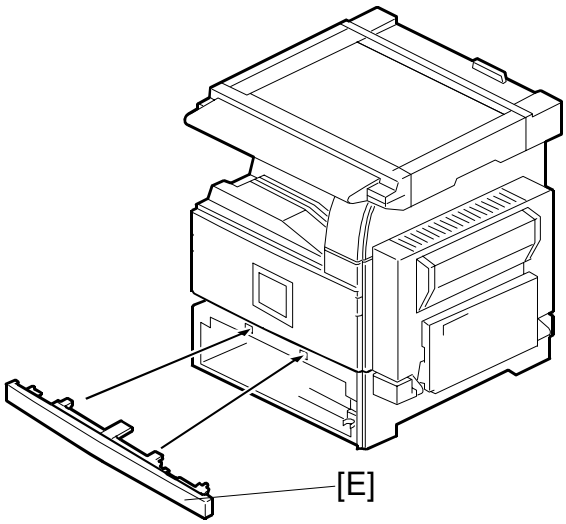
B004I100.WMF



B004I102.WMF



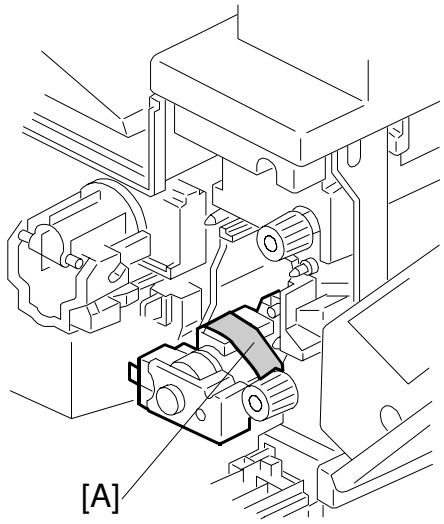
B004I103.WMF



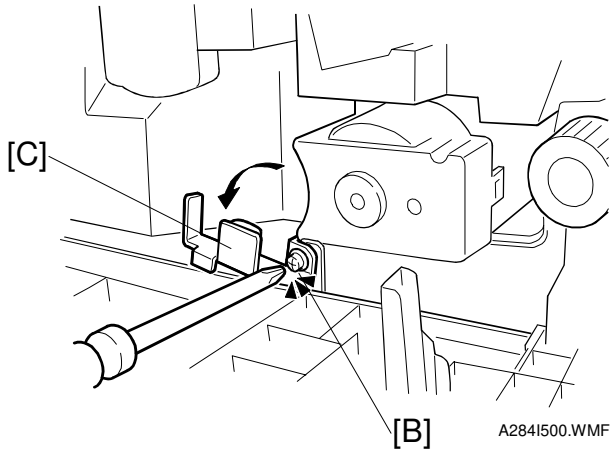
B004I101.WMF

1. Remove the main machine from the box, and remove all shipping retainers and tapes.
   NOTE: Store all shipping retainers as you remove them. You will need them if the machine is moved to another location in the future.
2. Remove scanner cushion [A], and install the end fence [B].
3. Pull out the paper trays and remove all tape and bottom plate stoppers [C].
4. On the right side of the machine, open the by-pass tray, duplex unit, and transfer right cover, and then remove all the shipping retainers [D]
   NOTE: If the paper tray unit is to be installed, do this now. (☛ 1.4)
5. If the paper tray unit is not to be installed, install the middle front cover [E] (provided in the second paper tray).

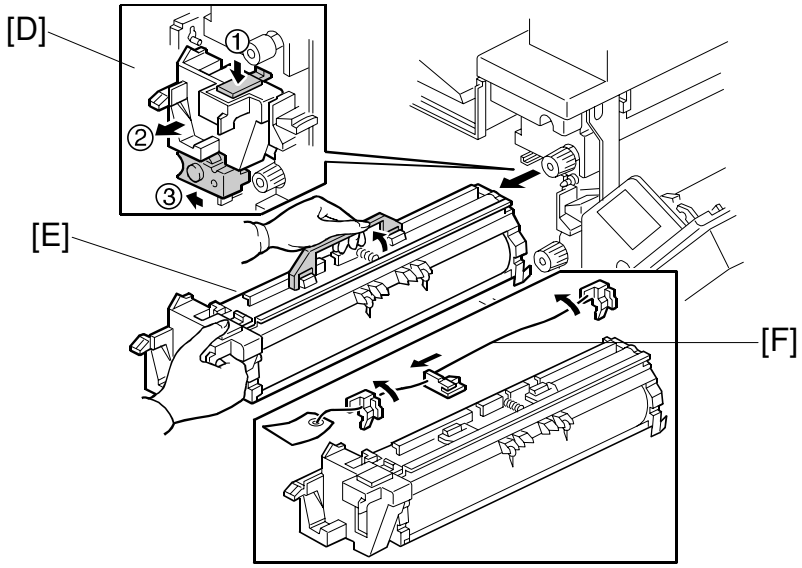
Development Unit and PCU



B004I104.WMF

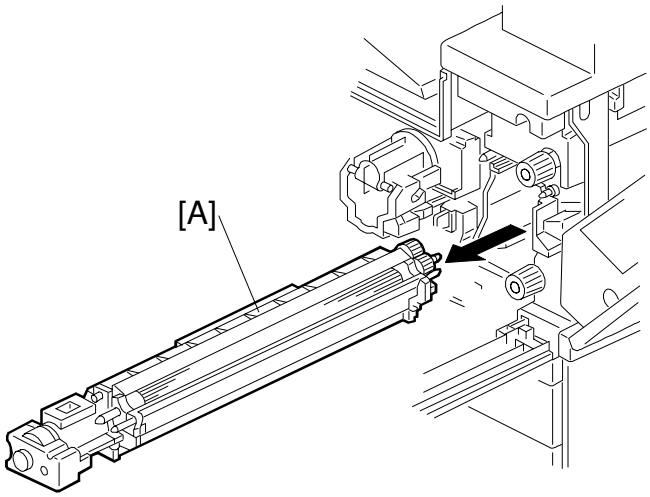


A284I500.WMF

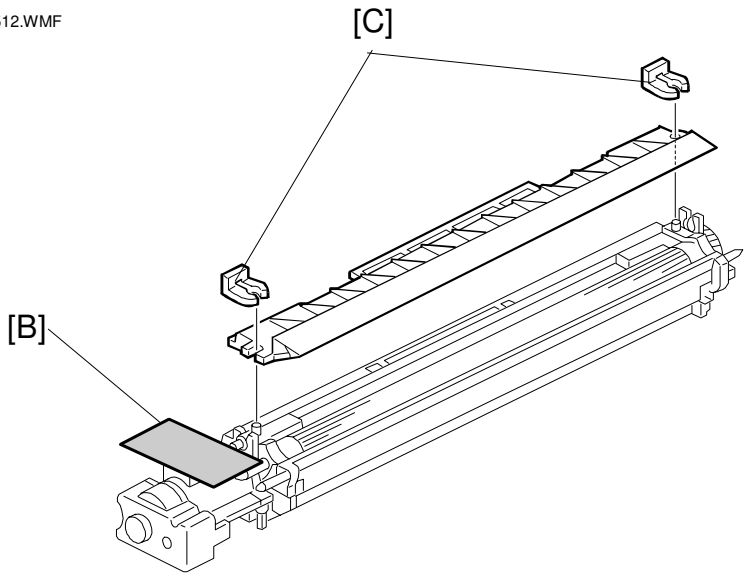


B004I511.WMF

1. Open the front cover and remove the tape and retainers [A].
2. Loosen [B] (☆ x1) and rotate the bracket [C].
3. At [D]: Push down lever ①. Pull the PCU out a small distance ②, and then push the development unit to the left ③ so the development unit is away from the drum.
4. Slowly slide out the PCU [E] and place it on a clean flat surface.
5. Remove the three clamps and wire [F].

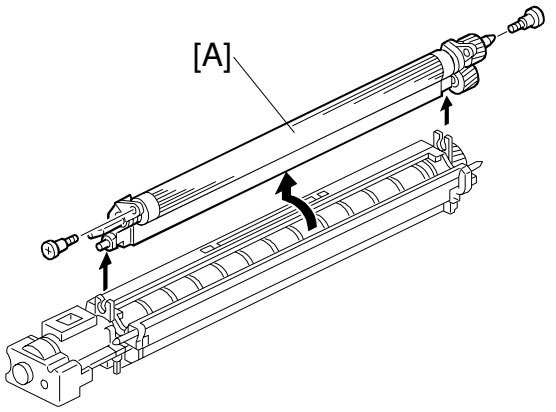


B004I512.WMF

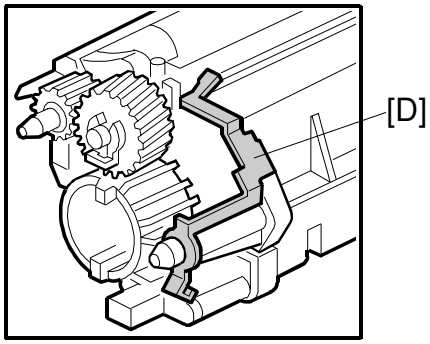


B004I105.WMF

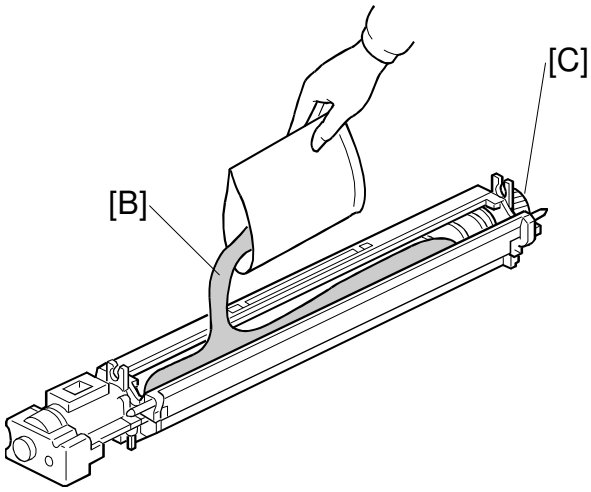
6. Spread a large piece of paper on a flat surface.
   NOTE: Make sure the area is free of pins, paper clips, staples, etc. to avoid attraction to the magnetic development roller.
7. Slide the development unit [A] out and place it on the paper.
8. Remove the tape and tag [B] from the development unit
9. Remove the entrance seal plate [C] (x2).



B004I106.WMF

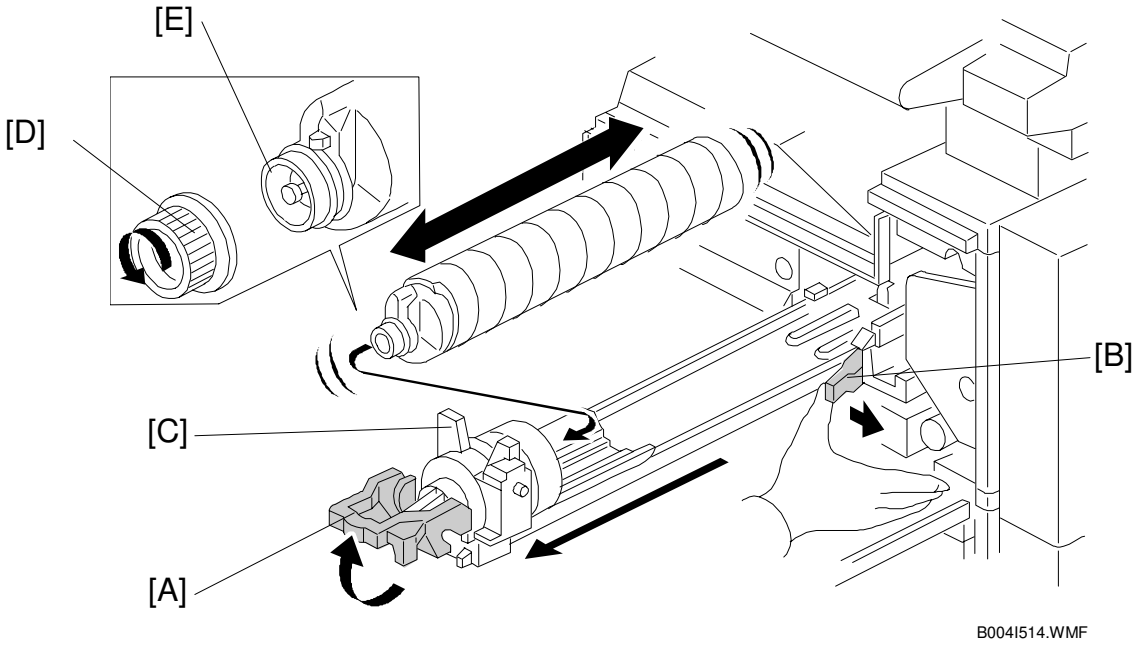


B004R957.WMF



B004I513.WMF

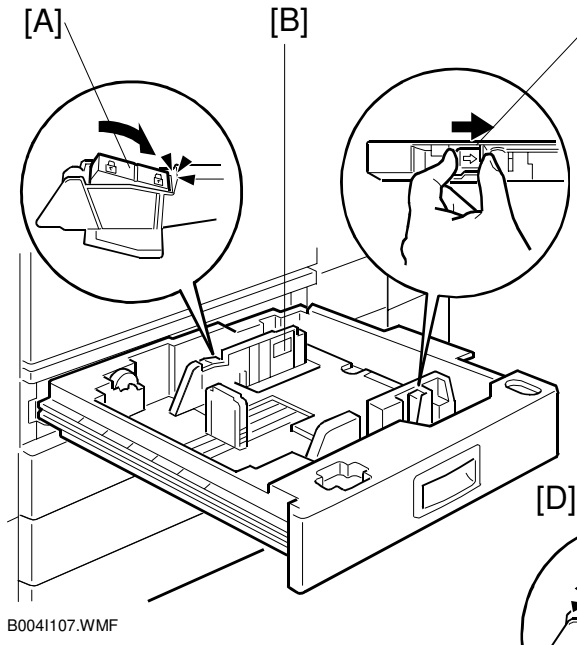
10. Remove the development roller unit [A], and set it on the paper.
11. Pour the developer [B] into the development unit.
    NOTE: The developer lot number is embossed on the end of the developer package. Do not discard the package until you have recorded the lot number. (☛ 1-14)
    1) Pour approximately 1/3 of the developer evenly along the length of the development unit.
    2) Rotate the drive gear [C] to work the developer into the unit.
    3) Repeat until all the developer is in the development unit.
    4) Continue to turn the drive gear until the developer is even with the top of the unit.
12. Reassemble the development unit.
    NOTE: Make sure that the earth plate [D] is positioned correctly.
13. Re-install the development unit and PCU.



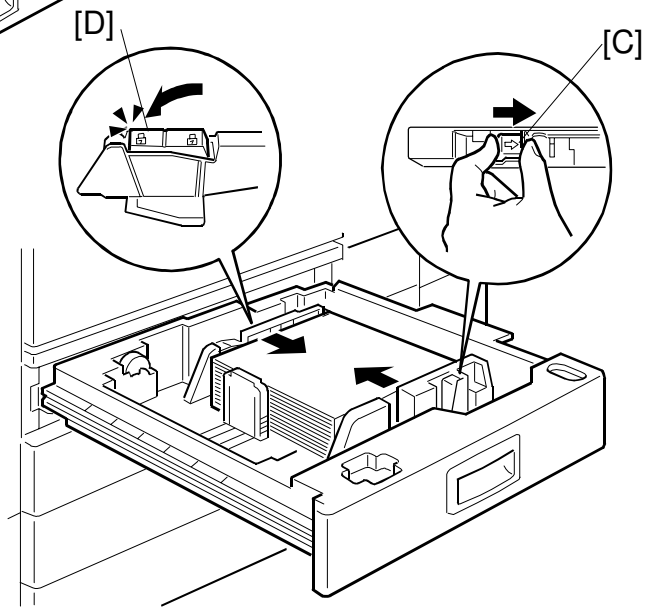
Toner Bottle

1. Raise the toner bottle holder lever [A], push the lever [B] to the side, and then pull the toner bottle holder [C] out.
2. Shake the new toner bottle well.
   NOTE: Do not remove the toner bottle cap [D] until after shaking.
3. Unscrew the bottle cap and set the bottle in the holder.
   NOTE: Do not touch the inner bottle cap [E].
4. Push the toner bottle holder into the main machine until it locks in place, and then lower the holder lever to secure the toner bottle.
   NOTE: The holder lever cannot be lowered unless the toner bottle is installed.

Paper Trays

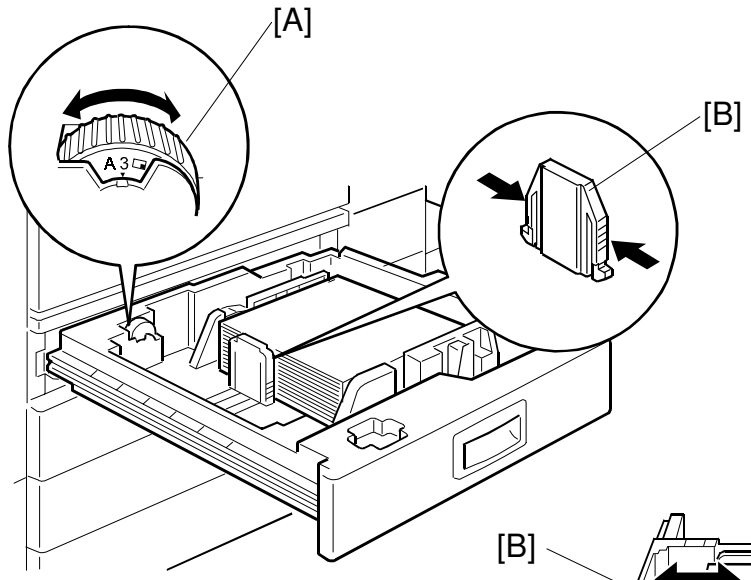


B004I107.WMF

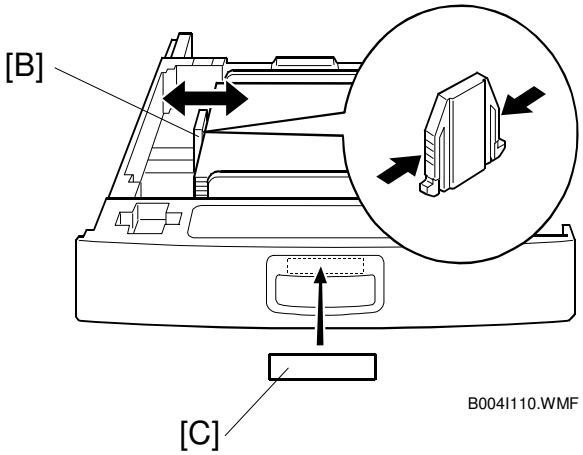


B004I108.WMF

1. Open the 1st paper tray, and then press down on the right side of the lock [A] switch to unlock the side fences.
2. If you are loading paper larger than A4 or Letter size in the 1st paper tray, attach the cushion [B].
   NOTE: This is required only for the 1st paper tray. Make sure that the cushion is not attached over the ribs.
3. Press in on the sides of the fence release [C], and slide the side fences to the appropriate mark for the paper size, and then load the paper.
4. Press down on the left side of the lock [D] to lock the side fences.



B004I109.WMF

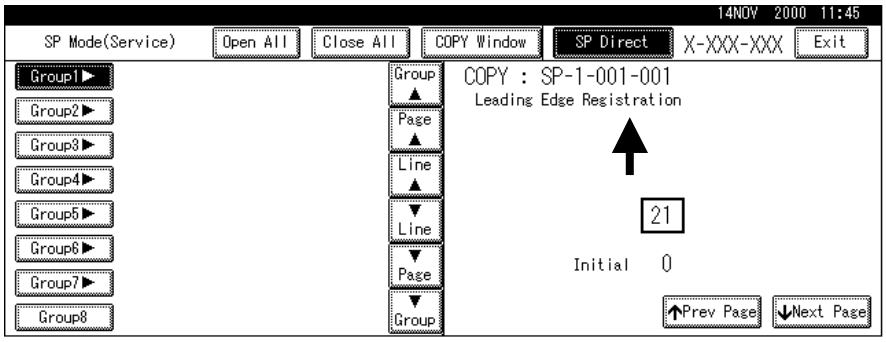


B004I110.WMF

5. Turn the dial [A] to the correct setting for the paper size.
6. Pinch the sides of the bottom fence [B] and slide it against the bottom of the stack.
7. Attach the appropriate paper size decal [C] to the paper tray.
8. Paper size decals are also used for the optional paper tray unit. Keep any remaining decals for use with the paper tray unit.
9. Repeat this procedure to load paper in the 2nd paper tray.

Initialize TD Sensor and Developer

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

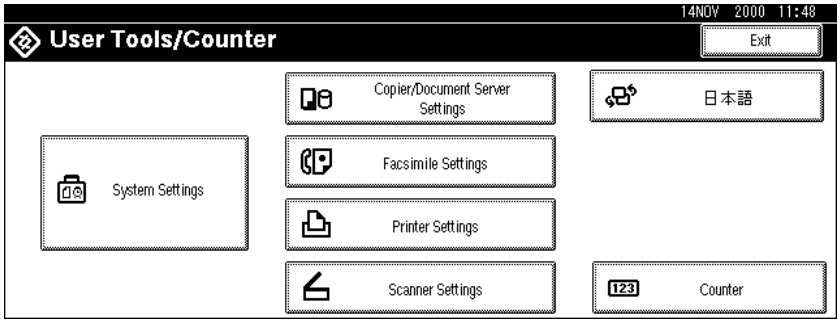


B004I500.WMF

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

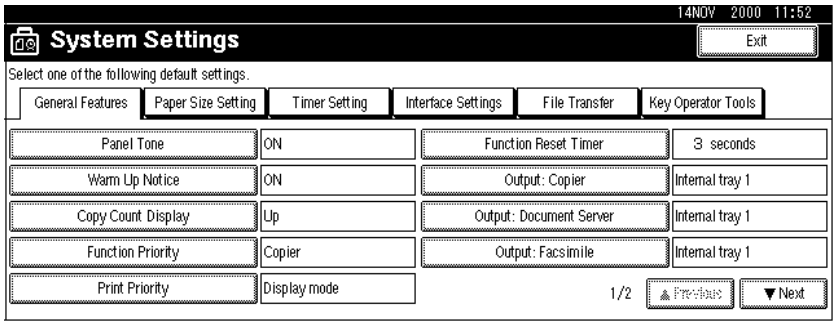
Set Paper Size for Paper Trays

1. Press User Tools/Counter [◈/123].



B004I110.WMF

2. On the touch panel, press System Settings.



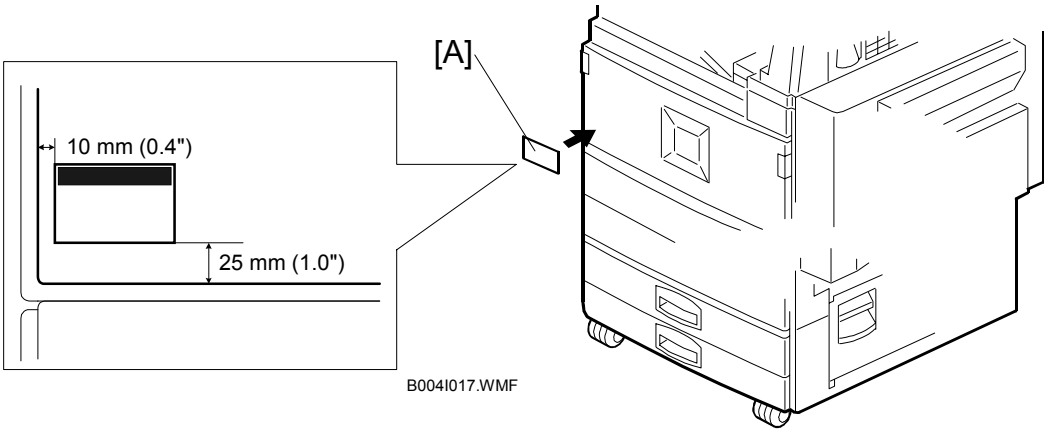
B004I110.WMF

3. Press the Paper Size Setting tab.
4. Press the button for the tray to change.
5. Change the setting and press the OK button.
6. Repeat for each tray installed.
7. Press Exit twice to return to the main display
   - The 1st and 2nd paper trays are provided with paper size dial selectors. The dial settings on the paper trays have priority over the UP settings. However, if you select the asterisk (*) position on the paper size dial, you can select the paper size with the UP setting.
   - The 3rd and 4th paper trays of the paper output unit are not equipped with paper-size selection dials, so you must do the Paper Size UP settings for the 3rd and 4th trays.
8. Check the copy quality and machine operation.

   NOTE: The test pattern print procedure is slightly different for this machine. Use SP2-902 and select 2 for the IPU Test Print or 3 for the Print Test Patterns. (☛ Chapter 5, 5.1.3 Test Pattern Printing)

Electrical Total Counter

1. Initialize the electrical total counter using SP7-825, depending on the service contract type.
   NOTE: This procedure has an effect only once, when the counter has a minus ("–") value.



HDD Caution Decal (for only NA models)

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

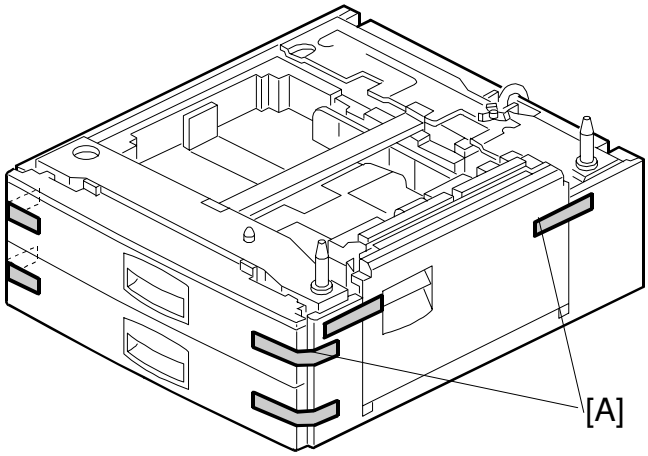
1.4 PAPER TRAY UNIT INSTALLATION

1.4.1 ACCESSORY CHECK

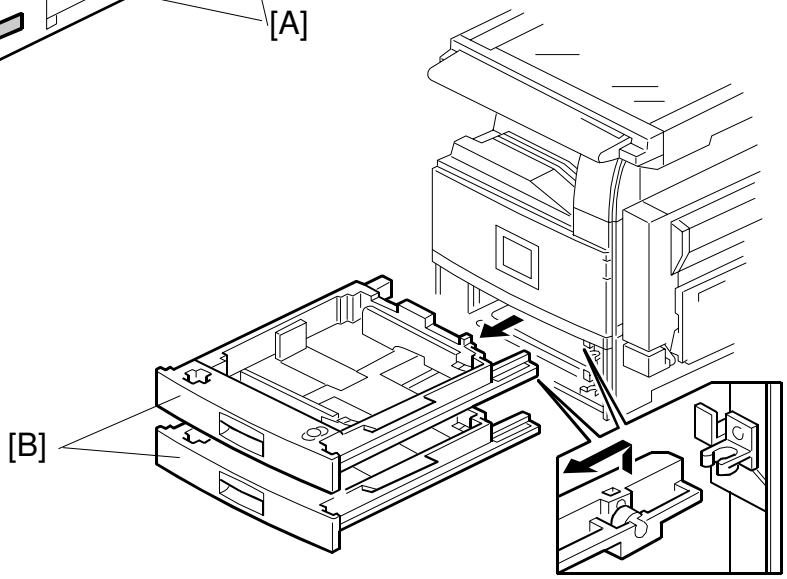
Check the quantity and condition of the accessories in the box against the following list:

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

1.4.2 INSTALLATION PROCEDURE



A682I111.WMF

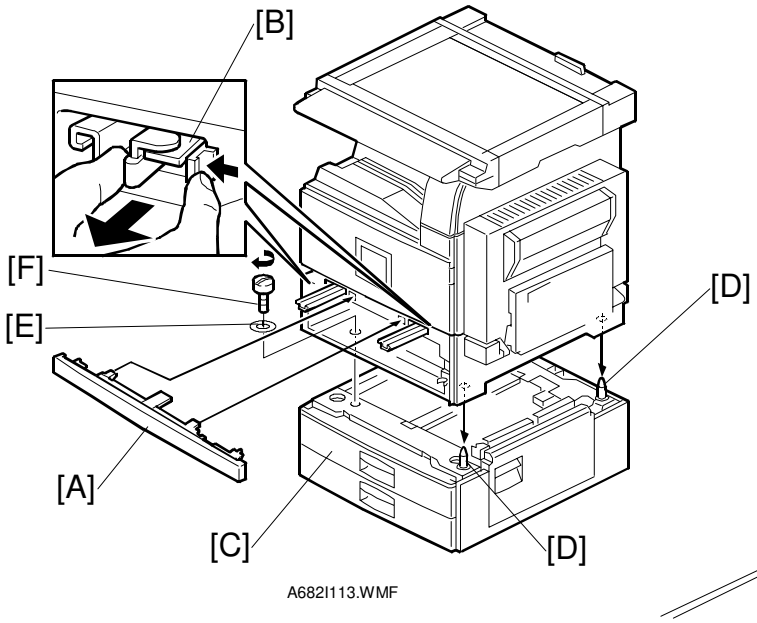


A682I112.WMF

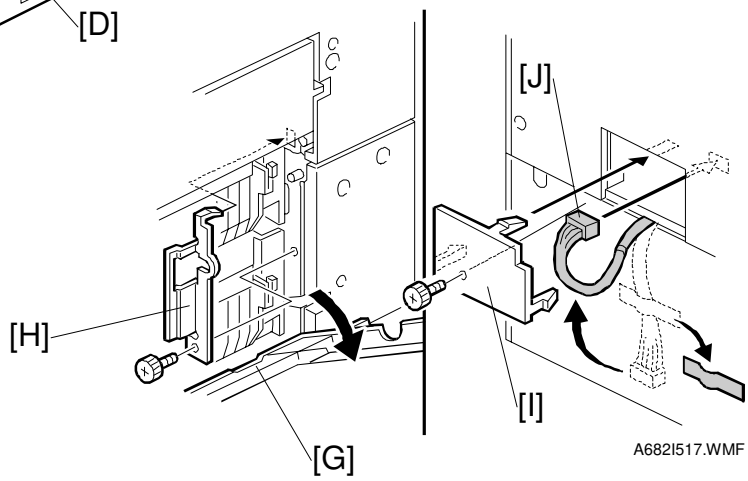
⚠CAUTION

Switch off the main machine and unplug its power cord before starting the following procedure.

1. Unpack the paper tray unit and remove all tape [A] and shipping retainers.
2. Remove the paper trays [B].

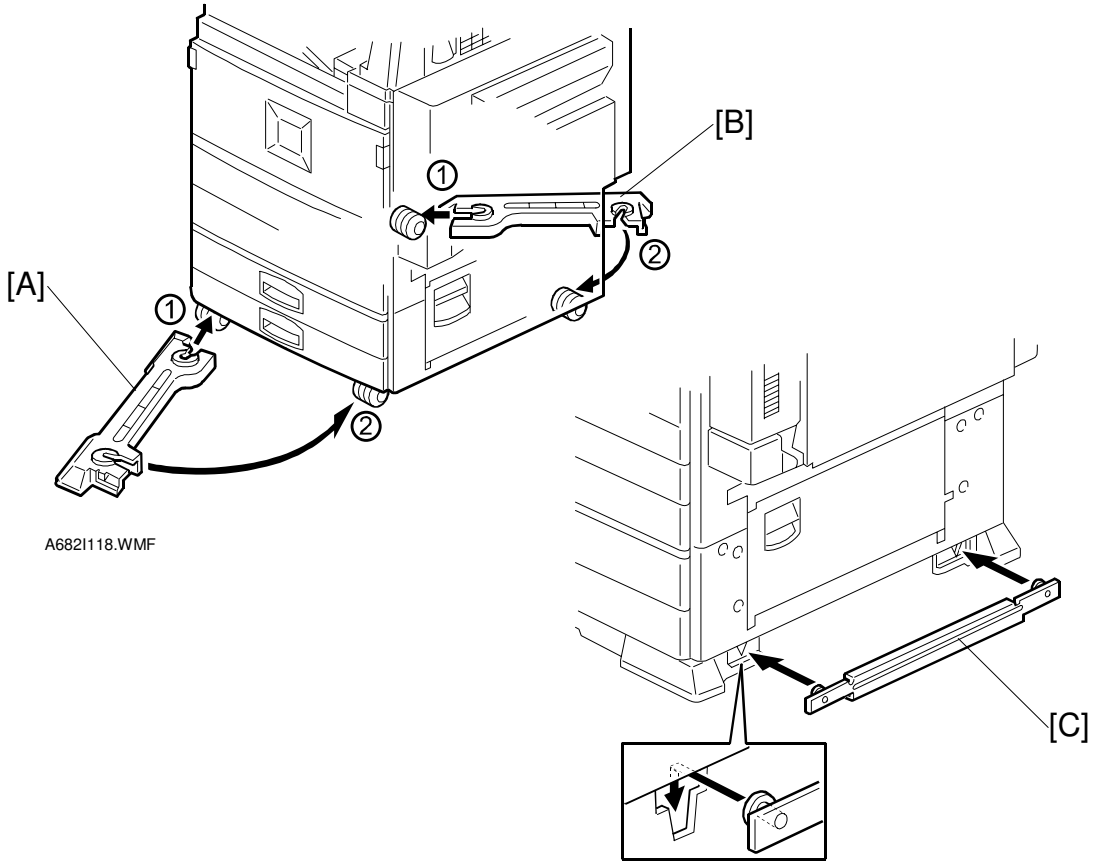


A682I113.WMF

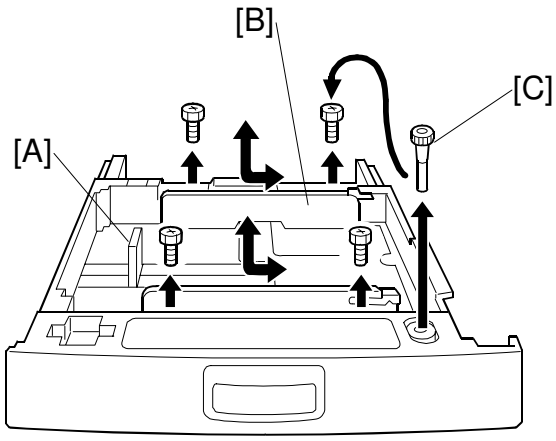


A682I517.WMF

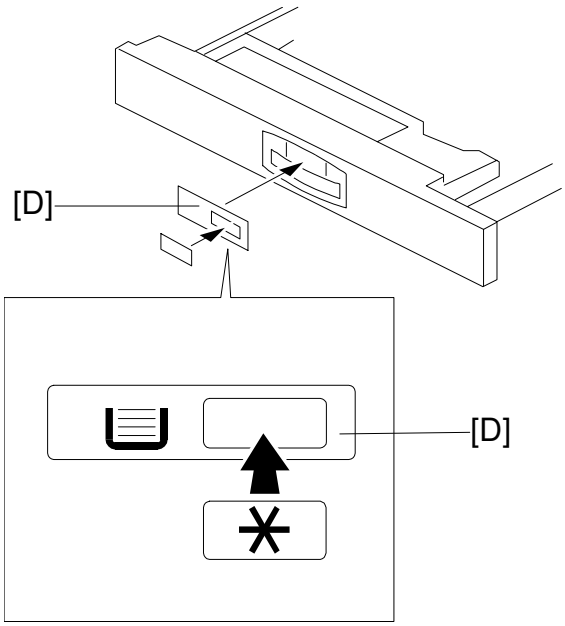
3. Remove the middle front cover [A], and pull out the front handles [B].
4. Using the front handles and rear handles, lift the machine and hold it over the paper tray unit [C].
5. Slowly lower the main machine onto the paper tray unit with the pegs [D] aligned with the peg holes on the bottom of the machine.
   NOTE: Do not hold the scanner unit.
6. Re-install the middle front cover [A].
7. Attach the lock washer [E] to the short knob screw [F]. Then, secure the paper tray unit to the machine (x1, spring washer).
8. Open the right cover of the paper tray unit [G].
9. Secure the joint bracket [H] (x 1).
10. Remove the connector cover [I] of the main machine (x1).
11. Connect the paper tray unit harness [J] to the main machine and re-attach the connector cover.



12. Install the front and rear stands [A] and [B]. First attach at ① and then swing the other end round to ②.
13. Install the stand bracket [C].
    NOTE: The stand bracket must be installed on the left side in order to allow installation of the two-tray finisher.



A682I120.WMF



A682I500.WMF

14. Position the side fence [A] and bottom fence [B] of the paper trays, load the paper, and then lock them in position by tightening the hex nuts with the green wrench [C] provided in the 1st paper tray.
15. Attach the appropriate tray decals [D] provided in the accessory box for the main machine.
16. Turn on the machine main power switch.
17. Enter the paper size for each paper tray using the UP mode.
18. Check the machine's operation and copy quality.

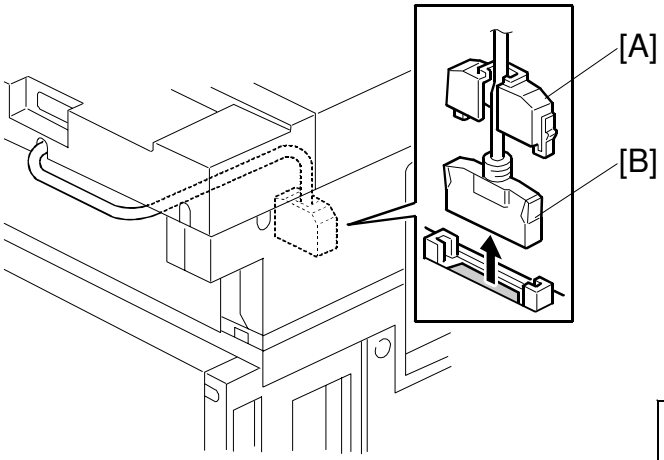
1.5 1-BIN TRAY UNIT INSTALLATION

1.5.1 ACCESSORY CHECK

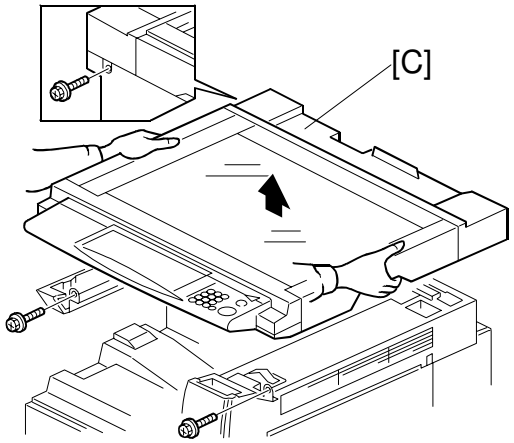
Check the quantity and condition of the accessories in the box against the following list:

Description	Q'ty
1. Ground Bracket	1
2. Connector Cover	1
3. Base Cover	1
4. Copy Tray	1
5. Mylar Strip	1
6. Stepped Screw – M3x8	5
7. Screw –M3x8	2
8. Screw – M4x7	1
9. Tapping Screw – M3x6	2
10. Tapping Screw – M3x14	1
11. Tapping Screw – M3x8	1
12. Installation Procedure	1

1.5.2 INSTALLATION PROCEDURE



B376I113.WMF

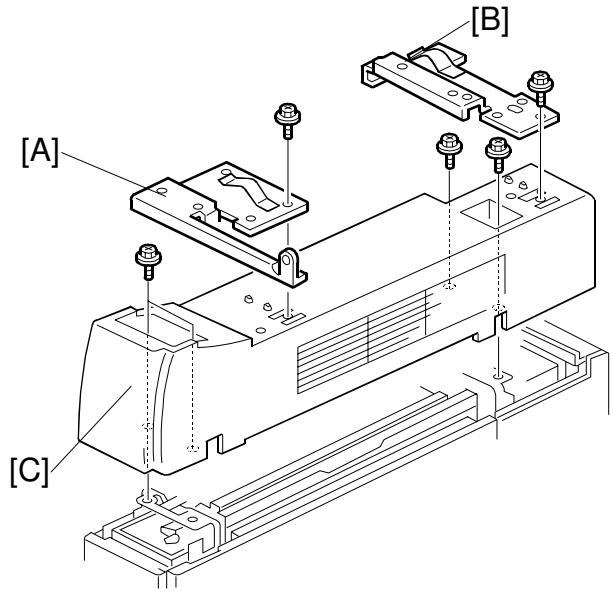


B376I114.WMF

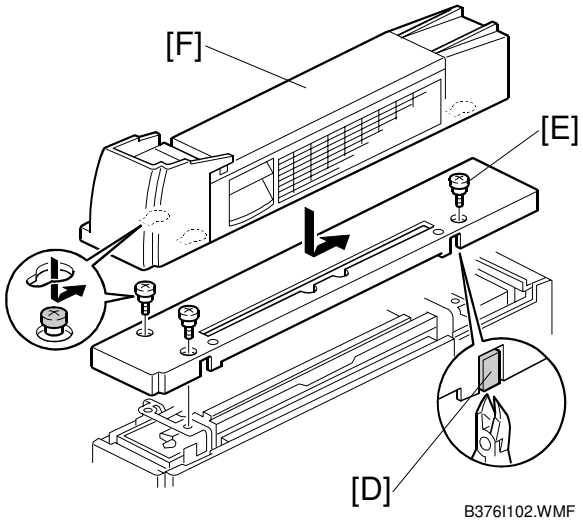
⚠CAUTION

Switch off the main machine and unplug its power cord before starting the following procedure.

1. Remove the scanner unit
   NOTE: If the ARDF is installed, remove the ARDF before removing the scanner unit.
   1) Remove the connector cover [A].
   2) Disconnect the scanner cable [B].
   3) Remove the scanner unit [C] (🔩 x 3).

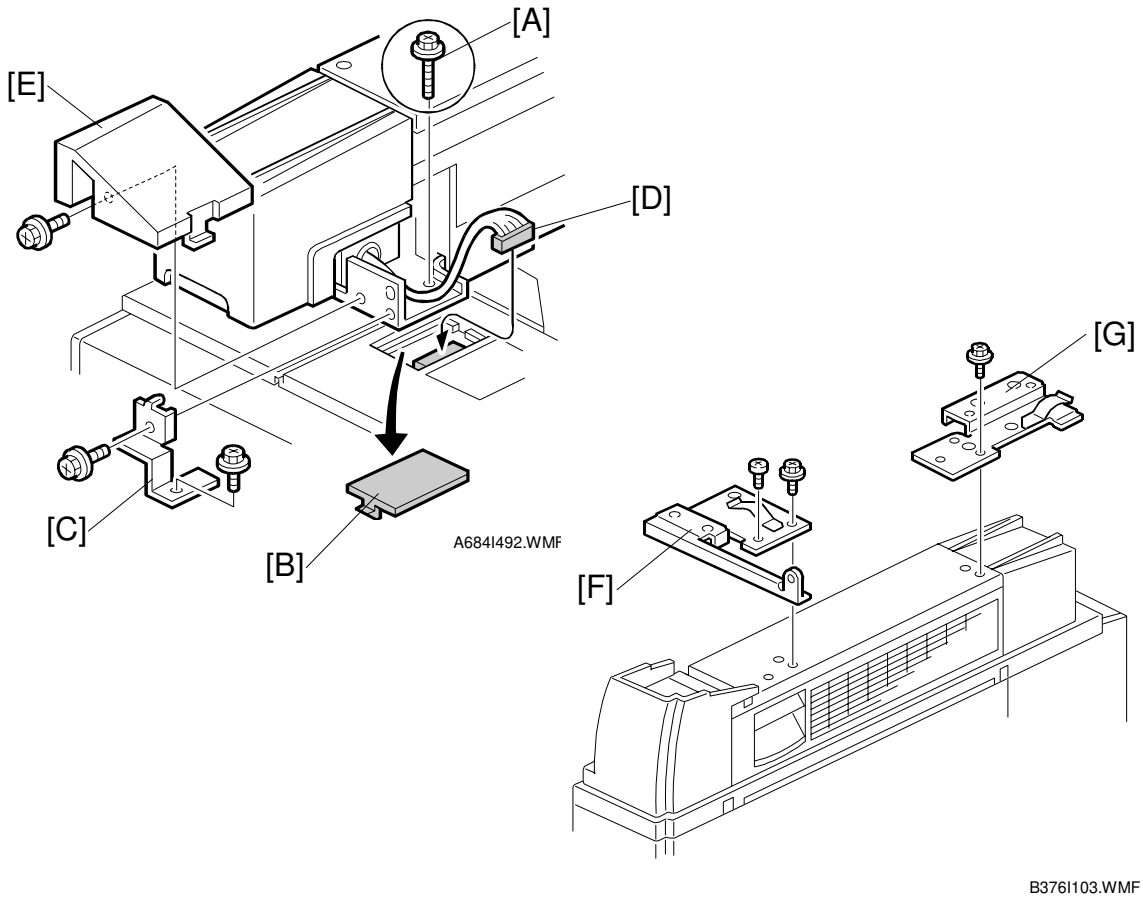


B376I201.WMF

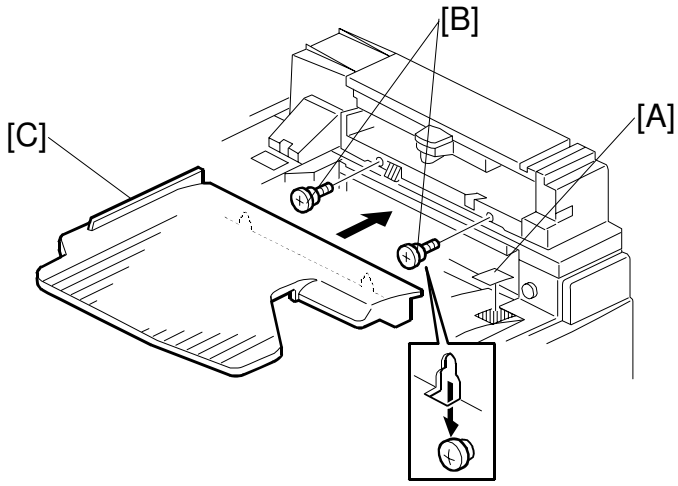


B376I102.WMF

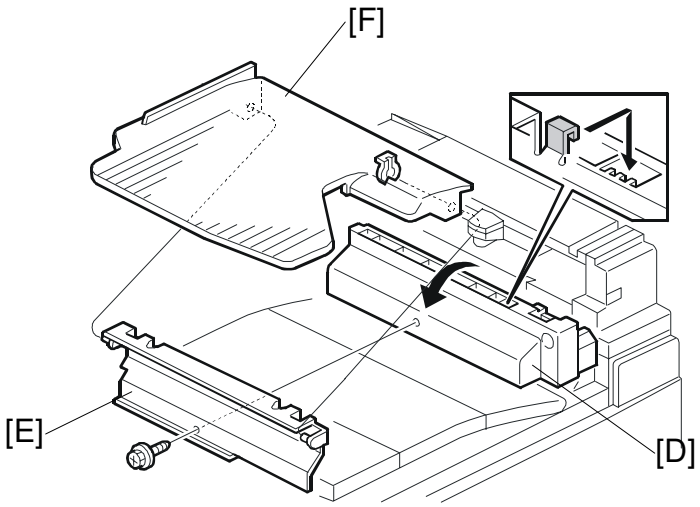
2. Unpack the 1-bin tray unit and remove the tapes.
3. Remove the front bracket [A] (☞ x1) and rear bracket [B] (☞ x1) from the top of the paper exit cover [C] (☞ x 1 each).
4. Remove the paper exit cover [C] (☞ x 4).
5. Cut away two covers [D] from the base cover [E].
6. Trim the edges so they are smooth.
7. Install the base cover [E] (☞ x 3: stepped screw).
8. Set the 1-bin tray unit [F] on the base cover and slide it onto the heads of the stepped screws.



9. Secure the 1-bin tray unit [A] (☞ x 1: M3x14).
10. Remove the cover [B].
11. Install the grounding bracket [C] (☞ x 2: M3x6).
12. Connect the harness [D].
13. Install the connector cover [E] (☞ x 1: M3x8)
14. Re-install the front bracket [F] (☞ x 2: M4x7, M4x10) and the rear bracket [G] (☞ x1 M4x10).



A684I493.WMF



B376I501.WMF

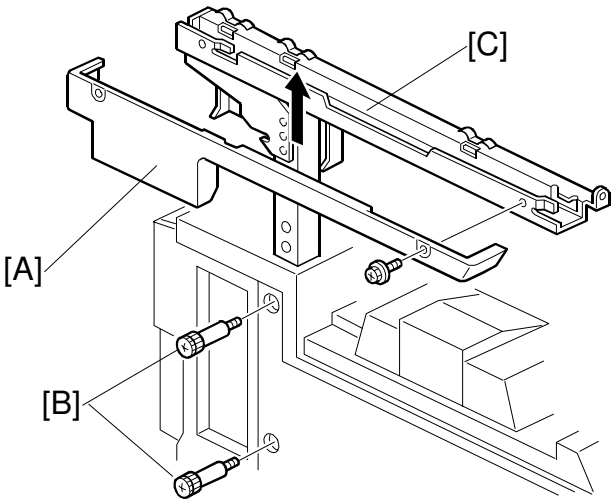
15. Attach the copy tray.

Bridge Unit (B397) not installed:

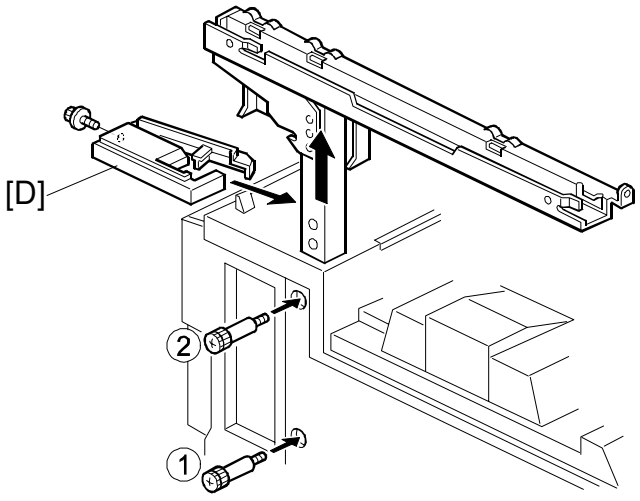
1) Attach the decal [A].
2) Secure [B] (x2: Stepped screw) into the side of the 1-bin tray housing.
3) Attach the copy tray [C] to the stepped screws.

Bridge Unit (B397) installed:

1) Open the cover of the bridge unit [D].
2) Install the copy tray bracket [E] (x1: tapping screw).
3) Install the copy tray [F] (x 1).

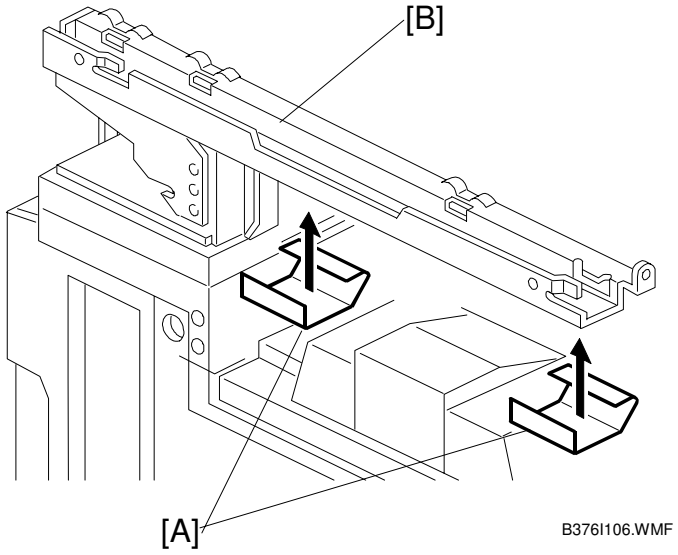


B376I104.WMF



B376I105.WMF

16. Remove the scanner stand cover [A] (x1).
17. To adjust the height of the scanner stand, first remove [B] (x2) to release the scanner stand [C].
18. Raise the scanner stand until the next set of screw holes in the main frame can be seen through the screw holes in the scanner stand.
19. Secure the stand and install the cover [D] (x1).



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

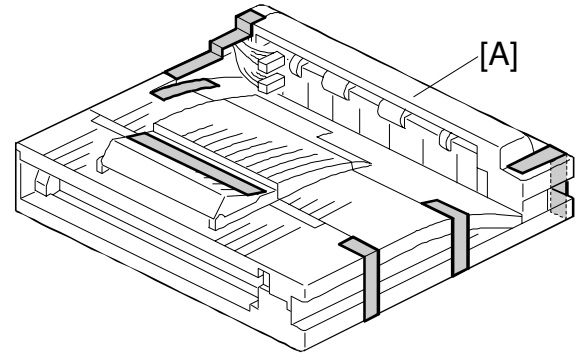
1.6 BRIDGE UNIT INSTALLATION

1.6.1 ACCESSORY CHECK

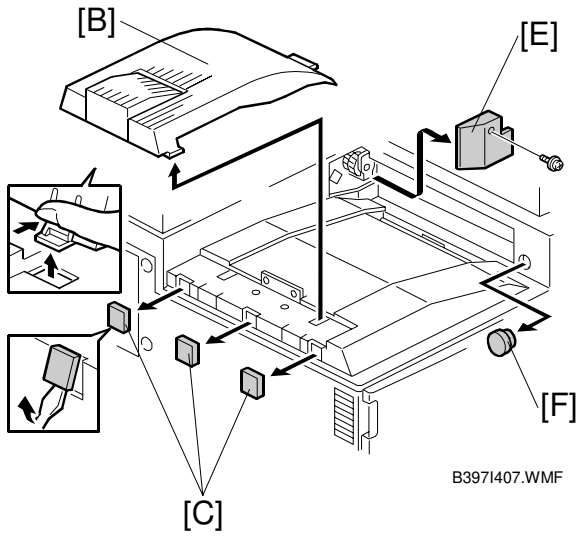
Check the quantity and condition of the accessories in the box against the following list:

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

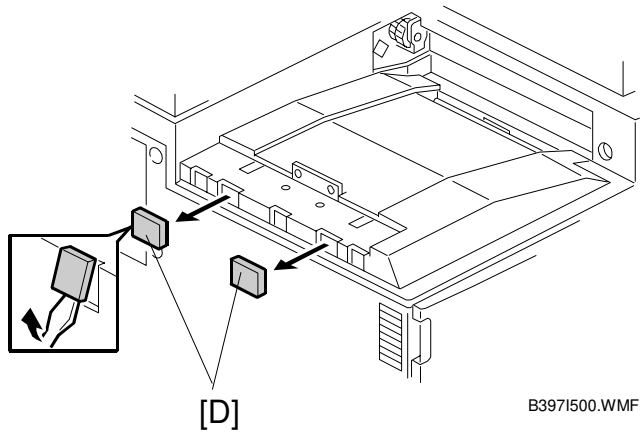
1.6.2 INSTALLATION PROCEDURE



B397I401.WMF



B397I407.WMF



B397I500.WMF

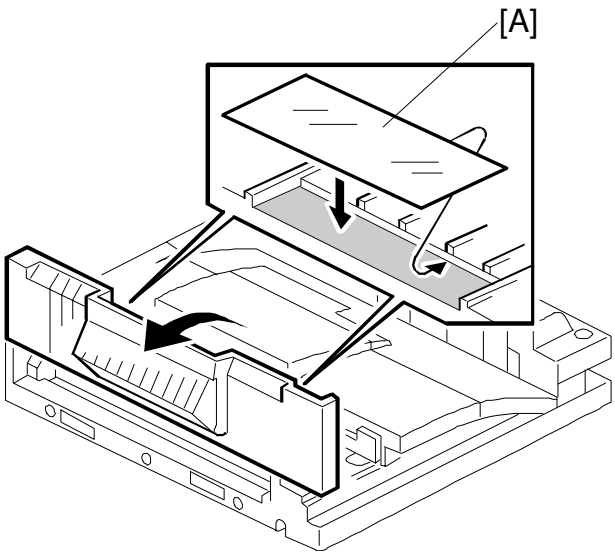
⚠CAUTION

Switch off the main machine and unplug its power cord before starting the following procedure.

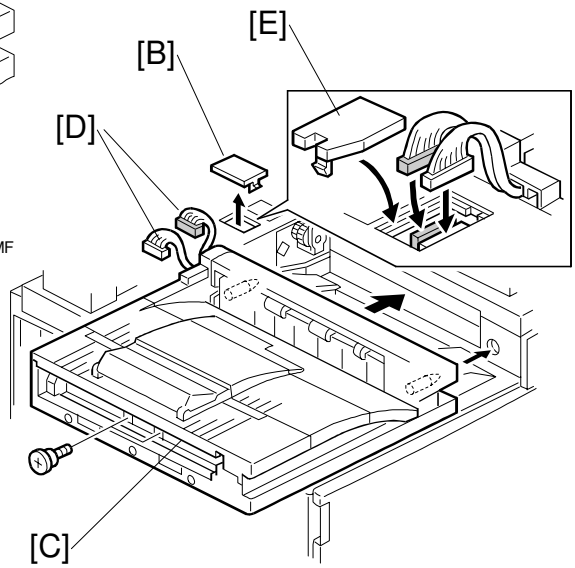
1. Unpack the bridge unit [A] and remove all tapes and shipping retainers.
2. Remove the inner tray [B].
3. On the side of the machine, remove the three small covers [C].

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

4. Remove the two small covers [D].
5. Remove the cover [E] (x1)
6. Remove the cap [F].



A688I402.WMF



B397I404.WMF

7. If an optional finisher is to be installed, attach two mylars [A] to the bridge unit.
8. Remove the cover [B].
9. Install the bridge unit [C] (x2).
10. Connect the bridge unit I/F harnesses [D] (x2).
11. Install the connector cover [E].
12. Turn on the main switch and check the bridge unit operation (make sure that there are no paper jams).

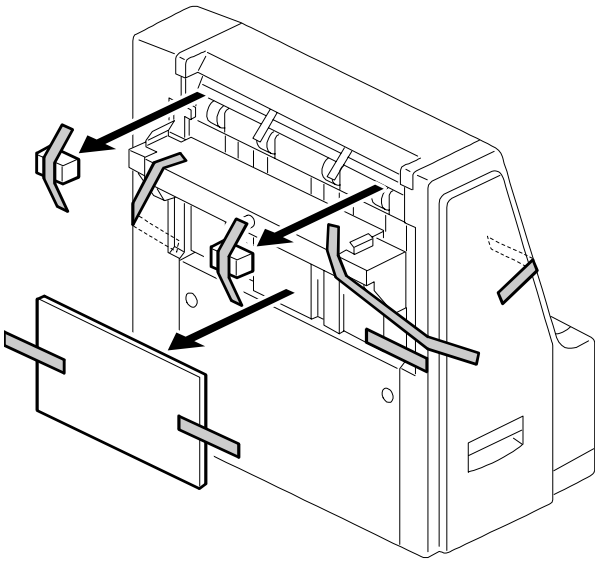
1.7 1000-SHEET FINISHER INSTALLATION

1.7.1 ACCESSORY CHECK

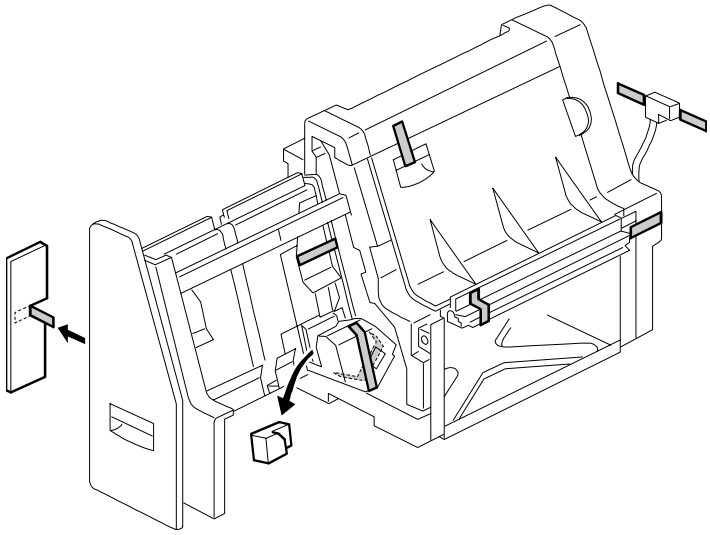
Check the quantity and condition of the accessories in the box against the following list:

Description	Q'ty
1. Front Stand	1
2. Rear Stand	1
3. Knob Screw	1
4. Screw - M4x12	6
5. NECR (-17 machine)	1
6. Installation Procedure	1

1.7.2 INSTALLATION PROCEDURE



A681I701.WMF



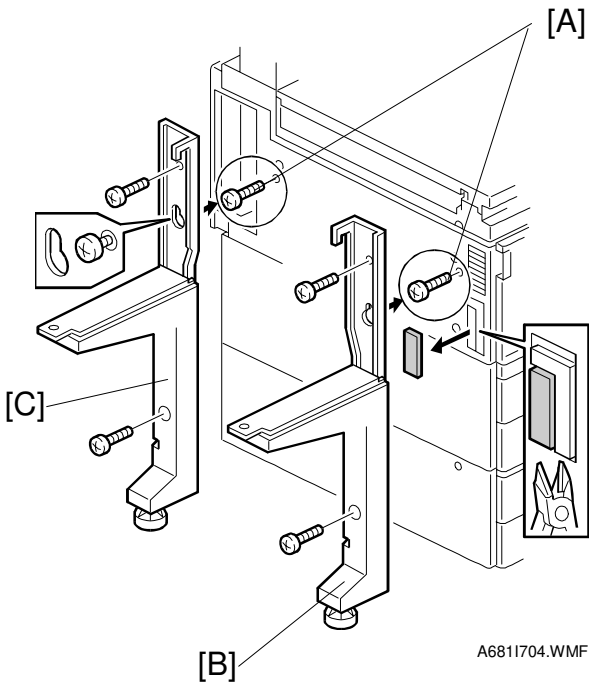
A681I702.WMF

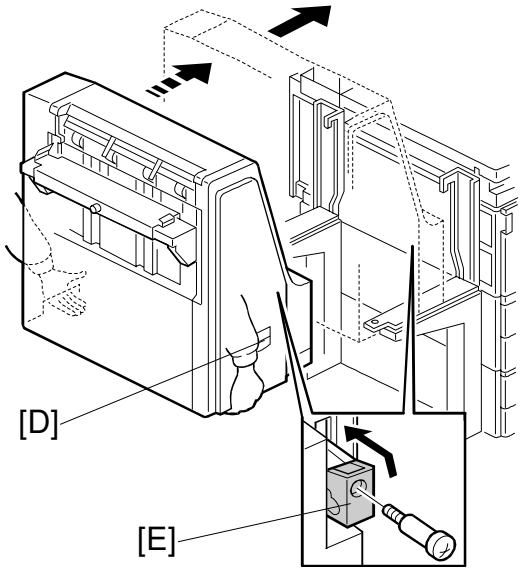
⚠CAUTION

Switch off the main machine and unplug its power cord before starting the following procedure.

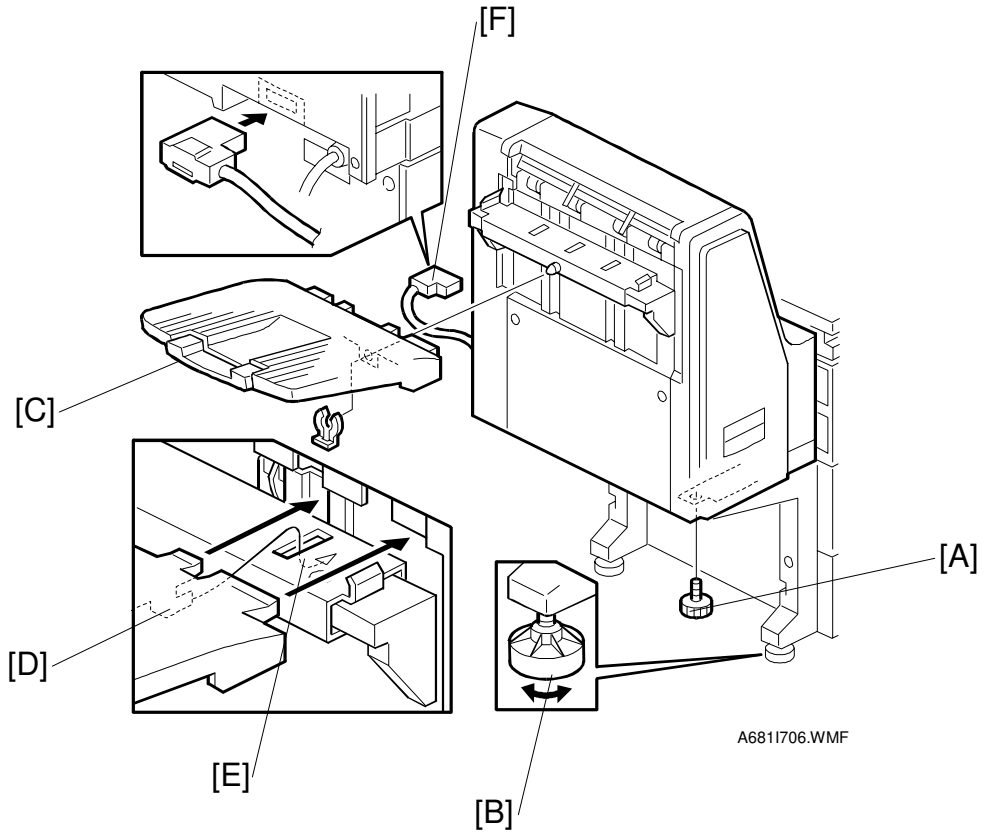
NOTE: The bridge unit (B397) and paper tray unit (A682) must be installed before installing this finisher.

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





2. Fasten [A] (☞ x2) loosely.
3. Hang the front stand [B] and rear stand [C] on the screws installed in step 2.
4. To secure the front and rear stands tighten [A] (☞ x2) and secure the stands (☞ x4).
5. At the front, use handle [D] to pull out the stapler unit.
6. Remove the locking lever [E] (☞ x1).
7. Align the finisher on the stands, and lock it in place by pushing the locking lever.
8. Secure the locking lever (☞ x1) and push the stapler unit into the finisher.



9. Secure the finisher [A] (x1).
10. Adjust the securing knobs [B] under the front and rear stands until the finisher is perpendicular to the floor.
11. Install the shift tray [C] (snap ring x1).
    NOTE: Make sure that the three pegs [D] fit into the slots [E] properly.
12. Connect the finisher cable [F] to the main machine.
13. Turn on the main power switch and check the finisher operation.

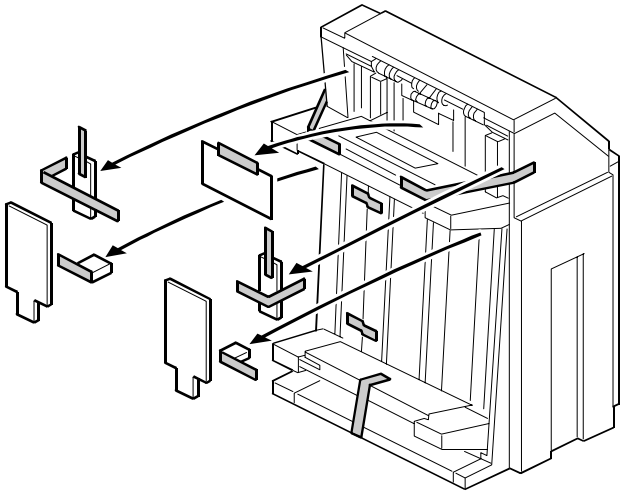
1.8 TWO-TRAY FINISHER INSTALLATION

1.8.1 ACCESSORY CHECK

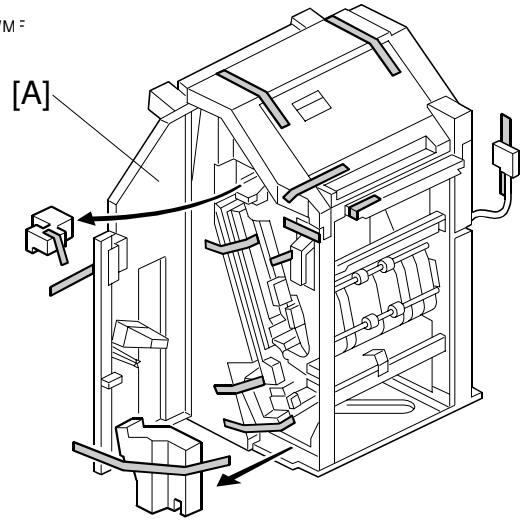
Check the quantity and condition of the accessories in the box against the following list:

Description	Q'ty
1. Front Joint Bracket	1
2. Rear Joint Bracket	1
3. Shift Tray	2
4. Screw – M3x6	2
5. Screw – M4x14	4
6. Lower Ground Plate	1
7. Installation Procedure	1

1.8.2 INSTALLATION PROCEDURE



B352I101.WMF



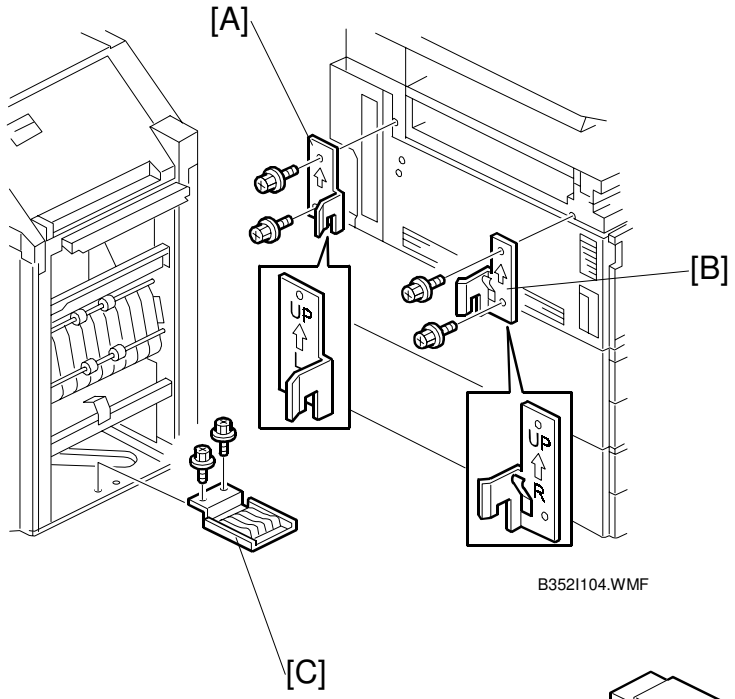
B352I102.WMF

⚠CAUTION

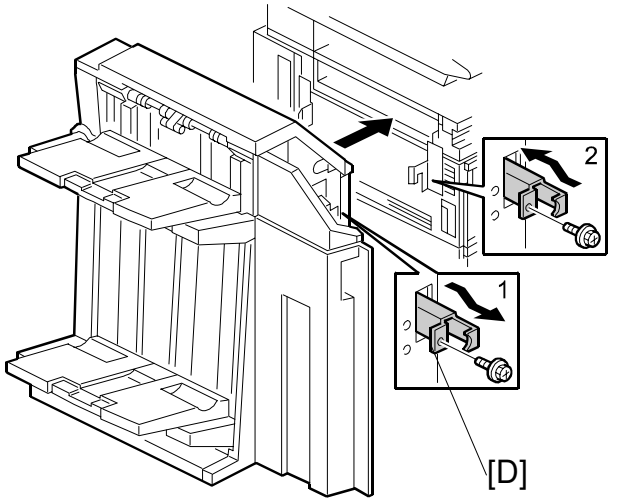
Switch off the main machine and unplug its power cord before starting the following procedure.

NOTE: The Paper Tray Unit (A682) and Bridge Unit (B397) must be installed before installing this finisher. (☛ 1.4, 1.6)

1. Unpack the finisher and remove all tapes and shipping retainers from outside the unit.
2. Open the front door [A] and remove all tapes and shipping materials from inside the finisher unit.

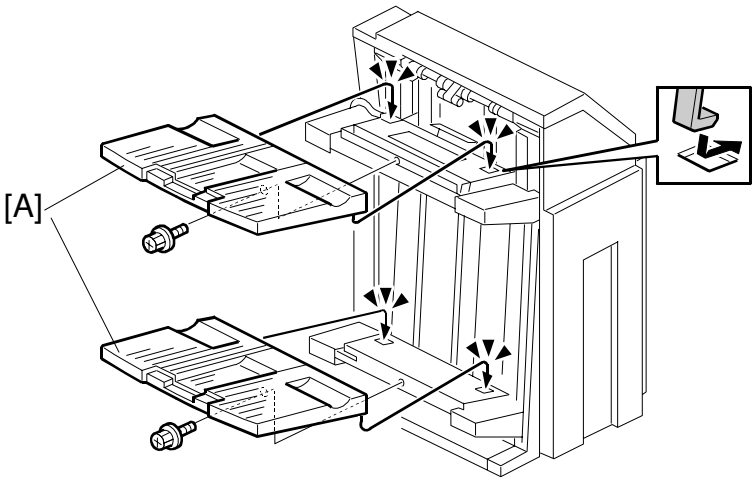


B352I104.WMF

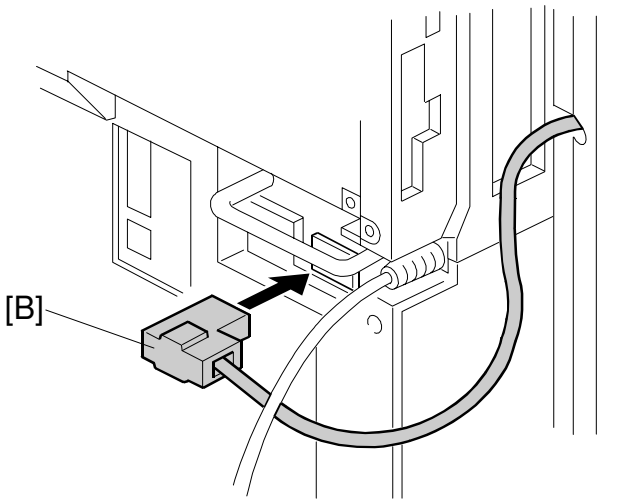


B352I105.WMF

3. Install the left joint bracket [A] (☞ x2 M4x14) and right joint bracket [B] (☞ x2 M4x14).
4. Attach the ground plate [C] (☞ x2 M3x6) to the center of the paper tray.
5. Open the front door of the finisher, and pull out the locking lever [D] (☞ x1).
6. Push the finisher to the side of the machine with the holes in the finisher aligned with the joint brackets, and then dock the finisher against the machine.
7. Push in the locking lever and secure it (☞ x1), then close the front door.



B352I103.WMF



B352I106.WMF

8. Install two trays [A] (x1 each).
9. Connect the finisher cable [B] to the main machine below the right rear handle.
10. Turn on the main switch and check the finisher operation.

NOTE: When moving the finisher to a new location, if you wish to put the finisher back in the original carton, change the DIP switch settings. See DIP Switches in the finisher service manual.

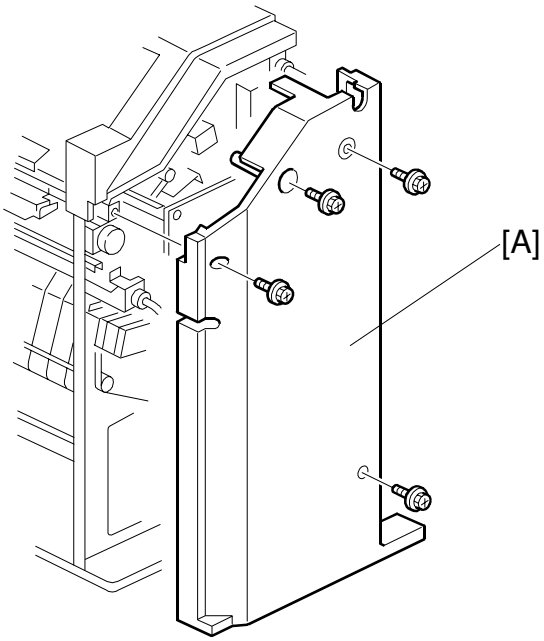
1.9 PUNCH UNIT INSTALLATION

1.9.1 ACCESSORY CHECK

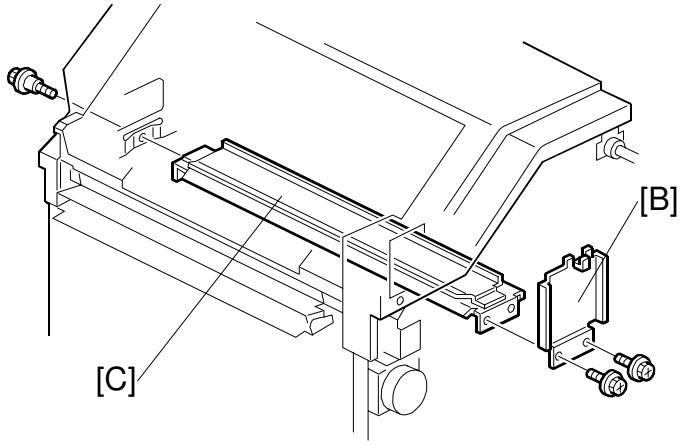
Check the quantity and condition of the accessories in the box against the following list:

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

1.9.2 INSTALLATION PROCEDURE



B377I102.WMF

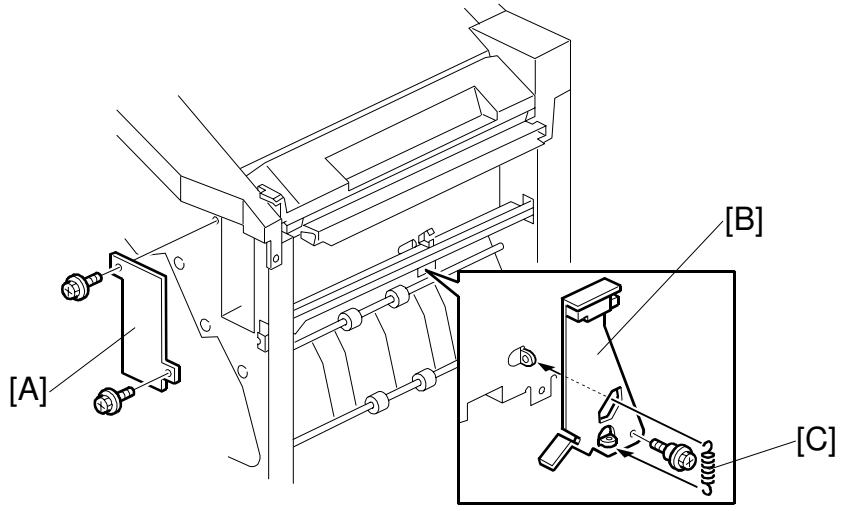


B377I103.WMF

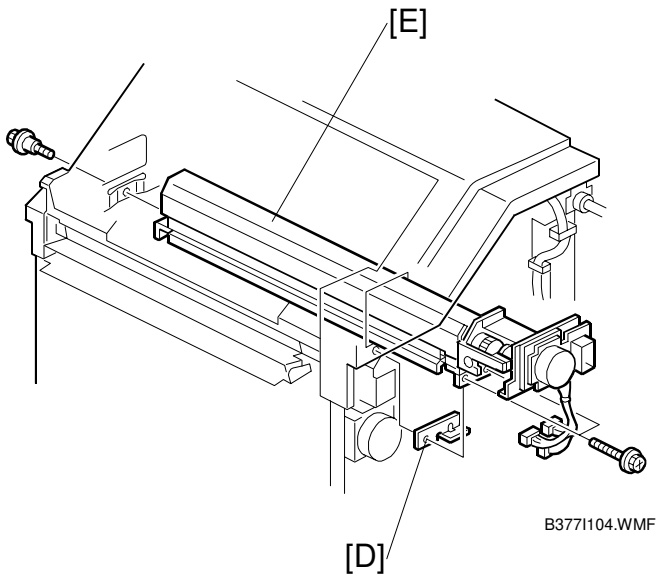
⚠CAUTION

Switch off the main machine and unplug its power cord. If the Two-Tray Finisher is installed, disconnect it and pull it away from the machine. (☛ 1.8)

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

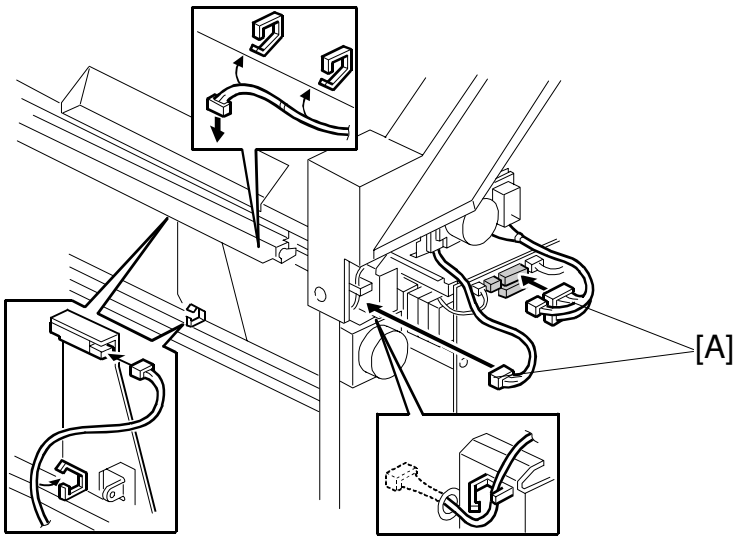


B377I101.WMF

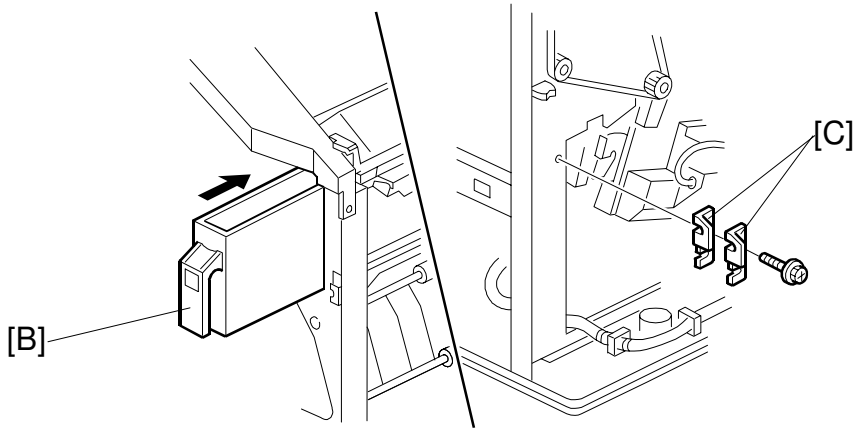


B377I104.WMF

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



B377I105.WMF



B377I106.WMF

9. Connect the harnesses [A] and clamp them as shown.
   NOTE: No special DIP switch settings are required for this punch unit. The punch unit sends an identification signal to the machine board so it knows what type of punch unit has been installed.
10. Slide the hopper [B] into the machine.
11. Fasten the two 1 mm spacers [C] to the rear frame for future adjustment.
    NOTE: The spacers are used to adjust the horizontal positioning of the holes.
12. Reassemble the finisher and check the punch operation.

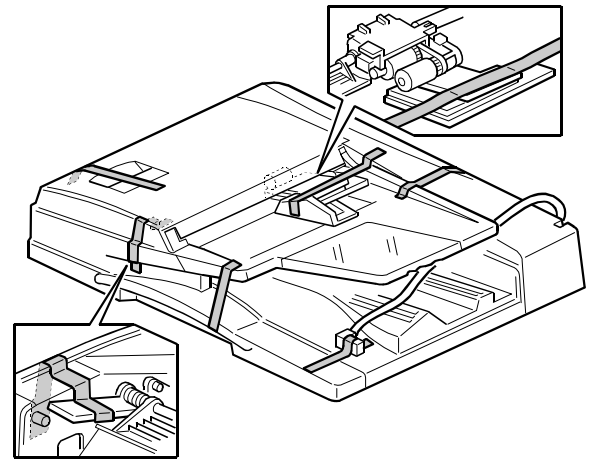
1.10 AUTO REVERSE DOCUMENT FEEDER INSTALLATION

1.10.1 ACCESSORY CHECK

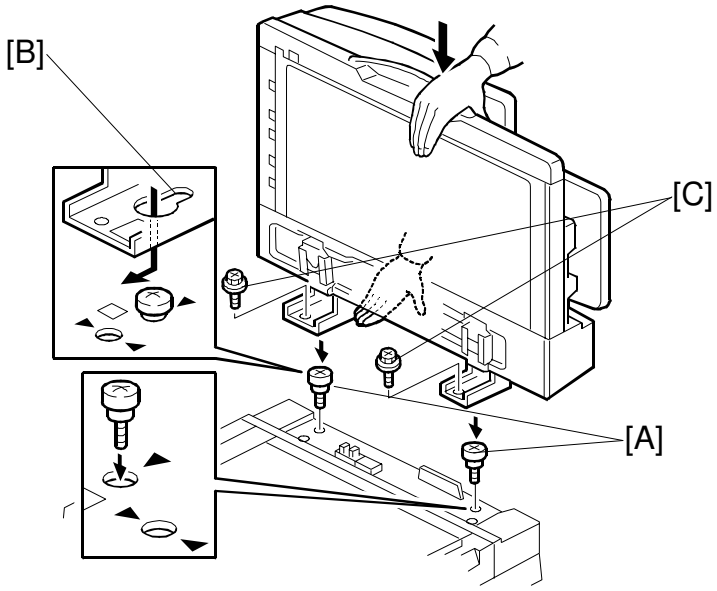
Check the quantity and condition of the accessories in the box against the following list:

Description	Q'ty
1. Stepped Screw	2
2. Screw – M4x10	2
3. Installation Procedure	1

1.10.2 INSTALLATION PROCEDURE



B351I122.WMF

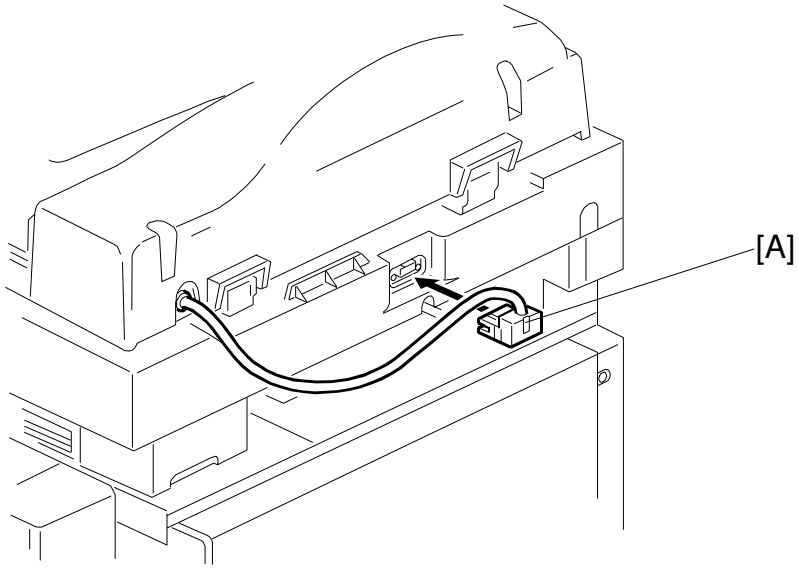


B351I123.WMF

⚠CAUTION

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

1. Unpack the ARDF and remove all tapes and shipping retainers.
2. Attach and tighten [A] (🔩 x2 stud).
3. Mount the ARDF by aligning the screw keyholes [B] of the ARDF support plate over the stud screws, and slide the ARDF toward the front of the machine.
   NOTE: To avoid damaging the ARDF, hold it as shown in the illustration.
4. Secure the ARDF [C] (🔩 x2).



B351I124.WMF

5. Connect the I/F cable [A] (x1) to the main machine.
6. Turn on the main switch.
7. Check the ARDF operation and copy quality. Be sure to check and adjust the registration for the ARDF with SP 6006.

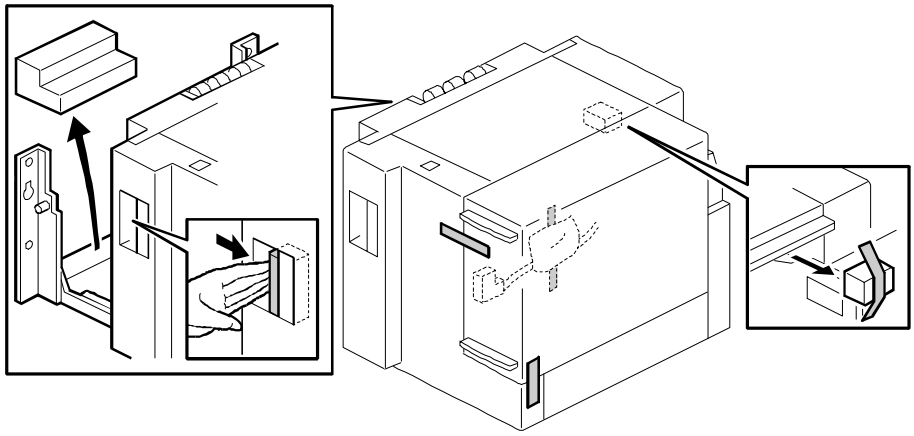
1.11 LCT INSTALLATION

1.11.1 ACCESSORY CHECK

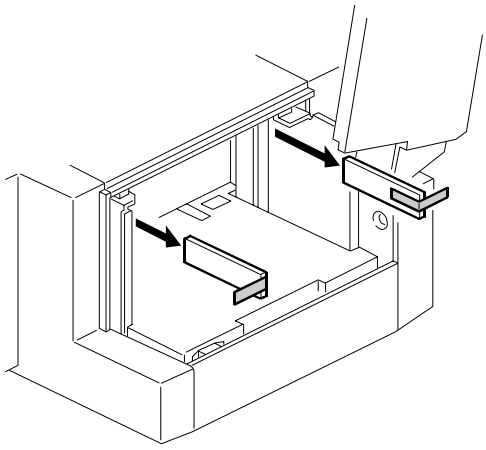
Check the quantity and condition of the accessories in the box against the following list:

Description	Q'ty
1. Joint Pin	2
2. Stepped Screw M3x18	4
3. Magnet Cover	1
4. NECR (-17, -27 machines)	1
5. Installation Procedure	1

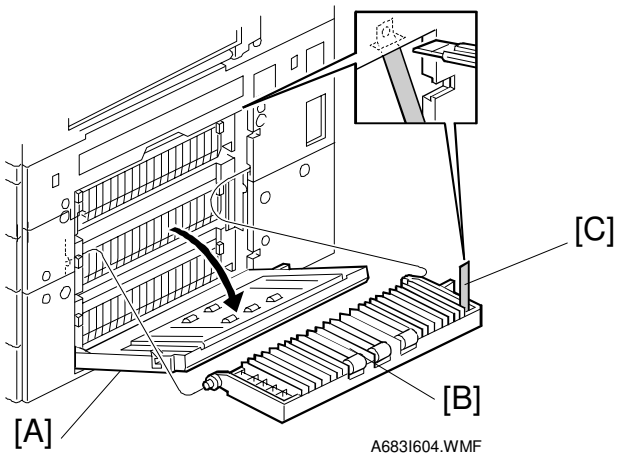
1.11.2 INSTALLATION PROCEDURE



A683I501.WMF



A683I500.WMF



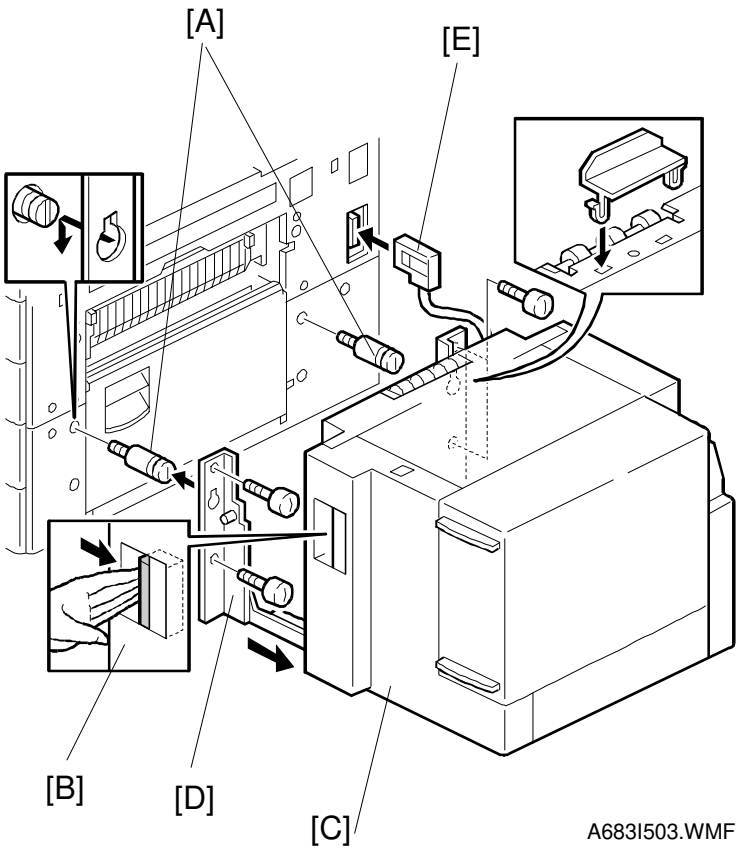
A683I604.WMF

⚠CAUTION

Switch off the main machine and unplug its power cord before starting the following procedure.

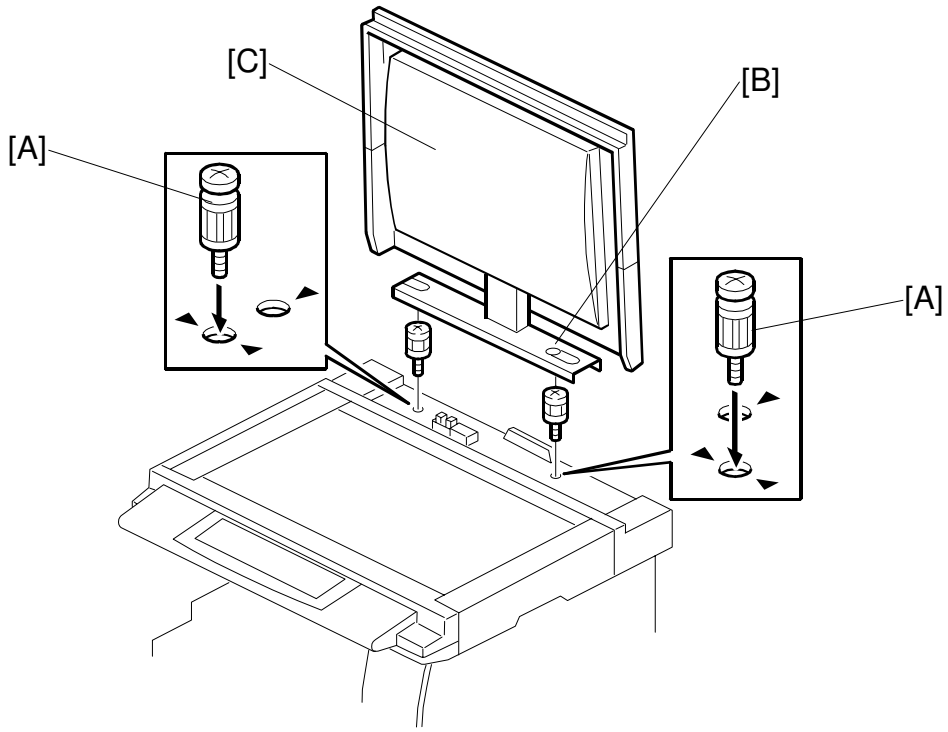
NOTE: The Paper Tray Unit (A682) must be installed before installing the LCT. (☛ 1.4)

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



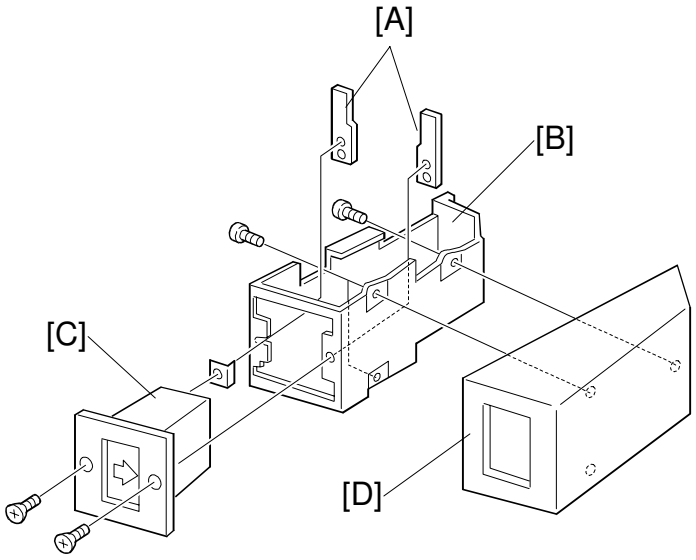
6. Install the joint pins [A].
7. Push the release lever [B] and slide the LCT to the right (front view).
8. Hang the LCT [C] on the joint pins, then secure the brackets [D] (x4).
9. Return the LCT to the previous position and connect the LCT cable [E].
10. Open the LCT cover and load the paper.
11. Turn on the ac switch and check the LCT operation.

1.12 PLATEN COVER INSTALLATION

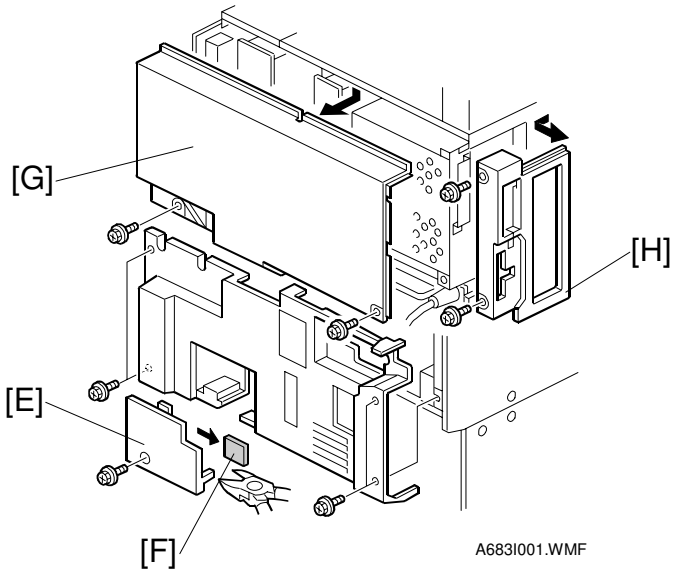


1. Install [A] (x2) on the top cover as shown.
2. Position the platen cover bracket [B] on the heads of the stud screws and slide the platen cover [C] to the left.

1.13 KEY COUNTER INSTALLATION



A683I518.WMF

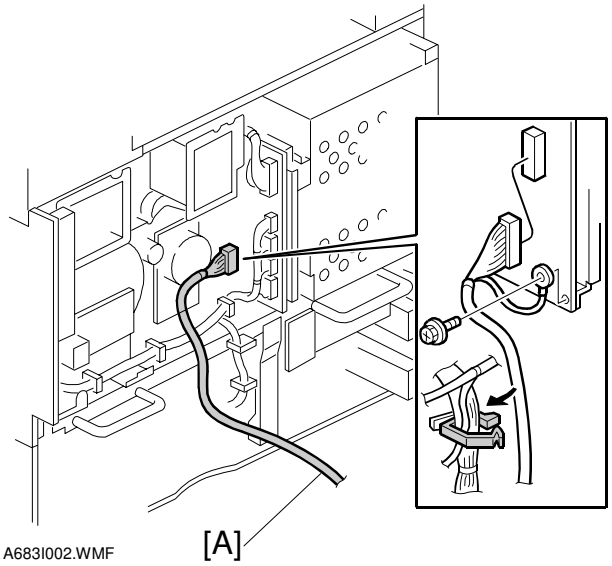


A683I001.WMF

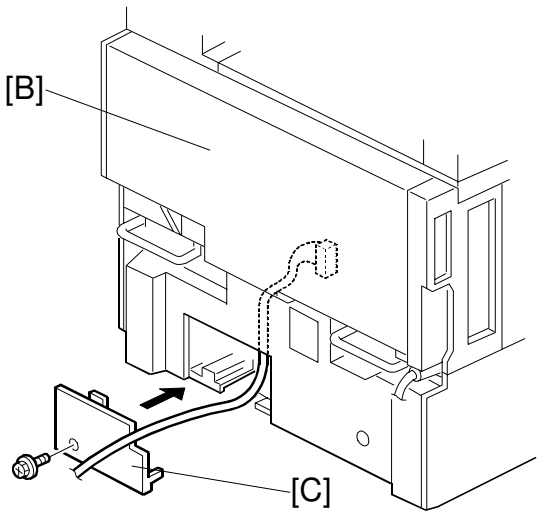
⚠CAUTION

Unplug the machine power cord before starting the following procedure.

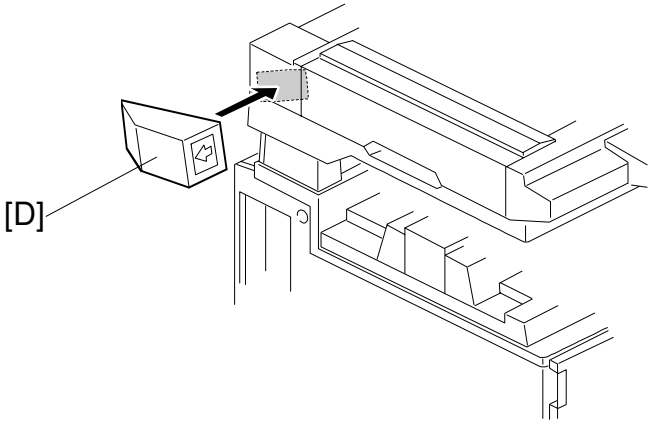
1. Hold the key counter plates [A] on the inside of the key counter bracket [B] and insert the key counter holder [C]
2. Secure the key counter holder to the bracket (🔩 x2).
3. Attach the key counter cover [D] (🔩 x2).
4. Remove the connector cover [E].
5. Remove the knockout [F] from the connector cover.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



A683I002.WMF



A683I003.WMF



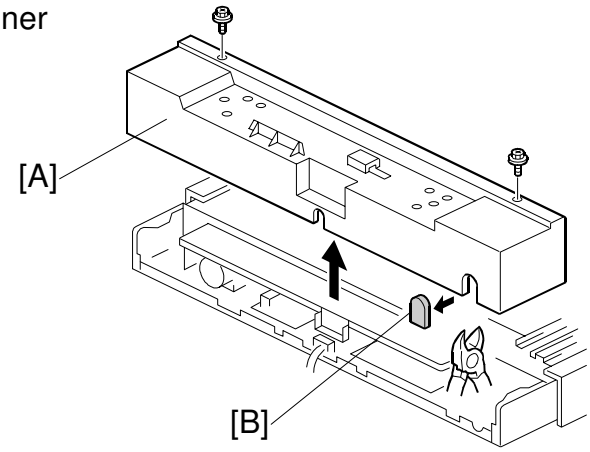
A683I965.WMF

7. Connect the key counter connector [A] to CN211 on the I/O board.
8. Reinstall the covers [B] and [C].
9. Attach the double-sided tape to the key counter bracket.
10. Peel off the backing of the double-sided tape and attach the key counter assembly [D] to the left side of the scanner unit.
    NOTE: When attaching the key counter assembly, press the assembly hard against the scanner cover. Otherwise, the key counter assembly may come off easily.
11. Set SP5-401-2 to 1. (This enables the restricted access control function.)
    NOTE: The key counter function is available for other modes by changing the following SP modes.

    - SP5-401-12 (Copy Server mode)
    - SP5-401-22 (Fax mode)
    - SP5-401-32 (Scanner mode)
    - SP5-401-42 (Printer mode)

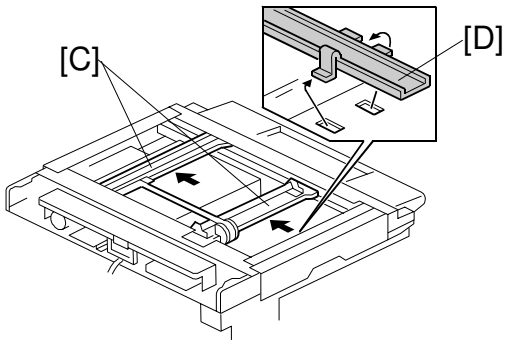
1.14 ANTI-CONDENSATION HEATER

1. Remove the ARDF and exposure glass.
   NOTE: For details about how to remove the ARDF and exposure glass, see section “3 REPLACMENT AND ADJUSTMENT”, sections 3.9.1 and 3.9.2.
2. Remove the rear cover [A] of the scanner unit (x2, x1)
3. Remove the knockout [B]



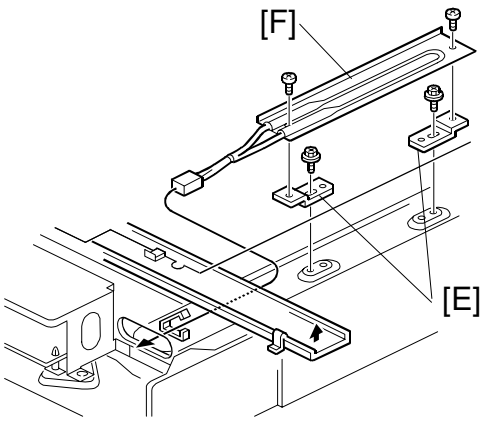
B004I204.WMF

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



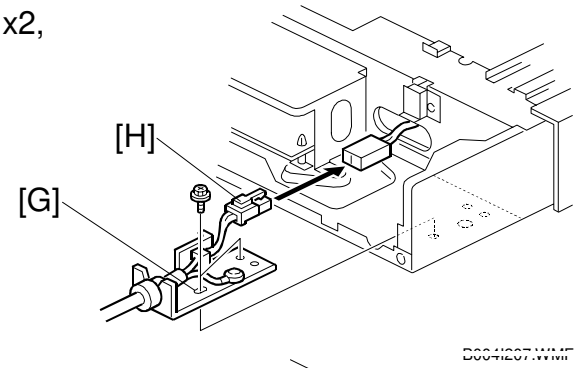
B004I205.WMF

6. Install the heater brackets [E] (x2, M3x6).
   NOTE: Use the screws already attached at the same position.
7. Install the heater [F] (x2, M4x6) and route the harness.



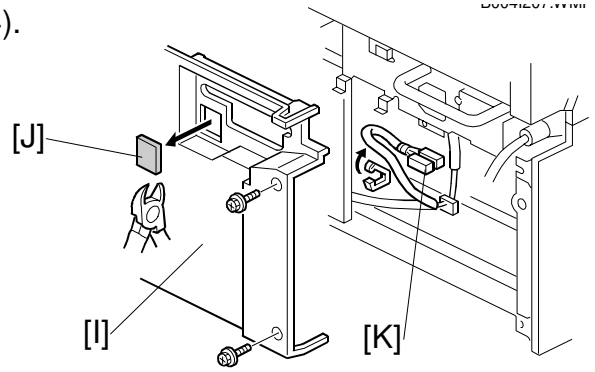
B004I206.WMF

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



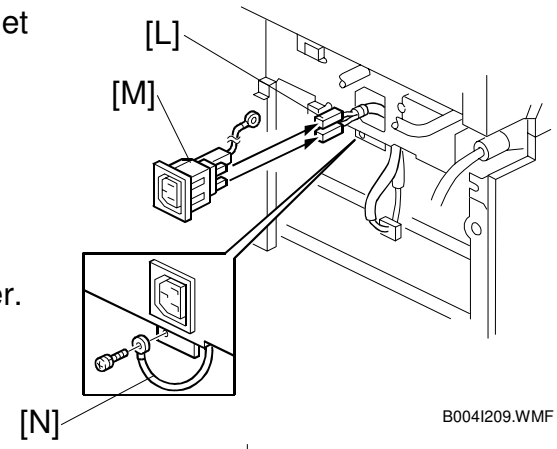
B004I207.WMF

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



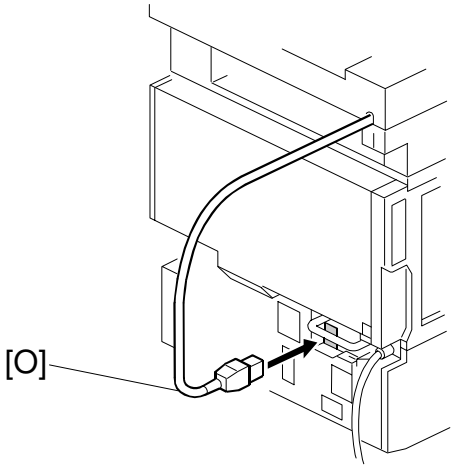
B004I208.WMF

12. Connect the ac harness [L] to the ac outlet [M].
    NOTE: Do not remove the ground wire from the ac outlet.
13. Install the ac outlet.
14. Install the ground wire [N] (x1, M4x6).
15. Re-install the rear cover, rear lower cover.



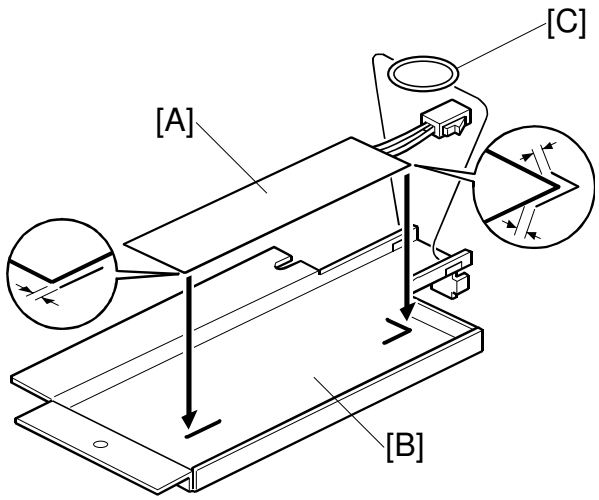
B004I209.WMF

16. Connect the harness [O].

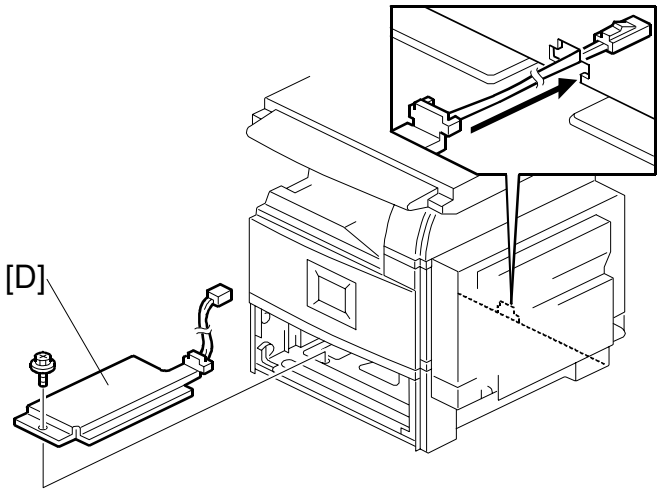


B004I210.WMF

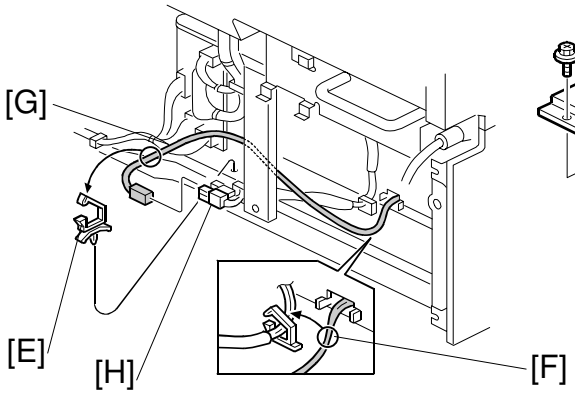
1.15 TRAY HEATER



A284I531.WMF



B004I202.WMF



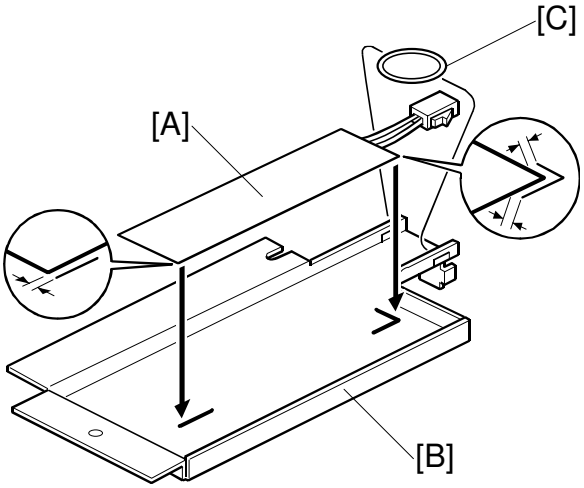
B004I203.WMF

⚠CAUTION

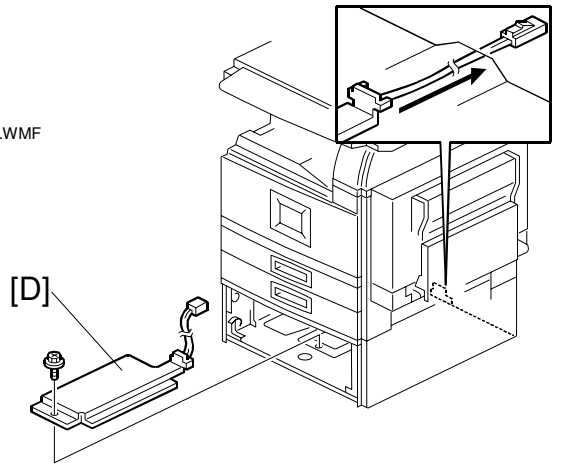
Unplug the machine power cord before starting the following procedure.

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

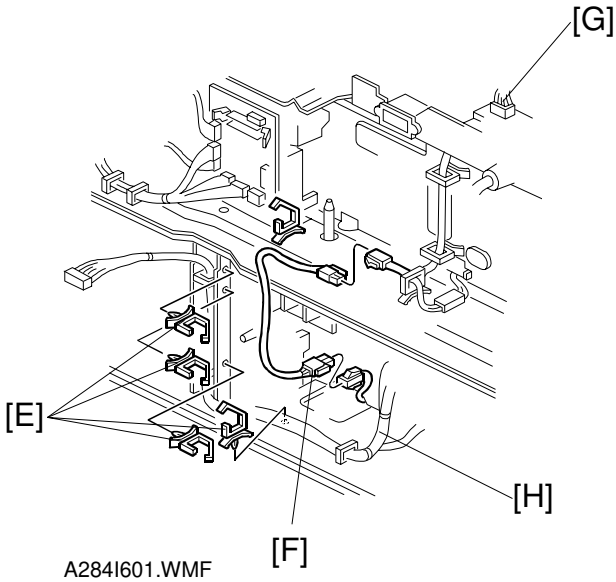
1.16 TRAY HEATER (OPTIONAL PAPER TRAY UNIT)



B004I531.WMF



B004I201.WMF



A284I601.WMF

⚠CAUTION

Unplug the machine power cord before starting the following procedure.

1. Attach the optional tray heater [A] to the heater bracket [B].
2. Install the harness holder [C].
3. Remove the rear lower cover of the machine and the rear cover of the optional paper tray unit.
4. Remove the upper and lower paper trays of the optional paper tray unit.
5. Install the heater assembly [D] (🔩 x1).
6. Install four harness clamps [E].
7. Route the harness [F] and connect it to the harness [G] and heater harness [H].

2. PREVENTIVE MAINTENANCE SCHEDULE

2.1 PM TABLE

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

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

B003/B004B006/B007	EM	150K	300K	450K	NOTE
SCANNER/OPTICS					
Reflector		C	C	C	Optics cloth
1st Mirror		C	C	C	Optics cloth
2nd Mirror		C	C	C	Optics cloth
3rd Mirror		C	C	C	Optics cloth
Scanner Guide Rails		I	I	I	Do not use alcohol. Lubricate if necessary.
Platen Sheet Cover	C	I	I	I	Dry cloth or alcohol. Replace platen sheet if required.
Exposure Glass		C	C	C	Dry cloth or alcohol
Toner Shield Glass		C	C	C	Optics cloth
APS Sensor		C	C	C	Dry cloth or alcohol
Exposure Glass (Sheet through)		C	C	C	Dry cloth or alcohol
DRUM (OPC) AREA					
Charge Roller		R	R	R	
Charge Roller Cleaning Pad		R	R	R	
Quenching Lamp			C		Dry cloth
Pick-off Pawls		R	R	R	
Spurs		C	C	C	Dry cloth or alcohol
ID Sensor		C	C	C	Perform SP3-001-2 after blower brush cleaning.
CLEANING UNIT					
Drum Cleaning Blade		R	R	R	
Cleaning Entrance Seal		C	C	C	Blower brush. Replace if required.
Side Seal		I	I	I	

B003/B004B006/B007	EM	150K	300K	450K	NOTE
DEVELOPMENT UNIT					
Development Drive Gears		I	I	I	
Development Filter		R	R	R	
Developer		I	R	I	
Entrance Seal		I	I	I	
Side Seal		I	I	I	
Development Roller		C	C	C	Dry cloth
PAPER FEED					
Registration Roller	C	C	C	C	Water or alcohol.
Paper Feed Roller	I	R	R	R	Check counter value for each (SP7-204). If ≥ 150 K, replace roller. After replacing the roller, do SP7-816 to reset counter.
Separation Roller	I	R	R	R	
Pick-up Roller	I	R	R	R	
Paper Feed Roller (By-pass feed table)	I	R	R	R	
Separation Roller (By-pass feed table)	I	R	R	R	
Pick-up Roller (By-pass feed table)	I	R	R	R	
Paper Feed Guides		C	C	C	Water or alcohol.
Relay Rollers		C	C	C	Water or alcohol.
Bottom Plate Pad		C	C	C	Water or alcohol.
Bottom Plate Pad (By-pass feed)		C	C	C	Water or alcohol.
Registration Sensor		C	C	C	Blower brush
Paper Feed Roller Gear		L	L	L	Silicone Grease G-501. See note below.[1]
DUPLEX UNIT					
Upper Transport Roller		C	C	C	Water or alcohol.
Lower Transport Roller		C	C	C	Water or alcohol.
TRANSFER BELT UNIT					
Transfer Belt	C	R	R	R	Dry cloth
Transfer Belt Cleaning Blade		R	R	R	
Transfer Belt Rollers		C	C	C	Dry cloth
Entrance Seal		C	C	C	Dry cloth
Transfer Entrance Guide	C	C	C	C	Dry cloth
Used Toner Tank	I	C	C	C	Empty the tank.

B003/B004B006/B007	EM	150K	300K	450K	NOTE
FUSING UNIT AND PAPER EXIT					
Fusing Entrance and Exit Guide Plates		C	C	C	Water or alcohol.
Hot Roller		R	R	R	
Pressure Roller		R	R	R	
Fusing Thermistors		R	R	R	
Cleaning Roller		C	C	C	Water or alcohol.
Cleaning Roller Bushings		L	L	L	Grease: Barrierta JFE 55/2
Hot Roller Strippers		C	R	C	Water or alcohol.
Paper Exit Guide Ribs		C	C	C	Water or alcohol.
Exit Sensor		C	C	C	Blower brush
DRIVE					
Drive Belts			I		Replace if necessary

B351	EM	80K	160K	240K	NOTE
ARDF (for originals)					
Pick-up Roller	C	R	R	R	Belt cleaner
Feed Belt	C	R	R	R	Belt cleaner
Separation Roller	C	R	R	R	Dry or damp cloth
Sensors		C	C	C	Blower brush
Drive Gears		L	L	L	Grease, G501

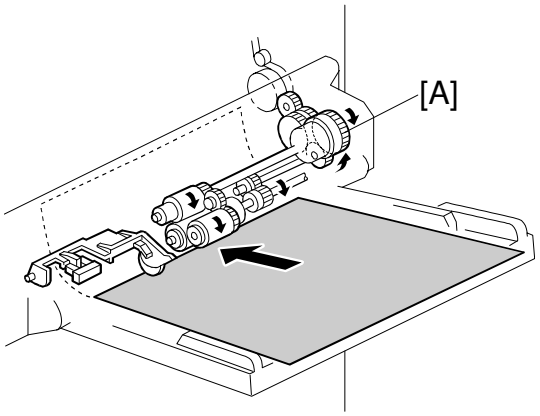
A682	EM	150K	300K	450K	NOTE
PAPER TRAY UNIT					
Paper Feed Rollers		R	R	R	Check counter with SP7-204. If ≥ 150 K, replace roller. After replacing the roller, do SP7-816 to reset counter.
Pick-up Rollers		R	R	R	
Separation Rollers		R	R	R	
Relay Rollers		C	C	C	Dry or damp cloth
Bottom Plate Pad		C	C	C	Dry or damp cloth

A683	EM	150K	300K	450K	NOTE
LCT					
Paper Feed Roller		R	R	R	Check counter with SP7-204. If ≥ 150 K, replace roller. After replacing the roller, do SP7-816 to reset counter.
Pick-up Roller		R	R	R	
Separation Roller		R	R	R	
Bottom Plate Pad		C	C	C	Dry or damp cloth

A681/B352	EM	150K	300K	450K	NOTE
1000-SHEET/Two-Tray FINISHER					
Rollers	C				Water or alcohol.
Brush Roller (A681 only)	I	I	I	I	Replace if required.
Discharge Brush	C	C	C	C	Dry cloth
Sensors	C				Blower brush
Jogger Fences	I	I	I	I	Replace if required.
Punch Waste Hopper	I	I	I	I	Empty hopper.

B376	EM	150K	300K	450K	NOTE
1-BIN TRAY UNIT					
Rollers	C				Dry or damp cloth
Copy Tray	C				Dry or damp cloth
Sensors	C				Blower brush

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



A689D500.WMF

3. REPLACEMENT AND ADJUSTMENT

3.1 GENERAL CAUTIONS

⚠CAUTION

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

⚠CAUTION

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

3.1.1 LASER UNIT

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

3.1.2 USED TONER

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

3.2 SPECIAL TOOLS AND LUBRICANTS

3.2.1 SPECIAL TOOLS

Part Number	Description	Q'ty
A2309003	Adjustment Cam – Laser Unit	1
A2309004	Positioning Pin – Laser Unit	1
A2309352	Flash Memory Card – 4MB	1
A2309351	Case – Flash Memory Card	1
A0069104	Scanner Positioning Pin (4 pcs/set)	1
A2929500	Test Chart – S5S (10 pcs/Set)	1
G0219350	Parallel Loopback Connector	1

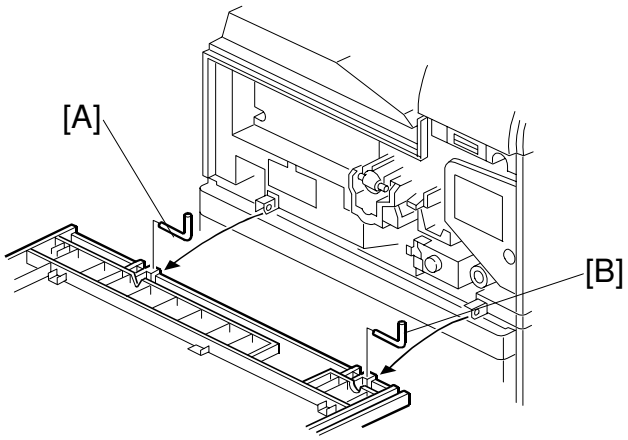
3.2.2 LUBRICANTS

Part Number	Description	Q'ty
A2579300	Grease Barrierta S552R	1
52039501	Silicone Grease G-501	1

3.2.3 SYMBOLS USED IN TEXT

Screw:  Connector:  C-clamp (snap ring):  E-clamp: 

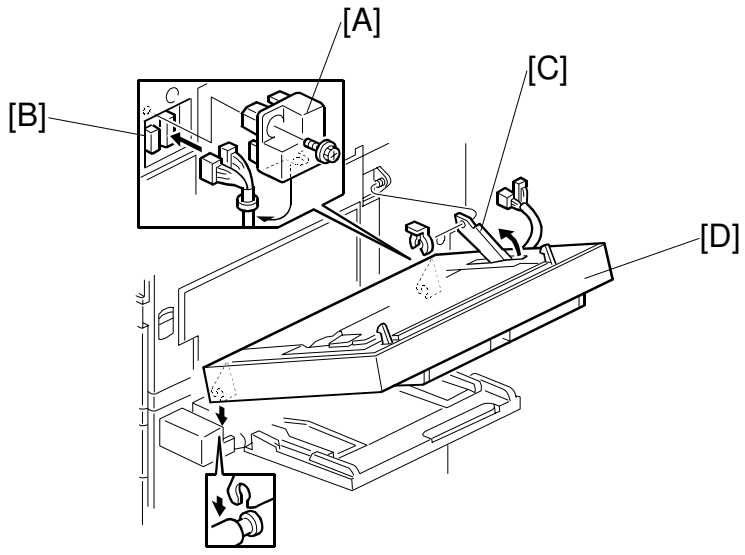
3.3 FRONT DOOR



B004R951.WMF

1. Open front door.
2. Front door. Left pin [A], right pin [B].

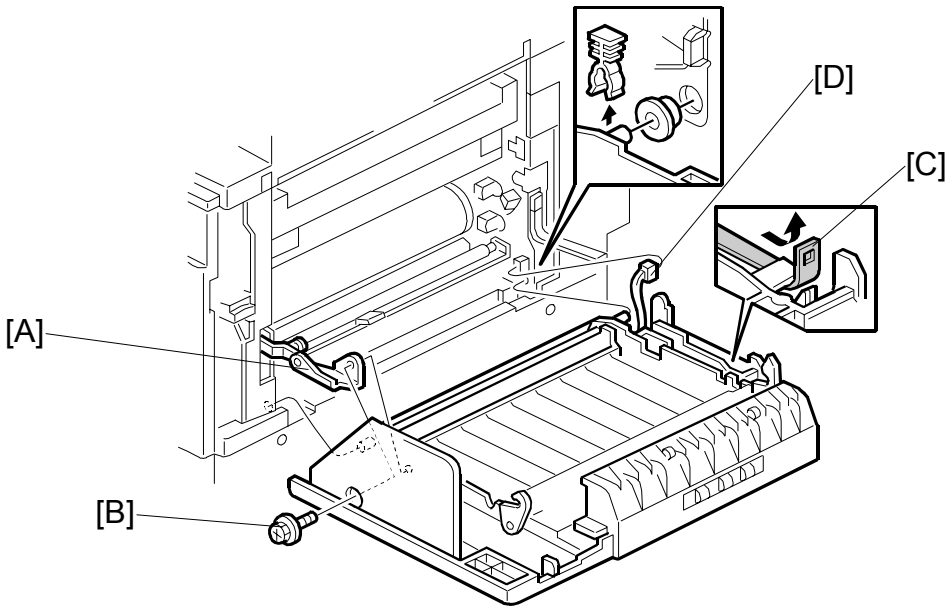
3.4 DUPLEX UNIT



B004R003.WMF

1. Connector cover [A] (x1)
2. Duplex connectors [B] (x2)
3. Duplex support arm [C] (x1)
4. Duplex unit [D]
   NOTE: Grip the duplex unit with both hands, slowly rotate it towards you and then lift up.

3.5 UPPER RIGHT COVER

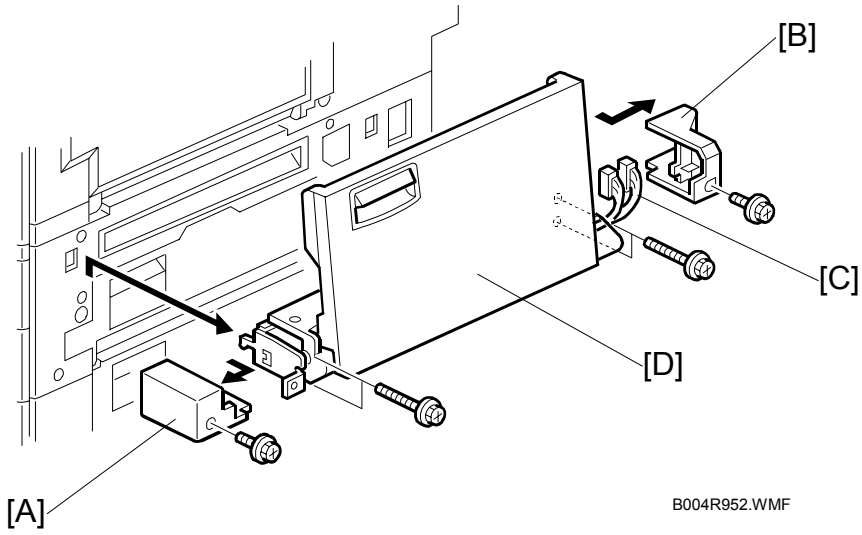


B004R915.WMF

NOTE: Work carefully to avoid damaging the development roller.

1. Duplex Unit (☛ 3.4)
2. Transfer belt unit (☛ 3.13.1)
3. Metal support arm [A] (x1 [B])
4. Band support arm [C] (loop fastener)
5. Connector [D] (x1)
6. Upper right cover (x1, bushing x1)

3.6 BY-PASS TRAY UNIT

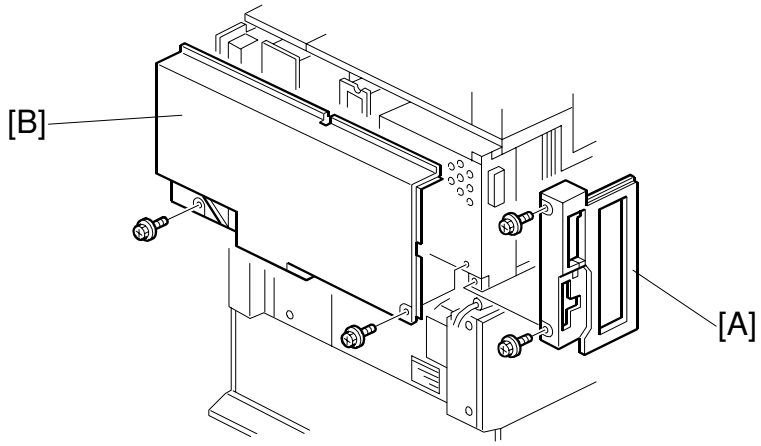


Use this procedure to remove the complete by-pass tray unit from the machine. If you wish to remove only the table, or some of the components of this unit, ☛ 3.16.

1. Duplex unit (☛ 3.4)
2. Left cover [A] (x1)
3. Right cover [B] (x1)
4. Connectors [C] (x2)
5. By-pass unit [D] (x4)
   NOTE: After removing the screws, lift to unhook the by-pass tray unit from the frame of the machine.

3.7 REAR COVERS

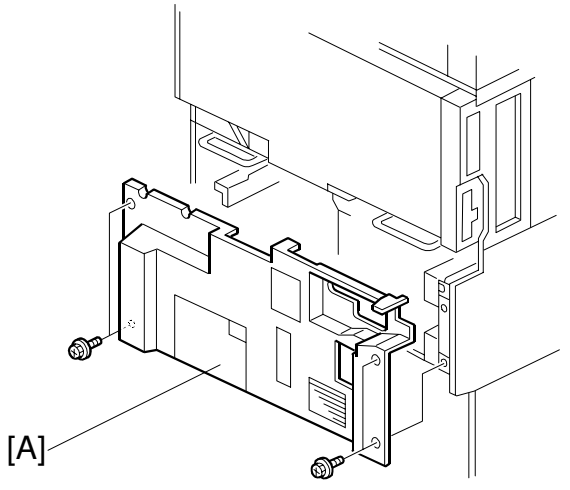
3.7.1 REAR UPPER COVER



B004R953.WMF

1. Left corner cover [A] (☞ x2)
2. Rear upper cover [B] (☞ x2)

3.7.2 REAR LOWER COVER

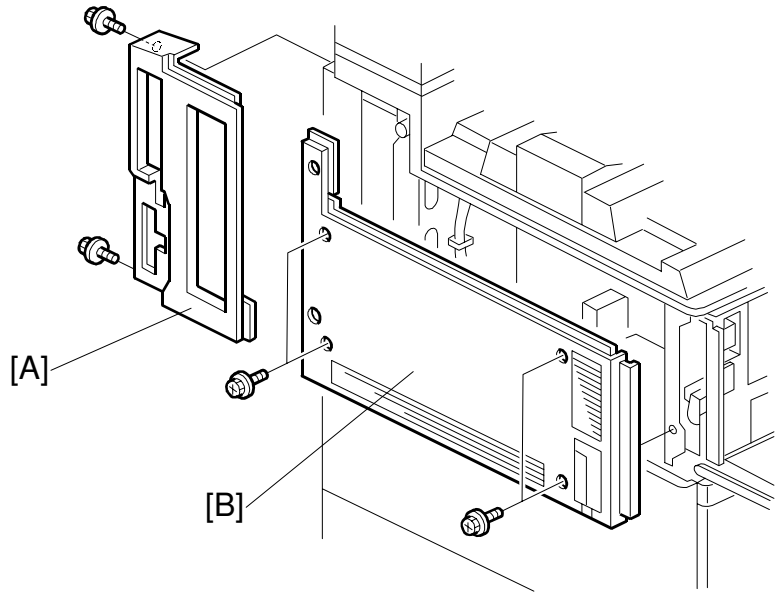


B004R954.WMF

1. Rear lower cover [A] (☞ x4)

3.8 LEFT COVERS

3.8.1 LEFT UPPER COVER

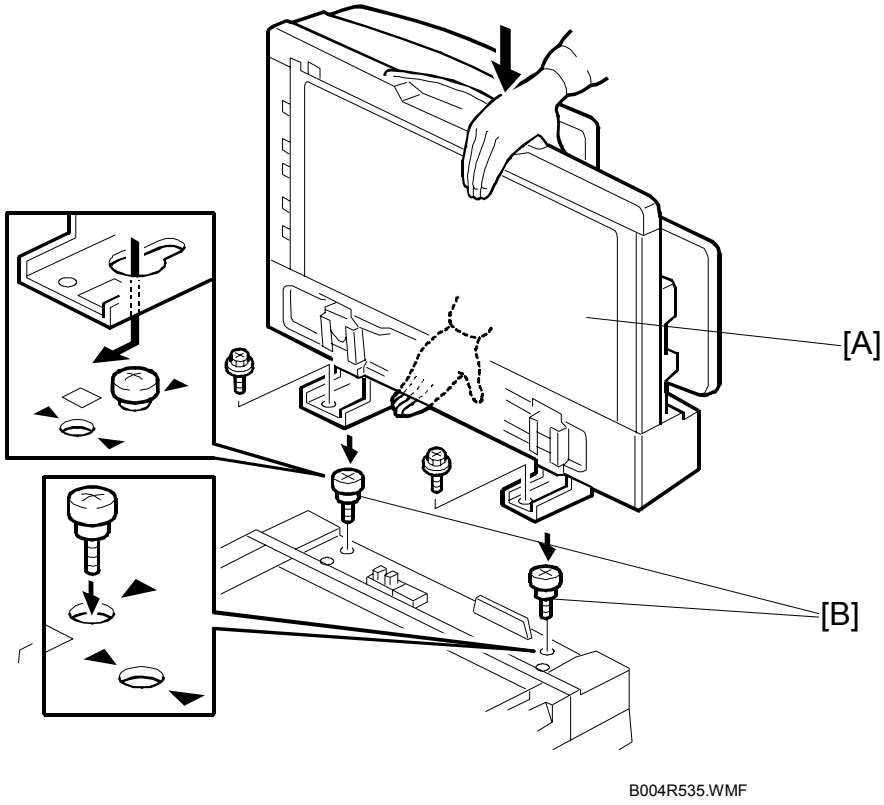


B004R955.WMF

1. Rear left corner cover [A] (x2)
2. Left upper cover [B] (x4)

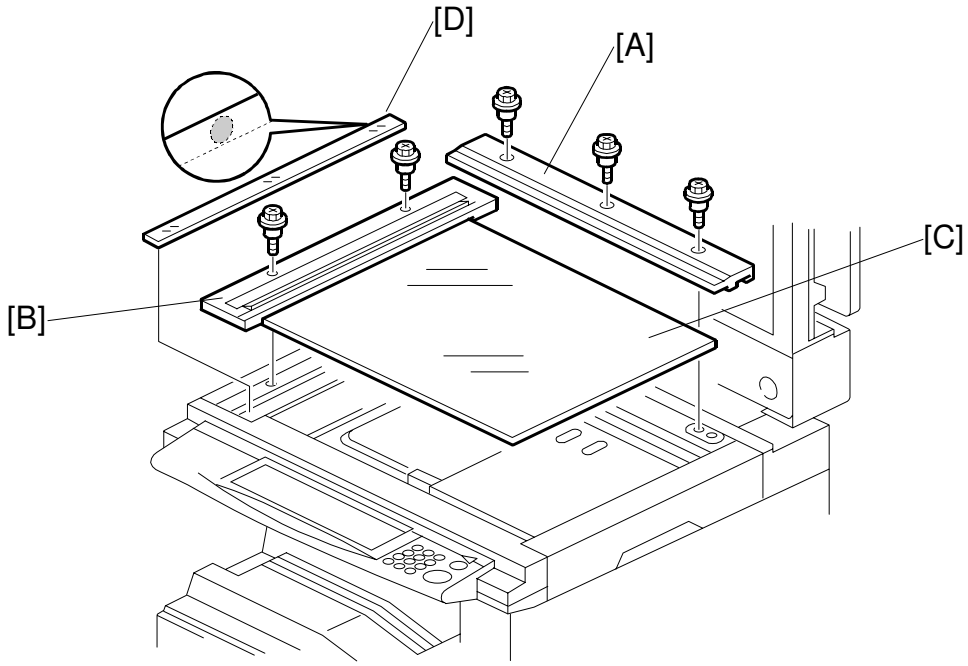
3.9 SCANNER UNIT

3.9.1 ARDF



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

3.9.2 EXPOSURE GLASS

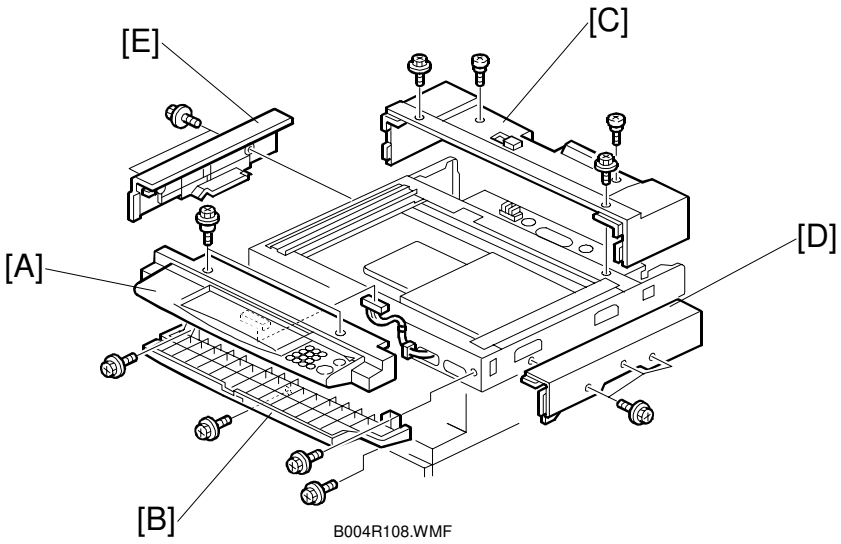


B004R959.WMF

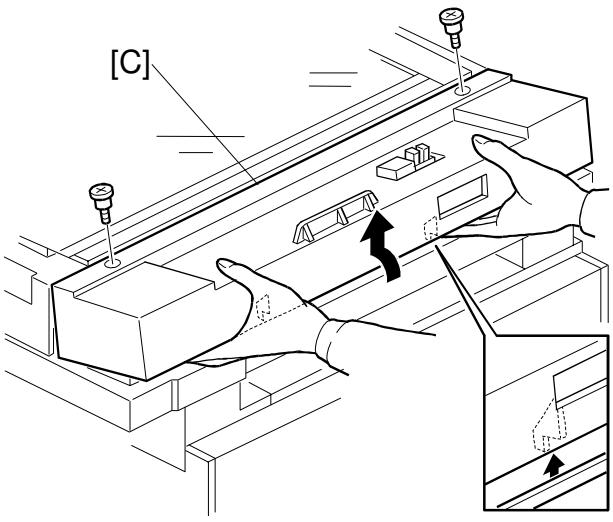
1. Open the ARDF or platen cover.
2. Rear scale [A] (x3)
3. Left scale [B] (x2)
4. Exposure glass [C]
5. DF exposure glass [D]

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

3.9.3 SCANNER EXTERIOR PANELS/OPERATION PANEL



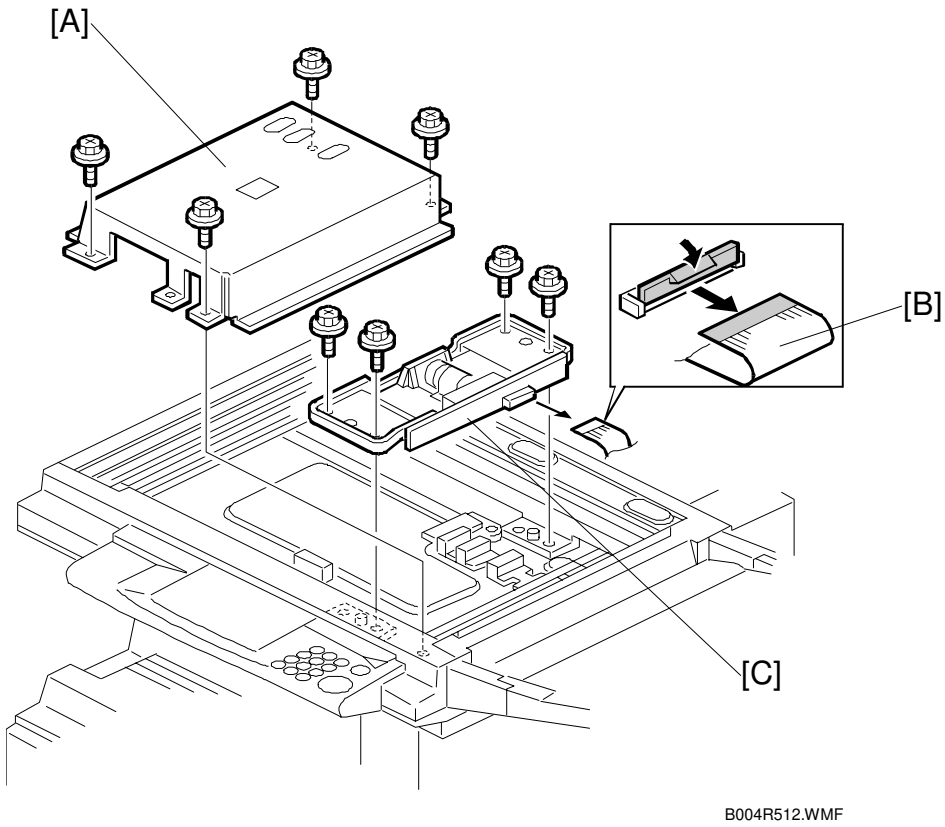
B004R108.WMF



B004R115.WMF

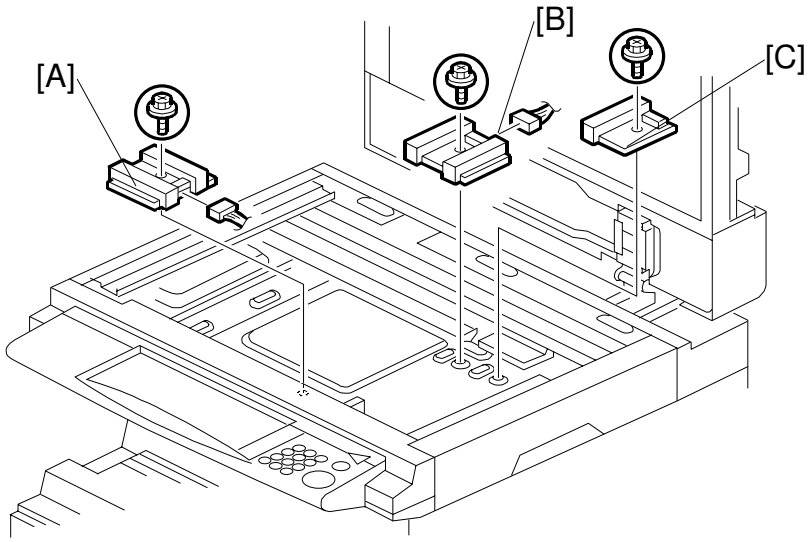
1. ARDF (☛ 3.9.1)
2. Exposure glass and DF exposure glass(☛ 3.9.2)
3. Operation panel [A] (☞ x2, ☞ x1)
4. Operation panel base [B] (☞ x4)
5. Rear cover [C] (☞ x4). Carefully lift in the direction of the arrow to disconnect the tab.
6. Right cover [D] (☞ x3)
7. Left cover [E] (☞ x2)

3.9.4 LENS BLOCK/SBU ASSEMBLY



1. ARDF (☛ 3.9.1)
2. Exposure glass and DF exposure glass (☛ 3.9.2)
3. Lens cover [A] (x4)
4. Flexible cable [B] (x1)
5. Lens block assembly [C] (x4)
   NOTE: The elements of the lens block assembly have been factory adjusted and paint locked at 8 points. Do not attempt to replace these items. Replace the unit.
6. Perform scanner and printer copy adjustments (☛ 3.21)

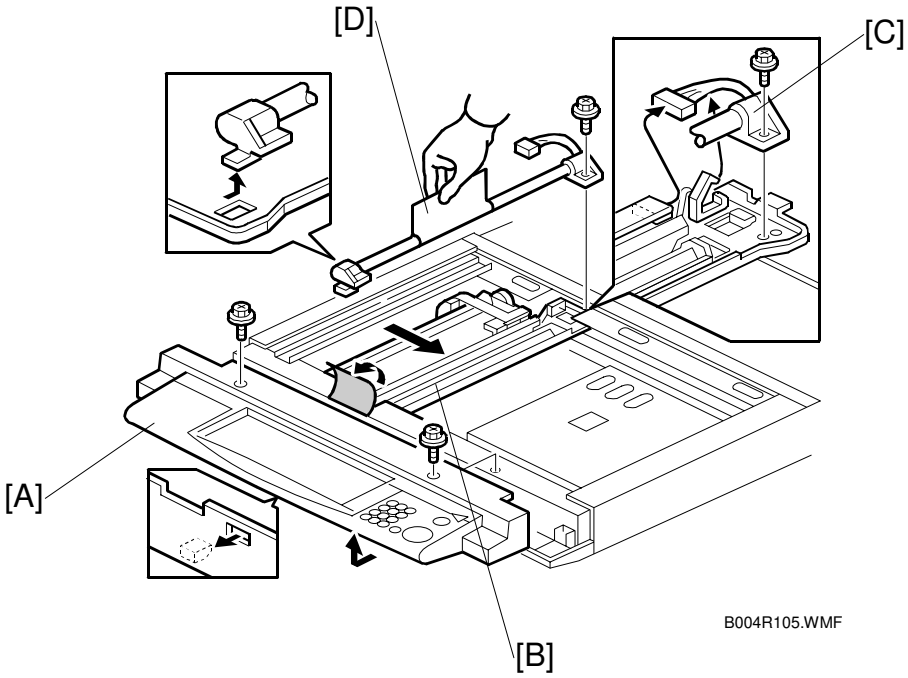
3.9.5 ORIGINAL SIZE SENSORS



B004R958.WMF

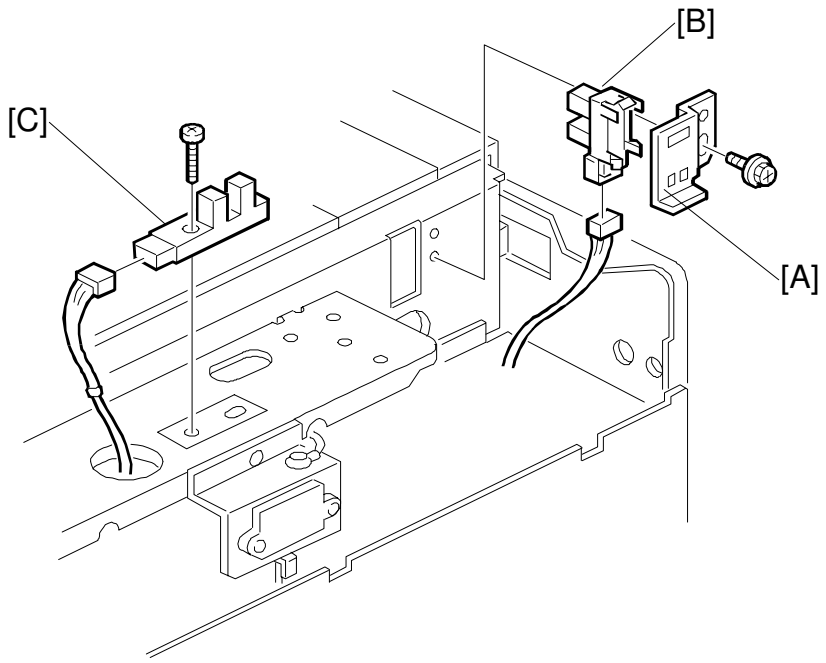
1. ARDF (☛ 3.9.1)
2. Exposure glass (☛ 3.9.2)
3. Lens block (☛ 3.9.4)
4. Original size sensor [A] (x1, x1)
5. Original size sensor [B] (x1, x1)
6. Original size sensor [C] (x1, x1)

3.9.6 EXPOSURE LAMP



1. ARDF (☛ 3.9.1)
2. Exposure glass (☛ 3.9.2)
3. Operation panel [A] (x2, x1)
4. Slide 1st scanner [B] to the cutout to expose connector and screw.
5. Exposure lamp [C] (x1, x1)
   NOTE: Never touch the glass surface of the exposure lamp with fingers. Slide the exposure lamp toward the rear to disengage the tab on its base from the hole below and then lift out.

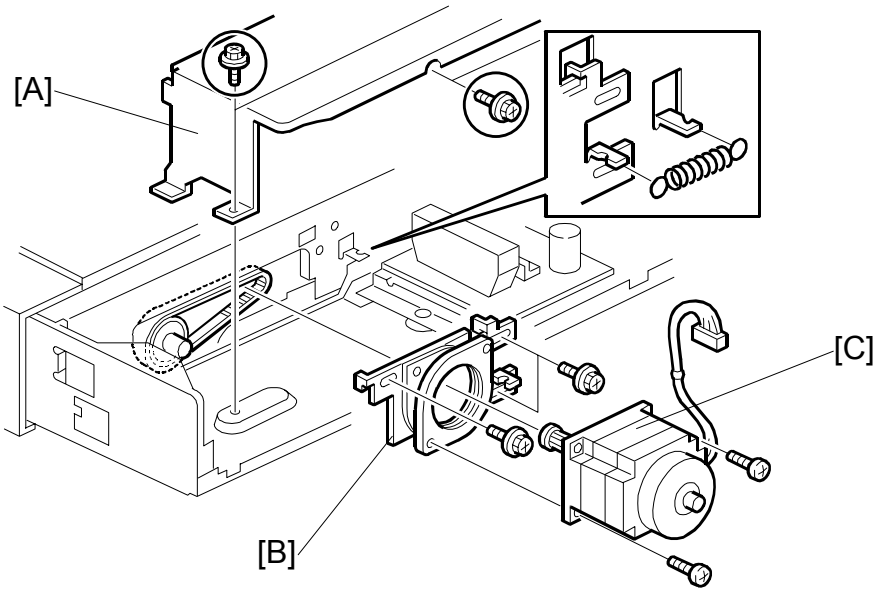
3.9.7 SCANNER HP SENSOR/PLATEN COVER SENSOR



B004R107.WMF

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

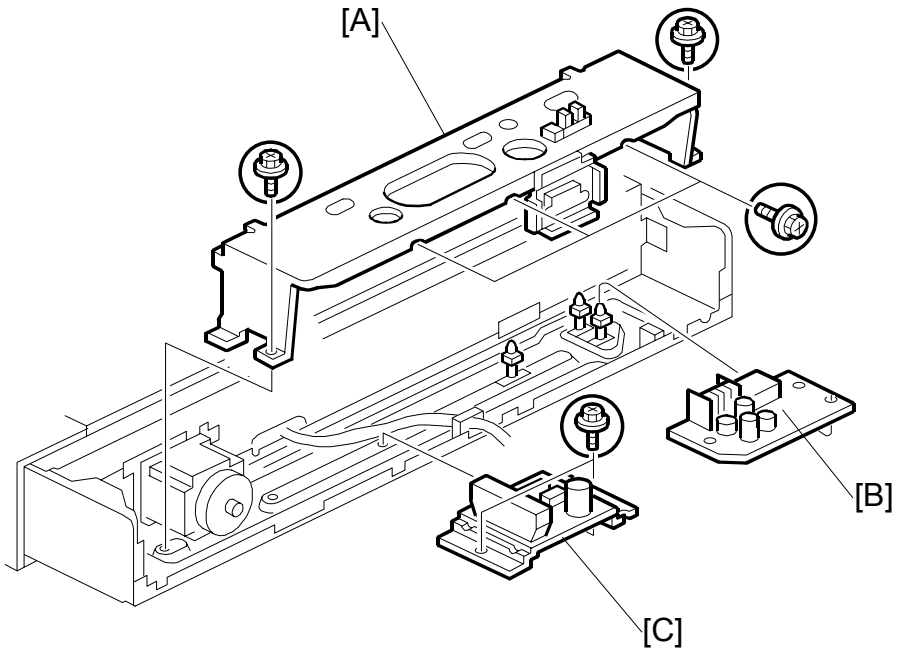
3.9.8 SCANNER MOTOR



B004R956.WMF

1. ARDF (☛ 3.9.1)
2. Scanner rear cover (☛ 3.9.3)
3. Rear bracket [A] (x5, x2)
4. Scanner motor bracket [B] (x3, x1, spring x1, timing belt x1)
   NOTE: Loosen motor bracket [B] (x3) to release tension on belt (motor slides side to side).
5. Scanner motor [C] (x2, x1)
6. Perform scanner and printer copy adjustments (☛ 3.21)

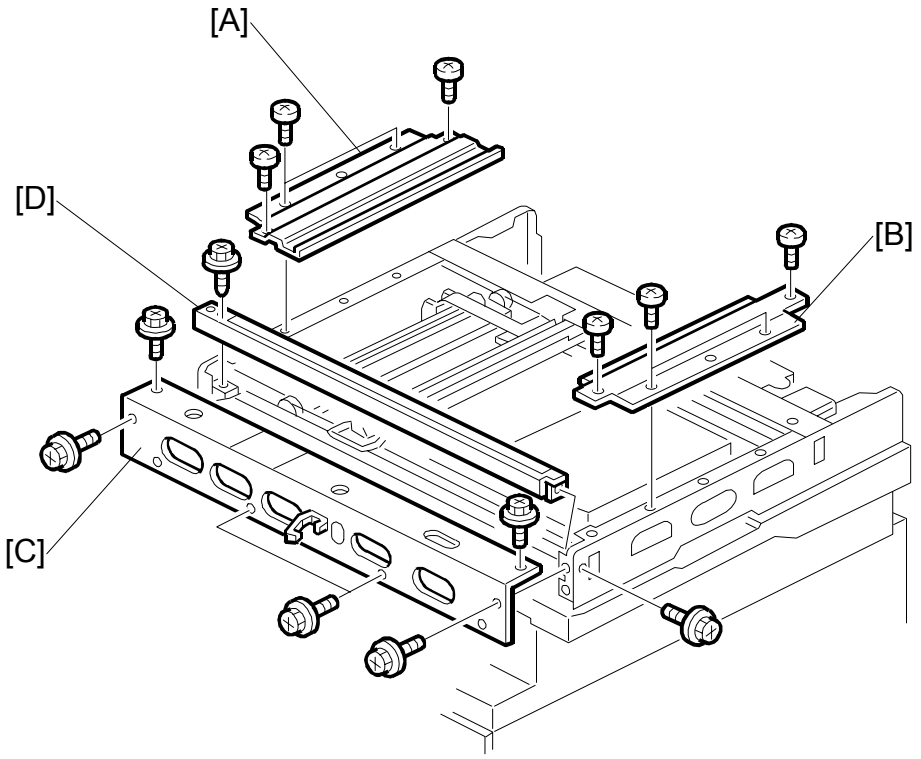
3.9.9 LAMP STABILIZER AND SCANNER MOTOR DRIVE BOARD



B004R960.WMF

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

3.9.10 SCANNER WIRE



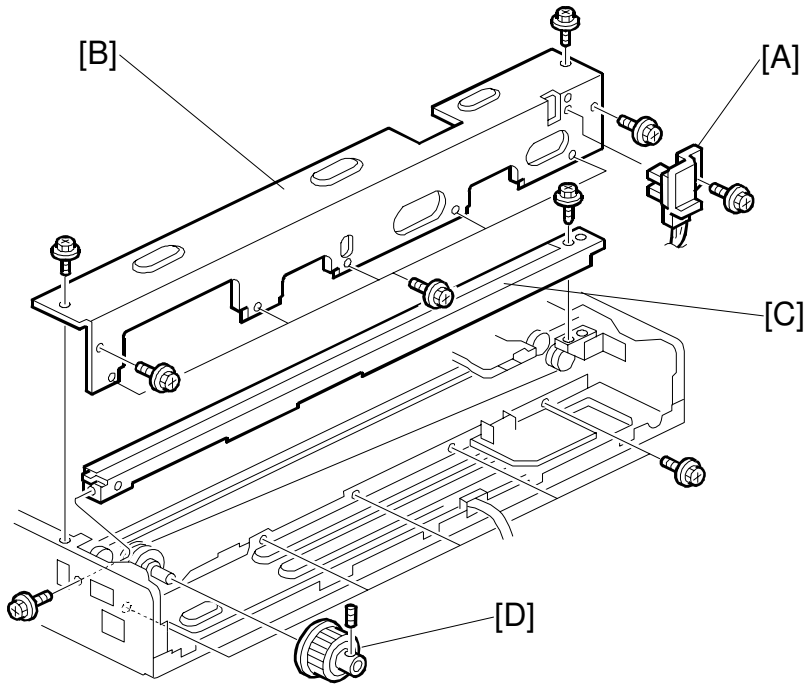
B004R109.WMF

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

Front wire:

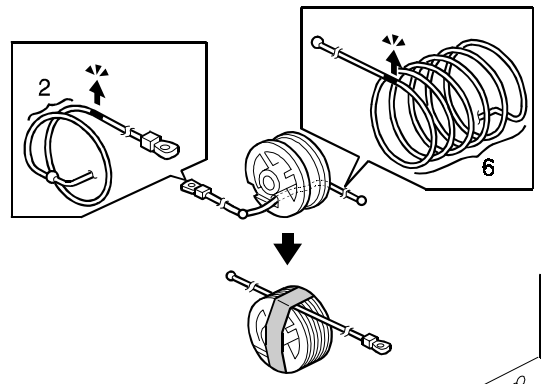
4. Left stay [A] (x5)
5. Right stay [B] (x5)
6. Front stay [C] (x6)
7. Front scanner rail [D] (x2)
8. To replace the scanner wire, see page 3-19.

Rear wire:

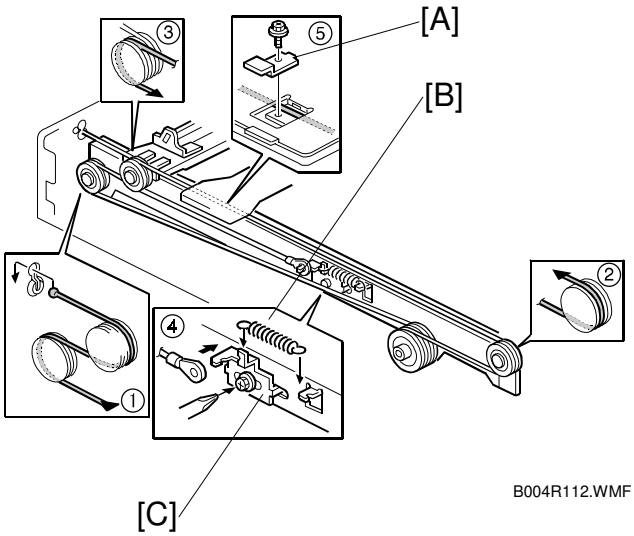


B004R961.WMF

1. Scanner HP sensor bracket [A] (x1)
2. Scanner motor (☛3.9.8)
3. Rear bracket [B] (x9)
4. Rear scanner rail [C] (x2)
5. Scanner drive pulley [D] (x1)



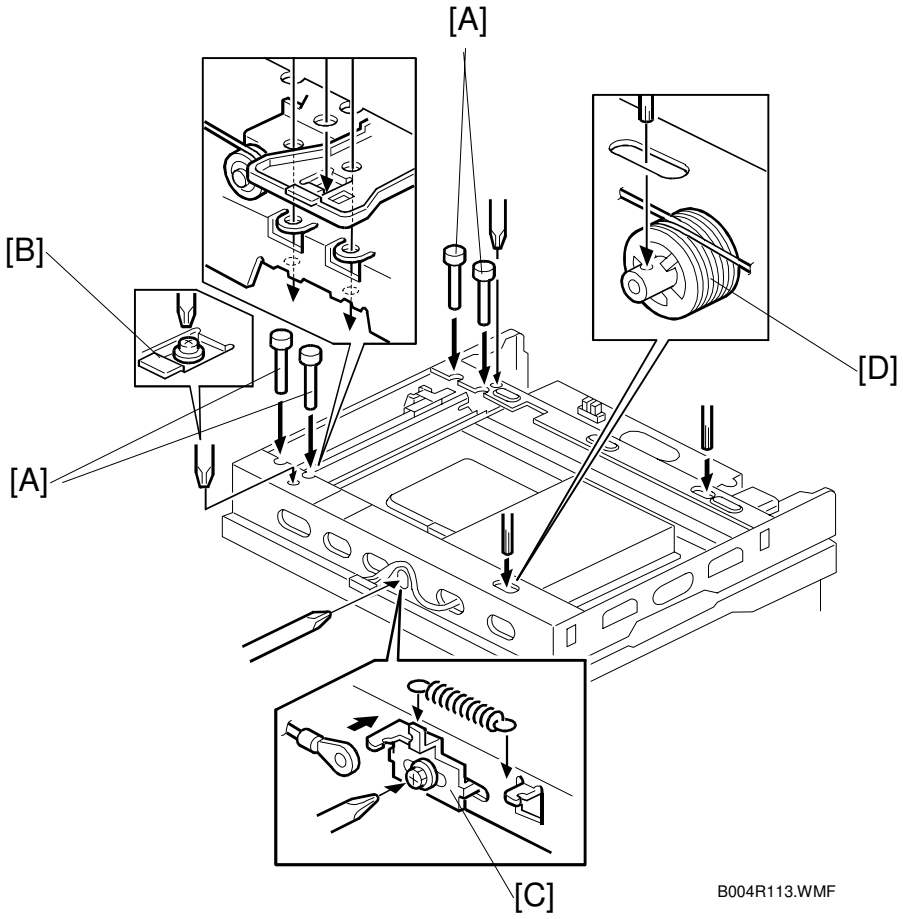
B004R111.WMF



B004R112.WMF

To replace the scanner wire:

1. Front and rear scanner wire bracket [A] (☞ x1 ea.)
2. Tension spring [B]
3. Tension bracket [C] (☞ x1). Loosen and do not remove!
4. Remove wires, front and rear.
5. Attach the new wires.
   NOTE: Illustration above shows the front wire.
6. Pass the wire through the pulleys as shown in the illustration, and then pass the bead-end of the wire through the slot in the pulley.
7. Turn the pulley until you see the red mark on the wire. 2 turns and 6 turns (see top illustration)
8. Without allowing the wire to loosen, tape the wire to the pulley.
9. Pass the wire through ①.
10. Complete threading the wire: ②➔③➔④➔Tension spring➔Screw
11. Scanner wire bracket ⑤ (☞ x1)



Completion:

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

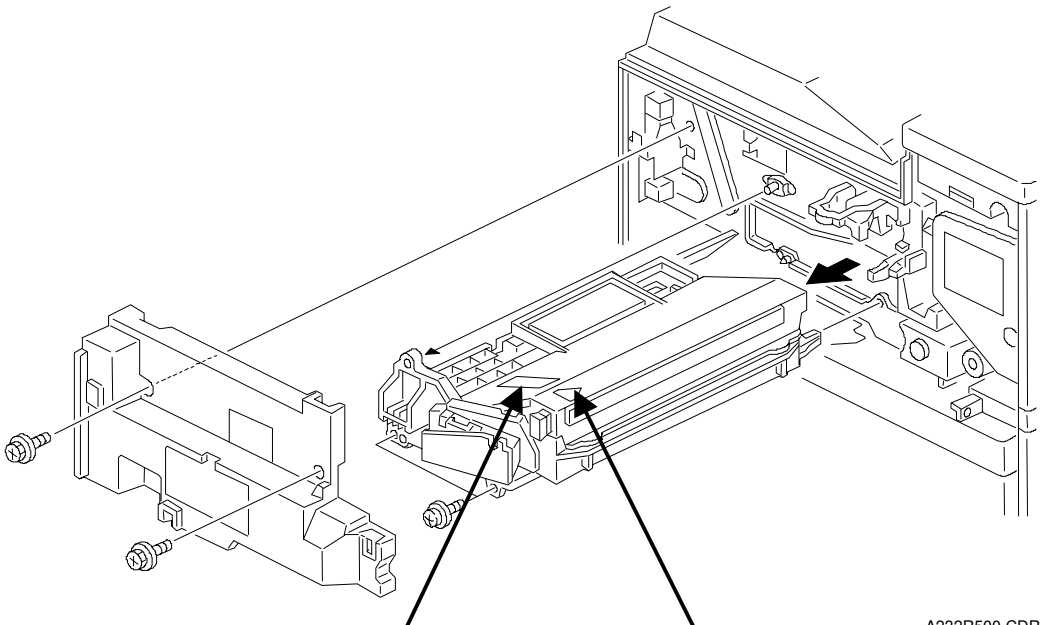
3.10 LASER UNIT

⚠WARNING

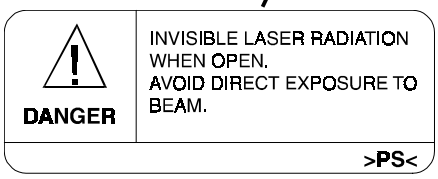
Turn off the main power switch and unplug the machine before attempting any of the procedures in this section. Laser beams can seriously damage your eyes.

3.10.1 CAUTION DECAL LOCATIONS

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



A232R500.CDR

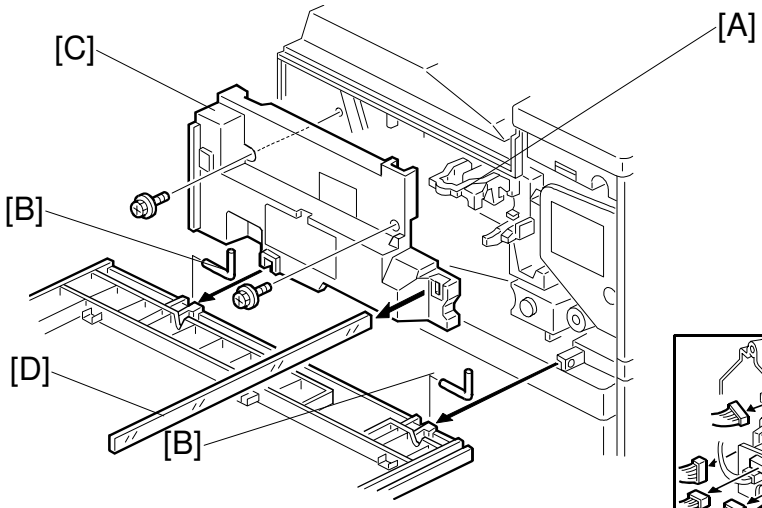


LASER-1.WMF

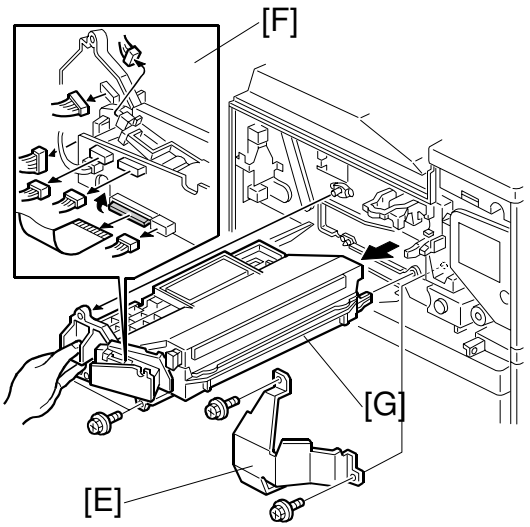
LASER-3.WMF

LASER_PS2.WMF

3.10.2 LASER UNIT



B004R211.WMF



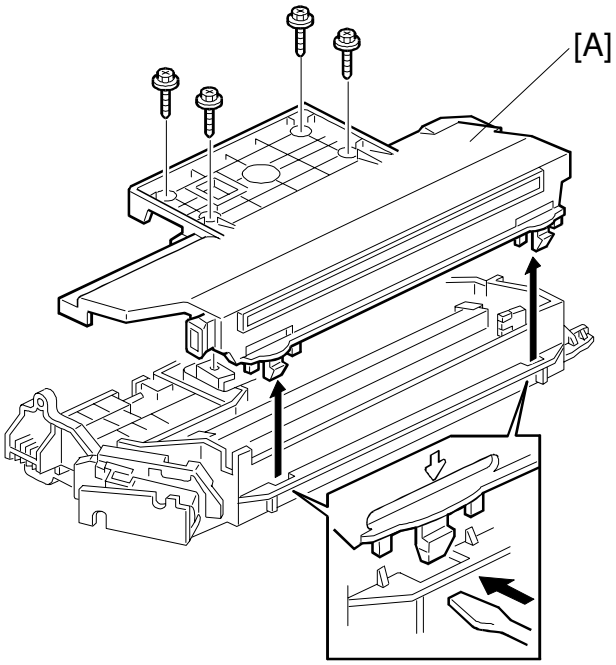
B004R962.WMF

⚠WARNING

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

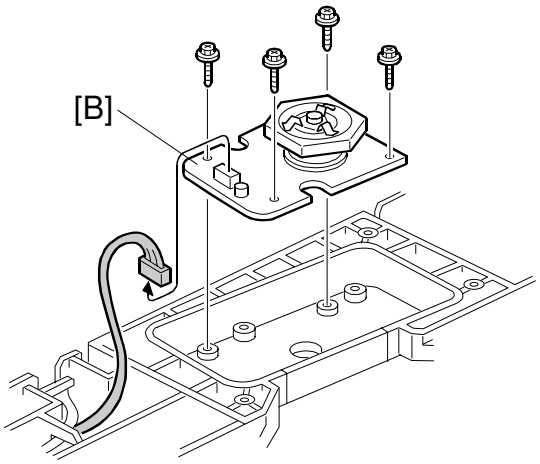
1. Open the front door and raise the toner bottle holder handle [A].
2. Front door (pins [B] x2)
3. Inner cover [C] (x2, x2)
4. Shield glass [D]
5. Shield plate [E] (x2)
6. Laser unit connectors [F] (x5, x1 flat cable)
   NOTE: Hold the LD board securely when disconnecting connectors.
7. Laser unit [G] (x2)
   NOTE: When sliding out the laser unit, do not hold the LD board. Hold the laser unit casing.

3.10.3 POLYGON MIRROR MOTOR



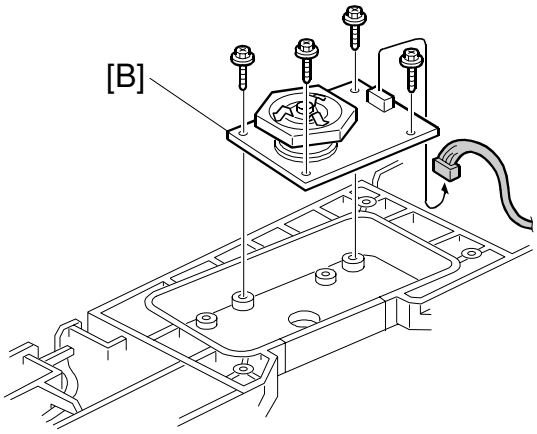
B004R903.WMF

– 45 cpm machine–



B004R201.WMF

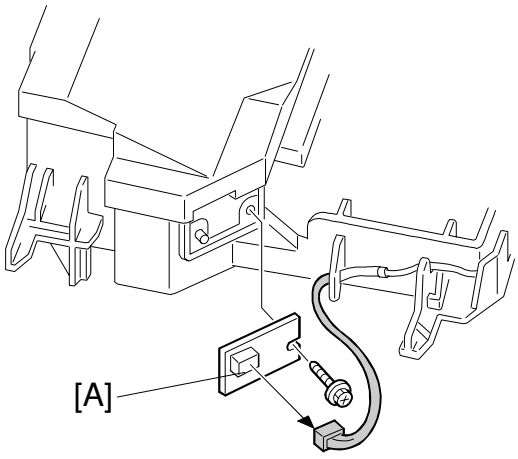
– 35 cpm machine–



B004R202.WMF

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

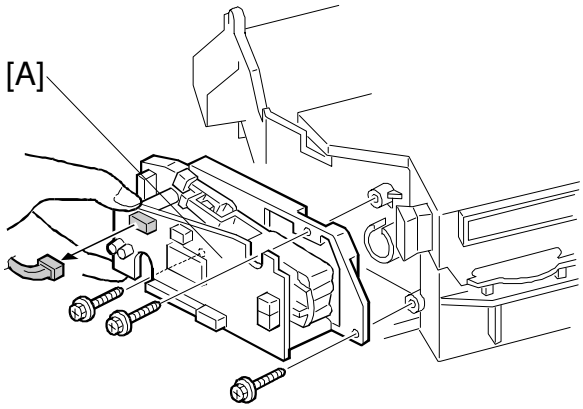
3.10.4 LASER SYNCHRONIZATION DETECTOR



B004R206.WMF

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

3.10.5 LD UNIT



B004R513.WMF

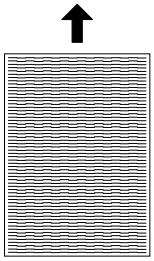
1. Laser unit (☛ 3.10.2)
2. LD unit [A] (x3, x1)
   NOTE: To avoid damaging the LD board, hold it securely when disconnecting the connectors. Hold the laser unit casing.
3. After replacing the LD board, perform SP 2-109 to adjust the laser beam pitch (described on the next page).

Laser beam pitch adjustment

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

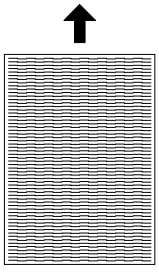
SP2-110	Test Mode Dpi (0: 400 dpi, 8: 600 dpi)
SP2-109-1:	LD Beam Pitch Adjustment – 400 dpi
SP2-109-2:	LD Beam Pitch Adjustment – 600 dpi
SP2-109-3:	LD Initial Setting – 400 dpi
SP2-109-4:	LD Initial Setting – 600 dpi

1. Set SP2-110 to 0 (for 400 dpi), or to 8 (for 600 dpi).
2. Do SP 2-109-8 to reset all the beam pitch data.
3. For SP2-109-1 input 144.
   NOTE: The entry “144” is only a starting reference value that will allow the machine to operate. It is only a starting point for adjustment.
4. Do SP2-109-3.
5. Print the test pattern onto A3 (11" x 17") paper using SP2-902-3 no.15. (☛ Section 5 Service Tables, 5.1.2 Test Pattern Printing (SP2-902).
6. On the test pattern write 144, the value of SP2-109-1.
7. Change the value of SP2-109-1 and then print another test pattern, repeating steps 2 to 6. Print about 5 patterns with different values for SP2-109-1 (e.g. 48, 96, 192, 240).
8. Check these test patterns. If the laser beam pitch is not correct, the image looks like a black vertical stripe pattern.
   NOTE: For example, if the pattern made with the value 192 has fewer obvious stripes than the other printouts, the correct value is near 192.
9. Fine adjustment: Do steps 2 to 6 to adjust the laser beam pitch position until thin lines are of uniform thickness (no stripes should appear on the printout).
   NOTE: In step 3, input a value estimated to be correct (e.g., if 192 was the closest, try 182), then do steps 4 and 5, then if necessary go back to step 2 and try another value.
10. After adjusting the laser beam pitch for 400 dpi, adjust it for 600 dpi, using the same procedure as for 400 dpi (use the SP modes for 600 dpi). Laser beam pitch for 600 dpi should be 24~48 more than for 400 dpi.



B004R552.WMF

Adjustment not complete

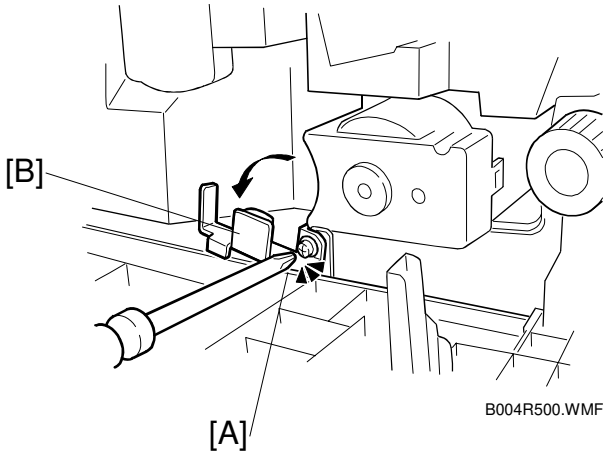


B004R553.WMF

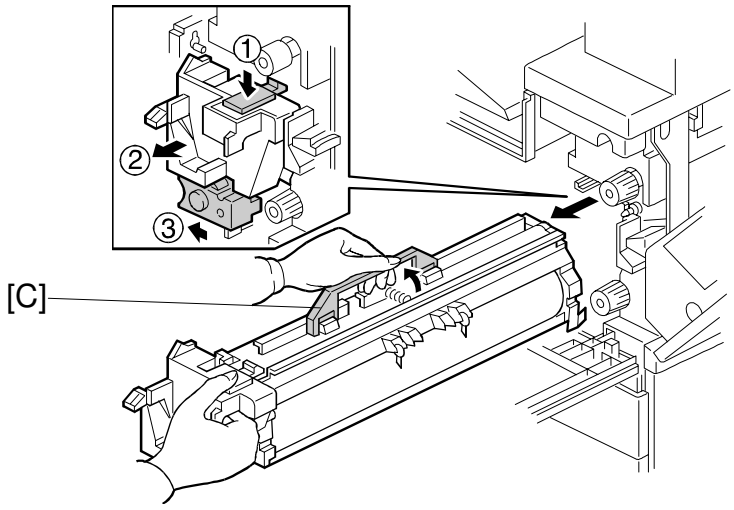
Adjustment complete

3.11 PHOTOCONDUCTOR UNIT (PCU)

3.11.1 PCU



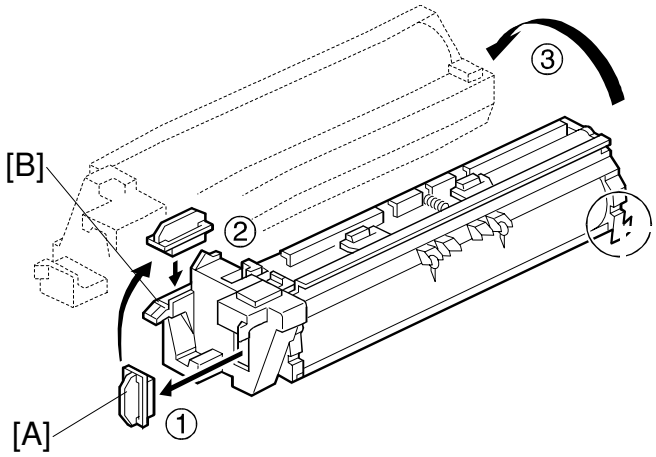
B004R500.WMF

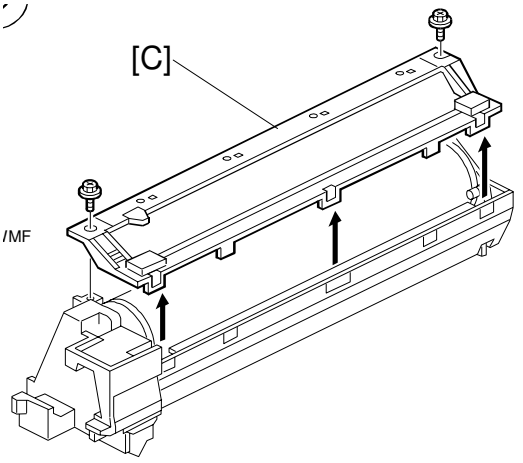


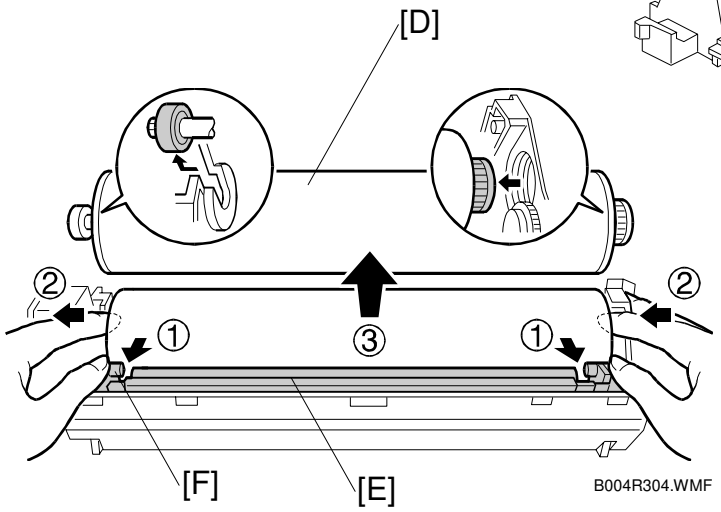
B004R301.WMF

1. Open the front door.
2. Lower the by-pass tray, open the duplex unit, and open the transfer unit right cover.
3. Loosen [A] (🔩 x1).
4. Rotate bracket [B] to the left.
5. Push the release lever ①, pull the PCU out slightly②, then push the development unit ③ to the left.
6. Grasp handle [C], and slowly pull the PCU out.
   NOTE: If the right cover is to be left open for a long time, cover the drum with paper, or remove the PCU and cover it with paper. This prevents exposing the drum to strong light. Before you re-install the PCU, align the brackets on the PCU with the rails above and make sure they are engaged before you slowly push the PCU into the machine.

3.11.2 DRUM

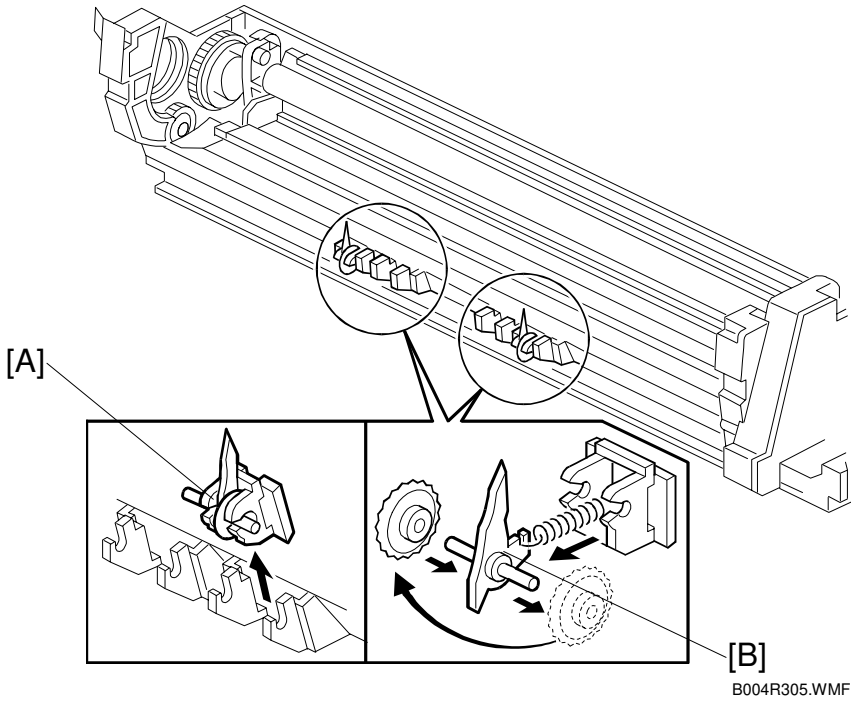






1. PCU (☛ 3.11.1)
2. Toner cap [A]
3. Insert cap [A] into the toner entrance hole [B].
4. Make sure that the cap is inserted completely into the hole.
5. Turn the PCU upside-down, and remove lower PCU cover [C] (☞ x2, 3 pawls).
6. Pull the drum [D] towards the front ② (the left side in the illustration) while releasing the charge roller [E] using the release lever ① [F], and then remove the drum ③.
   CAUTION: Never touch the drum surface with bare hands.
7. After replacing the drum, perform the ID sensor initial setting using SP3-001-2.
8. Do the process initial setting procedure (SP2-805).

3.11.3 PICK-OFF PAWLS



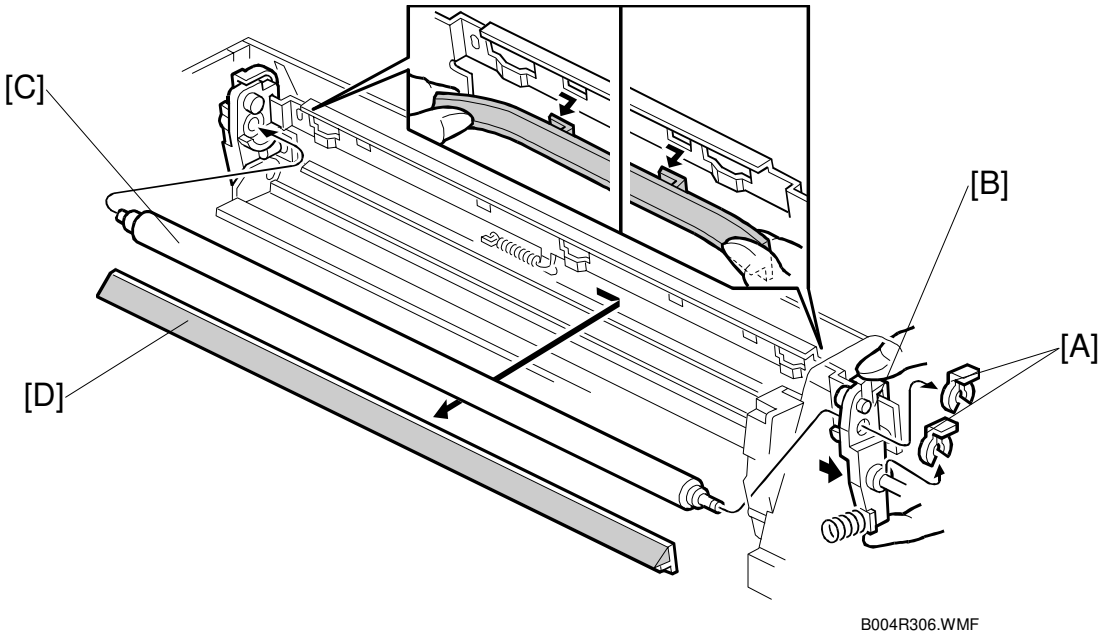
1. Remove the drum. (☛ 3.11.2)
2. Pawl assembly [A]
3. Pick-off pawl [B] (spring x1, spur x1)

Pick-off pawl position adjustment

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

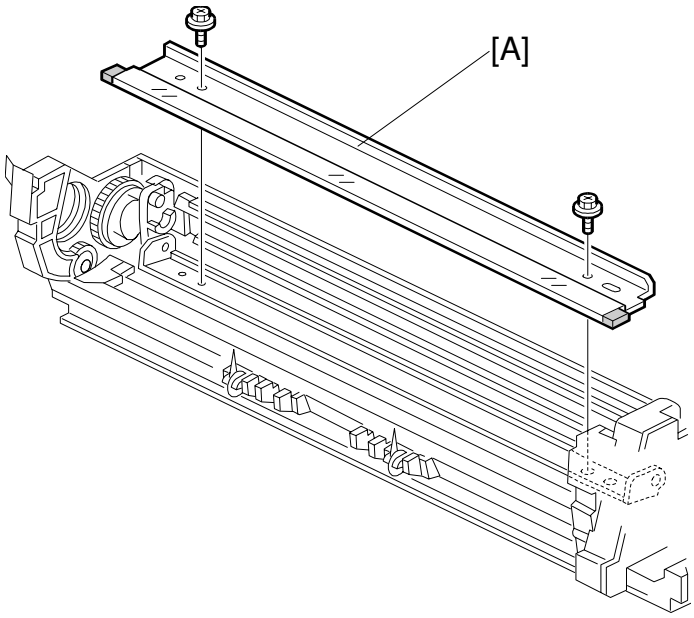
- Changing the spur position.
- Changing the pick-off pawl assembly position

3.11.4 CHARGE ROLLER/CHARGE ROLLER CLEANING PAD



1. Remove the drum. (☛ 3.11.2)
2. Two snap rings [A] (⟨⟩ x2)
3. Slide out front charge roller holder [B]
4. Charge roller [C]
   NOTE: Do not touch the charge roller.
5. Remove charge roller cleaning pad [D] (4 hooks)
6. After replacing the charge roller, check the value of SP2-001-1. If it is not at the standard value (1630V), set SP2-001-1 to –1630V.
   NOTE: If this is not done, the carrier will be attracted to the drum because the charge roller voltage will be too high.

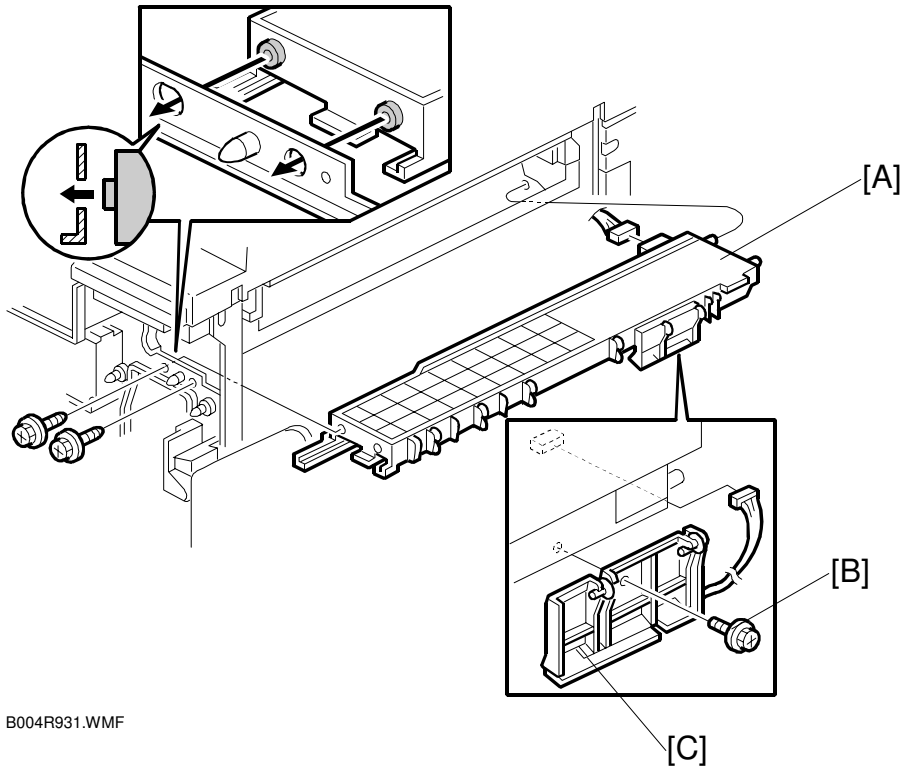
3.11.5 DRUM CLEANING BLADE



B004R307.WMF

1. Remove the drum. (☛ 3.11.2)
2. Remove the charge roller. (☛ 3.11.4)
3. Remove the drum cleaning blade [A] (☞ x2)

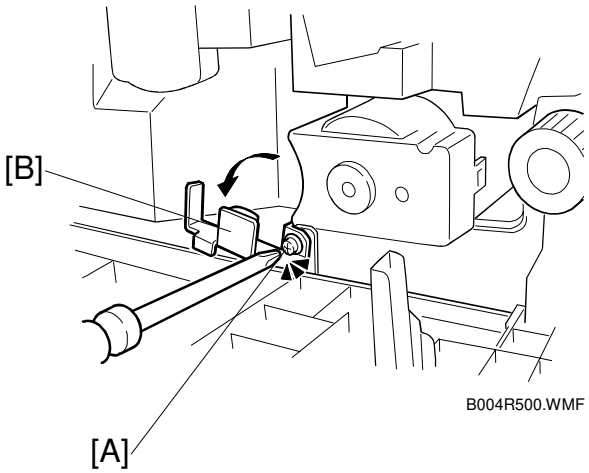
3.11.6 ID SENSOR



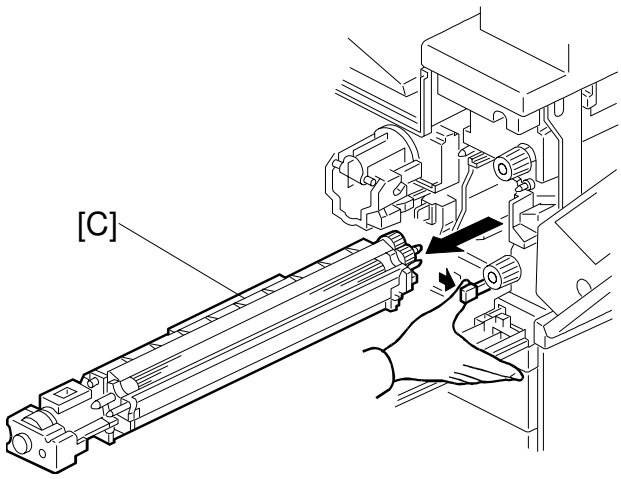
1. PCU (☛ 3.11.1)
2. Fusing unit (☛ 3.15.1)
3. Development unit (☛ 3.12.1)
4. Remove the PCU rail [A] (x2, x1)
5. Remove the ID sensor bracket [B] (x1, x1)
6. Remove the ID sensor [C] (x1)
7. Perform the ID sensor initial setting with SP3-001-2 (☛ Chapter 5, “Service Tables”)

3.12 DEVELOPMENT

3.12.1 DEVELOPMENT UNIT



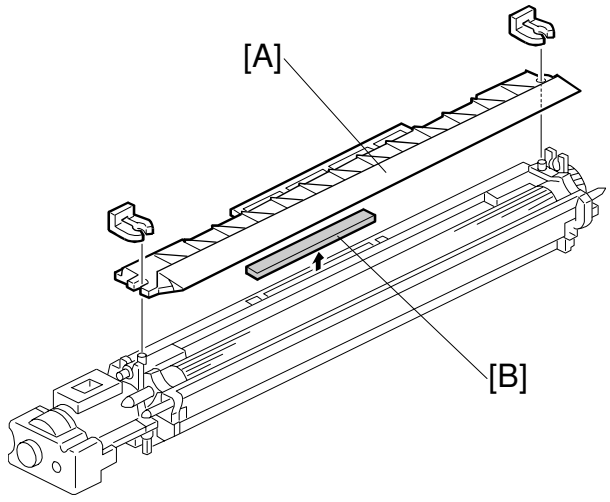
B004R500.WMF



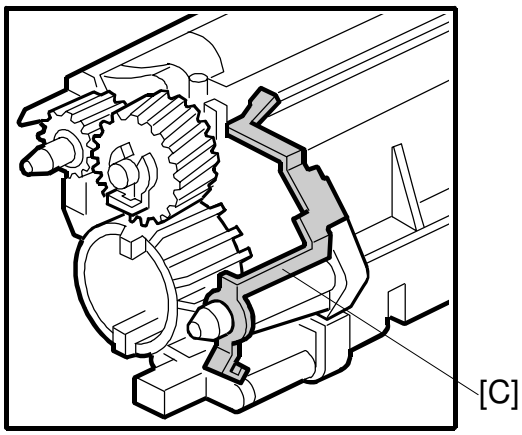
B004R401.WMF

1. Open the right upper cover and front cover.
2. PCU. (☛ 3.11.1)
   NOTE: Spread paper on a clean flat surface that is free of pins, paper clips, staples, screws or any other metal objects.
3. Loosen [A] (☞ x1)
4. Rotate bracket [B] left.
5. Development unit [C]
   NOTE: Pull slowly to avoid scratching or nicking the development roller.
6. Set the development unit on the spread paper.
7. If you are temporarily installing a used development unit for test purposes, perform SP2-220 and 2-802-1 after installation (☛ Chapter 5, “Service Tables)

3.12.2 DEVELOPMENT FILTER



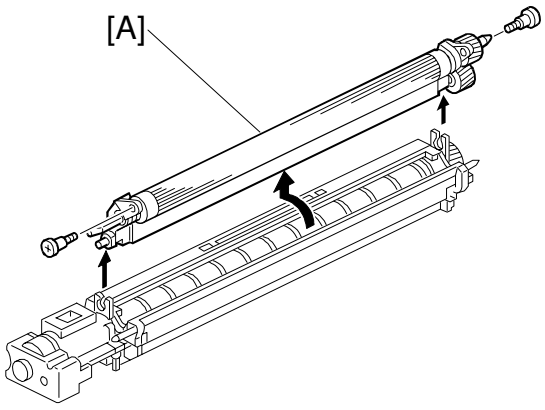
B004R402.WMF



B004R957.WMF

1. Development unit (☛ 3.12.1)
2. Upper development cover [A] (2 snap rings)
3. Development filter [B]
   NOTE: Make sure that the surface with the red mark is facing up.
4. Make sure that the ground plate [C] is positioned correctly.

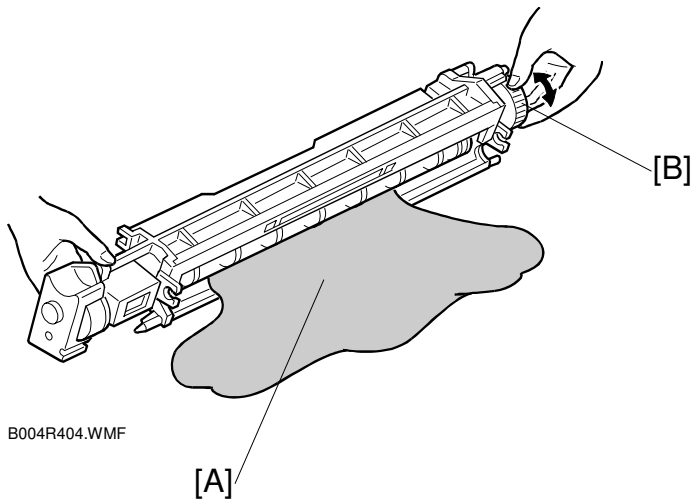
3.12.3 DEVELOPMENT ROLLER



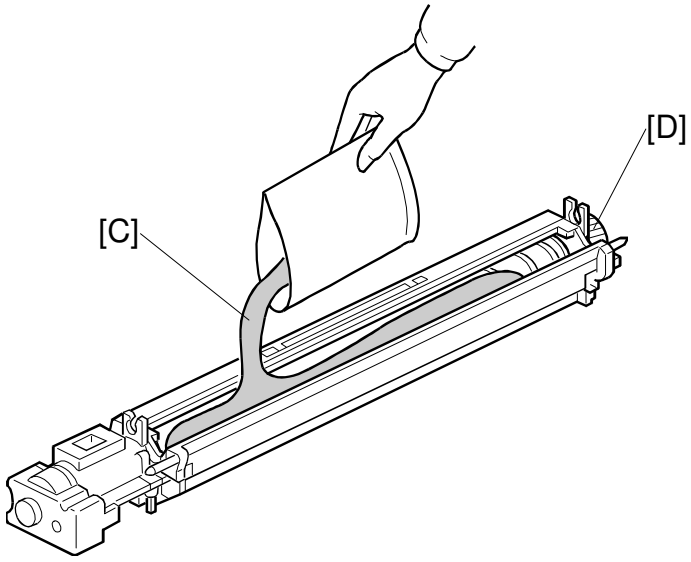
B004R106.WMF

1. Development unit (☛ 3.12.1)
2. Upper development cover (☛ 3.12.2)
3. Development roller [A] (x2)
   NOTE: Work carefully to avoid scratching or nicking the development roller.

3.12.4 DEVELOPER

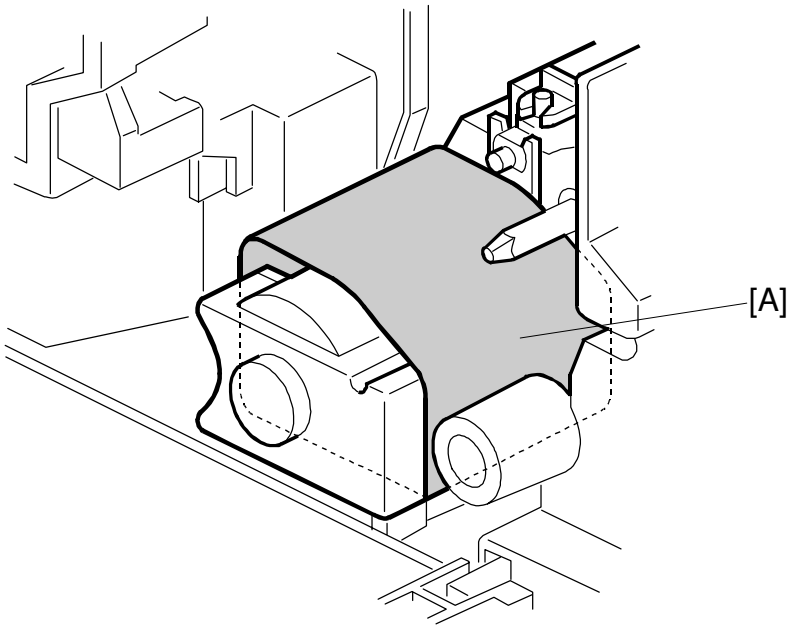


B004R404.WMF



B004R405.WMF

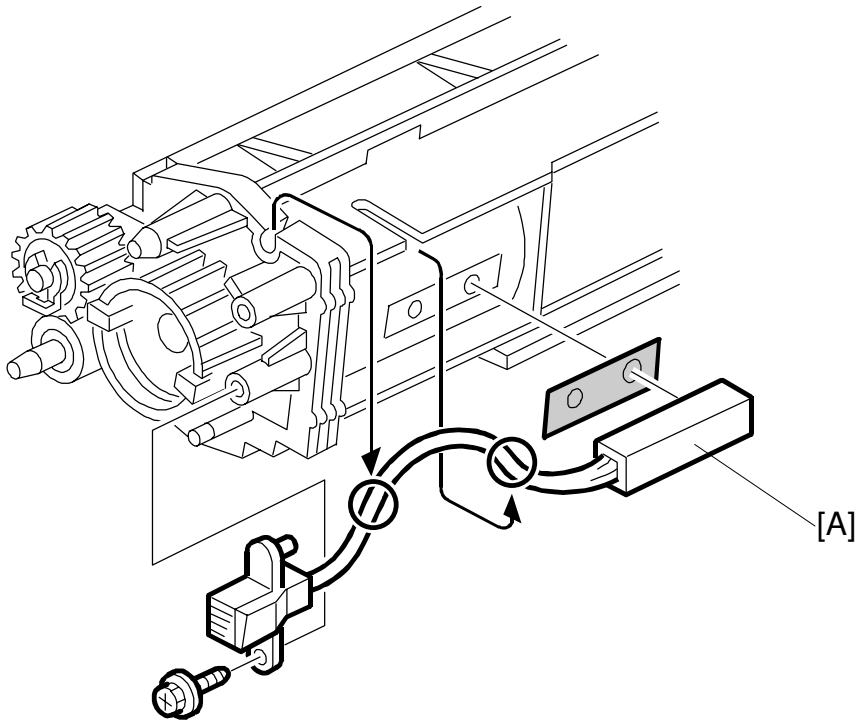
1. Development unit (☛ 3.12.1)
2. Remove the development roller (☛ 3.12.3)
3. Tip out the old developer [A].
4. Turn drive gear [B] to ensure that no developer remains in the unit or on the developer roller.
   NOTE: Dispose of the used developer in accordance with local regulations. Work carefully to avoid scratching or nicking the development roller.
5. Pour approximately 1/3 of the developer [C] evenly along the length of the development unit.
6. Rotate the drive gear [D] to work the developer into the unit. Repeat [C] and [D] until all toner is in the unit and level with the edges.



B004R518.WMF

7. Reassemble the development unit
8. Cover the toner entrance hole [A] with a piece of paper.
9. Install the development unit in the machine.
10. Turn on the main power switch, make sure that the machine has warmed up, then perform the TD sensor initial setting using SP 2-801.
    NOTE: When performing this setting, cover the toner entrance hole with a piece of paper. This prevents used toner falling from the PCU into the development unit during the TD sensor initial setting and interfering with the Vref setting (toner density reference voltage).
11. After performing the TD sensor initial setting, remove the sheet [A] from the development unit.

3.12.5 TD SENSOR

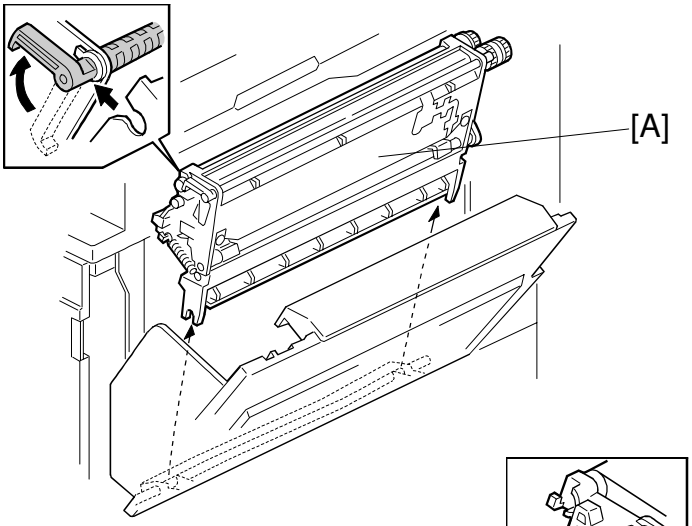


B004R975.WMF

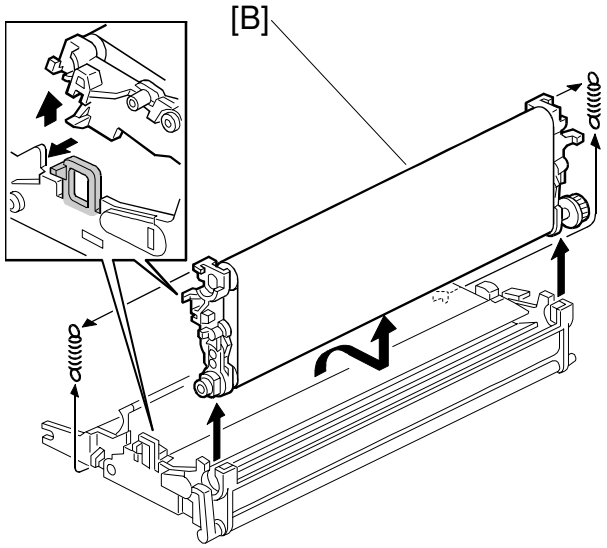
1. Remove the development unit (☛ 3.12.1)
2. Empty all developer from the development unit (☛ 3.12.4)
3. TD sensor [A] (🔩 x1)
   NOTE: The TD sensor is attached to the casing with double-sided tape. Pry it off with the flat head of a screwdriver. Use fresh double-sided tape to re-attach the sensor.
4. Pour new developer into the development unit and perform the TD sensor initial setting using SP2-801.
   NOTE: When performing the TD sensor initial setting, cover the toner entrance hole with a piece of paper (☛ 3.12.4).

3.13 TRANSFER UNIT

3.13.1 TRANSFER BELT UNIT



B004R501.WMF

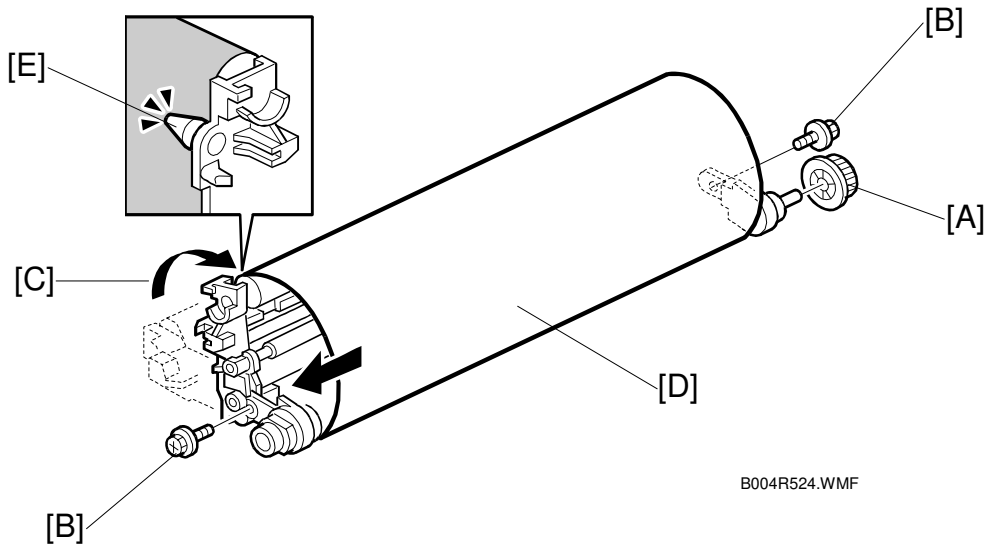


B004R522.WMF

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

1. Lower the by-pass tray, open the duplex unit, and open the right cover.
2. Transfer unit [A] (1 hook)
3. Transfer belt [B] (springs x2, 1 hook)
   NOTE: Avoid touching the transfer belt surface.

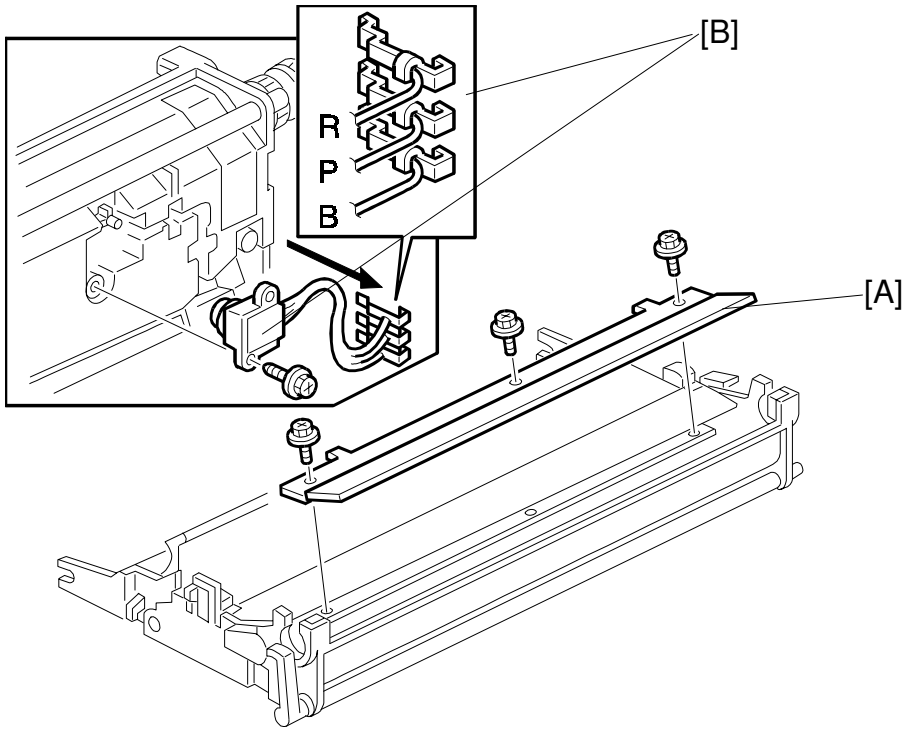
3.13.2 TRANSFER BELT



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

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

3.13.3 TRANSFER BELT CLEANING BLADE AND TONER OVERFLOW SENSOR



B004R523.WMF

Transfer Belt Cleaning Blade

1. Transfer belt unit. (☛ 3.13.1)
2. Transfer belt. (☛ 3.13.2)
3. Transfer belt cleaning blade [A] (x3)
   NOTE: Avoid touching the edge of the new blade. Check the new blade for dust or damage.

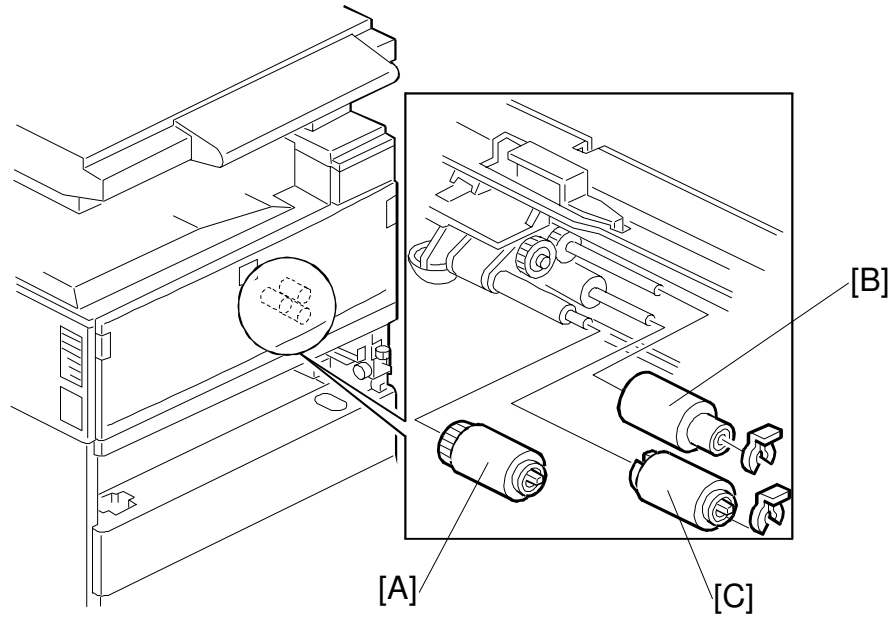
Toner Overflow Sensor

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

NOTE: Re-install the color-coded wires in the correct order. (R: Red, P: Purple, B: Blue)

3.14 PAPER FEED

3.14.1 PICK-UP, SEPARATION, AND FEED ROLLERS

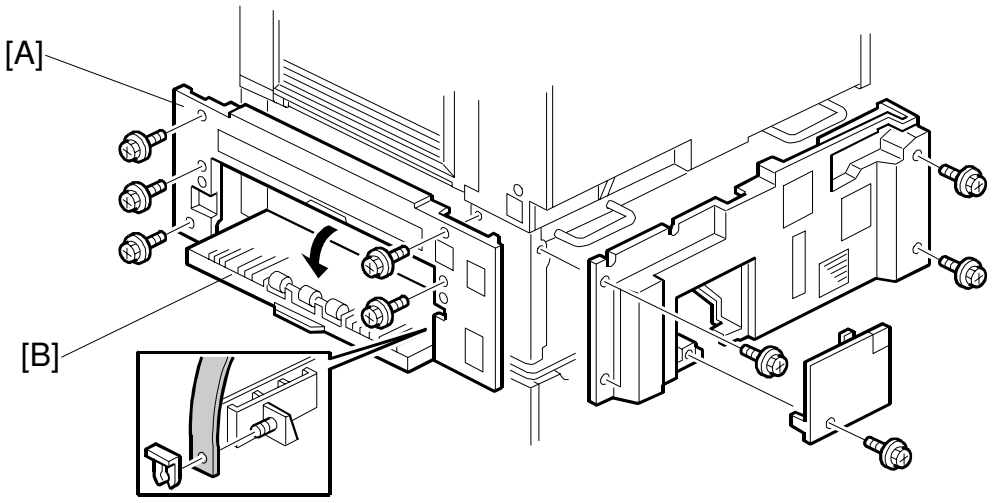


B004R918.WMF

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

NOTE: Do not touch the roller surface with bare hands. After installing the new rollers, do SP 7-816 for the appropriate paper tray.

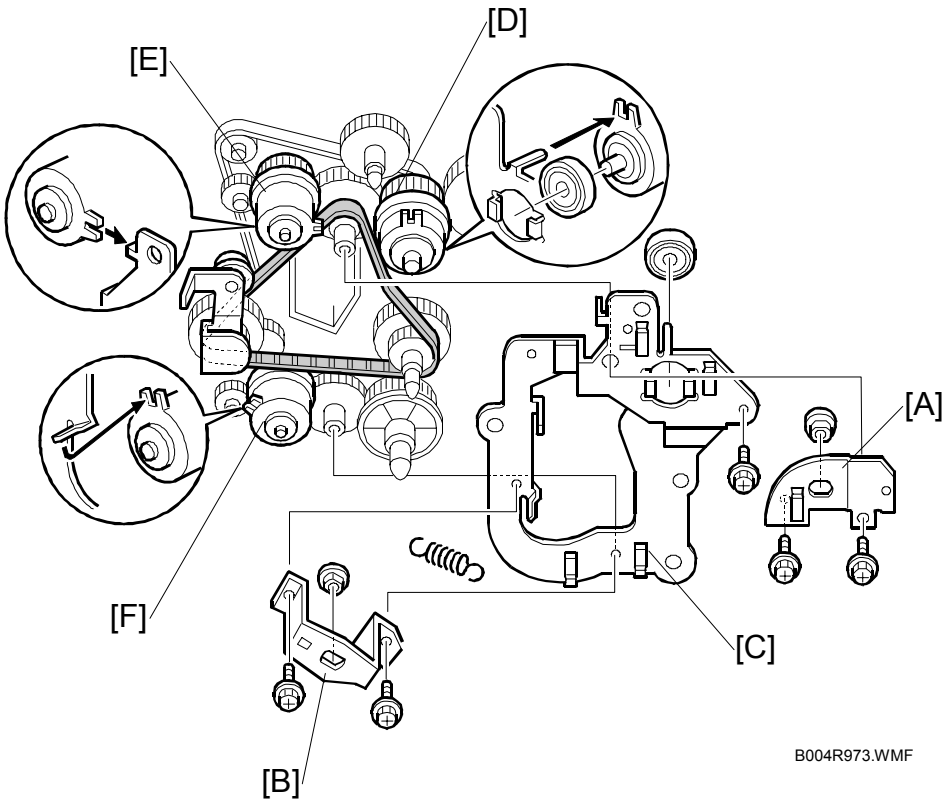
3.14.2 LOWER RIGHT COVER



B004R904.WMF

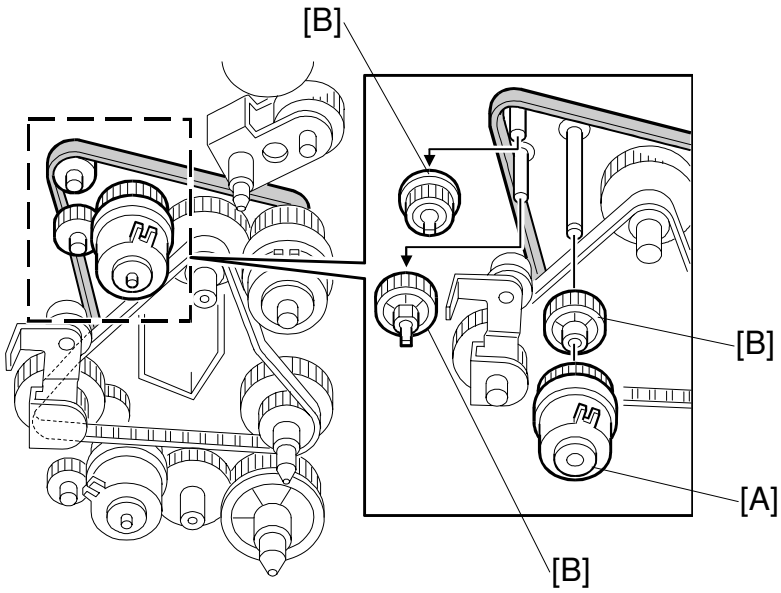
1. Duplex unit (☛ 3.4)
2. By-pass tray (☛ 3.6)
3. LCT (if installed)
4. Lower right cover [A] (x5)
5. Vertical transport cover [B]
   NOTE: Push the cover completely to the left and then press in on the right tab to release the peg from the hole.

3.14.3 RELAY/UPPER PAPER FEED AND LOWER PAPER FEED CLUTCHES

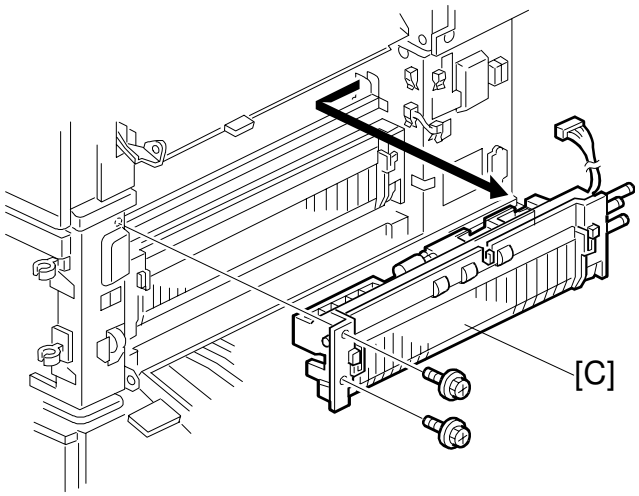


1. Rear lower cover (☛ 3.7.2)
2. First paper feed clutch bracket [A] (🔩 x2, bushing x1)
3. Second paper feed clutch bracket [B] (🔩 x2, bushing x1)
4. Drive bracket [C] (🔩 x1, spring x1, bearing x1)
5. Relay clutch [D] (✋ x1)
6. Upper paper feed clutch [E] (✋ x1)
7. Lower paper feed clutch [F] (✋ x1)

3.14.4 UPPER PAPER FEED UNIT FOR TRAY 1



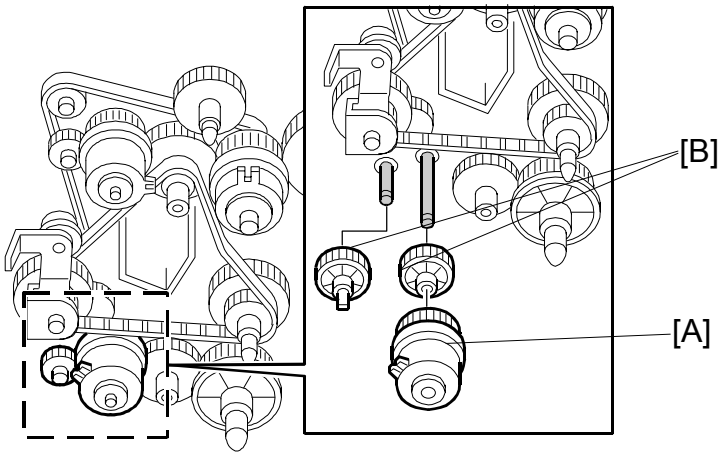
B004R910.WMF



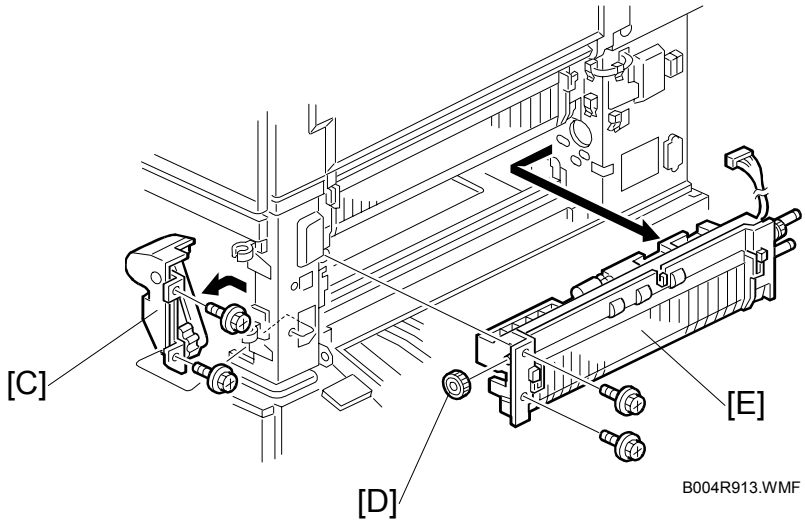
B004R911.WMF

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

3.14.5 LOWER PAPER FEED UNIT FOR TRAY 2



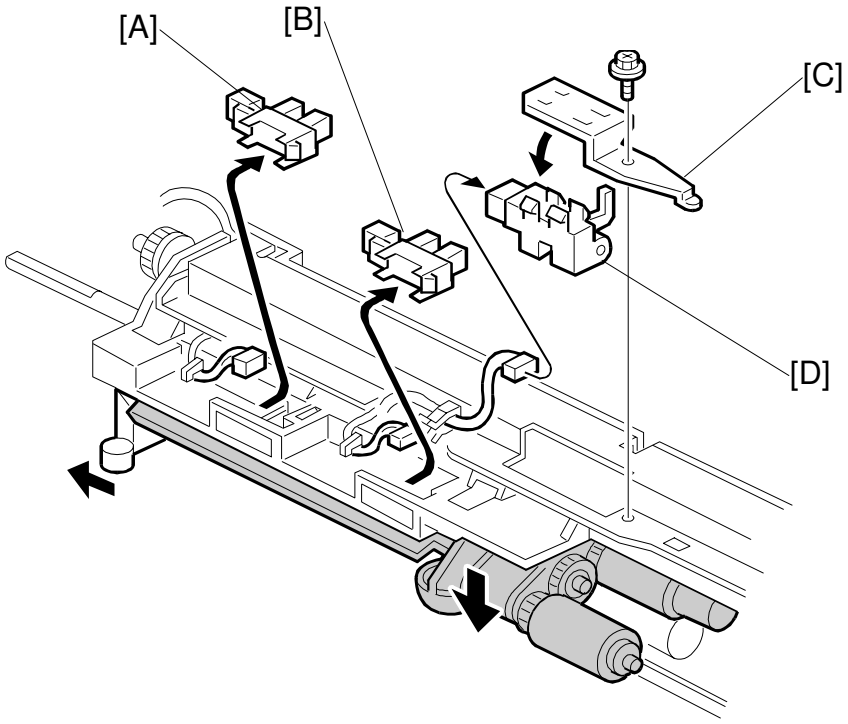
B004R974.WMF



B004R913.WMF

1. Lower the paper trays
2. Right lower cover (☛ 3.14.2)
3. Remove the lower paper feed clutch [A] (☛ 3.14.3)
4. Relay gears [B] (x3)
5. Cover [C] (x2)
6. Gear [D] (x1)
7. Lower paper feed unit [E] (x2, x1)

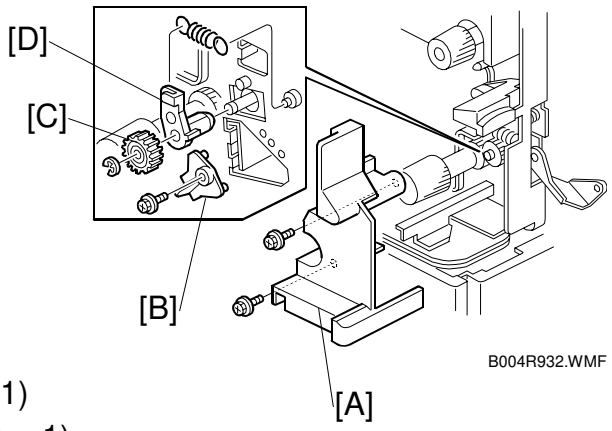
3.14.6 PAPER END/PAPER HEIGHT/RELAY SENSORS



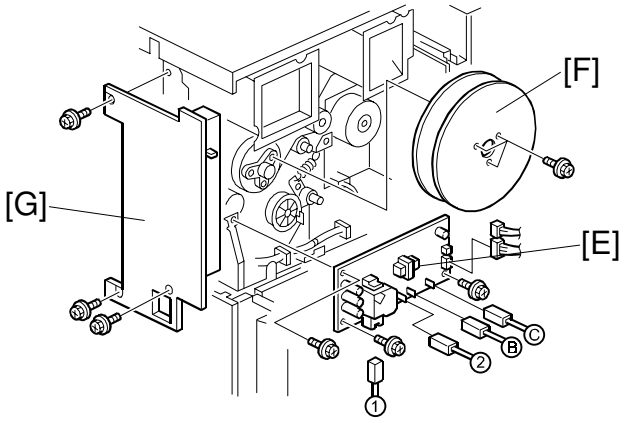
1. Appropriate paper feed unit (☛ 3.14.4, 3.14.5)
2. Paper height sensor [A] (x1)
3. Paper end sensor [B] (x1).
4. Relay sensor bracket [C] (x1, x1)
5. Relay sensor [D]

3.14.7 REGISTRATION SENSOR

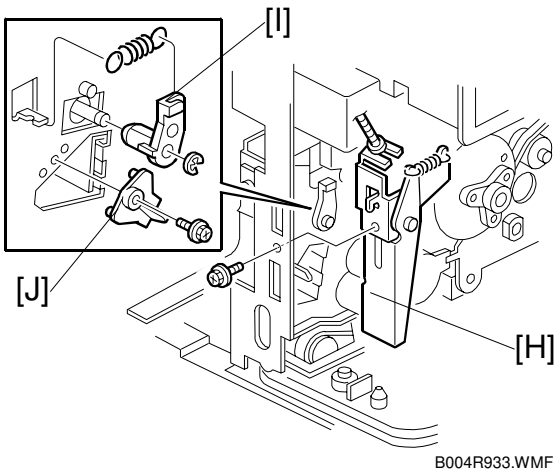
1. Front door (☛ 3-3)
2. Rear upper cover (☛ 3.7.1)
3. Right door and transfer belt unit (☛3.5, 3.13.1
4. PCU (☛ 3.11.1)
5. Development unit (☛ 3.12.1)
6. Inner cover [A] (☞ x2)
7. Front registration holder [B] (☞ x1)
8. Front registration roller gear [C] (ℂ x1)
9. Registration roller bushing [D] (spring x 1)

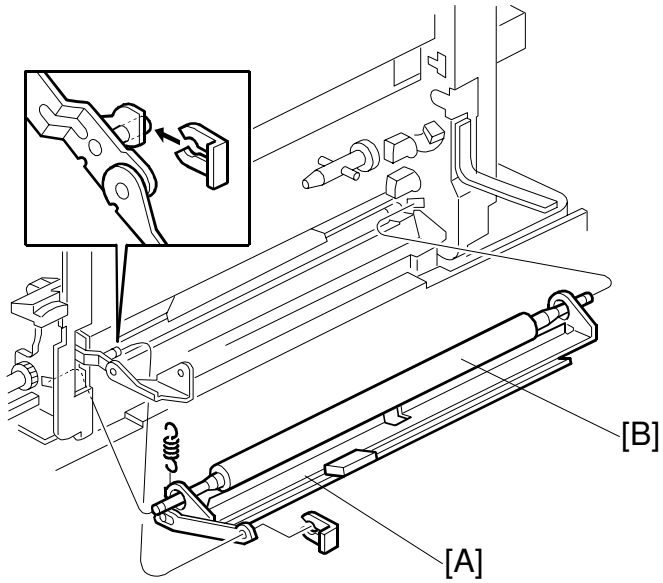


10. High voltage power supply board [E] (☞ x3, ☞ x6)
11. Flywheel [F] (☞ x3)
12. Right rear cover [G] (☞ x3)

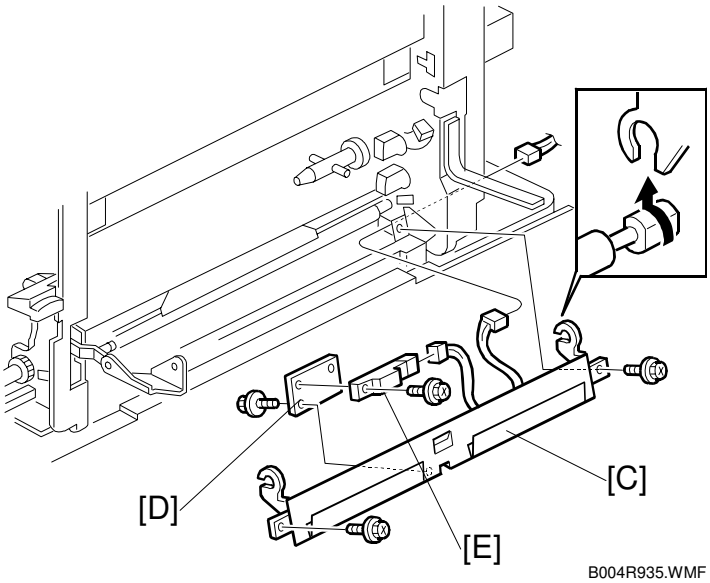


13. Right cover switch bracket [H] (☞ x1)
14. Rear registration holder [I] (☞ x1)
15. Registration roller bushing [J] (ℂ x1, spring x1)





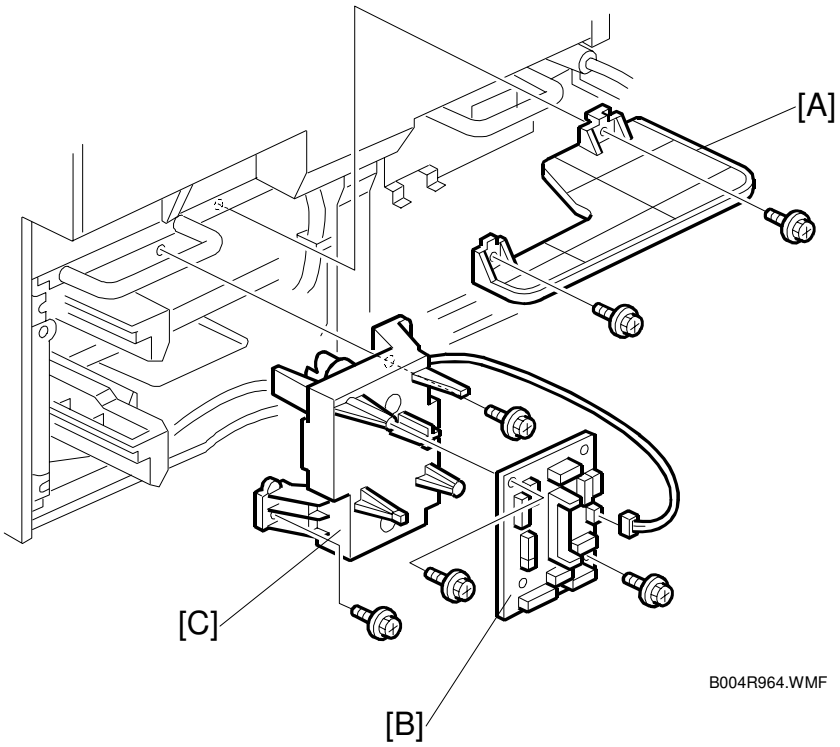
B004R934.WMF



B004R935.WMF

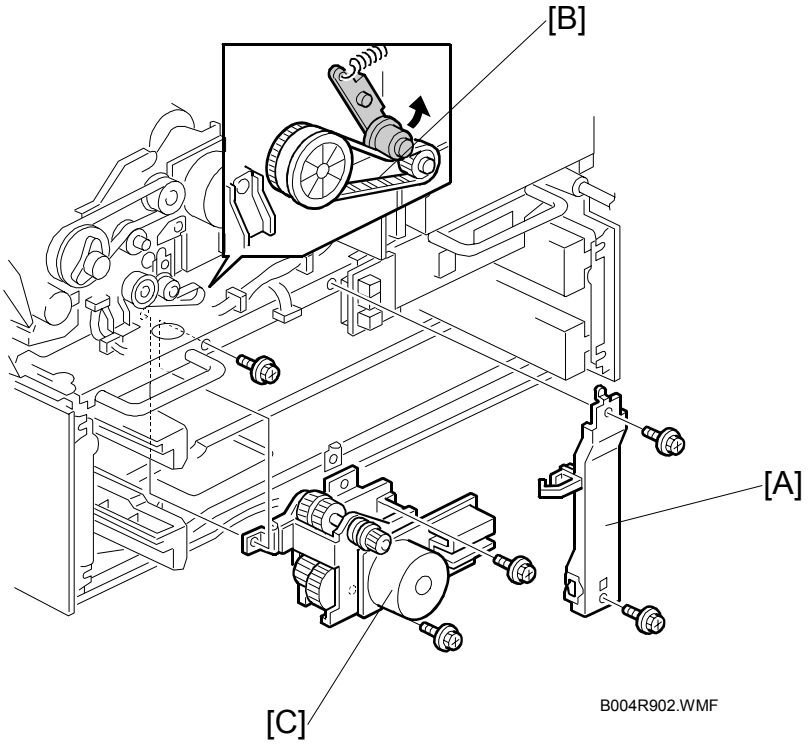
16. Guide plate [A] and registration roller [B] (spring x1, x 1)
17. Registration guide plate [C] (x2, x1)
18. Sensor bracket [D] (x1)
19. Registration sensor [E] (x1, x1)

3.14.8 TRAY LIFT MOTOR



1. Rear lower cover (☛ 3.7.2)
2. Bracket [A] (x2)
3. Motor control board [B] (x2, x13)
4. Tray lift motor [C] (x2)

3.14.9 FEED/DEVELOPMENT MOTOR

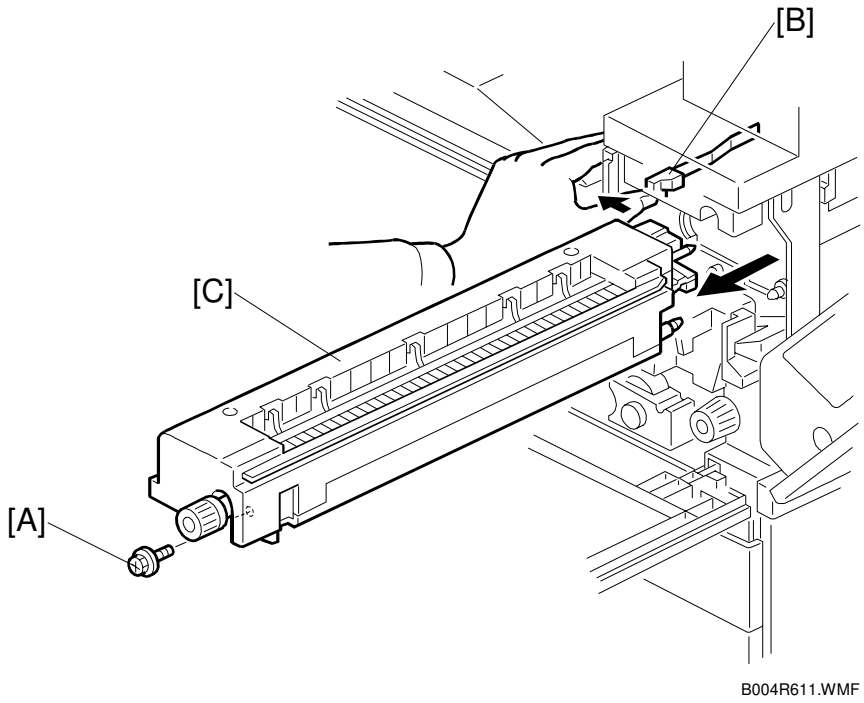


1. Rear lower cover (☞ x4) (☛3.7.2)
2. Rear upper cover (☞ x4) (☛3.7.1)
3. Tray lift motor (☛ 3.14.8)
4. Support [A] (☞ x2, harnesses x2)
5. Timing belt [B] (Raise arm to release tension on belt.)
6. Feed/development motor [C] (☞ x3, ☜ x2)

3.15 FUSING

3.15.1 FUSING UNIT

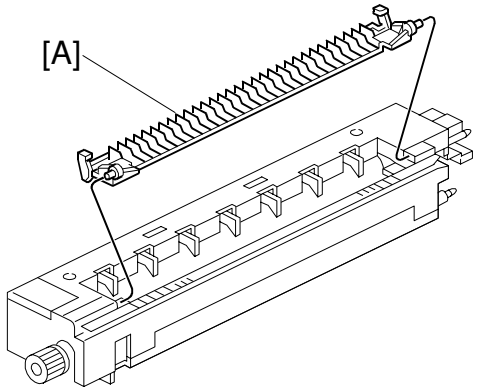
⚠CAUTION
Allow time for the unit to cool before doing the following procedure.



B004R611.WMF

1. Open the front door, duplex unit, and right door.
2. Set screw [A] (x1)
3. Fusing unit release lever [B]
4. Slide out the fusing unit [C]
   NOTE: After removing the fusing unit, close the right cover.

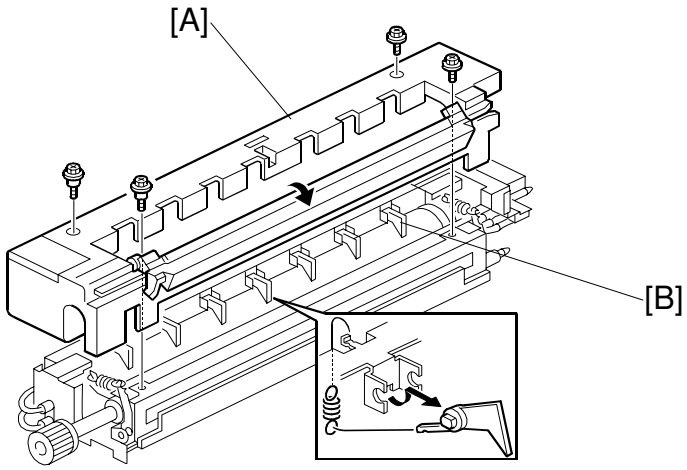
3.15.2 FUSING UNIT EXIT GUIDE



B004R601.WMF

1. Fusing unit (☛ 3.15.1)
2. Exit guide [A]
   NOTE: Press the guide to the left and then press on the right end to release the peg from the hole.

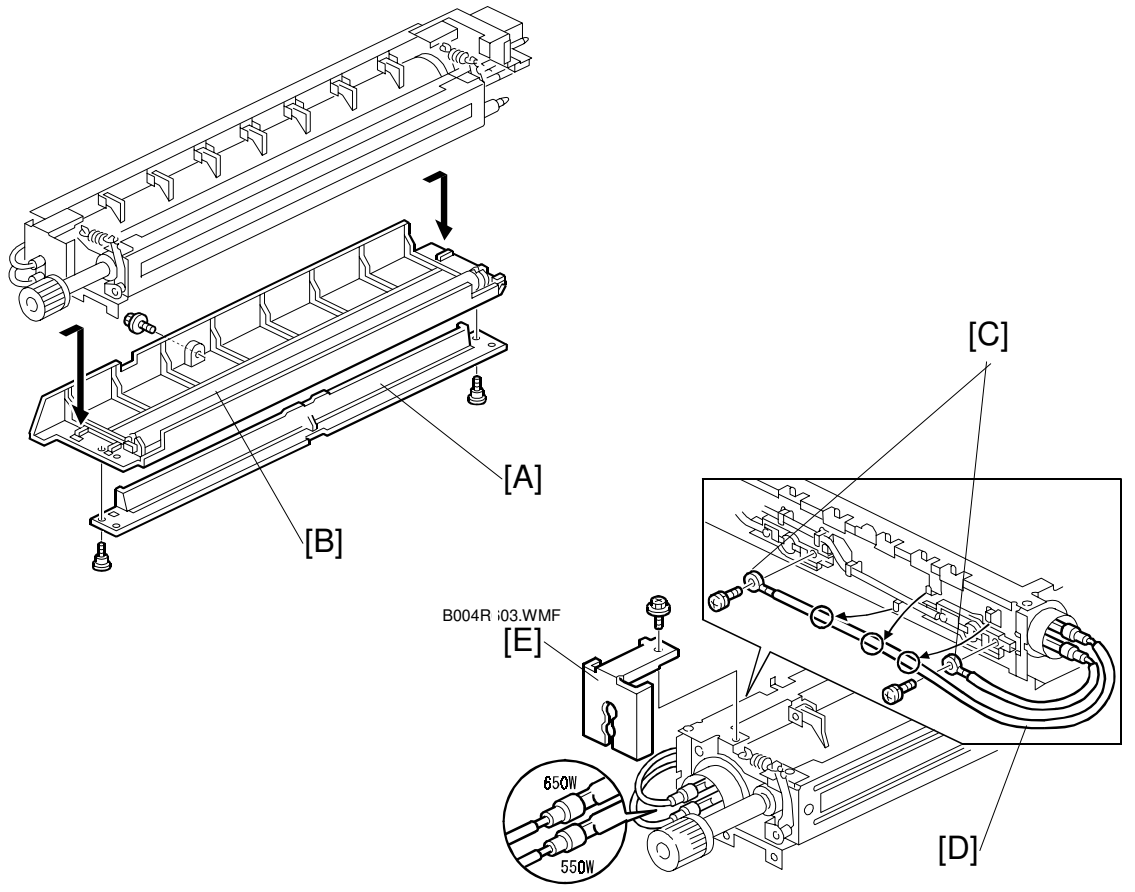
3.15.3 HOT ROLLER STRIPPERS



B004R602.WMF

1. Fusing unit (☛ 3.15.1)
2. Fusing unit cover [A] (🔩 x4)
   NOTE: Note the positioning of the step screws x2 and the set screws x2.
3. Hot roller strippers x7, springs x7

3.15.4 FUSING LAMPS

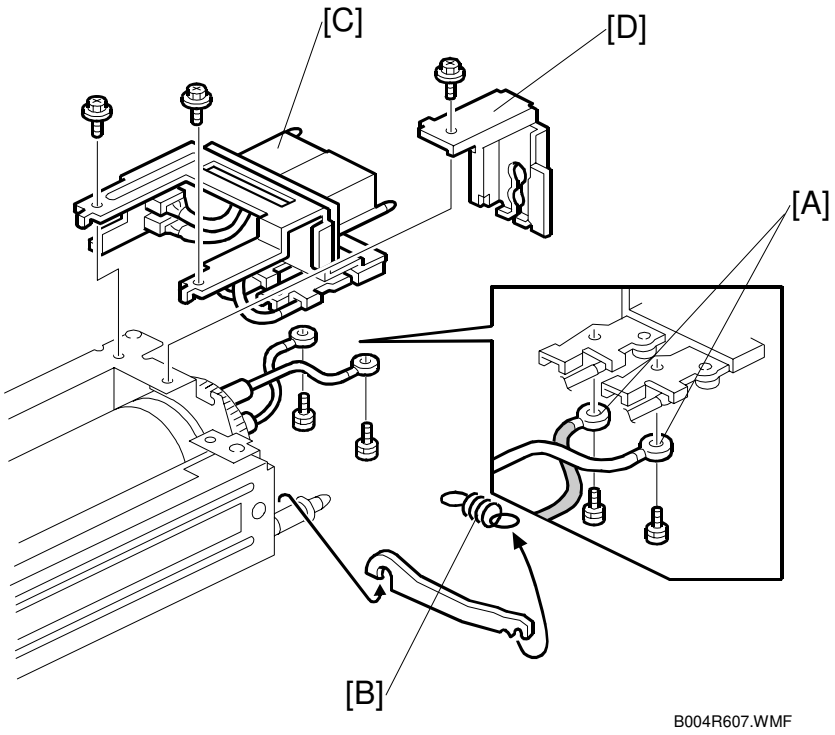


B004R606.WMF

1. Fusing unit (☛ 3.15.1)
2. Fusing unit cover (☛ 3.15.3)
3. Fusing entrance guide [A] (☞ x2)
4. Lower cover [B] (☞ x1)

Left side

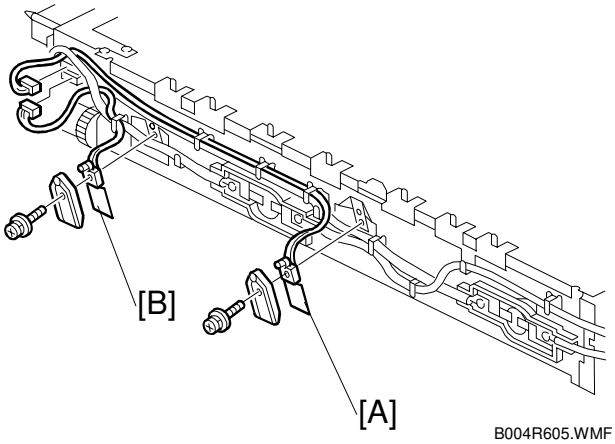
5. Two terminals [C] (☞ x2)
6. Center fusing lamp lead [D] (3 clamps)
7. Bracket [E] (☞ x1)

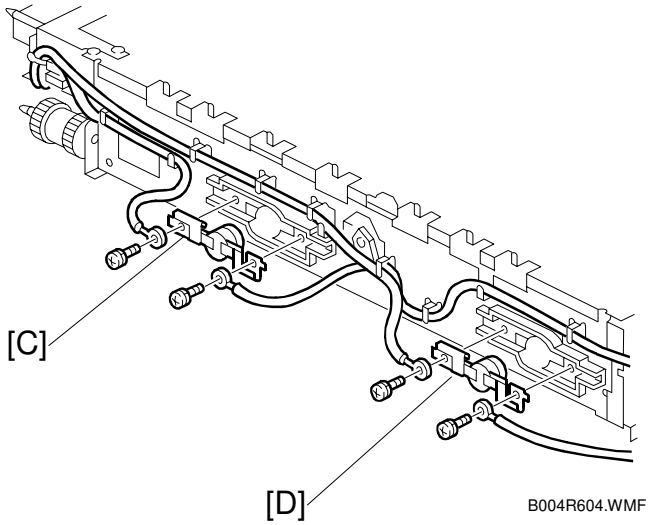


– Right side –

1. Two terminals [A] (☞ x2)
2. Spring [B]
3. Connector bracket [C] (☞ x2)
4. Bracket [D] (☞ x2)
   NOTE: To avoid breaking the fusing lamps, handle them with care. Avoid touching the lamps with your fingers. Note the top/bottom positioning of the fusing lamps as you remove them. The sizes of the holes in the holder match the sizes of the ends of the 650 W lamp (red) and 550 W lamp (brown).
5. Remove both fusing lamps.

3.15.5 THERMISTORS AND THERMOSTATS



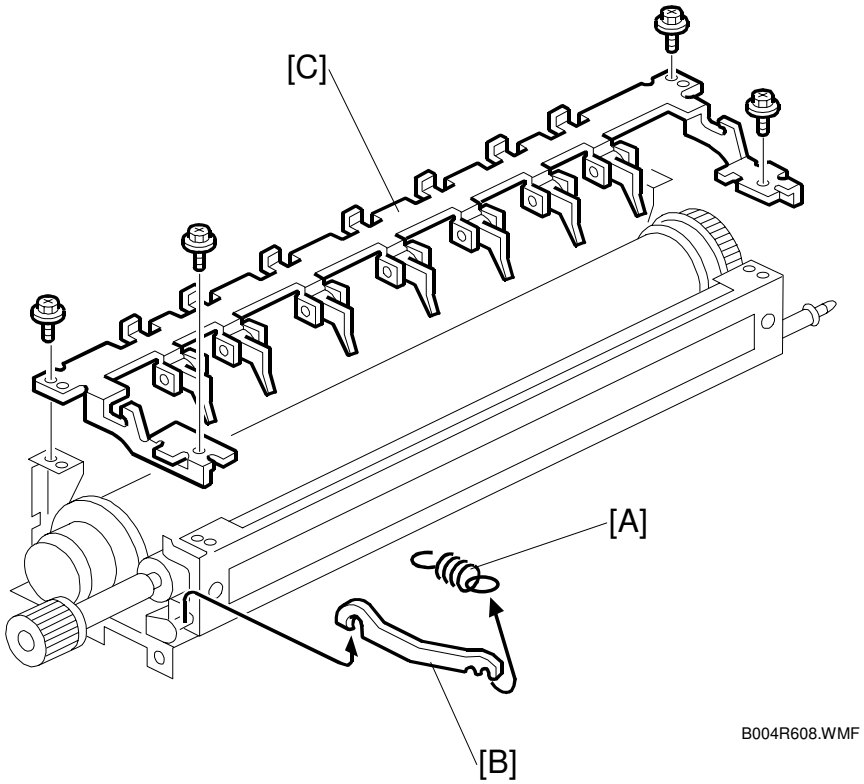


1. Fusing unit (☛ 3.15.1)
2. Fusing upper and lower cover. (☛ 3.15.3, 3.15.4)
3. Center thermistor [A] (x1, x1, holder x1)
4. End thermistor [B] (x1, x1, holder x1)

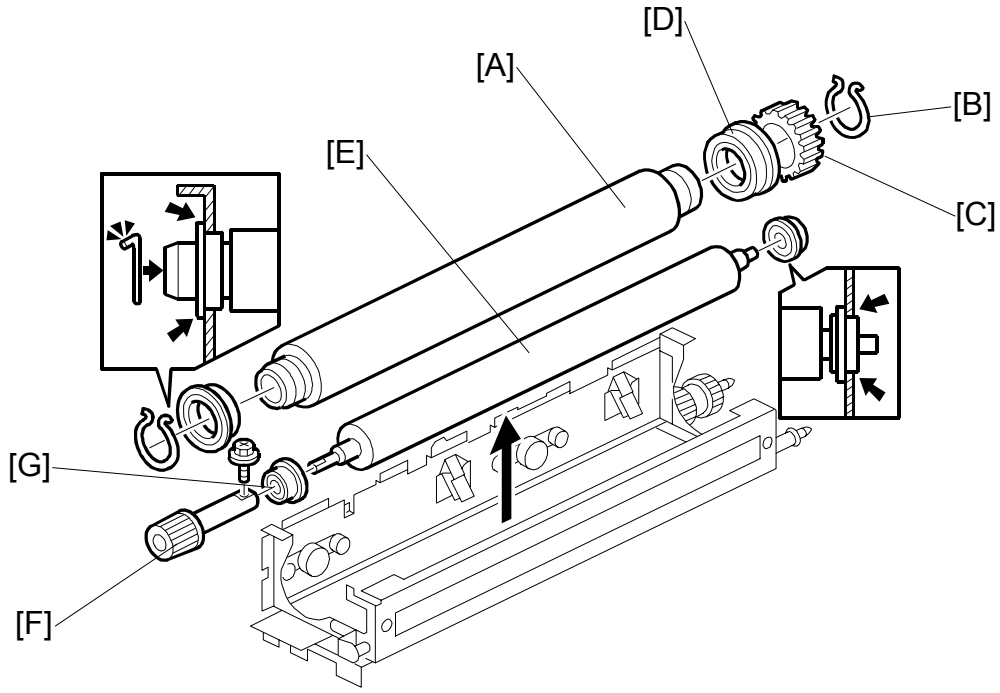
CAUTION: The thermistors are thinly coated and extremely fragile. Handle with care to avoid damaging them. They should be replaced every 150K.

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

3.15.6 HOT ROLLER/PRESSURE ROLLER



1. Fusing unit (☛ 3.15.1)
2. Fusing upper and lower cover. (☛ 3.15.3, 3.15.4)
3. Fusing lamp. (☛ 3.15.4)
4. Springs x2 [A] (both sides)
5. Arms x2 [B] (both sides)
6. Pawl bracket [C] (🔩 x4)



7. Hot roller [A]

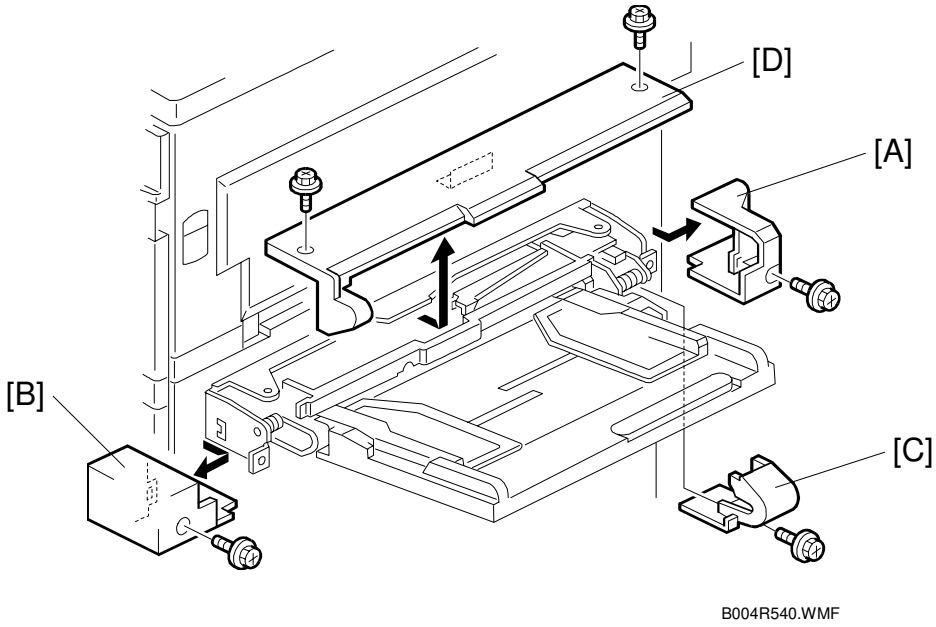
   CAUTION: The hot roller is easily damaged. Always handle it carefully.

8. C-rings x2 [B] (both ends)
9. Drive gear [C]
10. Bushings x2 [D] (both ends)
11. Pressure roller [E]
12. Fusing knob [F] (🔩 x1)
13. Bushings x2 [G] (both ends)

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

3.16 BY-PASS TRAY

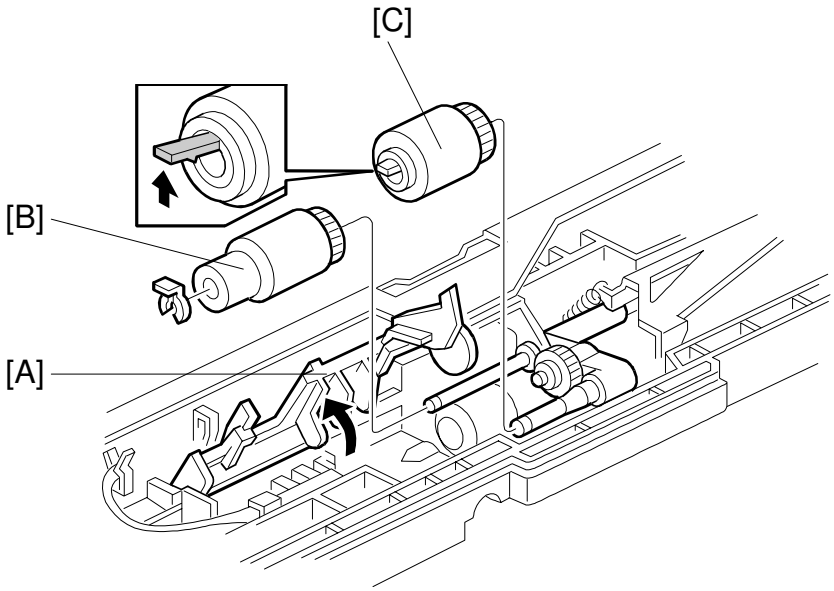
3.16.1 COVER REPLACEMENT



B004R540.WMF

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

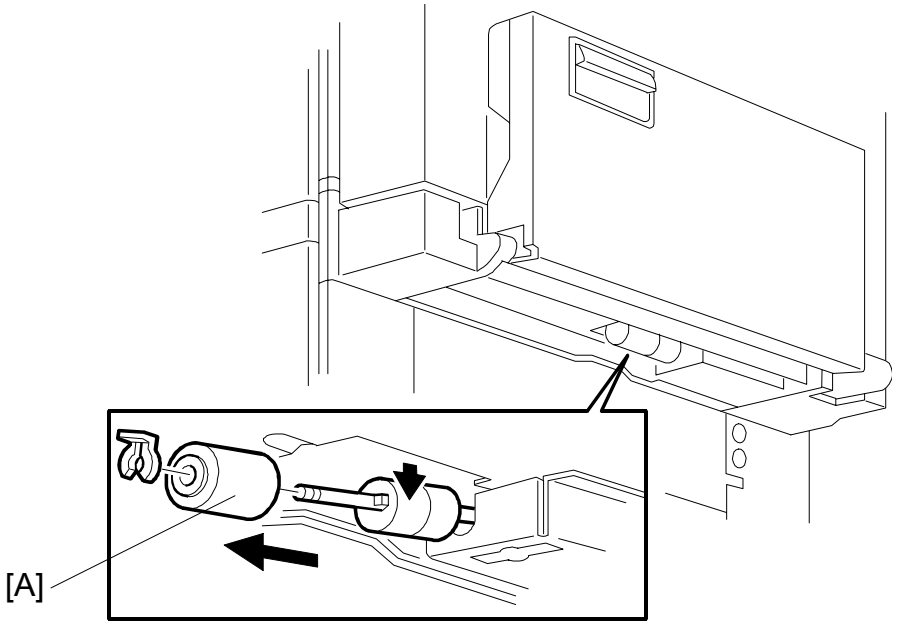
3.16.2 BY-PASS PAPER FEED AND PICK-UP ROLLER REPLACEMENT



B004R541.WMF

1. Upper cover (☛ 3.16.1)
2. Lift up paper end feeler [A] to lock feeler in position.
   NOTE: Before reinstalling the upper cover, return the paper end feeler to its original position.
3. Replace the paper feed roller [B] (⟲ x1)
4. Replace the pick-up roller [C].

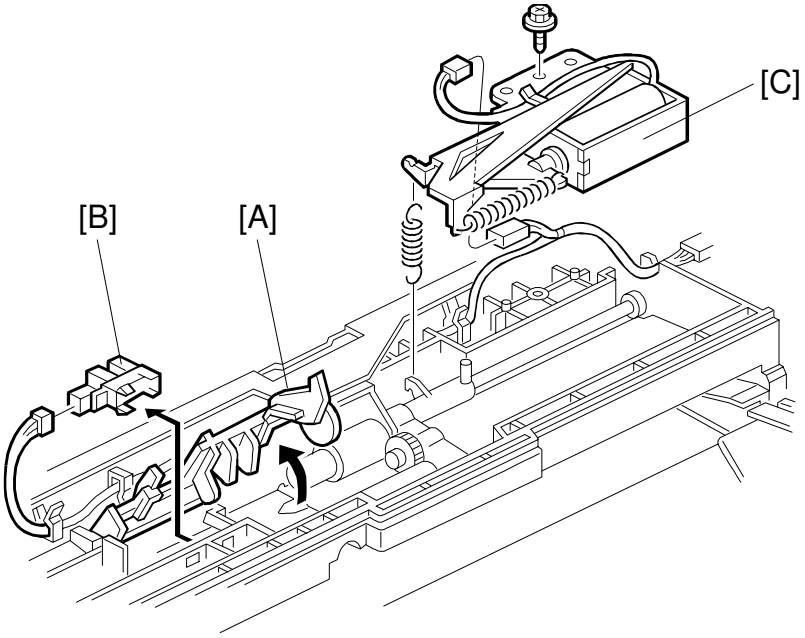
3.16.3 BY-PASS SEPARATION ROLLER REPLACEMENT



B004R542.WMF

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

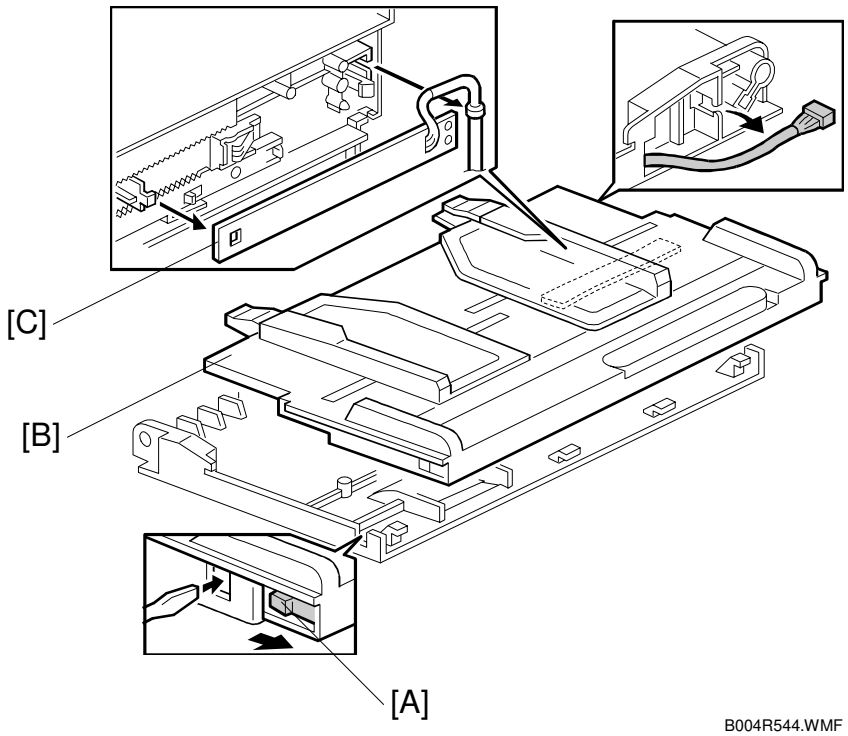
3.16.4 PAPER END SENSOR AND PICK-UP SOLENOID REPLACEMENT



B004R543.WMF

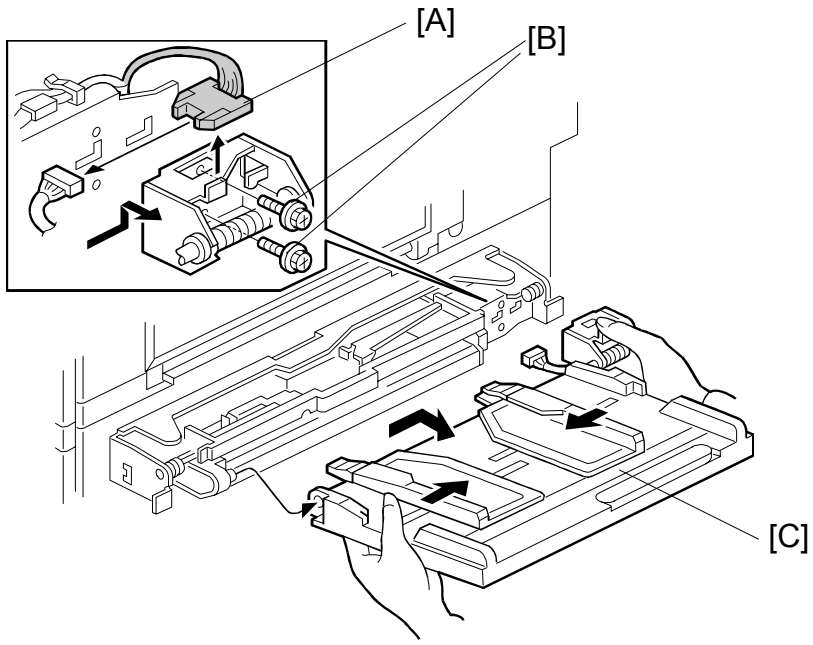
1. Upper cover (☛ 3.16.1)
2. Lift paper end feeler [A].
   NOTE: Before reinstalling the upper cover, return the paper end feeler to its original position.
3. Replace the paper end sensor [B] (x1).
4. Pick-up solenoid [C] (x1, x1) x1, spring x1).

3.16.5 PAPER SIZE SENSOR BOARD REPLACEMENT



1. Hook [A]
2. Paper tray [B] (☞ x1).
3. Size sensor board [C].
   NOTE: To avoid breaking the hook of the paper size sensor board, handle it carefully during removal.

3.16.6 BY-PASS TABLE REMOVAL



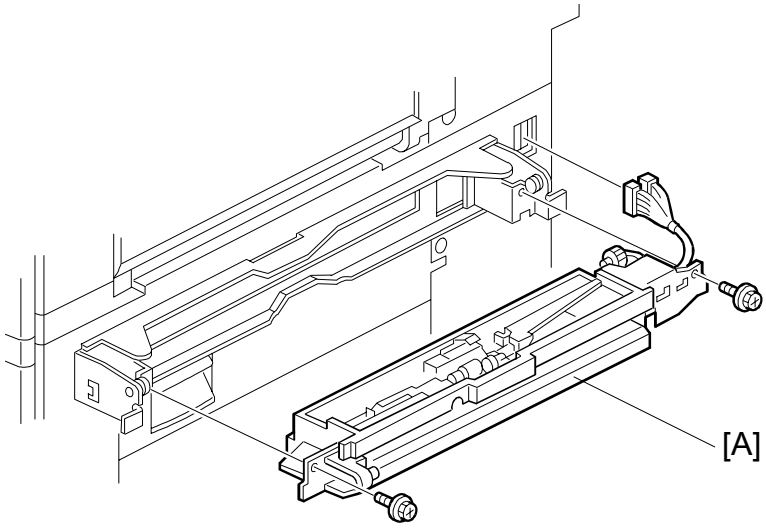
B004R505.WMF

Note: To remove the entire by-pass tray unit, and not just the table, ☛ 3.6

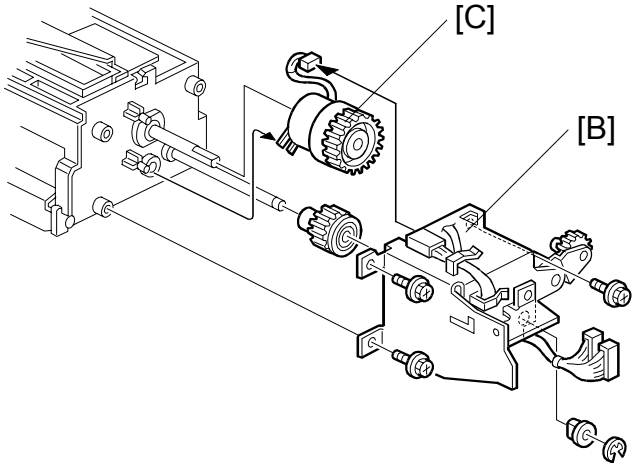
1. Hinge cover (☛ 3.16.1)
2. Harness [A] (x1).
3. Screws [B] (x2)
4. By-pass table [C].

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

3.16.7 PAPER FEED CLUTCH REPLACEMENT



B004R546.WMF

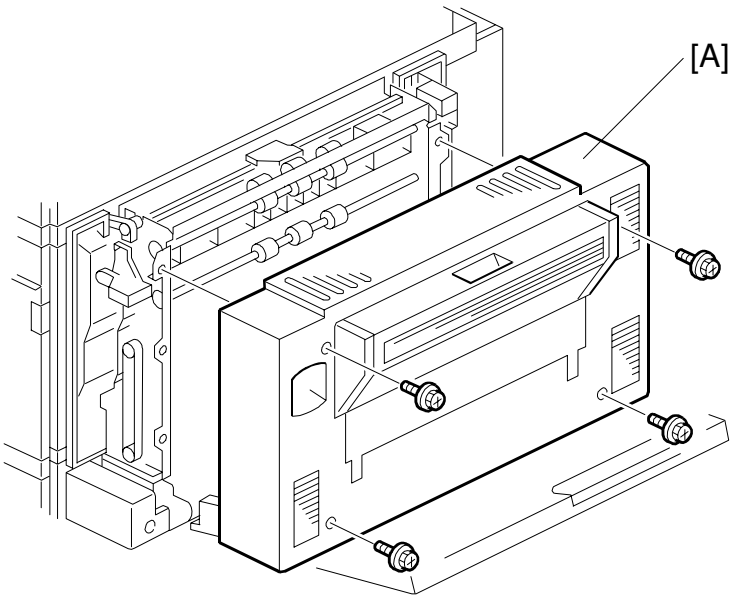


B004R547.WMF

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

3.17 DUPLEX UNIT

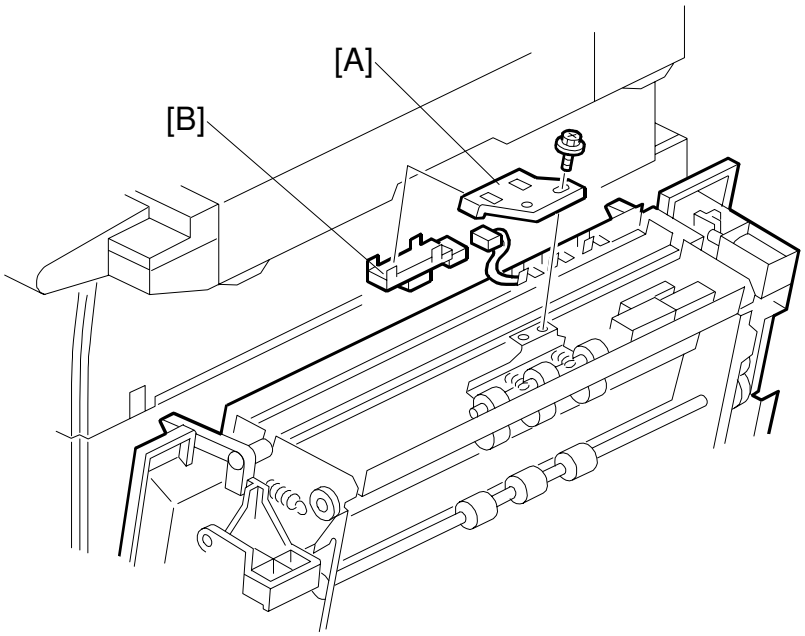
3.17.1 DUPLEX COVER REMOVAL



B363R101.WMF

1. Duplex unit cover [A] (🔩 x4)

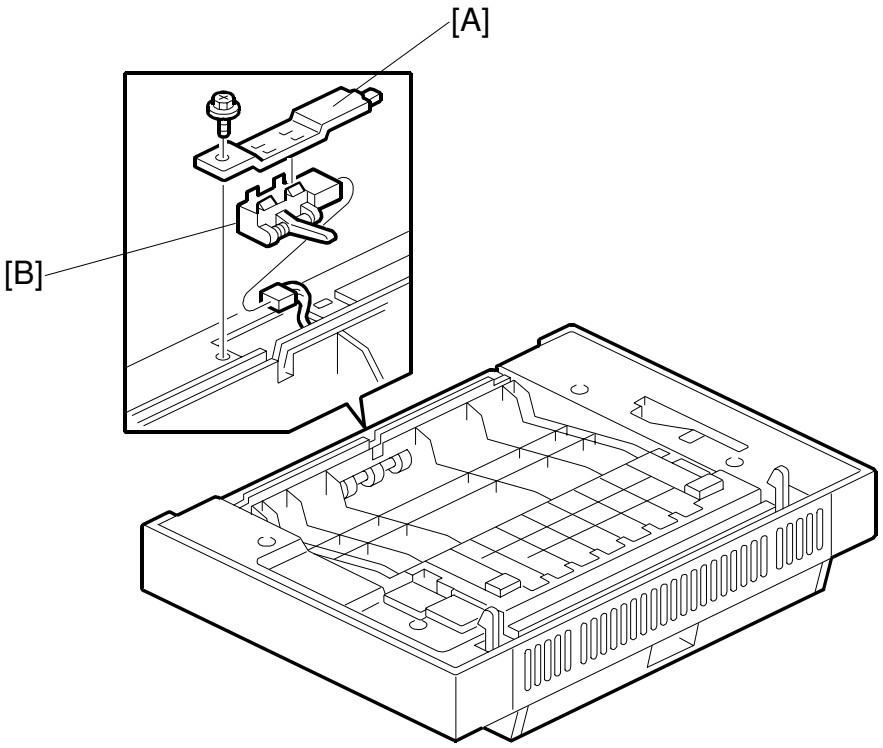
3.17.2 DUPLEX ENTRANCE SENSOR REPLACEMENT



B004R102.WMF

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

3.17.3 DUPLEX EXIT SENSOR REPLACEMENT

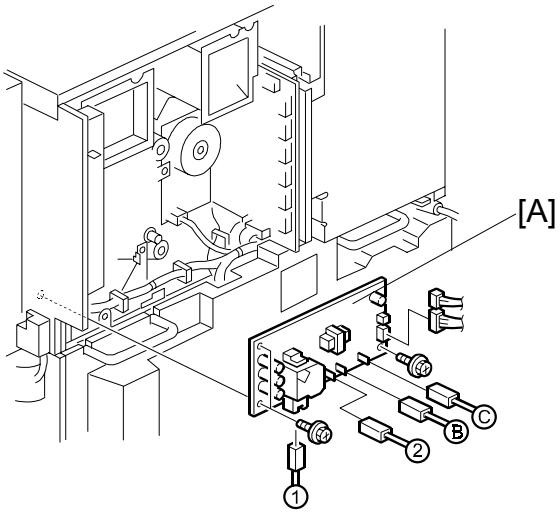


B004R103.WMF

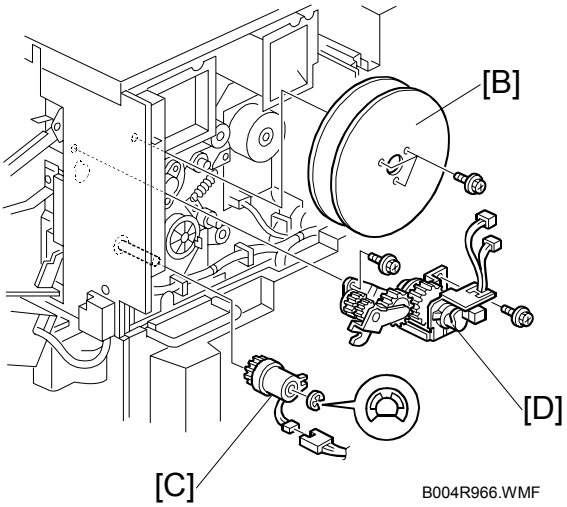
1. Duplex unit (☛3.4)
2. Sensor bracket [A] (☞ x1)
3. Exit sensor [B] (☜ x1)

3.18 DRIVE AREA

3.18.1 REGISTRATION CLUTCH AND TRANSFER BELT CONTACT CLUTCH

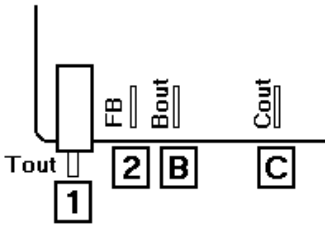


B004R965.WMF



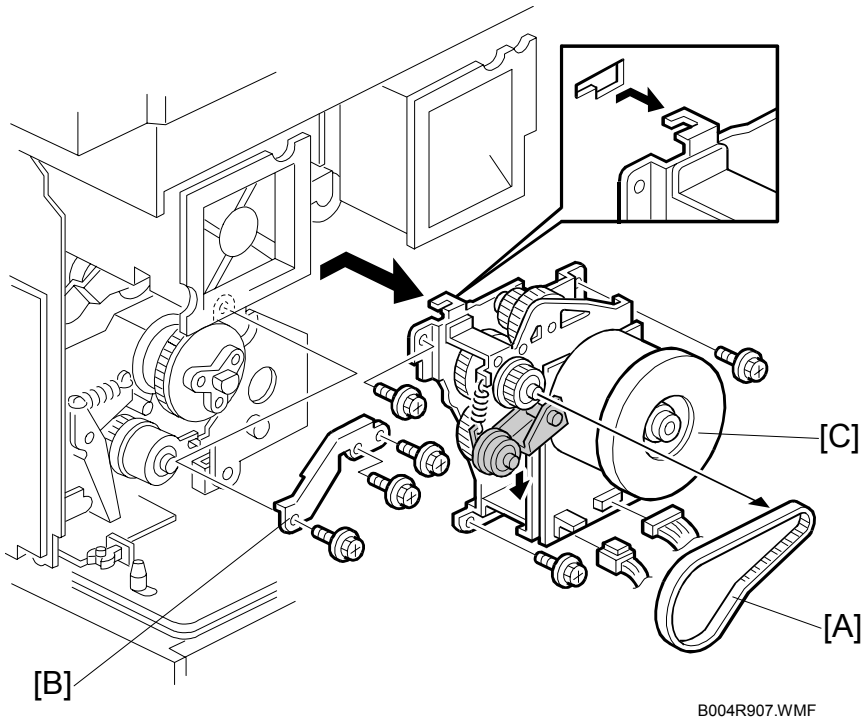
B004R966.WMF

1. Rear upper cover (x2) (☛3.7.1)
2. High voltage supply board [A] (x6, x3)
   NOTE: Make sure that you re-connect the wires in the correct order. They are labeled 1 ➔ 2 ➔ B ➔ C
3. Flywheels [B] (x3)
4. Registration clutch [C] (x1, x1)
5. Transfer belt contact clutch [D] (x2, x2)



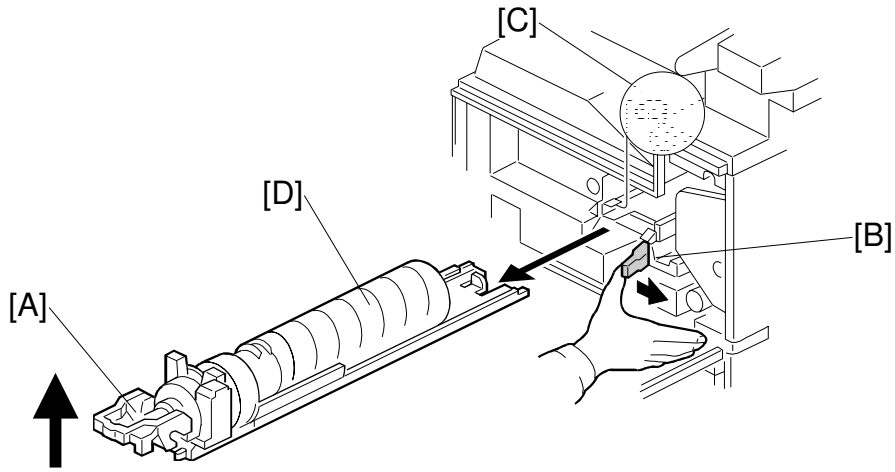
B004R502.WMF

3.18.2 MAIN MOTOR

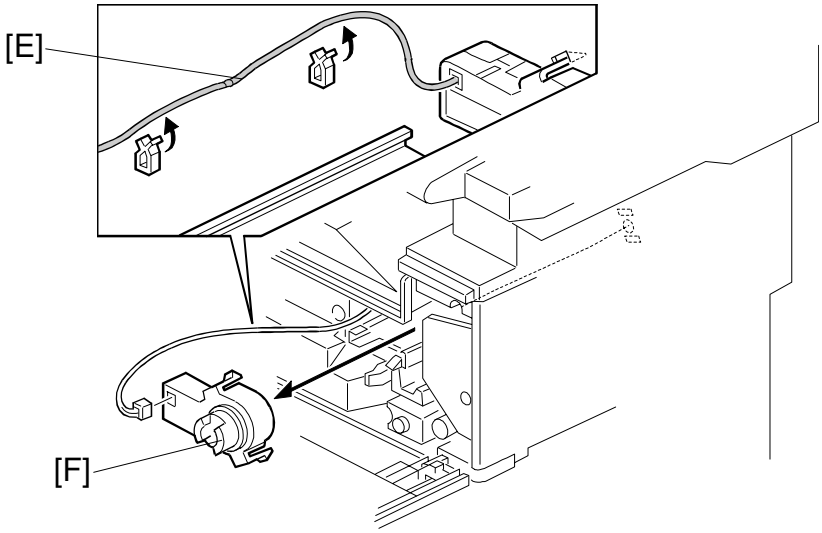


1. Rear upper cover, high voltage power supply, flywheel (☛ 3.18.1)
2. Timing belt [A] x1
3. Bracket [B] (🔩 x3)
4. Main motor [C] (✋ x2, 🔩 x3)

3.18.3 TONER SUPPLY MOTOR



B004R921.WMF

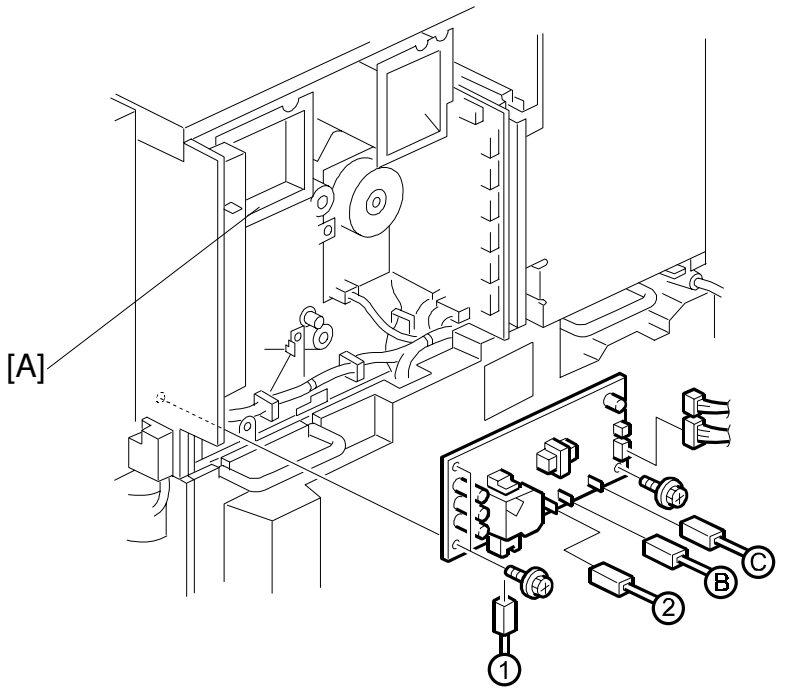


B004R922.WMF

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

3.19 PRINTED CIRCUIT BOARDS

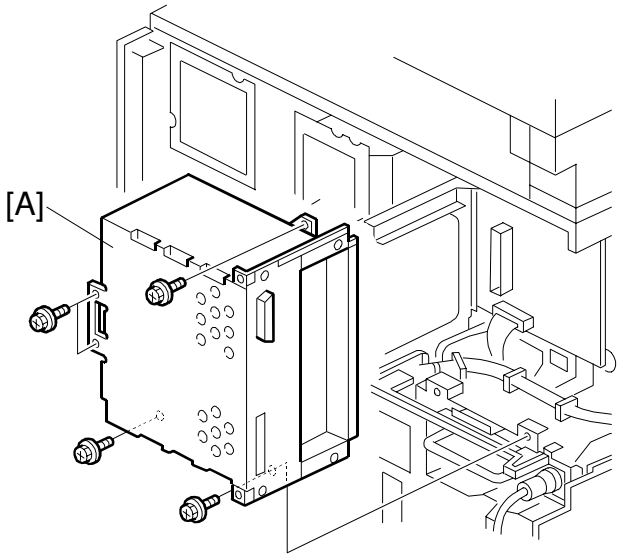
3.19.1 HIGH VOLTAGE POWER SUPPLY



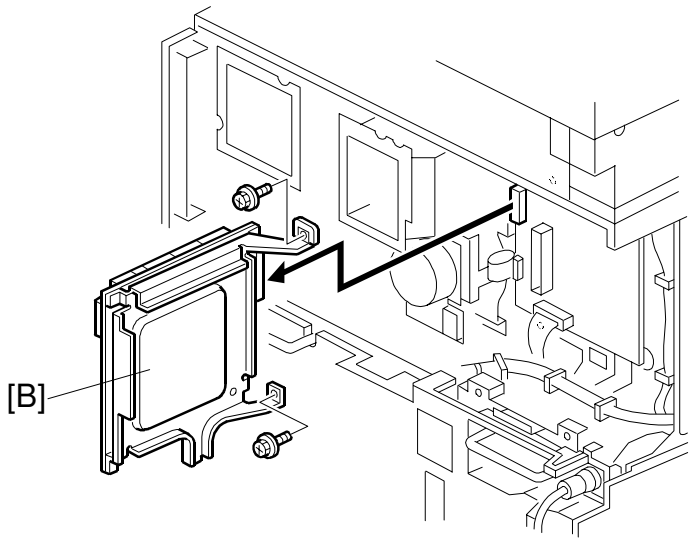
B004R965.WMF

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

3.19.2 I/O BOARD



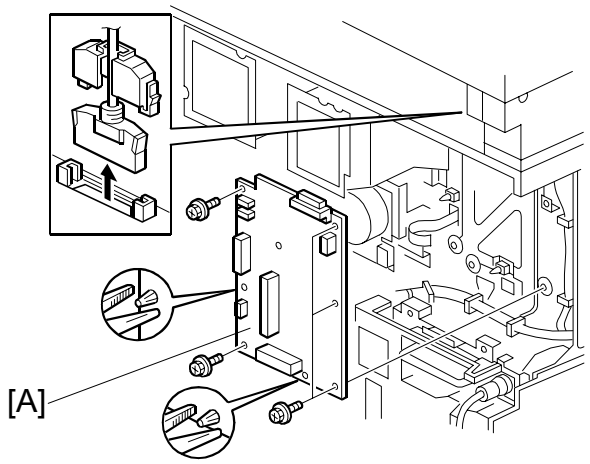
B004R967.WMF



B004R968.WMF

1. Rear upper cover (☛ 3.7.1)
2. Rear left corner cover (☛ 3.8.1)
3. Expansion box [A] (x5)
4. I/O board [B] (x2, x all)
   NOTE: Make sure that the DIP switch settings on the new board are the same as those on the old board.

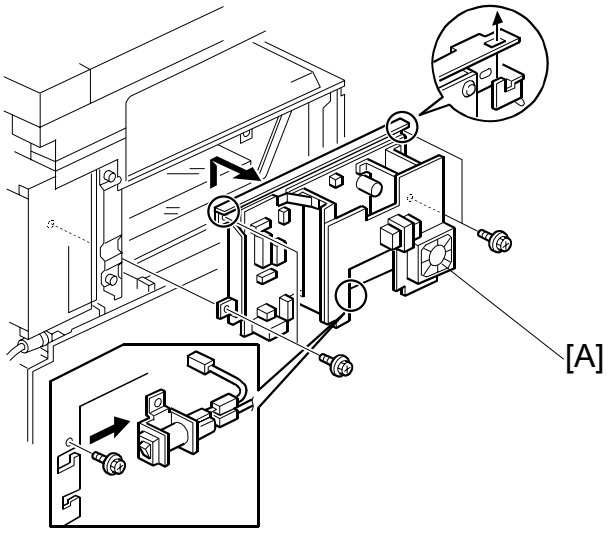
3.19.3 BICU BOARD



B004R969.WMF

1. I/O Board (☛ 3.19.2)
2. BICU board [A] (☞ x5, 🖐x all)

3.19.4 PSU

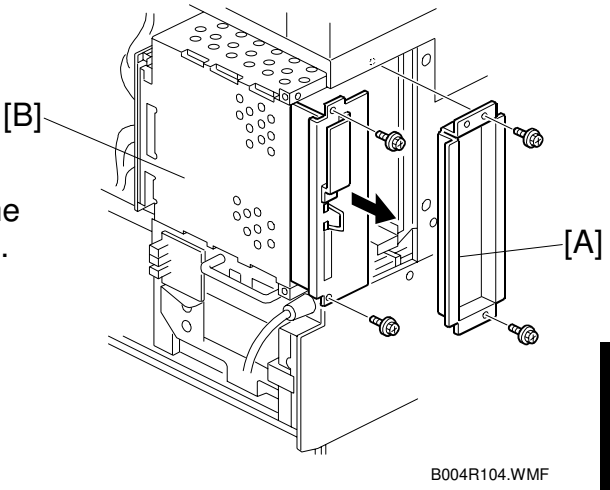


B004R970.WMF

1. Left upper cover (☛ 3.8.1)
2. PSU [A] (☞ x4, 🖐 x all)

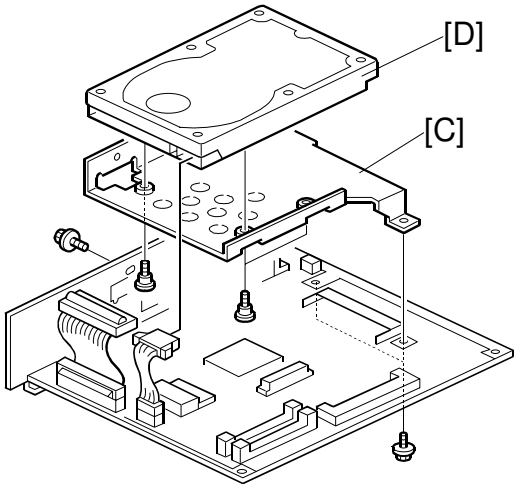
3.20 HARD DISK/CONTROLLER BOARD

1. Left rear corner cover (☛ 3.8.1)
2. Expansion spacer [A] (x2)
3. Controller board [B] (x2)
   NOTE: Use the wire handle to slide the HDD out of the expansion box.



B004R104.WMF

4. HDD unit bracket [C] (x3, x2)
5. HDD unit [D] (x4)
   NOTE: Work carefully to avoid dropping or hitting the HDD.



B004R971.WMF

3.21 COPY ADJUSTMENTS: PRINTING/SCANNING

NOTE: 1) Perform these adjustments after replacing any of the following:

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

(☛ Chapter 5, "Service Tables")

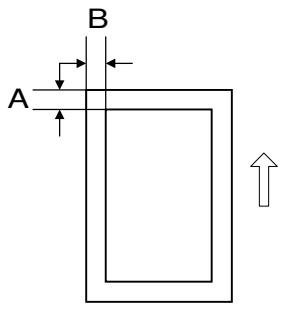
3.21.1 PRINTING

1. Make sure paper is installed correctly in each paper tray before you start these adjustments.
2. Use the Trimming Area Pattern (SP2-902-3, No. 11 to print the test pattern for the following procedures.
3. After completing these printing adjustments, be sure to set SP 2-902-3 to 0 again.

Registration - Leading Edge/Side-to-Side

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

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



A284R506.WMF

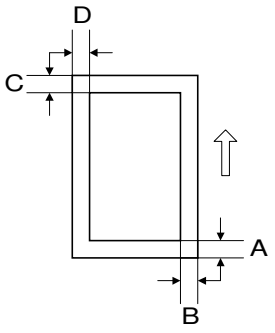
A: Leading Edge Registration
B: Side-to-side Registration

Blank Margin

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

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

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



B004R507.WMF

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

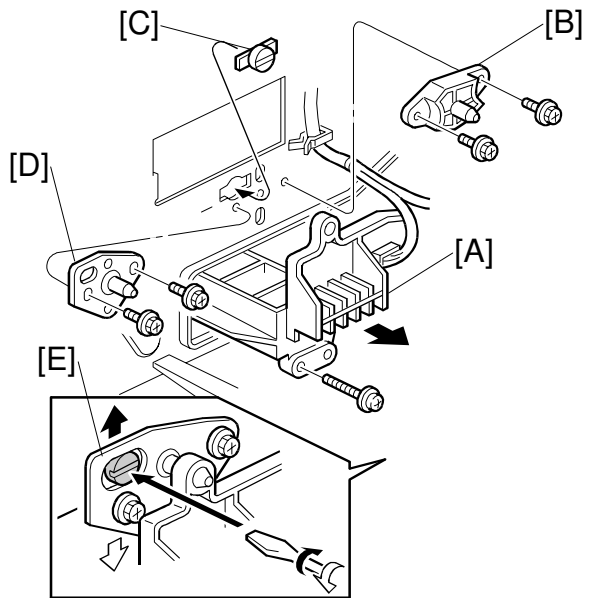
Main Scan Magnification

1. Use SP2-902-3, 5 (Printing Test Pattern, Single-Dot Line) to print a single dot pattern.
2. Check magnification, and then SP2-909-1 (Main Scan Magnification: Copy) to adjust magnification if required. Specification: ±2%.

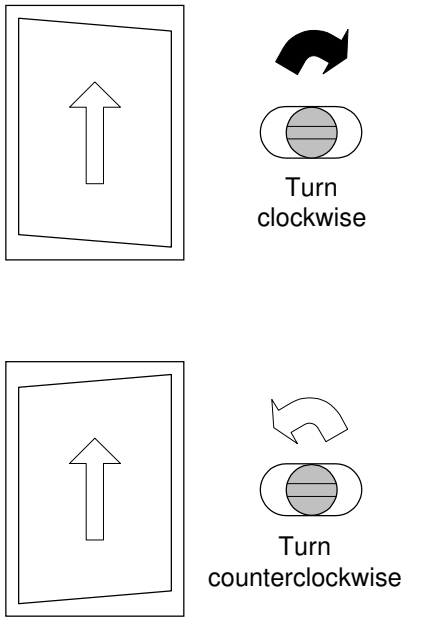
Parallelogram Image Adjustment

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

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



B004R207.WMF



B004R515.WMF

Use SP2-902-3 No. 11 (Printing Test Pattern: Belt Pattern Trimming Area) to determine whether a parallelogram image appears. If the parallelogram pattern appears, perform the following procedure.

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

3.21.2 SCANNING

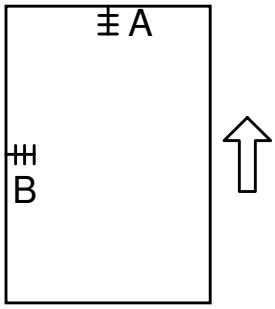
Before doing the following scanner adjustments, perform or check the printing registration/side-to-side adjustment and the blank margin adjustment.

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

Registration: Platen Mode

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

	SP mode
Leading Edge	SP4-010
Side-to-side	SP4-011



B004R508.WMF

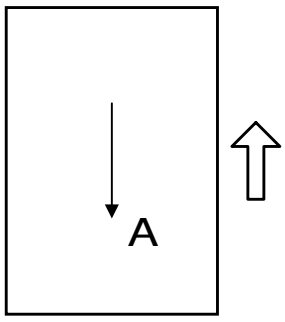
A: Leading Edge Registration
B: Side-to-side Registration

Magnification

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

Sub Scan Magnification

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

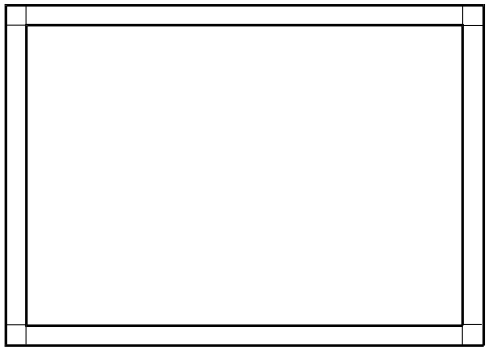


B004R510.WMF

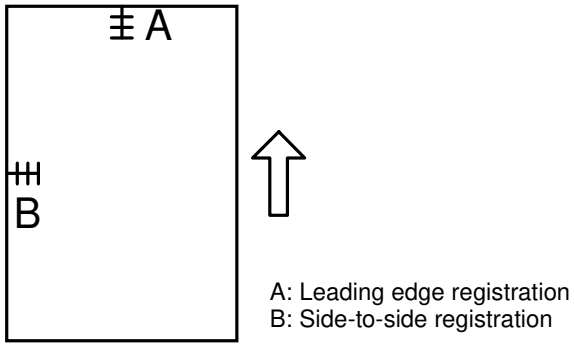
A: Main scan magnification

3.21.3 ADF IMAGE ADJUSTMENT

Registration



B004R511.WMF



B004R508.WMF

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

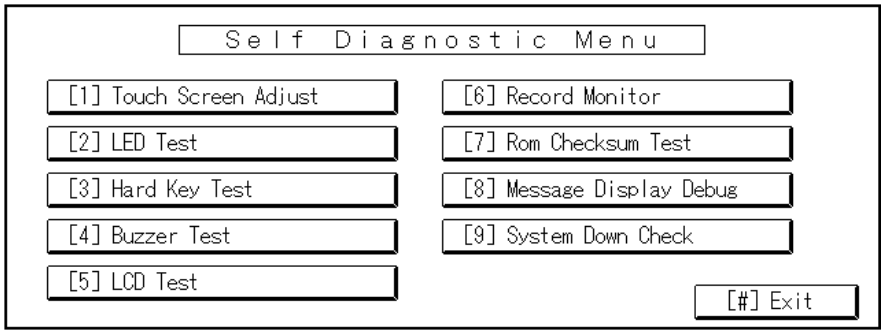
SP Code	What It Does	Adjustment Range
SP6-006-1	Side-to-Side Registration	±3.0 mm
SP6-006-2	Leading Edge Registration (Simplex)	±3.0 mm
SP6-006-3	Leading Edge Registration (Duplex: Front)	±4.2 mm
SP6-006-4	Leading Edge Registration (Duplex: Back)	±4.2 mm

3.21.4 TOUCH SCREEN CALIBRATION

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

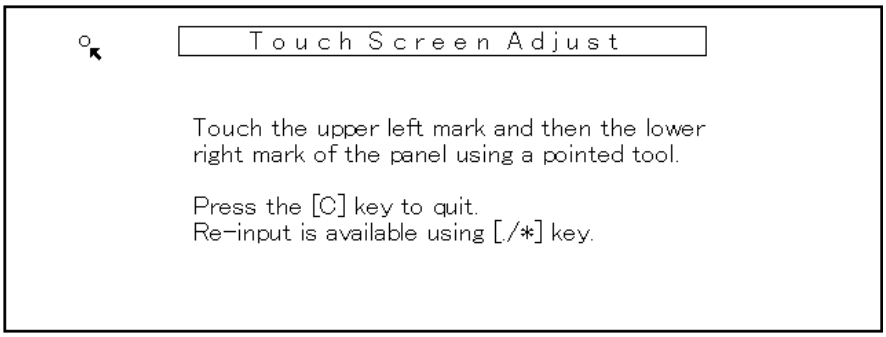
NOTE: Do not attempt to use items [2] to [9] on the Self-Diagnostic Menu. These items are for design use only.

1. Press [◈], press ①⑨⑨③, and then press [C/©] 5 times to open the Self-Diagnostics menu.



B004R503.WMF

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



B004R504.WMF

3. Use a pointed (not sharp!) tool to press the upper left mark ↖.
4. Press the lower right mark ↘ after it appears.
5. Touch a few spots on the touch panel to confirm that the marker (**+**) appears exactly where the screen is touched.

   If the **+** mark does not appear where the screen is touched, press Cancel and repeat from Step 2.
6. When you are finished, press [#] OK on the screen (or press [#]).
7. Touch [#] Exit on the screen to close the Self-Diagnostic menu and save the calibration settings.

4. TROUBLESHOOTING

⚠CAUTION

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

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

4.1 SERVICE CALL CONDITIONS

4.1.1 SUMMARY

There are 4 levels of service call conditions.

Level	Definition	Reset Procedure
A	To prevent damage to the machine, the main machine cannot be operated until the SC has been reset by a service representative (see the note below).	Enter SP mode, and then turn the main power switch off and on.
B	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 operation switch and main power switch off and on.
C	The main machine can be operated as usual, excluding the unit related to the service call.	Turn the operation 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.

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

4.1.2 SC CODE DESCRIPTIONS

Code No.		Symptom	Possible Cause
101	C	Exposure lamp error • The standard white level was not detected properly when scanning the white plate.	• Exposure lamp defective • Lamp stabilizer defective • Exposure lamp connector defective • Standard white plate dirty • Scanner mirror or scanner lens out of position or dirty • SBU defective
120	B	Scanner home position error 1 • The scanner home position sensor does not detect the on condition during initialization or copying.	• SIB or scanner drive motor defective • Scanner motor defective • Harness between SIB and scanner drive motor disconnected • Harness between SIB and scanner drive motor power source disconnected • Scanner HP sensor defective • Harness between SIB and HP sensor disconnected • Scanner wire, timing belt, pulley, or carriage defective
121	B	Scanner home position error 2 • The scanner home position sensor does not detect the off condition during initialization or copying.	• SIB or scanner motor drive board defective • Scanner motor defective • Harness between SIB and scanner drive motor disconnected • Harness between SIB and scanner drive motor power source disconnected • Scanner HP sensor defective • Harness between SIB and scanner HP sensor disconnected • Scanner wire, timing belt, pulley, or carriage defective
130	B	SBU defective • Within 1 second after power on, the SOUT signal does not go high, or within 1 second after power on the SOUT signal goes high, but the SBU ID could not be read after two attempts.	• SBU defective • BICU defective • Harness between SBU and BICU disconnected or damaged
131	B	F-Gate asserts during shading • F-Gate was asserted by the DF during shading.	• While scanning at the DF, a software setting procedure caused an error. You must reboot the machine.
302	C	Charge roller current leak A charge roller current leak signal was detected.	• Charge roller damaged • High voltage supply board defective • PCU harness defective or disconnected
304	C	Charge roller current correction error • The charge roller bias correction is performed twice even if the maximum charge roller bias (-2000V) is applied to the roller.	• ID sensor defective

Code No.		Symptom	Possible Cause
320	C	Polygon motor error • The polygon motor does not reach its operating speed within 25 seconds after the polygon motor on signal, or the lock signal is still activated for more than 2 seconds after the polygon motor off signal.	• Cable at the polygon mirror motor disconnected or defective • Polygon motor or polygon motor driver defective • Polygon motor drive pulse not output correctly • LOCK signal could not be detected
321	C	F-Gate error: No laser writing signal • The laser writing signal (F-GATE) does not go to LOW for more than 30 seconds after the copy paper reaches the registration sensor.	• BICU board defective • PCI harness between the controller board and the BICU defective or disconnected
322	C	1st laser synchronization error • The 1st laser synchronization signal cannot be detected by the main scan synchronization detector board even if the laser diodes are activated.	• Poor cable connection between the laser synchronization detector board and the LD unit. • Laser synchronization detector board out of position and angle of reflection not correct • Laser synchronization detector board defective • LD unit defective
323	C	LD drive current too high • The LD drive board applies more than 100 mA to the LD.	• LD unit defective (not enough power, due to aging) • Poor connection between the LD unit and the BICU board • BICU defective
326	C	2nd laser synchronization error The 2nd laser synchronization signal cannot be detected by the main scan synchronization detector board even if the laser diodes are activated.	• Poor connection between the laser synchronization detector board and the LD unit. • Laser synchronization detector board out of position • Laser synchronization detector board defective • LD unit defective
327	B	LD unit home position error 1 The LD unit home position sensor does not detect an on condition when the LD unit moves to its home position.	• HP sensor/harness defective • LD unit home position sensor defective • LD positioning motor harness defective • LD unit movement blocked because of incorrect connector routing
328	B	LD unit home position error 2 The LD unit home position sensor does not detect an off condition when the LD unit moves from its home position.	• HP sensor/harness defective • LD positioning/harness motor defective • LD unit movement blocked because of incorrect connector routing
329	B	LD unit beam pitch adjusted incorrectly The LD unit HP sensor does not detect the ON condition while changing the LD unit position for correcting the LD position or changing the dpi.	• After initialization of the SP modes, SP2-109-3 or SP2-109-4 was not executed. • The harness is blocking the LD drive (PCB), preventing adjustment of the pitch.

Code No.		Symptom	Possible Cause
350	C	ID sensor pattern test error • One of the following ID sensor output voltages was detected twice consecutively when checking the ID sensor pattern. 1) Vsp ≥ 2.5V 2) Vsg ≤ 2.5V 3) Vsp = 0V 4) Vsg = 0V	• ID sensor defective • ID sensor connector defective • Poor ID sensor connector connection • I/O board (IOB) defective • High voltage supply board defective • ID sensor dirty • Defect at ID sensor pattern writing area of the drum
351	C	ID sensor Vsg test error When the ID sensor was checked, the ID sensor output voltage was 5.0V while the PWM signal input to the ID sensor was 0.	• ID sensor defective • ID sensor connector defective • Poor ID sensor connection • I/O board (IOB) defective • Scanning system defective • High voltage supply board defective • ID sensor dirty • Defect at the ID sensor pattern writing area of the drum
352	C	ID sensor, pattern edge detect error The ID sensor pattern edge voltage is detected to be not 2.5V twice consecutively during an 800 ms interval.	• ID sensor defective • ID sensor connector defective • Poor ID sensor connector connection • I/O board (IOB) defective • High voltage supply board defective • Dirty ID sensor • Defect at the ID sensor pattern writing area of the drum
353	C	ID sensor, LED current abnormal at initialization • One of the following ID sensor output voltages is detected at ID sensor initialization. 1) Vsg < 4.0V when the maximum PWM input (255) is applied to the ID sensor. 2) Vsg ≥ 4.0V when the minimum PWM input (0) is applied to the ID sensor.	• ID sensor defective • ID sensor harness defective • ID sensor connector defective • Poor ID sensor connection • I/O board (IOB) defective • Exposure system defective • High voltage supply board defective • Dirty ID sensor
354	C	ID sensor timeout abnormal at adjustment Vsg falls out of the adjustment target (4.0 ± 0.2V) at the start of Vsg checking after 20 seconds	• ID sensor defective • ID sensor harness defective • ID sensor connector defective • I/O board (IOB) defective • Exposure system defective • Poor ID sensor connector connection • High voltage supply board defective • Dirty ID sensor
390	C	TD sensor error: Test value abnormal The TD sensor output voltage is less than 0.5V or more than 5.0V after 10 consecutive times during copying.	• TD sensor defective • TD sensor not connected or connector damaged • Poor connection between the TD sensor and the I/O board (IOB) • I/O board (IOB) defective • Toner supply defective

Code No.		Symptom	Possible Cause
391	C	TD sensor error: Auto adjust error During automatic adjustment of the TD sensor, output voltage is less than 1.8V or more than 4.8V during TD sensor initial setting.	• TD sensor abnormal • TD sensor disconnected • Poor TD sensor connection • I/O board (IOB) defective • Toner supply defective
395	C	Development output abnormal A development bias leak signal is detected. High voltage output to the development unit exceeded the upper limit (65%) for 60 ms.	• High voltage supply board defective • Poor connection at the development bias terminal • Poor connection at the high voltage supply board
401	C	Transfer roller leak detected A transfer roller current leak signal is detected.	• High voltage supply board defective • Poor cable connection or defective cable • Transfer connector defective
402	C	Transfer roller open error The transfer roller current feedback signal is not detected.	• High voltage supply board defective • Transfer connector cable defective • Transfer connector defective • Poor PCU connection
403	C	Transfer belt position sensor error The transfer belt position sensor does not activate even if the transfer belt contact clutch has been switched on twice and rotated once.	• Main motor/drive malfunction • Transfer belt contact clutch defective • Transfer belt position sensor defective • Harness disconnected
405	C	Transfer belt error The transfer belt does not move away from the drum during ID sensor pattern checking.	• Main motor/drive malfunction • Transfer belt position sensor defective • Poor transfer belt position sensor connection • Transfer belt contact clutch defective
440	C	Main motor lock A main motor lock signal is not detected within 2 seconds after the main motor turns on.	• Too much load on the drive mechanism • Main motor defective
490	C	Exhaust fan motor lock An exhaust fan motor lock signal is not detected within 5 seconds after the exhaust fan motor turns on.	• Too much load on the drive mechanism • Exhaust fan motor defective or a loose object is interfering with the fan • Poor fan motor connector connection
492	C	Cooling fan motor lock A cooling fan motor lock signal is not detected within 5 seconds after the cooling fan motor turns on.	• Too much load on the drive mechanism • Cooling fan motor defective or a loose object is interfering with the fan • Poor fan motor connector connection

Code No.		Symptom	Possible Cause
501	C	1st tray lift malfunction The paper height sensor is not activated after the tray lift motor has been on for 10 seconds. If the main power switch is turned on when the paper is already at the feed height, the paper height position is detected again. At this time, the paper height sensor should de-activate within 5 seconds after the paper bottom plate starts to drop. If it does not deactivate within 5 s four times consecutively, a message will prompt the user to reset Tray 1. After two attempts to release the error by re-setting the paper tray, if this does not solve the problem then this SC is displayed.	• Lift motor malfunction or disconnected • Height sensor abnormal, or connector loose • Loose paper or object between the tray and motor • Pick-up arm malfunction
502	C	2nd tray lift malfunction The paper height sensor is not activated after the tray lift motor has been on for 10 seconds. If the main power switch is turned on when the paper is already at the feed height, the paper height position is detected again. At this time, the paper height sensor should de-activate within 5 seconds after the paper bottom plate starts to drop. If it does not deactivate within 5 s four times consecutively, a message will prompt the user to reset Tray 2. After two attempts to re-set the paper tray, if this does not solve the problem then this SC is displayed.	• Lift motor abnormal or disconnected • Height sensor defective or disconnected • Loose paper or object between the tray and motor • Pick-up arm malfunction
503	C	3rd tray lift malfunction (optional paper tray unit) The paper height sensor is not activated after the tray lift motor has been on for 13 seconds. If the main power switch is turned on when the paper is already at the feed height, the paper height position is detected again. At this time, the paper height sensor should de-activate within 5 seconds after the paper bottom plate starts to drop. If it does not deactivate within 5 s four times consecutively, the tray lift motor halts. After two attempts to re-set the paper tray, if this does not solve the problem, then this SC is displayed and tray control halts.	• Tray lift motor defective or disconnected • Height sensor defective or disconnected

Code No.		Symptom	Possible Cause
504	C	4th tray lift malfunction (optional paper tray unit) The paper height sensor is not activated after the tray lift motor has been on for 13 seconds. If the main power switch is turned on when the paper is already at the feed height, the paper height position is detected again. At this time, the paper height sensor should de-activate within 5 seconds after the paper bottom plate starts to drop. If it does not deactivate within 5 s four times consecutively, the tray lift motor halts. After two attempts to re-set the paper tray, if this does not solve the problem, then this SC is displayed and tray control halts.	• Tray lift motor defective or disconnected • Height sensor defective or disconnected
506	C	Paper tray unit main motor lock (optional paper tray) A main motor lock signal is detected for more than 50 ms during rotation.	• Paper tray unit main motor defective • Paper tray unit main motor connection loose • Too much load on the drive mechanism
507	C	LCT main motor lock (optional LCT) A main motor lock signal is detected for more than 50 ms during rotation.	• LCT main motor defective • Paper tray unit main motor connection loose • Too much load on the drive mechanism
510	C	LCT tray malfunction 1) The LCT lift sensor does not activate for more than 18 seconds after the LCT lift motor turned on. 2) The LCT lower limit sensor does not activate for more than 18 seconds after the LCT lift motor turned on. 3) The LCT lift sensor is already activated when the LCT lift motor turns on. 4) After the paper end sensor is actuated while the tray is raising, the upper limit sensor is not actuated within 5 s. A message is displayed to remind the user to set the paper and tray control halts. Resetting the display is done by opening and closing the LCT door. 5) The 4) state has been detected 3 times in succession.	• LCT lift motor defective or disconnected. • Upper limit sensor defective or disconnected • Pick-up solenoid defective or disconnected • Paper end sensor defective

Code No.		Symptom	Possible Cause
541	A	Fusing thermistor open The fusing temperature detected by the thermistor was below 7°C (44.6°F) for 5 seconds, or 2 seconds after reaching 45°C (113°F) the temperature does not reach an additional 15°C (59°F) after checking five times at 0.1 intervals.	• Fusing thermistor disconnected • Fusing thermistor connector defective • Fusing thermistor damaged or warped • Fusing temperature –15% less than the standard input voltage
542	A	Fusing temperature warm-up error The fusing temperature does not reach the fusing standby temperature of 45°C (113°F) within 9 seconds [for the B003/B006 (35 cpm)]/14 seconds [for the B004/B007 (45 cpm)] after switching on the main power or closing the front cover, or 40 seconds after reaching 50°C the fusing roller does not reach warm-up temperature.	• Fusing lamp defective • Poor fusing unit connector • Thermistor warped or broken • Thermostat has tripped • BICU defective • Power supply board defective
543	A	Fusing overheat error (software detection) A fusing temperature of over 230°C (446°F) is detected for 5 seconds by the fusing thermistors at the center or at either end of the fusing roller.	• Power supply unit defective • I/O board (IOB) defective • BICU defective • Fusing thermistor defective
544	A	Fusing overheat error (hardware circuit detection) The dual monitoring circuitry of the BICU detects extremely high temperature and tripped the relay circuit off.	• Power supply unit defective • I/O board (IOB) defective • BICU defective • Fusing thermistor defective
545	A	Fusing lamp remains on After warm-up the fusing lamp remains at full power for 10 seconds without the hot roller rotating.	• Thermistor is out of position.
546	A	Fusing ready temperature unstable The fusing temperature is fluctuating.	• Thermistor connection loose • Fusing unit connector loose
547	B	Zero cross signal malfunction The applied power supply ac frequency was detected at over 66Hz or below 45Hz, and the zero cross signals are not detected within a certain period within 500 ms after the main power switch has been turned on.	• Power supply board defective • Noise on the ac power line
548	A	Fusing unit installation error The machine cannot detect the fusing unit when the front cover and right cover are closed.	• Fusing unit is not installed • Fusing unit connection loose
599	C	1-bin tray motor lock (optional 1-bin tray unit) A 1-bin tray motor lock signal is not detected for more than 300 ms during rotation.	• 1-bin tray motor locked from overload • 1-bin tray motor defective • 1-bin tray motor connection loose

Code No.		Symptom	Possible Cause
601	C	Communication error between BICU and scanner unit Within 800 ms after power on, after 3 attempts the BICU does not communicate with the SIB via the serial line.	• Serial line connecting the BICU and SIB defective • External noise on the serial line • SIB board defective • BICU board defective
610	C	Communication timeout error between BICU and ADF The BICU cannot receive a response within 100 ms after 3 attempts after sending data to the ARDF.	• BICU board and ADF main board serial line connection defective • External noise • ADF main board defective • BICU board defective
611	C	Communication break error between BICU and ADF The BICU receives a break signal from the ADF main board.	• Serial line connecting BICU and ADF unstable • External noise • ADF main board defective • BICU board defective
612	C	Communication command error between BICU and ADF The BICU sends a command to the ADF main board that it cannot execute.	• Abnormal operation performed by software
620	C	Communication timeout error between BICU and finisher or mailbox The BICU cannot receive a response within 100 ms after 3 attempts after sending data to the finisher or mailbox.	• Serial line connecting BICU and finisher unstable • External noise • BICU board and finisher main board connection defective or loose • Finisher main board defective • BICU board defective
621	C	Communication timeout error between BICU and finisher or mailbox A break (low) signal was received from the finisher or the mailbox.	• Serial line connecting BICU and finisher unstable • External noise
623	C	Communication timeout error between BICU and paper tray unit The BICU cannot receive a response within 100 ms after 3 attempts after sending data to the paper tray unit.	• Serial line connecting BICU and paper tray unit unstable • External noise • BICU board and paper tray main board connection defective or loose • Paper tray main board defective • BICU board defective
624	C	Communication break error between BICU and paper tray unit The BICU cannot communicate with the paper tray unit normally as a result of receiving a break signal.	• Serial line connecting BICU and paper tray unit unstable • External noise • BICU board and LCT main board connection defective or loose • Optional paper feed unit interface board defective • BICU board defective
626	C	Communication timeout error between BICU and LCT The BICU cannot receive a response within 100 ms after 3 attempts after sending data to the LCT.	• Serial line connecting BICU and LCT unit unstable • External noise • BICU board and LCT main board connection defective or loose • LCT interface board defective • BICU board defective

Code No.		Symptom	Possible Cause
627	C	Communication break error between BICU and LCT The BICU cannot communicate with the LCT unit normally as a result of receiving a break signal.	• Serial line connecting BICU and LCT unit unstable • External noise • BICU board and LCT main board connection defective or loose • LCT interface board defective • BICU board defective
630	D	SC630 Communication failure with CSS (RSS) The communication from the copier was detected as abnormal at the CSS center. This error occurs when the acknowledge signal from the LADP does not complete normally.	• Occurred with a SC call, CC call, Supply Management call, User call, or CE call. • Timeout while no response from the LADP, and signal on the RS-485 line between PI and LADP is abnormal.
640	D	BICU control data transfer sumcheck error A sampling of control data sent from the BICU to the controller reveals a sumcheck error. Only the logging count is performed.	• Controller board defective • External noise • BICU board defective
641	D	BICU control data transfer abnormal A sampling of the control data sent from the BICU reveals an abnormality.	• Controller board defective • External noise • BICU board defective
670	B	Engine response error After powering on the machine, a response is not received from the engine within the specified time.	• BICU installed incorrectly • BICU defective • Controller board defective
672	B	Controller-to-operation panel communication error at startup After powering on the machine, the communication circuit between the controller and the operation panel is not opened, or communication with controller is interrupted after a normal startup.	• Controller stall • Controller board installed incorrectly • Controller board defective • Operation panel connector loose or defective
690	A	GAVD block I^2C bus error An error is detected in the GAVD communication I^2C control register of the GABIC2.	• I2C bus on BICU defective
691	A	GAVD FCI block I^2C bus error An error is detected in the FCI communication I^2C control register of the GABIC2.	• I2C bus on BICU defective
692	A	CDIC GAVD block I^2C bus error An error is detected in the CDIC communication I^2C control register of the GABIC2.	• I2C bus on BICU defective

Code No.		Symptom	Possible Cause
700	B	ARDF original pick-up malfunction After the pick-up motor is turned on, the original stopper HP sensor is not detected.	• Original stopper HP sensor (output abnormal) • Pick-up motor defective (not rotating) • Timing belt out of position • ADF main board defective
701	B	ARDF original pick-up/paper lift mechanism malfunction The original pick-up HP sensor does not activate three times consecutively after the pick-up motor has turned on.	• Original pick-up HP sensor defective. • Pick-up motor defective • ADF main board defective
722	B	Finisher jogger motor error The finisher jogger HP sensor does not return to the home position, or move out of the home position, within the specified time.	• Jogger HP sensor defective • Jogger motor defective
724	B	Finisher staple hammer motor error Stapling does not finish within 600 ms after the staple hammer motor turned on.	• Staple jam • Stapler overload caused by trying to staple too many sheets • Staple hammer motor defective
725	B	Finisher stack feed-out motor error The stack feed-out belt HP sensor does not activate within a certain time after the stack feed-out motor turned on.	• Stack feed-out HP sensor defective • Stack feed-out motor overload • Stack feed-out motor defective
726	B	Finisher shift tray 1 lift motor error Tray shift does not finish within the specified time after the shift motor turned on, or the stack height sensor does not activate within the specified time after the shift tray lift motor turned on.	• Shift motor defective or overloaded • Shift tray lift motor defective or overloaded
727	B	Finisher stapler rotation motor error Stapler rotation does not finish within the specified time after the staple rotation motor turned on, or the stapler does not return to its home position within the specified time after stapling finished.	• Stapler rotation motor defective or overloaded • Stapler rotation motor connection loose or connector defective
729	B	Finisher punch motor error After the punch motor is turned on, the punch HP sensor does not activate within the specified time.	• Punch motor defective or overloaded • Punch HP sensor defective • Punch motor connection loose or connector defective
730	B	Finisher stapler positioning motor error After the stapler motor is turned on, the stapler does not return to its home position within the specified time, or the stapler HP sensor does not activate within the specified time after the stapler motor is turned on.	• Stapler positioning motor defective or overloaded • Stapler HP sensor defective • Stapler positioning motor connection loose or connector defective
731	B	Finisher exit guide open/close motor error After the finisher exit guide open/close motor is turned on, the open/close sensor does not activate within the specified time.	• Finisher exit guide open/close motor defective • Open/close sensor defective

Code No.		Symptom	Possible Cause
732	C	Finisher upper tray shift motor error The upper tray shift motor does not stop within the specified time.	• Upper tray shift motor defective or overloaded • Upper tray shift sensor defective
733	C	Finisher lower tray lift motor error The stack height sensor does not activate within a certain time period after the lower tray lift motor turned on.	• Lower tray lift motor defective or overloaded • Upper stack height sensor defective • Lower tray lower limit sensor defective
734	C	Finisher lower tray shift motor error The lower tray shift motor driving the lower tray does not stop within the specified time.	• Lower tray shift motor defective or overloaded • Lower tray shift sensor defective
800	B	Startup without video output end error (K) Video transfer to the engine is started, but a video transmission end command was not issued by the engine within the specified time.	• Control board defective
804	B	Startup without video input end (K) A video transmission was requested from the scanner, but a video transmission end command was not issued by the scanner within the specified time.	• Control board defective
819	B	Kernel mismatch error Software bug	• Software application error
820	B	Self-Diagnostic Error: CPU The central processing unit returned an error during the self-diagnostic test.	• Controller board defective • Software defective
821	B	Self-Diagnostic Error: ASIC The ASIC returned an error during the self-diagnostic test because the ASIC and CPU timer interrupts were compared and determined to be out of range.	• Controller board defective
822	B	Self-Diagnostic Error: HDD The hard disk drive returned an error during the self-diagnostic test.	• HDD defective • HDD connector defective • Controller board defective
823	B	Self-diagnostic Error: NIB The network interface board returned an error during the self-diagnostic test.	• Network interface board defective • Controller board defective
824	B	Self-diagnostic Error: NVRAM The resident non-volatile RAM returned an error during the self-diagnostic test.	• NVRAM damaged or abnormal • Backup battery has discharged • NVRAM socket damaged
826	B	Self-diagnostic Error: NVRAM/Optional NVRAM The NVRAM or optional NVRAM returned an error during the self-diagnostic test.	• NVRAM defective
827	B	Self-diagnostic Error: RAM The resident RAM returned a verify error during the self-diagnostic test.	• Memory malfunction

Code No.		Symptom	Possible Cause
828	B	Self-diagnostic Error: ROM The resident read-only memory returned an error during the self-diagnostic test.	• Controller board defective • Firmware defective
829	B	Self-diagnostic Error: Optional RAM The optional RAM returned an error during the self-diagnostic test.	• RAM DIMM defective • Controller board defective
835	B	Self-Diagnostic Error: Parallel Interface Loopback test error.	• Loopback connector not detected • IEEE1284 connector defective • Controller board defective
836	B	Self-diagnostic Error: Resident Font ROM The resident font ROM returned an error during the self-diagnostic test.	• Font ROM defective
837	B	Self-diagnostic Error: Optional Font ROM The optional font ROM returned an error during the self-diagnostic test.	• Font ROM defective
838	B	Self-diagnostic Error: Clock Generator Verify error occurred when setting data was read from the clock generator via the I2C bus.	• Clock generator abnormal • I2C bus abnormal • CPU port for the I2C bus abnormal
850	B	Network I/F Abnormal NIB interface error.	• NIB defective • Controller board defective
851	B	IEEE 1394 I/F Abnormal IEEE1394 interface error.	• IEEE1384 interface board defective • Controller board defective
860	C	Startup without HD connection at main power on The hard disk connection is not detected.	• Cable between HDC and HD loose or defective • HD power connector loose or defective • HD defective • HDC defective
861	C	Startup without HD detection at power key on The hard disk connection is not detected.	• Cable between HDC and HD loose or defective • HD power connector loose or defective • HD defective • HDC defective
862	A	Maximum number of bad sectors detected on HD Up to 101 bad sectors have appeared in the area on the hard disk where image data is archived, and the hard disk may require replacement.	• SC863 returned while reading data from the HD and the number of registered bad sectors reached 101.
863	B	Startup without HD data lead Data stored on the hard disk is not read correctly.	• A bad sector occurred during operation of the HD
864	B	HD data CRC error During operation of the HD, the HD responded with a CRC error.	• Data transfer was abnormal in the data read from the HD.
865	B	HD access error The hard disk detected an error.	• Error detected other that the bad sectors error (SC863) or the CRC error (SC864)

Trouble-shooting

Code No.		Symptom	Possible Cause
900	B	Electronic total counter error The value of the total counter has already exceeded 9,999,999	• NVRAM defective
901	B	SC901 Mechanical total count error The IO board cannot receive the mechanical total count data.	• Mechanical total counter defective
951	C	F-gate error at write request After the IPU receives an F-gate signal, it receives another F-gate signal.	• Software defective • BICU defective
953	C	Scanner setting error The IPU does not respond with the scanner setting signal required to start scanning processing.	• Software defective
954	B	Printer setting error The IPU does not respond with the settings that are required to start image processing by the printer.	• Software defective
955	C	Memory setting error The IPU does not respond with the settings that are required to start image processing using the memory.	• Software defective
964	C	Printer ready error The printer ready signal is not generated within 17 seconds after the IPU received the print start signal.	• Software defective
984	B	Print image data transfer error The image transfer from the controller to the engine via the PCI bus does not end within 15 s after starting.	• Controller board defective • BICU defective • Connectors between BICU and controller loose or defective
985	B	Scanner image data transfer error The image transfer from the engine to the controller via the PCI bus does not end within 3 s after starting.	• Controller board defective • BICU defective • Connectors between BICU and controller loose or defective • SIB defective
986	C	Software write parameter setting error An unstable area at the storage destination in the settings table is set NULL for the parameter received by the write module.	• Software defective
990	B	Software performance error The software attempted to perform an unexpected operation.	• Software defective • Internal parameter incorrect • Insufficient working memory • When this SC occurs, the file name, address, and data will be stored in NVRAM. This information can be checked by using SP7-403. Note the above data and the situation in which this SC occurs. Then report the data and conditions to your technical control center.

Code No.		Symptom	Possible Cause
991	D	Software continuity error The software attempted to perform and unexpected operation. However, unlike SC990, the object of the error is continuity of the software.	• Software bug • Internal parameter incorrect • Insufficient working memory
996	B	FCU board error FCU board is connected but not ready.	• FCU board defective and requires replacement • Firmware incorrect
997	B	Application function selection error The application selected by a key press on operation panel does not start or ends abnormally.	• Software defective • An option required by the application (RAM, DIMM, board) is not installed
998	B	Application start error After power on the application does not start within 60 s. (All applications neither start nor end normally.)	• Software defective • An option required by the application (RAM, DIMM, board) is not installed
999	B	Program download error The download (program, print data, language data) from the IC card does not execute normally.	• Board installed incorrectly • BICU defective • IC card defective • NVRAM defective • Loss of power during downloading • Important Notes About SC999 • Primarily intended for operating in the download mode, logging is not performed with SC999. • If the machine loses power while downloading, or if for some other reason the download does not end normally, this could damage the controller board or the PCB targeted for the download and prevent subsequent downloading. If this problem occurs, the damaged PCB must be replaced.

4.2 ELECTRICAL COMPONENT DEFECTS

4.2.1 SENSORS

Component (Symbol)	CN	Condition	Symptom
Scanner Home Position (S1)	504-5(SIB)	Open	SC121 is displayed.
		Shorted	SC120 is displayed.
Platen Cover (S2)	504-8 (SIB)	Open	APS and ARE do not function properly.
		Shorted	No symptom.
Original Width (S3)	505-3, 4 (SIB)	Open	CPU cannot detect the original size properly. APS and ARE do not function correctly.
		Shorted	
Original Length-1 (S4)	505-8,9 (SIB)	Open	CPU cannot detect the original size properly. APS and ARE do not function correctly.
		Shorted	
Original Length-2 (S5)	505-13 (SIB)	Open	CPU cannot detect the original size properly. APS and ARE do not function correctly.
		Shorted	
LD Unit Home Position (S6)	220-2 (IOB)	Open	SC328 is displayed when the laser beam pitch is changed.
		Shorted	SC327 is displayed when the laser beam pitch is changed.
Toner Density (TD) (S7)	205-5 (IOB)	Open	The add toner indicator blinks even if there is toner in the development unit.
		Shorted	SC390-01 is displayed.
Paper Exit (S8)	203-B2 (IOB)	Open	The Paper Jam indicator will light whenever a copy is made.
		Shorted	The Paper Jam indicator lights even if there is no paper.
Registration (S9)	207-B2 (IOB)	Open	The Paper Jam indicator lights even if there is no paper.
		Shorted	The The Paper Jam indicator will light whenever a copy is made.
Image Density (ID) (S10)	219-5 (IOB)	Open	SC350-03 is displayed after copying.
		Shorted	SC350-01 is displayed after copying.
Upper Paper Height (S11)	235-2 (PFB)	Open	Add Paper is displayed even if there is paper. If this condition occurred four times, SC501-02 will be displayed.
		Shorted	SC501-01 is displayed.
Lower Paper Height (S12)	236-2 (PFB)	Open	Add Paper is displayed even if there is paper. If this condition occurred four times, SC502-02 will be displayed.
		Shorted	SC502-01 is displayed.
Upper Paper End (S13)	235-8 (PFB)	Open	The Paper End indicator lights even if paper is placed in the upper paper tray.
		Shorted	The Paper End indicator does not light even if there is no paper in the upper paper tray.

Component (Symbol)	CN	Condition	Symptom
Lower Paper End (S14)	236-8 (PFB)	Open	The Paper End indicator lights even if paper is placed in the lower paper tray.
		Shorted	The Paper End indicator does not light even if there is no paper in the lower paper tray.
Upper Relay (S15)	235-5 (PFB)	Open	The Paper Jam indicator will light whenever a copy is made.
		Shorted	The Paper Jam indicator lights even if there is no paper.
Lower Relay (S16)	236-5 (PFB)	Open	The Paper Jam indicator will light whenever a copy is made.
		Shorted	The Paper Jam indicator lights even if there is no paper.
Transfer Belt Position (S19)	203-A10 (IOB)	Open	No symptom
		Shorted	SC403 is displayed

4.2.2 SWITCHES

Component (Symbol)	CN	Condition	Symptom
Right Lower Cover (SW1)	232-3 (PFB)	Open	“Doors/Covers Open” is displayed even if the right lower cover is closed.
		Shorted	The LCD goes blank when the lower cover is opened.
Main (SW3)	102-1~4 (PSU) 107-1	Open	The machine does not turn on.
		Shorted	The machine does not turn off.
Front Cover Safety (SW4)	107-1 (PSU)	Open	“Doors/Covers Open” is displayed even if the front cover is closed.
		Shorted	“Doors/Covers” Open is not displayed even if the front cover is opened.

4.3 BLOWN FUSE CONDITIONS

Fuse	Rating		Symptom at power on
	115V	210 ~ 230V	
Power Supply Board			
FU1	6.3A / 125V	6.3A / 250V	"Doors/Covers Open" is displayed
FU2	6.3A / 125V	6.3A / 250V	"Doors/Covers Open" for the finisher is displayed
FU3	6.3A / 125V	4A / 250V	Paper end condition
FU4	6.3A / 125V	6.3A / 250V	SC121 is displayed
FU5	6.3A / 125V	6.3A / 250V	SC302, or SC403, or SC405 displayed
FU101	15A / 125V	---	No response
FU102	10A / 125V	5A / 250V	No response
FU103	2A / 125V	1A / 250V	Normal operation (optional heaters do not work)

4.4 LEDS

BICU

Number	Monitored Signal
LED101	Monitors whether the program is working normally or not. The LED blinks in normal conditions.
LED102	Flashes during program downloading.

4.5 TEST POINTS

Controller Board

Number	Monitored Signal
TP1	+2.5V
TP2	+3.3V
TP3-9	Ground
TP10	Data Strobe
TP11	Busy
TP12	Acknowledge
TP13	DB0TXD
TP14	+15V
TP15	GND
TP16	DB0RXD

5. SERVICE TABLES

⚠CAUTION

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

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

5.1 SERVICE PROGRAM MODE

5.1.1 SERVICE PROGRAM MODE OPERATION

The service program mode is used to check electrical data, change modes, and adjust values. Two service program modes are provided:

- **SP Mode (Service)**. Includes all the options in the SP displays for normal maintenance and adjustments.
- **SSP Mode (Special Service)**. Includes the normal SP modes and *some additional options in the SP displays not required for normal settings and adjustments*. (Most are marked "DFU" in the following tables.) Do not change these important settings needlessly. For details, contact your supervisor.

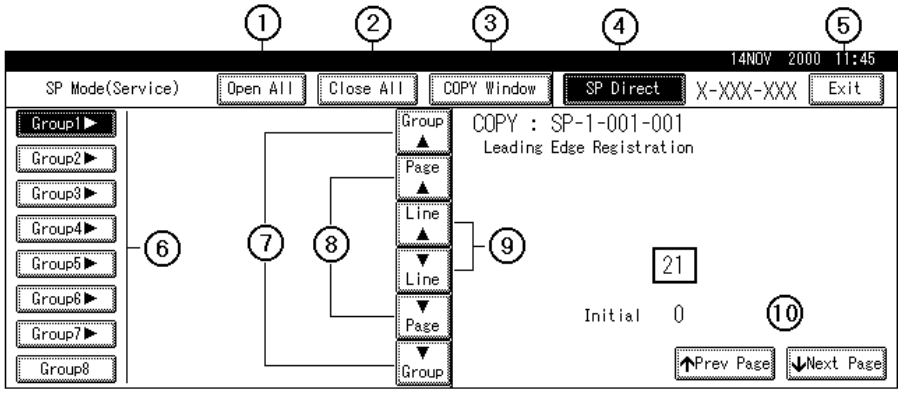
Entering and Exiting SP mode

Clear Mode	1.	Press the Clear Mode key.
1 0 7	2.	Use the keypad to enter "107".
Clear/Stop	3.	Hold down Clear/Stop for at least 3 seconds.
	4.	Enter the Service Mode.
		To enter the Normal Service Mode:
Copy SP		On the touch-panel, press Copy SP.
		To enter the Special service Mode:
# **Copy SP**		Hold down # and then press Copy SP.
Exit	5.	Press Exit twice to return to the copy window.

NOTE: Use SP2-902 to perform test pattern printing. (☛ 5.1.3)

SP Mode Button Summary

Here is a short summary of the touch-panel buttons.



B004S500.WMF

① Opens all SP groups and sublevels.

② Closes all open groups and sublevels and restores the initial SP mode display.

③ Opens the copy window (copy mode) so you can make test copies. To return to the SP mode screen, press SP Mode (highlighted) in the copy window.

④ Enter the SP code directly with the number keys if you know the SP number and then press #. (SP Mode must be highlighted before you can enter the number. Just press SP Mode if it is not highlighted.)

⑤ Press twice to leave the SP mode and return to the copy window to resume normal operation.

⑥ Press any Group number to open a list of SP codes and titles for that group. For example, to open the SP code list for SP1-nnn, press Group1. If an SP has sublevels, click the appropriate button to expand the list.

⑦ Press to scroll the display to the previous or next group.

⑧ Press to scroll to the previous or next display in segments the size of the screen display (page).

⑨ Press to scroll the display to the previous or next line, line by line.

⑩ Press to move the highlight on the left to the previous or next selection in the list.

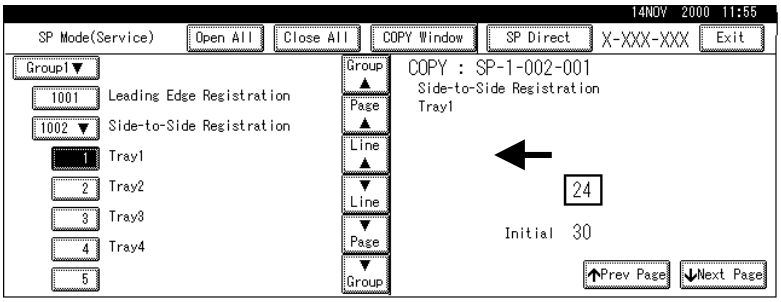
Switching Between SP Mode and Copy Mode for Test Printing

1) In the SP mode, select the test print and then press Copy Window.
2) Use the copy window (copier mode), to select the appropriate settings (paper size, etc.) for the test print.
3) Press Start ⓘ to execute the test print.
4) Press SP Mode (highlighted) to return to the SP mode screen and repeat from step 1.

Selecting the Program Number

Program numbers have two or three levels.

1. Before you begin, refer to the Service Tables to find the SP that you want to adjust. (☛ 5.1.2)
2. Press the Group number on the left side SP Mode window that contains the SP that you want to adjust.
3. Use the scrolling buttons in the center of the SP mode window to display the SP number that you want to open, and then press that number to expand the list.
4. Use the center touch-panel buttons to scroll to the number and title of the item that you want to set and press. The small entry box on the right is activated and displays the default or the current setting below.



B004S501.WMF

NOTE: Refer to the Service Tables for the range of allowed settings. (☛ 5.1.2)

5. To enter a setting”
   - Press ⓒ to toggle between plus and minus and then use the keypad to enter the appropriate number. The number you enter will write over the previous setting.
   - Press ⓗ to enter the setting. (If you enter a number that is out of range, the key press is ignored.)
   - When you are prompted to complete the selection, press Yes.
6. If you need to perform a test print, press Copy Window to open the copy window and select the settings for the test print. Press Start ⓘ twice, and then press SP Mode (highlighted) in the copy window to return to the SP mode display.
7. When you are finished, press Exit twice to return to the copy window.

Service Tables

5.1.2 SERVICE PROGRAM MODE TABLES

Service Table Key

Notation	What it means
[range / **default** / step]	Example: [-9 ~ +9 / **+3.0** / 0.1 mm step]. The setting can be adjusted in the range ±9, value reset to +3.0 after an NVRAM reset, and the value can be changed in 0.1 mm steps with each key press.
italics	Comments added for reference.
*	Value stored in NVRAM. After a RAM reset, this default value (factory setting) is restored.
1111	An SP number set in bold-italic denotes a "Special Service Program" mode setting that appears only after entering the SP mode by pressing # and Copy SP together. (☛ 5-1)
B003/B006	Denotes the 35 cpm model.
B004/B007	Denotes the 45 cpm model.
DFU	Denotes "Design or Factory Use". Do not change this value.
Japan only	The feature or item is for Japan only. Do not change this value.
(S)	Sideways feed direction
(L)	Lengthwise feed direction

SP1-xxx: Feed

SP1	Mode Number		Function and [Setting]
1001*	Leading Edge Registration		Adjusts the printing leading edge registration using the trimming area pattern (SP2-902-3, No.11). [+9 ~ –9 / **3.0** / 0.1 mm] Use ⊙ to toggle between ± before entering the value. Specification: 3 ±2 mm
1002*	Side-to-Side Registration		Adjusts the printing side-to-side registration from the 3rd paper feed station using the trimming area pattern (SP2-902-3, No.11). Use the ⊙ key to toggle between + and – before entering the value. Specification: 2 ±1.5 mm
	1	Tray1	[–9~ +9/ **+3.0 mm** / 0.1 mm step]
	2	Tray2	
	3	Tray3	[–9~ +9/ **+2.0 mm** / 0.1 mm/step] *Tray3, Tray4 for Paper Feed Unit.*
	4	Tray4	
	5	Duplex Tray	[–9~ +9/ **+0.0 mm** / 0.1 mm/step]
	6	By-pass Tray	[–9~ +9/ **+3.0 mm** / 0.1 mm/step]
	7	LCT (if present)	[–9~ +9/ **+1.5 mm** / 0.1 mm/step]
1003*		Registration Buckle Adjustment	
	1	Paper Feed Trays/LCT	Adjusts the relay clutch timing at registration. Relay clutch timing determines the amount of paper buckle at registration. (A "+" setting causes more buckling.) [–9~+9/**+0.0 mm** (**1 mm** for 1st Tray Feed)/0.1 mm step]
	2	Duplex Tray	
	3	By-pass Tray	
	4	Tray1 Feed	
1007		By-pass Feed Paper Size Display	Displays the paper width sensor data for the by-pass feed table.

SP1	Mode Number		Function and [Setting]	
1012*		Exit Junction Solenoid Start Timing	Adjusts the timing of the solenoids at the entrance and exit of the paper exit section to accommodate the increased speed of the duplex unit. *This SP has been added to compensate for the increased operation speed of the duplex unit for this machine. Increase the value if the leading edges are jamming. Decrease the value if trailing edges are bending at the entrance.*	
	1*	Exit Entrance Junction Solenoid	B003/B006	[200~450 ms / **370 ms** / 10 ms]
	2*	Exit Last Junction Solenoid	B004/B007	[200~450 ms / **300 ms** (entrance) **370 ms** (exit) /10 ms]
1103*		Fusing Idling	Switches fusing idling on/off. When on, printing will not start until enough time has elapsed so the hot roller can reach optimum temperature. This ensures even heat on the hot roller. *Switch on if fusing on the 1st and 2nd copies is incomplete (this may occur if the room is cold.)*	
	1*	Enable Fusing Idling	**0 = Off**, 1 = On *In a cold environment, switch on and then set the idling time with SP1-103-2 to ensure the quality of the first copies.*	
	2*	Fusing Idling Interval	[0~60 sec. / **30 sec.** / 1 sec.] *You must switch SP1-103-1 on before you can set the fusing idling interval.*	
1104*		Fusing Temperature Control	Selects the fusing temperature control mode. [**0 = On/Off** / 1 phase	
1105*		Fusing Temperature Adjustment	Adjusts the fusing temperature at the center and both ends of the hot roller for paper fed from a tray. Use SP1-105-1, SP1-105-2 to adjust for any tray other than the by-pass tray. Use SP1-105-3, SP1-105-4 to adjust for by-pass tray. *Allows adjustment of the hot roller temperature at the center and ends of the roller for the quality or thickness of the paper. The hot roller in this machine has two fusing lamps: one heats the center of the roller, the other heats both ends. Each fusing lamp can be adjusted separately.*	
	1*	Roller Center: Trays	[120°C ~ 200°C / **160°C** (B004/B007: **180°C**) / 1°C step]	
	2*	Roller Ends: Trays	[120°C ~ 200°C / **170°C** (B004/B007: **185°C**) / 1°C step]	
	3*	Roller Center: By-pass	[120°C ~ 220°C / **175°C** (B004/B007: **190°C**) / 1°C step]	
	4*	Roller Ends: By-pass		
	5*	Re-load Temp. Minus: Roller Center	Adjusts the temperature for re-heating the hot roller. **Re-load Temp. = Fusing. Temp – SP Value** [0°C ~ 60°C / **30°C** / 1°C step] *When the fusing temperature surpasses this setting, the machine can operate. Do not set up a re-load temperature (Spec. Temp – SP Value) that is higher than the SP1-105-2 setting.*	
	6*	Re-load Temp. Minus: Roller Ends Reload Temperature = Print Ready Temperature		
	7*	Roller Center: By-pass (Thick Paper)	Adjusts temperature of the hot roller when feeding thick paper. [120°C ~ 220°C / **190°C** (B004/B007: **200°C**) / 1°C step]	

Service Tables

SP1	Mode Number		Function and [Setting]
1105*	8*	Roller Ends: By-Pass (Thick Paper Feed)	
	9*	Re-load Temp. Minus: Roller Center (Thick Paper)	Forces paper feed to wait until the fusing unit has reached the specified temperature. Feed temp. = Spec. temp. for thick paper – SP value *Feed begins when the hot roller reaches the specified temperature.* [0°C ~ 60°C / **0°C** (B004/B007: **5°C** / 1°C step]
	10*	Re-load Temp. Minus: Roller Ends (Thick Paper)	
1106		Fusing Temperature Display	Displays the fusing temperature for the center or ends of the hot roller. *This machine has two fusing lamps inside the hot roller: one lamp heats the center of the roller, the other lamp heats both ends.*
	1	Roller Center	
	2	Roller Ends	
1109*		Fusing Nip Band Check	Checks the fusing nip band. (☛ 5.1.7) [**0**=Off, 1=On]
1111*		Paper Reverse Timing (Duplex)	Adjusts the timing for stopping the rotation of the reverse roller after the trailing edge of the paper passes the duplex entrance sensor. [+5 ~ –5 / **0 mm** / 1 mm step] *Adjust the timing if paper frequently jams at the inverter gate in the duplex unit.*

SP2-xxx: Drum

SP2	Mode Number		Function and [Setting]
2001*	Charge Roller Bias Adjustment		
	1*	Copying	Adjusts the voltage applied to the grid plate for copying. [–1000 ~ –2000 / **–1480V** / 10V step]
	2*	ID Sensor Pattern	Adjusts the voltage applied to the charge roller when making the VSDP ID sensor pattern (for charge roller voltage correction). The actual charge roller voltage is this value plus the value of SP2-001-1. [0 ~ 700 / **200V** / 10V step]
2005*		Charge Roller Bias Correction Adjustment	
	1*	Charge Roller Voltage Correction 1	Adjusts the lower threshold value for the charge roller correction. *When the value of VSP/VSG is greater than this value, the charge roller voltage increases by 30 V (e.g., from –500 to –530).* [0.1 ~ 1.0 / **0.85** / 0.05 step]
	2*	Charge Roller Voltage Correction 2	Adjusts the upper threshold value for the charge roller correction. *When the value of VSP/VSG is greater than this value, the charge roller voltage decreases by 30 V (absolute value).* [0.1 ~ 1.0 / **0.90** / 0.05 step]
	3*	Charge Roller Voltage Adjustment 1	Adjusts the lower limit value for charge roller voltage correction. [–1000 ~ –2000 / **1480V** / 10V step]
	4*	Charge Roller Voltage Adjustment 2	Adjusts the upper limit value for charge roller voltage correction. [–1000 ~ –2000 / **2000V** / 10V step]
	5*	Charge Roller Voltage Step	Adjusts the correction voltage adjustment step size. [0 ~ 100V / **30V** / 10V step]
2101*		Printing Erase Margin	Adjusts the leading edge (top), trailing edge (bottom), left, and right margins.
	1*	Leading Edge (Top)	[0.9 ~ 9.0 / **3** / 0.1 mm step] Specification: ±2 mm
	2*	Trailing Edge (Bottom)	
	3*	Left Edge	[0.9 ~ 9.0 / **2** / 0.1 mm step] Specification: ±1.5 mm
	4*	Right Edge	
	5*	Trailing Edge - Back side	Adjusts the trailing edge erase margin on the reverse side of duplex copies. [0.0 ~ 4.0 / **1.2** / 0.1 mm step] *Recommended: 2 ±1.5 mm*
	6*	Back Side - Right	Adjusts the right side erase margin in the reverse side of duplex copies. [0.0 ~ 9.0 / **0.3** / 0.1 mm step] *Recommend: 2 ±1.5 mm*
	7*	Back Side - Left	Adjusts the left side erase margin in the reverse side of duplex copies. [0.0 ~ 9.0 / **0.3** / 0.1 mm step] *Recommended: 2 +2.5/-1.5 mm*

SP2	Mode Number		Function and [Setting]
2103*		LD Power Adjustment	Adjusts the intensity of the laser for the copier, printer, and fax unit. The Copier and Printer/Fax settings can be adjusted separately. **DFU**
	1*	LD1 (Copier)	(–55~+64 / **–20** /1 LSB step) *Approx. 50/128 = .4%*
	2*	LD2 (Copier)	
	3*	LD1 (Printer, FAX)	(–50~ –35 / **–5** /1 LSB step)
	4*	LD2 (Printer, FAX)	
	5*	LD1 Adjustment Start/End	
	6*	LD2 Adjustment Start/End	
2109*		LD Beam Pitch Adjustment	Adjusts the beam gap for the dual beam system. After replacing the LD unit or replacing or clearing the NVRAM, use this SP mode to adjust the laser beam pitch. *This adjustment is performed by specifying the number of pulses to the stepper motor that will adjust the angle of rotation of the LD unit from the home position.*
	1*	400 dpi	Adjusts the laser beam pitch value for 400 dpi resolution. 400 dpi: [8~262 / **144** / 1 pulse step] *After replacing the LD unit or replacing or clearing NVRAM, use this SP and SP2-109-3 to adjust the laser beam pitch.*
	2*	600 dpi	Adjusts the laser beam pitch value for 600 dpi resolution. 600 dpi: [30~284 / **168** / 1 pulse step] *After replacing the LD unit or replacing or clearing NVRAM, use this SP and SP2-109-4 to adjust the laser beam pitch.*
	3*	400 dpi Initial Setting	Initializes the laser beam pitch for 400 dpi using the value for SP2-109-1. *After entering a value for SP2-109-1, this SP must be used.*
	4*	600 dpi Initial Setting	Initializes the laser beam pitch for 600 dpi using the value for SP2-109-2. *After entering a value for SP2-109-2, this SP must be used.*
	5*	Auto Pitch Adjustment Interval	Sets the interval for automatic laser beam pitch adjustment. [0 ~ 65535 / **1000** / 1 step] *When the number of times that the resolution has been changed reaches this value, the laser unit position is automatically corrected.*
	6	Current LD Unit Position	Displays the current LD unit position (number of pulses from home position). If this is different from the value of 2-109-1 or 2-109-2, LD unit positioning has failed.

SP2	Mode Number		Function and [Setting]		
2109*	7	Beam Pitch Change Counter	Displays how many times the LD unit position has been changed (how many times the resolution has changed.) *When the laser beam pitch adjustment is done, this counter is reset to zero.*		
	8	Beam Pitch Data Reset	Resets the values of SP2-109-6 and SP2-109-7. *After replacing the LD unit, this SP mode must be performed. See the LD Unit Removal Procedure.*		
2110		Test Mode dpi	Sets the scanning resolution (dpi). **DFU** [See below / **8** / 0~18]		
			Range	0	400 x 400 dpi
				1	391 x 406 dpi
				2	406 x 391 dpi
				4	300 x 300 dpi
				8	**600 x 600 dpi**
				15	439 x 430 dpi
				16	476 x 476 dpi
				17	483 x 465 dpi
				18	465 x 483 dpi
2112		Polygon Motor Off Timer	Input the time that the polygon motor is to switch off after the printer has remained idle for the specified time and entered the standby mode. *If set to zero, the polygon motor never switches off in standby mode. However, if the machine enters the energy saver mode, the polygon motor will ignore the zero setting and switch itself off.* [0~60 s / **10 s** / 5 s step]		
2201*		Development Bias Adjustment			
	1*	Development Bias	Adjusts the development bias for copying. *Use as a temporary measure to correct faint copies from an aging drum.* [200~700 / **600V** / 10V step]		
	2*	ID Sensor Pattern	Adjusts the development bias for the ID sensor pattern for V_{SP} [200~700 / **380V** / 10V step]		
2207		Forced Toner Supply	Forces the toner bottle to supply toner at 1-second intervals for up to 30 seconds. To start, press #.		
2208*	1*	Toner Supply Mode	Selects the toner mode. **0**: Sensor control 1: Image pixel count. *If you select 1, SP2-209-002 should be set to its default value. Use image pixel count modes only as a temporary measure if the ID or TD sensor is defective.*		
2209*		Toner Supply Rate	Adjusts the toner supply rate.		
	1*	Toner Rate	Sets the amount of toner supplied every second by the toner supply motor. *Increasing this value reduces the toner supply clutch on time. Use a lower value if the user tends to make lots of copies that have a high proportion of black.* [10~800 mg/s / **60 mg/s** / 5 mg/s step]		

SP2	Mode Number		Function and [Setting]
2209*	2*	Toner Supply Correction Data	Displays the toner supply correction coefficient (K). It can also be used to adjust K, but the value is changed again when VT is measured for the next copy. *The toner supply rate depends on the amount of toner in the toner bottle. This change is corrected using this coefficient. This SP can be used to check the toner supply condition. The lower the value of K, the lower the toner density.* [25 ~300 / **300** / 25 step]
2210*		ID Sensor Pattern Interval	Sets the interval between ID sensor pattern prints. *This setting allows adjustment for customers who do not make many copies daily. The zero value disables this setting.* [0~200 / **10** / 1 copy step]
2213*	1*	Copies After Toner Near-End	Selects the number of copies that can be printed once the copier has detected toner near-end. Select 1 or 2 if the customer normally makes copies of high density. **0**: 90 copies 1: No copies 2: 10 copies
2220*		Vref Manual Setting	Adjusts the TD sensor reference voltage (Vref). [1.0 ~ 5.00 V / **4.00V** / 0.01V step]
		Change this value after replacing the development unit with another unit that contains toner. *1. Check the value of SP2-220 in both the machine containing the test unit and the machine that you are going to move it to.* *2. Install the test development unit, and then input the VREF for this unit into SP2-220.* *3. After the test, put back the old development unit, and change SP2-220 back to the original value.*	
2223*		Vt Display	Displays the TD sensor output voltage for each copy.
	1*	Current	Displays the TD sensor output voltage for the immediately previous copy.
	2*	Average Previous 10 copies	Displays the average of the most recent TD sensor outputs (from the previous 10 copies).
	3*	Rate of Change	Displays the rate of change in the TD sensor output.
	4*	GAIN	Displays the GAIN value used to calculate the on time for the toner supply motor.
	5*	Image Pixel Count	Displays the image pixel count.
2301*		Transfer Current Adjustment	Adjusts the current applied to the transfer belt during copying the 5 phases listed below.
	1*	1st Side of Paper	Printing the first side of the paper (image area). *If the user uses thicker paper, the current may have to be increased to ensure sufficient transfer of toner.* [20~100μA / **35** (B004/B007: **45**) / 1μA step]
	2*	2nd Side of Paper	Printing the second side of the paper (image area). [20~100μA / **35** (B004/B007: **40**) / 1μA step]

SP2	Mode Number		Function and [Setting]
2301*	3*	Leading Edge	Copying at leading edge of the paper. *Increase the current to separate the paper from the drum properly in high humidity and high temperature conditions.* [20~100μA / **35** (B004/B007: **45**) / 1μA step]
	4*	By-pass Feed	Copying from the by-pass tray (image area). *If the user normally feeds thicker paper from the bypass tray, use a higher setting.* [20~100μA / **35** (B004/B007: **45**) / 1μA step]
	5*	Leading Edge By-pass Feed	Copying at the leading edge of paper fed from the by-pass tray. *Increase the current to separate the paper from the drum properly in high humidity and high temperature conditions*. [20~100μA / **45** (B004/B007: **60**) / 1μA step]
2309*		Transfer Current Correction	Corrects the transfer current for the items below.
	1*	Paper Lower Width (a)	Adjusts the lower paper width threshold for the transfer current, charge voltage, and development bias corrections. *Use this SP when an image problem (e.g., insufficient toner transfer) occurs with a small width paper. If the paper width is smaller than this value, the transfer current will be multiplied by the factor in SP2-309-3 (paper tray) or SP2-309-5 (by-pass).* [0~297 / **150** / 1 mm step]
	2*	Paper Upper Width (b)	Adjusts the upper paper width threshold for the transfer current, charge voltage, and development bias corrections. *As for SP2-309-1, but the factors are in SP2-309-4 (paper tray) and SP2-309-6 (by-pass).* [0~297 / **216** / 1 mm step]
	3*	Paper Tray (α)	Adjusts the transfer current correction coefficient used if the paper width is less than the setting of SP2-309-1. [1.0~3 / **1.2** / 0.1 mm step]
	4*	Paper Tray (β)	Adjusts the transfer current correction coefficient used if the paper width is less than the setting of SP2-309-2. [1.0~3 / **1.2** / 0.1 mm step]
	5*	By-Pass Feed (γ)	Adjusts the transfer current correction coefficient used if the paper width is less than the setting of SP2-309-1. [1.0~3 / **1.5** / 0.1 mm step]
	6*	By-Pass Feed (δ)	Adjusts the transfer current correction coefficient used if the paper width is less than the setting of SP2-309-2. [1.0~3 / **1.5** / 0.1 mm step]
2801*		TD Sensor Initial Setting	Performs the TD sensor initial setting. This SP mode controls the voltage applied to the TD sensor to make the TD sensor output about 4.0 V. Press 1 to start. After finishing this, the TD sensor output voltage is displayed. *Use this mode only after installing the machine, changing the TD sensor, or adding new developer.*

SP2	Mode Number		Function and [Setting]
2802*		TD Sensor Manual Setting	Allows you to adjust the TD sensor output manually for the following.
	1*	VTS	Adjusts the TD sensor output (VT). *Change this value after replacing the development unit with another one that already contains toner. For example, when using a development unit from another machine for test purposes. To adjust VT, use a similar procedure as for SP2-220.* [1.00~5.00V / **4.78V** / 0.02V step]
	2*	VTMAX	Adjusts the maximum value for SP2-802-1. [1.00~5.00V / **4.78**V / 0.02V step]
	3*	VTMIN	Adjusts the minimum value for SP2-802-1. [1.00~5.00V / **1.00V** / 0.02V step]
2805		Developer Initialization	Performs the developer initialization. Press 1 to start. *This SP should be performed after doing SP2-801-1 at installation and after replacing the drum.*
2902	2	IPU Test Pattern	Prints the test patterns for the IPU chip. (☛ 5.1.3) [0~15 / **0** / 1 step] *This SP mode is useful for finding whether the BICU or the SBU is defective. If the printout is not OK, the BICU is defective.*
	3	Printing Test Pattern	Prints the printer test patterns. Select the number of the test pattern that you want to print. (☛ 5.1.3) [0~38 / **0** / 1 step] *This SP mode is useful for finding whether the LDDR or the BICU is defective. If the printout is not satisfactory, the LDDR is defective.* [0~38 / **0**]
2909*		Main Scan Magnification	
	1*	Copier	Adjusts the magnification in the main scan direction for copy mode. Press # to toggle ±. [–2.0~+2.0 / **0** / 1% step]
	2*	Printer	Adjusts the magnification in the main scan direction when printing from a personal computer. Press # to toggle ±. [–2.0~+2.0 / **0** / 1% step]
2911		Transfer Current On/Off Timing	Adjusts the transfer current timing for the three items below.
	1	La (On Timing)	On timing at leading edge. [–30~+30 / **0 mm** / 1 mm step]
	2	Lb (Switch Timing)	Transfer current switch timing. This determines when the leading edge stops and the image area current begins (see SP2-301). [0~+30 / **10 mm** / 1 mm step]
	3	Lc (Off Timing)	Transfer current timing (e.g. –5 mm) is 5 mm after the trailing edge. [–30~+30 / **– 5 mm** / 1 mm step]
2912	***1***	Drum Reverse Rotation Interval	**DFU**.

SP2	Mode Number		Function and [Setting]
2913*	***1****	Print Density for Test Pattern	Sets the print density for the patterns printed with SP2-902-3. [0~15 / **15** / 1]
2914*		Process Control Setting – By-pass	Adjusts the charge roller voltage for the following items.
	1*	Cα	Adjusts the charge roller voltage used when paper with a small width is fed from the by-pass tray. The paper width below which the correction starts depends on the value of SP2-309-1. *Use this SP when an image problem (such as white spots at the center of black dots or breaks in thin black lines) occurs when paper with a small width is fed from the by-pass feed tray.* [0 ~ 400 / **250** / 10V step]
	2*	Cβ	Adjusts the charge roller voltage used when paper with a small width is fed from the by-pass tray. The paper width below which the correction starts depends on the value of SP2-309-2. *Use this SP when an image problem (see 2-914-1) occurs when paper with a small width is fed from the by-pass feed tray.* *[0 ~ 400 / **50** / 10V step]*
	3*	Bγ	Adjusts the development bias used when paper with a small width is fed from the by-pass tray. The paper width below which the correction starts depends on the value of SP2-309-1. *Use this SP when an image problem (see 2-914-1) occurs when paper with a small width is fed from the by-pass feed tray.* *[0 ~ 300 / **200** / 10V step]*
	4*	Bδ	Adjusts the development bias used when paper with a small width is fed from the by-pass tray. The paper width below which the correction starts depends on the value of SP2-309-2. *Use this SP when an image problem (see 2-914-1) occurs when paper with a small width is fed from the by-pass feed tray.* *[0 ~ 300 / **50** / 10V step]*
2920		LD Off Check	**DFU**
2960*		Toner Overflow Sensor	Selects whether the toner overflow sensor is activated or not. 0 = No, **1** = Yes
2964*	***1****	Transfer Cleaning Blade Forming	Applies a pattern of toner to the transfer belt at a defined interval between sheets on the transfer belt in order to reduce friction between the belt surface and the cleaning blade. [0 ~ 30/ **3** / 1 sheets] *Under conditions of high temperature and high humidity, the density control feature may reduce the amount of toner, which also reduces the amount of toner on the surface of the transfer belt. With less toner on the belt, the coefficient of friction (μ) between the belt and the blade increases, and could cause the blade to bend or scour the surface of the belt.*

SP2	Mode Number		Function and [Setting]
2969*		LD – PWM Selection	
	1*	Printer Output LD – PWM Selection	Changes the LD power PWM control for printed copies. A smaller value produces a lighter image. *Use this SP to adjust the image density for printing from a personal computer or printing a received fax message.* [1 ~ 5 / **1** / 1 step]
	2*	Fax Output LD – PWM Selection	Changes the LD power PWM control for printed fax messages. A smaller value produces a lighter image *Use this SP to adjust the image density for printing fax messages.* [1 ~ 5 / **1** / 1 step]
2971		Toner Full Sensor Count	**DFU**
2972*		Grayscale Limit	A new feature of this machine that controls the halftone density level to prevent deterioration of the OPC. The halftone density is detected by the ID sensor, and the machine adjusts the intensity of the LD beam according to the upper/lower limit setting.
	1*	Upper Limit	Defines the upper limit for grayscale. *A larger value allows a wider range of halftones at the pale end of the scale. If the image contains pale areas with fuzzy borders surrounded by dark areas, reduce this value to make the borders clearer.* [0 ~ 100 / **85** / 1 step]
	2*	Lower Limit	Defines the lower limit for grayscale. *A smaller value allows a wider range of halftones at the dark end of the scale.* [0 ~ 100 / **65** / 1 step]
2973*	***1****	Grayscale Copy Interval Check	Sets the halftone operation interval in order to prevent deterioration of the OPC. If the number of copies exceeds this setting, at the end of the job, or if the door is opened and closed, charge correction is executed. [0 ~ 1000 / **100** / 10 step]
2974*	***1****	Image Density Adjustment	Adjusts image density. Changing this setting adjusts development bias and ID sensor output voltage that in turn raises or lowers image density. [1 ~ 5 / **3** / 1 step]
2980*		Charge Counter	Sets the number of pages to print after toner and carrier initialization before the charge input is increased to compensate for deterioration over time in the polarity of the carrier. [0 ~ 1000000 / **0** / 1 step] *The strength in the polarity of the carrier in the toner will eventually decrease and cause lower charge output. Setting the charge output to increase after a specified number of copies can compensate for this effect.*

SP3-xxx: Process

SP3	Mode Number		Function and [Setting]
3001*		ID Sensor Initial Setting	
*	1*	ID Sensor PWM Setting	Allows you to reset the PWM of the ID sensor LED to avoid a service call error after clearing NVRAM or replacing the NVRAM. [0 ~ 255 / **100** / 1 step] *The PWM data is stored by executing SP-3001-2.*
	2*	ID Sensor Initialization	Performs the ID sensor initial setting. ID sensor output for the bare drum (V_{SG}) is adjusted automatically to 4.0 ±0.2 V. *Press ① to start. Perform this setting after replacing or cleaning the ID sensor, replacing the drum, or clearing NVRAM.*
3103*		ID Sensor Output Display	Displays the current V_{SG}, V_{SP}, V_{SDP}, and grayscale control.
	1*	Vsg (Drum Surface Output)	[0V ~ 5.00V] If the ID sensor does not detect the ID pattern, V_{SP} = 5.0 V/V_{SG} = 5.0 V is displayed and an SC code is generated. If the ID sensor does not detect the bare area of the drum, V_{SP} = 0.0 V/V_{SG} = 0.0 V is displayed and an SC code is generated.
	2*	Vsp (Pattern Output)	
	3*	Vpdp (Immediate Post-Pattern Output).	
	4*	Vsm/Vsg (Immediate Grayscale Post-Pattern Output)	

SP4-xxx: Scanner

SP4	Mode Number		Function and [Setting]
4008*		Scanner Sub Scan Magnification	Adjusts the magnification of the sub scan direction during scanning. Changing this value changes the scanner motor speed. Press ⊙ to toggle ±. [–0.9 ~ 0.9 / **0.0** / 0.1 mm step]
4010*		Scanner Leading Edge Registration	Adjusts the leading edge registration for scanning. Press ⊙ to toggle ±. *As you enter a negative value, the image moves toward the leading edge.* [–0.9 ~ 0.9 / **0.0** / 0.1 mm step]
4011*		Scanner Side-to-Side Registration	Adjusts side-to-side registration for scanning. Press ⊙ to toggle ±. *As you enter negative values, the image will disappear at the left, and as you enter positive values, the image will appear at the left.* [–4.6 ~ +4.6 / **0.0** / 0.1 mm step]
4012*		Scanner Erase Margin	Adjusts scanning margins for the following items. Do not adjust unless the customer desires a scanner margin greater than the printer margin.
	1*	Leading Edge	Adjusts leading edge erase margin for sub scanning. Specification: 3 ± 2 mm [0 ~ 9 / **1.0** / 0.1 mm step]
	2*	Trailing Edge	Adjusts trailing edge erase margin for sub scanning. Specification: 2 ± 2 mm [0 ~ 9 / **0.5** / 0.1 mm step]
	3*	Right	Adjusts right margin for main scanning. Specification: +2.5 ~ -1.5 mm [0 ~ 9 / **0.5** / 0.1 mm step]
	4*	Left	Adjusts left margin for main scanning. Specification: 2 ± 1.5 mm [0 ~ 9 / **1.0** / 0.1 mm step]
4013		Scanner Free Run	Performs a scanner free run with the exposure lamp off.
4301		APS Sensor Output Display	Displays the time required to detect the size of the paper on the scanner exposure glass. Asterisks (*) are displayed if the size cannot be detected. (☛ Chap. 6, "Original Size Detection in Platen Mode". *Dimensions are displayed in inches for North America and in mm for other areas.*
4303*		APS A5/LT Size Detection	Determines whether the original is A5/HLT size when the APS sensor does not detect the original size. **0**: not detected, 1: A5 length 5½ x 8½ *If 1 is selected, paper sizes that cannot be detected are regarded as A5 lengthwise. If 0 is selected, "Cannot detect original size" will be displayed.*

SP4	Mode Number		Function and [Setting]
4305*	8K/16K Detection		Selects whether or not the copier determines that the original is 8K/16K size when the APS sensor does not detect the original size. This SP is intended for use with 8K/16K Chinese paper sizes only. **For Chaina/Taiwan area:** [0,1 /**0**/1] 0: 8k/16k not detected – Non-standard size 1: 8K, 16K paper size detect enabled **Other areas:** [0,1 /**0**/1] 0: 8k/16k not detected - Non-standard size 1: 8k/16k not detected - Non-standard size
4307*		APS Sensor Output Display	Determines whether or not the original size is detected while the exposure lamp lights during initialization. 0 ~ 1 /**1** / 1 step 0: Original size detection at power on disabled. 1: Original size detection at power on enabled.
4428	***1***	Flag Display	**DFU**
	2	Start	**DFU**
	3	Flag Reset	**DFU**
4901*	***1***	Image Data Path Setting	**DFU**
	2	Read ASIC ID	**DFU**
	3	BK Adjustment	**DFU**
	4	EO Adjustment	**DFU**
	5	Dummy Range Adjustment	**DFU**
	6	Range Adjustment	**DFU**
	7	Gain Adjustment – Ech	**DFU**
	8	Gain Adjustment – Och	**DFU**
	9	Dummy Range Adjustment	**DFU**
	10	Range Adjustment	**DFU**
	11	Scan-Apli. Gain Adjustment – Ech	**DFU**
	12	Scan-Apli. Adjustment – Och	**DFU**
	13	Standard White Level Adjustment	**DFU**
	14	Overflow Flag	**DFU**
	15	Time-Out Flag	**DFU**
	16	Error Flag	**DFU**
	17	SBU Reset Error Flag	**DFU**
	18*	Range Adjustment	**DFU**
	19*	Gain Adjustment – Ech at Factory	**DFU**
	20*	Gain Adjustment – Och at Factory	**DFU**
	21*	Standard White Level Adjustment at Factory	**DFU**

SP4	Mode Number		Function and [Setting]
4901*	***22****	A/D Standard Voltage in AE Mode	**DFU**
	23*	BK Adjustment	**DFU**
	24*	EO Adjustment	**DFU**
	26*	Range Adjustment	**DFU**
	27*	Gain Adjustment – Ech	**DFU**
	28*	Gain Adjustment – Och	**DFU**
	29*	Apli. Dummy Range Adjustment	**DFU**
	30*	Apli. Range Adjustment	**DFU**
	31*	Apli. Gain Adjustment – Ech	**DFU**
	32*	Apli. Gain Adjustment – Och	**DFU**
	33	Dummy Gain Adjustment – Ech	**DFU**
	34	Dummy Gain Adjustment – Och	**DFU**
4903*		Filter Setting	
	5	Full Size Mode	Selects whether the copy is always full size, even if the magnification ratio has been changed. Set to 1 to check the main scan magnification. If the magnification is not 100%, the image processing circuits could be malfunctioning. [0~1 / **0** / 1 step] 0: Normal operation 1: Always full-size mode
	7	Image Shift in Magnification	Adjusts the amount of pixel shift in the main scan direction in the magnification mode. [0~7680 / **0** / 1 step] **DFU**
	8*	Fax 25%, 50% Reduction	Determines whether 25% and 50% reduction is available in the fax mode. [0~1 / **0** / 1 step] **DFU** 0: Available 1: Not available
	9*	Filter Type Selection – Photo Mode	Selects the filter to be used for originals that contain photos. [0~1 / **1** / 1 step] 0: Selects MTF correction for continuous grayscale photos. To set the MTF coefficient and strength, set: SP4-903-036 SP4-903-038 1: Selects smoothing for originals that contain dithered images. If you select 1, set the filter smoothing coefficient with: SP4-903-037

SP4	Mode Number		Function and [Setting]
4903*	***10****	Pre-Filter: Text 25%~64%	Selects the Pre-Filter coefficient in the main scan direction for text mode. Pre-filter emphasizes lines parallel to the direction of feed. (☛ Chap.6, "Image Processing". [0~3 / **0** / 1 step] *Increasing this value strengthens smoothing but can also increase the occurrence of moiré and reduce sharpness.*
	11*	Pre-Filter: Text 65%~154%	Selects the Pre-Filter coefficient in the main scan direction for text mode. Pre-filter emphasizes lines parallel to the direction of feed. (☛ Chap.6, "Image Processing". [0~3 / **0** / 1 step] *Increasing this value strengthens smoothing but can also increase the occurrence of moiré and reduce sharpness.*
	12*	Pre-Filter: Photo	Selects the Pre-Filter coefficient in the main scan direction for photo mode. (☛ Chap.6, "Image Processing". [0~3 / **0** / 1 step]
	13*	Pre-Filter: Text/Photo 25%~64%	Selects the Pre-Filter coefficient in the main scan direction for text/photo mode (25%~64%) emphasizes lines parallel to the direction of feed. (☛ Chap.6, "Image Processing". [0~3 / **1** / 1 step] *Increasing this value strengthens smoothing but can also increase the occurrence of moiré and reduce sharpness.*
	14*	Pre-Filter: Text/Photo 65%~154%	Selects the Pre-Filter coefficient in the main scan direction for text/photo mode (65%~154%) and emphasizes lines parallel to the direction of feed. (☛ Chap.6, "Image Processing". [0~3 / **0** / 1 step] *Increasing this value strengthens smoothing but can also increase the occurrence of moiré and reduce sharpness.*
	15*	Pre-Filter: Light	Selects the Pre-Filter coefficient in the main scan direction for low density mode and enhances lines parallel to the direction of feed. (☛ Chap.6, "Image Processing". [0~3 / **0** / 1 step] *Increasing this value strengthens smoothing but can also increase the occurrence of moiré and reduce sharpness.*
	16*	Pre-Filter: Generation	Selects the Pre-Filter coefficient in the main scan direction for copied original mode emphasizes lines parallel to the direction of feed. (☛ Chap.6, "Image Processing". [0~3 / **0** / 1 step] *Increasing this value strengthens smoothing but can also increase the occurrence of moiré and reduce sharpness.*

SP4	Mode Number		Function and [Setting]
4903*	***18****	Black Streaking Correction	Corrects streaks, black lines is copies caused by a dirty platen or scanning glass. [0~8 / **0** / 1 step] 0: Off (no black streaking adjustment is performed) *Select a higher value (1 to 8) to eliminate black streaking. However, raising the value could lighten parts of the image or cause part of the image or text to drop out.*
	20*	Filter Level: Text 25%~64%	Selects the MTF filter coefficient for the text mode in the main scan direction. [0~15 / **9** / 1 step]
	21*	MTF Filter Level: Text 25%~64%	Selects the MTF filter coefficient for the text mode in the sub scan direction. [0~13 / **13** / 1 step]
	22*	Filter Strength: Text 25%~64%	Selects the MTF filter strength in the main scan direction for the text mode. [0~7 / **2** / 1 step]
	23*	MTF Filter Strength: Text 25%~64%	Selects the MTF filter strength in the sub scan direction for the text mode. [0~7 / **2** / 1 step]
	24*	Filter Level: Text 65%~154%	Selects the MTF filter coefficient for the main scan direction in the text mode. [0~15 / **12** / 1 step]
	25*	MTF Filter Level: 65%~154%	Selects the MTF filter coefficient for the sub scan direction in the text mode. [0~13 / **13** / 1 step]
	26*	Filter Strength: 65%~154%	Selects the MTF filter strength for the main scan direction in the text mode. [0~7 / **2** / 1 step]
	27*	MTF Filter Strength: Text 65%~154%	Selects the MTF filter strength for the sub scan direction in the text mode. [0~7 / **2** / 1 step]
	28*	Filter Level: Text 155%~256%	Selects the MTF filter coefficient for the main scan direction in the text mode. [0~15 / **14** / 1 step]
	29*	MTF Filter Level: Text 155%~256%	Selects the MTF filter coefficient for the sub scan direction in the text mode. [0~13 / **13** / 1 step]
	30*	Filter Strength Text: 155%~256%	Selects the MTF filter strength for the main scan direction in the text mode. [0~7 / **2** / 1 step]
	31*	MTF Filter Strength: Text 155%~256%	Selects the MTF filter strength for the sub scan direction in the text mode. [0~7 / **2** / 1 step]
	32*	Filter Level: Text 257%~400%	Selects the MTF filter coefficient for the sub scan direction in the text mode. [0~15 / **15** / 1 step]
	33*	MTF Filter Level: 257%~400%	Selects the MTF filter coefficient for the sub scan direction in the text mode. [0~13 / **13** / 1 step]

SP4	Mode Number		Function and [Setting]
4903*	34*	MTF Filter Strength: Text 257%~400%	Selects the MTF filter strength for the main scan direction in the text mode. [0~7 / **2** / 1 step]
	35*	MTF Filter Strength: Text 257%~400%	Selects the MTF filter strength for the sub scan direction in the text mode. [0~7 / **2** / 1 step]
	36*	MTF Filter in Photo Mode	Selects the MTF filter coefficient for the main scan direction in the photo mode. Use this setting to eliminate moiré from continuous grayscale images and sharpen images. [0~6 / **0** / 1] *This item is enabled only after 0 has been selected for SP-4-903-009 to switch on MTF correction.*
	37*	Smoothing Filter in Photo Mode	Selects the filter coefficient for smoothing in the photo mode. The higher the number you select, the greater the applied smoothing effect. [0~7 / **2** / 1] *This item is enabled only after 1 has been selected for SP-4-903-009 to switch on smoothing.*
	38*	Filter Strength: Photo Mode	Selects the MTF filter strength for the sub scan direction in the photo mode. Select a higher number for stronger application of the filter. [0~7 / **1** / 1 step] 0: 1/32x 2: 1/8x 4: 1/2x 6: 2x 1: 1/16x 3: 1/4x 5: 1x 7: 4x
	39*	Filter Level: Text/Photo 25%~64%	Selects the MTF filter coefficient in the main scan direction in the text/photo mode. Select a higher number for stronger application of the filter. However, increasing the value could increase the incidence of moiré. [0~15 / **9** / 1 step]
	40*	MTF Filter Level: Text/Photo 25%~64%	Selects the MTF filter coefficient in the sub scan direction in the text/photo mode. Select a higher number for stronger application of the filter. However, increasing the value could increase the incidence of moiré. [0~13 / **10** / 1 step]
	41*	Filter Strength: Text/Photo 25%~64%	Selects the MTF filter strength in the main scan direction in the text/photo mode. Select a higher number for stronger application of the filter. However, increasing the value could increase the incidence of moiré. [0~7 / **1** / 1 step] 0: 1/32x 1: 1/16x 2: 1/8x 3: 1/4x 4: 1/2x 5: 1x 6: 2x 7: 4x

Service Tables

SP4	Mode Number		Function and [Setting]
4903*	42*	MTF Filter Strength: Text/Photo 25%~64%	Selects the MTF filter strength in the sub scan direction in the text/photo mode. Select a higher number for stronger application of the filter. However, increasing the value could increase the incidence of moiré. [0~7 / **1** / 1 step] 0: 1/32x 1: 1/16x 2: 1/8x 3: 1/4x 4: 1/2x 5: 1x 6: 2x 7: 4x
	43*	Filter Level: Text/Photo 65%~154%	Selects the MTF filter coefficient in the main scan direction in the text/photo mode. Select a higher number for stronger application of the filter. However, increasing the value could increase the incidence of moiré. [0~15 / **10** / 1 step]
	44*	MTF Filter Level: Text/Photo 65%~154%	Selects the MTF filter coefficient in the sub scan direction in the text/photo mode. Select a higher number for stronger application of the filter. However, increasing the value could increase the incidence of moiré. [0~13 / **13** / 1 step]
	45*	MTF Filter Strength: Text/Photo 64%~154%	Selects the MTF filter strength in the main scan direction in the text/photo mode. Select a higher number for stronger application of the filter. However, increasing the value could increase the incidence of moiré. [0~7 / **1** / 1 step] 0: 1/32x 1: 1/16x 2: 1/8x 3: 1/4x 4: 1/2x 5: 1x 6: 2x 7: 4x
	46*	MTF Filter Strength: Text/Photo 65%~154%	Selects the MTF filter strength in the sub scan direction in the text/photo mode. Select a higher number for stronger application of the filter. However, increasing the value could increase the incidence of moiré. [0~7 / **1** / 1 step] 0: 1/32x 1: 1/16x 2: 1/8x 3: 1/4x 4: 1/2x 5: 1x 6: 2x 7: 4x
	47*	Filter Level: Text/Photo 155%~256%	Selects the MTF filter coefficient in the main scan direction in the text/photo mode. Select a higher number for stronger application of the filter. *However, increasing the value could increase the incidence of moiré.* [0~15 / **14** / 1 step]
	48*	MTF Filter Level: Text/Photo 155%~256%	Selects the MTF filter coefficient in the sub scan direction in the text/photo mode. Select a higher number for stronger application of the filter. However, increasing the value could increase the incidence of moiré. [0~13 / **13** / 1 step]

SP4	Mode Number		Function and [Setting]
4903*	49*	Filter Strength: Text/Photo 155%~256%	Selects the MTF filter strength in the main scan direction in the text/photo mode. Select a higher number for stronger application of the filter. However, increasing the value could increase the incidence of moiré. [0~7 / **1** / 1 step] 0: 1/32x 1: 1/16x 2: 1/8x 3: 1/4x 4: 1/2x 5: 1x 6: 2x 7: 4x
	50*	MTF Filter Strength: Text/Photo 155%~256%	Selects the MTF filter strength in the sub scan direction in the text/photo mode. Select a higher number for stronger application of the filter. *However, increasing the value could increase the incidence of moiré.* [0~7 / **1** / 1 step] 0: 1/32x 1: 1/16x 2: 1/8x 3: 1/4x 4: 1/2x 5: 1x 6: 2x 7: 4x
	51*	Filter Level: Text/Photo 257%~400%	Selects the MTF filter coefficient in the main scan direction in the text/photo mode. Select a higher number for stronger application of the filter. *However, increasing the value could increase the incidence of moiré.* [0~15 / **9** / 1 step]
	52*	MTF Filter Level: Text/Photo 257%~400%	Selects the MTF filter coefficient in the sub scan direction in the text/photo mode. Select a higher number for stronger application of the filter. *However, increasing the value could increase the incidence of moiré.* [0~13 / **10** / 1 step]
	53*	Filter Strength: Text/Photo 257%~400%	Selects the MTF filter strength in the main scan direction in the text/photo mode. Select a higher number for stronger application of the filter. *However, increasing the value could increase the incidence of moiré.* [0~7 / **2** / 1 step] 0: 1/32x 1: 1/16x 2: 1/8x 3: 1/4x 4: 1/2x 5: 1x 6: 2x 7: 4x
	54*	MTF Filter Strength: Text/Photo 257%~400%	Selects the MTF filter strength in the sub scan direction in the text/photo mode. Select a higher number for stronger application of the filter. *However, increasing the value could increase the incidence of moiré.* [0~7 / **2** / 1 step] 0: 1/32x 1: 1/16x 2: 1/8x 3: 1/4x 4: 1/2x 5: 1x 6: 2x 7: 4x
	55*	Filter Level: Light Original	Selects the MTF filter coefficient in the low-density mode. *Although selecting a larger number strengthens application of the filter and improves contrast, it could also increase the incidence of moiré.* [0~6 / **6** /1]

SP4	Mode Number		Function and [Setting]
4903*	56*	Filter Strength: Light Original	Selects the MTF filter strength in the low-density mode. *Although selecting a larger number strengthens application of the filter and improves contrast, it could also increase the incidence of moiré.* [0~7 / **3** /1 step] 0: 1/32x 1: 1/16x 2: 1/8x 3: 1/4x 4: 1/2x 5: 1x 6: 2x 7: 4x
	57*	Filter Level: Generation Copy	Selects the MTF filter coefficient for the copied original mode. Select a higher number for stronger application of the filter. *Although selecting a larger number strengthens application of the filter and improves contrast, it could also increase the incidence of moiré.* [0~6 / **3** /1 step]
	58*	Filter Strength: Generation Copy	Selects the MTF filter strength for the copied original mode. Select a higher number for stronger application of the filter. *Although selecting a larger number strengthens application of the filter and improves contrast, it could also increase the incidence of moiré.* [0~7 / **2** / 1 step] 0: 1/32x 1: 1/16x 2: 1/8x 3: 1/4x 4: 1/2x 5: 1x 6: 2x 7: 4x
	60*	Independent Dot Erase: Text Mode	Selects the independent dot erase level for the text mode. *A larger value erases more dots. If zero is selected, independent dot erase is disabled.* [0~15 / **5** / 1 step]
	62*	Independent Dot Erase: Text/Photo	Selects the independent dot erase level for the text/photo mode. *A larger value erases more dots. If zero is selected, independent dot erase is disabled.* [0~15 / **0** / 1 step]
	63*	Independent Dot Erase: Light Original	Selects the independent dot erase level for the light original mode. *A larger value erases more dots. If zero is selected, independent dot erase is disabled.* [0~15 / **0** / 1 step]

SP4	Mode Number		Function and [Setting]
4903*	64	Independent Dot Erase: Generation Copy	Selects the independent dot erase level for the generation copy mode. *A larger value erases more dots. If zero is selected, independent dot erase is disabled.* [0~15 / **8** / 1 step]
	65*	Background Erase Level: Text Mode	Adjusts the threshold for background erase for the text mode. A larger value reduces dirty background. If zero is selected, background erase is disabled. [0~255 / **10** / 1 step]
	66*	Background Erase Level: Photo	Adjusts the threshold for background erase for the photo mode. A larger value reduces dirty background. If zero is selected, background erase is disabled. [0~255 / **0** / 1 step]
	67*	Background Erase Level: Text /Photo	Adjusts the threshold for background erase for the text/photo mode. A larger value reduces dirty background. If zero is selected, background erase is disabled. [0~255 / **0** / 1 step]
	68*	Background Erase Level: Light Original	Adjusts the threshold for background erase for the light original mode. A larger value reduces dirty background. If zero is selected, background erase is disabled. [0~255 / **10** / 1 step]
	69*	Background Erase Level: Generation Copy	Adjusts the threshold for background erase for the generation copy mode. A larger value reduces dirty background. If zero is selected, background erase is disabled. [0~255 / **20** / 1 step]
	70*	Edge Detection: Text	Selects edge detection for the text mode (65%~154%). Edge detection applies MTF correction only to edges. [0~1 / **0** / 1 step] **0**: Edge detection not conducted. 1 Conducts edge detection processing.
	71*	Edge Detection: Text/Photo	Selects edge detection for the text/photo mode (65%~154%). Edge detection applies MTF correction only to edges. [0~1 / **0** / 1 step] **0**: Edge detection not conducted. 1 Conducts edge detection processing.
	72*	Edge Detection Threshold Value: Text	Selects the threshold value for edge detection for the text mode (65%~154%). [0~8 / **4** / 1 step] *The larger the value, the easier the edge detection and the better the text quality.* *The lower the value, the more difficult the edge detection and the better the pattern quality. As MTF correction is applied only to edges, this function is effective in reducing moiré. However, a higher value could cause image quality to deteriorate as a result of erroneous edge detection output.*

<table>
<tr><th>SP4</th><th colspan="2">Mode Number</th><th colspan="4">Function and [Setting]</th></tr>
<tr><td rowspan="20">4903*</td><td>73*</td><td>Edge Detection Threshold Value: Text/Photo</td><td colspan="4">Selects the threshold value for edge detection for the text/photo mode (65%~154%).
[0~8 / 4 / 1 step]</td></tr>
<tr><td>75*</td><td>Line Width Correction: Generation Mode</td><td colspan="4">Selects how line widths are corrected in the copied original mode for both the main and sub scan direction.
In copied original mode, lines may bulge in the main scan direction. Adjust until result is satisfactory.
[0~15 / 8 / 1 step]</td></tr>
<tr><td colspan="3"></td><td>Value</td><td>Main Scan Line Correction</td><td>Sub Scan Line Correction</td></tr>
<tr><td colspan="3"></td><td>1</td><td>None</td><td>Thin</td></tr>
<tr><td colspan="3"></td><td>2</td><td>None</td><td>Very thin</td></tr>
<tr><td colspan="3"></td><td>3</td><td>None</td><td>Thick</td></tr>
<tr><td colspan="3"></td><td>4</td><td>None</td><td>None</td></tr>
<tr><td colspan="3"></td><td>5</td><td>Very thin</td><td>Very thin</td></tr>
<tr><td colspan="3"></td><td>6</td><td>Very thin</td><td>Thin</td></tr>
<tr><td colspan="3"></td><td>7</td><td>Very thin</td><td>Thick</td></tr>
<tr><td colspan="3"></td><td>8</td><td>Thin</td><td>None</td></tr>
<tr><td colspan="3"></td><td>9</td><td>Thin</td><td>Very thin</td></tr>
<tr><td colspan="3"></td><td>10</td><td>Thin</td><td>Thin</td></tr>
<tr><td colspan="3"></td><td>11</td><td>Thin</td><td>Thick</td></tr>
<tr><td colspan="3"></td><td>12</td><td>Thick</td><td>None</td></tr>
<tr><td colspan="3"></td><td>13</td><td>Thick</td><td>Very thin</td></tr>
<tr><td colspan="3"></td><td>14</td><td>Thick</td><td>Thin</td></tr>
<tr><td colspan="3"></td><td>15</td><td>Thick</td><td>Thick</td></tr>
<tr><td>76*</td><td>Line Width Correction Threshold (Main Scan)</td><td colspan="4">Selects the threshold for line width detection in the main scan direction in the copied original mode.
[0~5 / 1 / 1 step]
Low: More difficult to thicken thin lines.
High: Easier to thicken thin lines.</td></tr>
<tr><td>77*</td><td>Line Width Correction Threshold (Sub Scan)</td><td colspan="4">Selects the threshold for line width detection in the sub scan direction in the copied original mode.
[0~5 / 1 / 1 step]
Low: More difficult to thicken thin lines.
High: Easier to thicken thin lines.</td></tr>
<tr><td>4904*</td><td></td><td>IPU Setting 1</td><td colspan="4"></td></tr>
<tr><td rowspan="6">2*</td><td rowspan="6">Gradation Processing Selection</td><td colspan="4">Selects the size of the dither matrix for the photo mode.
[0~4 / 2 / 1]</td></tr>
<tr><td>Value</td><td>Method</td><td>Lines</td><td>Effect</td></tr>
<tr><td>0</td><td>Error Diffusion</td><td></td><td>Best resolution</td></tr>
<tr><td>1</td><td>Dither 8 x 8</td><td>75</td><td>Screening</td></tr>
<tr><td>2</td><td>Dither 8 x 8</td><td>106</td><td>Best grayscale</td></tr>
<tr><td>3</td><td>Dither 6 x 6</td><td>142</td><td>Good grayscale</td></tr>
<tr><td>4</td><td>Dither 4 x 4</td><td>212</td><td>Good resolution</td></tr>
</table>

SP4	Mode Number		Function and [Setting]
4904*	3*	Density Setting for Low Density Original Mode	Selects the density γ factor for the low-density original mode. [0~1 / **0** / 1] **0**: Selects γ normal density. 1: Digitizes to near binary image. *Use to achieve better balance between text and images, correct shadows that appear around text in handwritten documents, to enhance documents written in pencil, or to achieve stark contrast when copying blueprints, building plans, etc.*
	4*	Density Setting for Copied Original Mode	Setting same as above. [0~1 / **0** /1 step]
	7*	Error Diffusion Pattern	Adjusts the threshold level for error diffusion processing in the text/photo mode. [0~2 / **0** / 1 step] **0**: No pattern (matrix) used. 1: Matrix 1 used. 2 Matrix 2 used. *Select zero for daily use. Select 1 or 2 to improve the texture.*
	12*	Binary Threshold Level	Selects the threshold value for binary digitization of the copied image. Image data equal to or greater than the value is processed as black; image data less than the value is processed as white. [0~255 / **128** / 1 step] *This feature is not used for copy applications. Other applications set for binary digital processing will use the SP as the default setting.*
	18*	Binary Dither Pattern	Selects the dithering threshold value for the pattern to be used in the photo mode during binary processing. [0~3 / **0** / 1 step] 0: 106 lines (8 x 8 matrix) 1: 141 lines (6 x 8 matrix) 2: 212 lines (8 x 8 matrix) 3: 268 lines (8 x 8 matrix)
4905		Image Data Path	
	1	Filtering/Magnification	**DFU**
	2	Gradation	**DFU**
	4	Printout Type Selection	**DFU**
4909		IPU Settings 2	
	1	IPU Module Skip Setting (Image Processing)	**DFU**
	17	Image Data Path – CDIC	**DFU**
	19	Image Data Path – Application	**DFU**
	20	Image Data Path – Printer	**DFU**

SP4	Mode Number		Function and [Setting]
4911		HDD	Enter the Copy SP mode, select the desired SP, and then press Execute on the touch panel. (☛ 5.1.1) **Note**: After execution, you must cycle the machine off and on with the main power switch.
	1	HDD Formatting (All)	Initializes the entire hard disk.
	2	HDD Formatting (IMH)	Initializes documents stored with the document servers, stamp print data, scanner send data, fax send data
	3	HDD Formatting (NFA)	Initializes NetFile thumbnail images.
	4	HDD Formatting (Job Log)	Initializes job logging data (for popular server)
	5	HDD Formatting (Printer Fonts)	Initializes printer and stored fonts.
	9	HDD Formatting (Debug)	**DFU**

.

SP5-xxx: Mode

SP5	Mode Number		Function and [Setting]
5024*		mm/inch Display Selection	Selects the unit of measurement. After selection, turn the main power switch off and on. 0: Europe/Asia 1: North America 0: mm, 1: inch
5044		Operation Panel Bit SW	**DFU**
5104*		A3/DLT Double Count	Specifies whether the counter is doubled for A3/DLT. **0: No**, 1: Yes *If ① is selected, the total counter and the current user code counter count up twice when A3 or DLT paper is used.*
5106*	6*	ADS Level Selection	Selects the image density level used in ADS mode. [1~7 / **4** / 1 notch per step] Example: If you set SP5-106-6 to "2": Pressing the Auto Image Density key toggles the display off and manual notch 2 is selected. *Adjust this SP if the customer cannot attain clean copies after performing automatic density adjustment.*
5112*		Non-Standard Paper Selection	Determines whether a non-standard paper size can be initialized for copying or not. **0: No**, 1: Yes If ① is selected, a non-standard size can be input using the UP mode.
5113*		Optional Counter Type	Selects the corresponding key for installed devices such as a coin lock. **Japan only** [0~5 / **0** / 1 step]
			0 None.
			1 Key card (RK3, RK4)
			2 Key card (subtraction count setting)
			3 Pre-paid card
			4 Coin lock
			5 MF key card
5118*		Disable Copying	**DFU**
5120*		Mode Clear Opt. Counter Removal	Clears all coin devices. **Japan only** [0~2 / 0 / 1 step] 0: Normal reset. 1: Resets only when job finished or before job begins. 2: Not normal reset.
5121*		Counter Up Timing	Determines whether the optional key counter counts up at paper feed or at paper exit. **0: Feed**, 1: Exit *The total counter is not affected by this SP mode.*
5127*		APS Mode	Selects whether the APS function is enabled or disabled with the contact of a pre-paid card or coin lock. **0: Enabled**, 1: Disabled

Service Tables

SP5	Mode Number		Function and [Setting]
5129*		F Paper Size Selection	Selects the "F" paper size [0~2 / **0** / 1 step] 0: 8" × 13" (L) 1: 8½" × 13" (L) 2: 8¼" × 13" (L)
5131*		Paper Size Type Selection	Selects the paper size (type) for both originals and copy paper. [0~2 / **DIP SW setting** / 1 step] 0: Japan 1: North America 2: Europe *After changing the setting, turn the copier off and on. If the paper size of the archive files stored on the HDD is different, abnormal copies could result.*
5150*		By-Pass Wide Paper Mode	Determines whether the transfer sheet from the by-pass tray is used or not. **0**: Off, 1: On *Normally the length for sub scanning paper from the by-pass tray is limited to 600 mm, but this can be extended with this SP to 1260 mm.*
5212*		Page Stamp	
	3*	Duplex Printout Right/Left Position	Determines how horizontal printing is executed during duplex printing. Sets the upper right corner of the front side and the upper left corner of the backside so the starting points for horizontal printing are the same on both sides **DFU.** [–10~+10 / **0** / 1 mm step] –10: Extreme right +10: Extreme left
	4*	Duplex Printout High/Low Position	Determines how vertical printing is executed during duplex printing. Sets the upper right corner of the front side and the upper left corner of the backside so the starting points for vertical printing are the same on both sides. **DFU** [–10~+10 / **0** / 1 mm step] –10: Extreme top +10: Extreme bottom
5302*	2*	Set Time	Adjusts the RTC time setting for the local time zone. [–1440~+1440 / 1 min. step] *Example: For Japan (+9 GMT), enter 540 (9 hours x 60 min.)*
5501*	1*	PM Alarm Interval	Sets the PM alarm interval. [0~255 / **0** / 1 step] **0**: Alarm off 1~255: Alarm goes off when *Value (1~255) x 1000 ≥ PM counter*

SP5	Mode Number		Function and [Setting]
5501*	2*	Original Count Alarm	Sets the alarm to sound after the specified total number of originals goes through the ARDF. **0: Disabled**, 1: Enabled 0: No alarm sounds 1: Alarm sounds after the number of originals passing through the ARDF ≥ 10,000
5504*		Jam Alarm	Sets the alarm to sound for the specified jam level (document mis-feeds are not included). **DFU** [0~3 / **3** / 1 step] 0: Zero (Off) 1: Low (2.5K jams) 2: Medium (3K jams) 3: High (6K jams)
5505*		Error Alarm	Sets the error alarm level. **Japan only** [0~255 / **ACV** / 100 copies per step]
5507*	1*	Paper Supply Alarm	Switches the control call on/off for the paper supply. **DFU** **0: Off**, 1: On 0: No alarm. 1: Sets the alarm to sound for the specified number transfer sheets for each paper size (A3, A4, B4, B5, DLT, LG, LT, HLT)
	2*	Staple Supply Alarm	Switches the control call on/off for the stapler installed in the finisher. **Japan only** **0: Off**, 1: On 0: No alarm 1: Alarm goes off for every 1K of staples used.
	3*	Toner Supply Alarm	Switches the control call on/off for the toner end. **DFU** **0: Off**, 1: On If you select "1" the alarm will sound when the copier detects toner end.
	128*	Others	The "Paper Supply Call Level: nn" SPs specify the paper control call interval for the referenced paper sizes. **DFU** [00250 ~ 10000 / 1000 / 1 Step]
	132*	A3	
	133*	A4	
	134*	A5	
	141*	B4	
	142*	B5	
	160*	DLT	
	164*	LG	
	166*	LT	
	172*	HLT	
5508*		CC Call	
	1*	Remain of Jam (Unattended Jam)	Switches the control call on/off for an unattended jam. **DFU** 0: Off, **1: On** If you select "1", the alarm sound if a jam is left unattended for 15 minutes.

SP5	Mode Number		Function and [Setting]
5508*	2*	Continuous Jam Occurrence	Switches the control call on/off for the occurrence of consecutive jams. **DFU** 0: Off, **1: On** If you select "1", the alarm will sound if 5 consecutive jams occur in the copier.
	3*	Continuous Door Open	Switches the control call on/off for the cover open alarm. **DFU** 0: Off, **1: On** If you select "1", the alarm will sound if the door remains open for 15 minutes.
5801*		Memory Clear	Resets all correction data for process control and all software counters, and returns all modes and adjustments to their default values. (☛ 5.1.8) *To execute, hold down 1 for over 3 seconds, and then turn the copier off and on again.* *Use this SP only after replacing the NVRAM, or after the copier has malfunctioned due to a damaged NVRAM.*
5802*		Printer Free Run	Performs a free run. The scanner scans once and the printer prints for the number of copies requested. To perform the free run, after selecting "1", press the Copy Window to enter copy mode, input the number of copies, and then press the Start key. To stop the free run, press C/⊘. **0: Off**, 1: On
5803		Input Check	Displays the signals received from sensors and switches. (☛ 5.1.4)
5804		Output Check	Turns on the electrical components individually for test purposes. (☛ 5.1.5)
5807		Option Connection Check	Checks the connectors to the optional peripheral devices. Execution will return either a "1" or "0": 0: Device not connected correctly. 1: Device connected correctly.
	1	ARDF	
	2	Bank (Paper Tray Unit)	
	3	LCT	
	4	Finisher (1000-sheet, Two-Tray finisher)	
5811*	1*	Machine Serial Number	Use to input the machine serial number. This is normally done at the factory. *If you want to know the serial number, print the system parameter list. Press # and then input "A".*
5812*		Service Tel. No. Setting	
	1*	Service Tel. Number	Use this to input the telephone number of the service representative. This number is displayed when a service call condition occurs. *Press the # key to input a pause. Press the "Clear modes" key to delete the telephone number.*

SP5	Mode Number		Function and [Setting]
5812*	2*	SMC Report Transfer Fax. No.	Use this to input the fax number of the service representative This number is printed on the Counter Report (UP: System No. 19) *Press the ⓒ key to input a pause.* *Press the "Clear modes" key to delete the telephone number.*
5816*	1	CSS Function On/Off	**Japan Only** **0: Off**, 1: On.
	2	CE Call	**Japan Only** **0: Start**, 1: Finish
5821*		CSS PI Device Code	Selects the PI device code. **DFU** [0~4 / **0** / 1 step]
5824		NVRAM Data Upload	Uploads the UP and SP mode data (except for counters and the serial number) from NVRAM on the control board to a flash memory card. (☛ 5.3.1) *While using this SP mode, always keep the front cover open. This prevents a software module accessing the NVRAM during the upload.*
5825		NVRAM Data Download	Downloads the content of a flash memory card to the NVRAM on the control board. (☛ 5.3.2) *While using this SP mode, always keep the front cover open. This prevents a software module accessing the NVRAM during the download.* *After executing this SP, switch the copier off and on.*
5828*	25*	Software Switch	Sets the reference for the network software. [00000000~FFFFFFFFh / **00000000h** / 1 hex unit step]
	26*	Network Operation Mode Setting	Sets the TCP operation mode for the network. [00000000~FFFFFFFFh / **00000000h** / 1 hex unit step]
	27*	Network Syslog Server Address Setting	Sets the syslog server address for the network. [00000000~FFFFFFFFh / **7F000001h** / 1 hex unit step]
	28*	Network Time Server Address Setting	Sets the time server address for the network. [00000000~FFFFFFFFh / **00000000h** / 1 hex unit step]
	29*	Network DNS Server Address Setting	Sets the DNS server address for the network. [00000000~FFFFFFFFh / **00000000h** / 1 hex unit step]
	30*	Network Directprint Port Number Setting	Sets the directprint port number for the network. [1024~65535 / **9100** / 1 step]
	31*	Network IPP Timeout Setting	Sets the IPP timeout for the network. [30~65535 / **900** / 1 step]
	32	Network IPX Address Setting (NetWare)	Sets the IPX Address.
	33*	Network Remote Printer Number Setting (NetWare)	Sets the remote printer number for the network. [0~254 / **0** / 1 step]
	34*	Network Software Switch Setting (NetWare)	Sets the software switch for the network. [0000~FFFFh / **0003h** / 1 hex unit step]
	35*	Network Transport Protocol of Print Server Setting (NetWare)	Sets the transport protocol of print server for the network. **0001h: TCP & IPX** 0100h: TCP& IPX (Priority: IPX) 0102h: TCP Only (Priority: TCP) 0001h: IPX Only

SP5	Mode Number		Function and [Setting]
5828*	36	Network AppleTalk Module Setting	Sets the AppleTalk module for the network. **2: EtherTalk Phase2**
	37	Network NetNo Setting (AppleTalk)	Sets the NetNo of AppleTalk network.
	38	Network Object Name Setting (AppleTalk)	Sets the object name of AppleTalk network.
	39*	Network AppleTalk Type Setting	Sets the AppleTalk type for the network.
	40	Network Working Zone Setting (AppleTalk)	Sets the AppleTalk working zone for the network.
	47*	Network Job Analysis Timeout Setting (Centronics)	Sets the Centronics job analysis timeout for the network. [0~4200 s / **3 s** / 1 sec. step]
	48*	Network Job Timeout Setting (Centronics)	Sets the Centronics job timeout for the network. [0~4200 s / **0 s** / 1 sec. step]
	49*	Network Noise Cancel Setting (Centronics)	Sets the noise cancel level for the network. [4~7 / 4 / 1 clock per step]
	50*	Network 1284 Compatibility Setting (Centronics)	Switches Centronics IEEE1284 compatibility on/off for the network. 0: Disabled, **1: Enabled** *Selecting "0" disables bi-directional data transmission.*
	51*	Network Data Transfer Speed Setting (Centronics)	Sets the Centronics transfer speed for the network. 0: SLOW, **1: FAST** *If you select "0" there will be a 120 μs delay from the STP signal to the data transfer. (With 1: FAST there is no delay.)*
	52*	Network ECP Setting (Centronics)	Switches the ECP setting for Centronics off/on. 0: Disabled, **1: Enabled** *With "1" selected, SP5-828-050 must be enabled for 1284 mode compatibility.*
	53*	Network Transmission Speed Setting	Selects the Ethernet transmission speed. [0x00~0x03 / **0x00** / 0x01 step]

Bit1	Bit2	Speed
0	0	Auto Sense
0	1	10Base-T
1	0	100Base-Tx
1	1	Auto

5833		Job Log Transfer On/Off Setting	Switches the job log transfer on/off for Poplar server. **0: Off (disable),** 1: On (enable)
5834		Enable Operation Panel Image Settings	Enables and disables the operation panel read (dump) feature. After powering on the machine, set this option to 1 to enable this feature. **0**: Off (disable), 1: On (enable) *To reset the machine to 0, the machine must be turned off and on again. Selecting 0 for this option without cycling the power off and on does not restore the default setting (0).*

SP5	Mode Number		Function and [Setting]
5907*		Plug & Play	Sets the brand name and the production name for Windows Plug & Play. This information is stored in NVRAM. If the NVRAM is defective or has been replaced, these names should be registered again. *To set the plug and play model name, enter the model number, and then press #.*
5914*		Application Counter Display	Selects whether or not the total printer counter is displayed in the UP mode. **0: Off**, 1: On
5915		Mechanical Counter Detection	Checks whether the mechanical counter inside the inner cover is connected or not. Display: 0: Not detected 1: Detected 2: Unknown
5918*		A3/DLT Counter Display	Sets the key press display for the counter key. [0, 1 / **1** / --] This setting has no relation to (SSP) SP5-104 A3/DLT Double Count.
5923*		Flame Elimination Area Change	Toggles between two settings that affect the appearance of the pages for border removal and printed facing pages: (1) Using the original area as the allotted area, or (2) Using only the copy paper as the allotted area. [0, 1/ **0** / --] 0: Original area used as base 1: Copy used as the base
5958		Feed Clutch Start Timing Adjustment	Adjusts the clutch timing to optimize the intervals between fed sheets to reduce jams in the feed unit. [35 ~ 57.5 / **42.5** / 2.5mm]
5961*		Large Capacity Exit Mode	Selects whether or not all stapled copies are sent to Shift Tray 1 when the Two-Tray finisher is installed. [0, 1 / **1** / ---] 1: Enabled 2: Disabled
5970*	Debug Serial Output		**DFU**
5974*		Cherry Server lite/ Switch to Full	Switches writing between the Cherry lite application provided and the optional full version. **0: Lite**, 1: Full
5990		SMC Printout	Prints all of the system parameter lists for the item selected. (☛ 5.1.6) Input the number for the item that you want to print, and then press ①: "Execute" on the touch panel.
	1	All (Data List)	
	2	SP (Mode Data List)	
	3	User Program	
	4	Logging Data	
	5	Diagnosis Report	
	7	NIB Summary	
	21	Copier User Program	
	22	Scanner SP	
	23	Scanner User Program	

SP6-xxx: Peripherals

SP6	Mode Number		Function and [Setting]
6006*		DF Registration Adjustment	Adjusts the side-to-side and leading edge registration for simplex and duplex original feeding in ARDF mode. Press # to toggle ±.
	1*	Side-to-side	[–3 ~ +3 / **0.0** / 0.1 mm step]
	2*	Leading Edge (Thin Original)	[–30 ~ +30 / **0.0** / 0.17 mm step]
	3*	Leading Edge (Duplex Front)	[–42 ~ +42 / **0.0** / 0.12 mm step]
	4*	Leading Edge (Duplex Rear)	
6007		ADF Input Check	Displays the signals received from sensors and switches of the ARDF.(☛ 5.1.4)
	1	Group 1	
	2	Group 2	
6008		ADF Output Check	Switches on each electrical component (ARDF motor, solenoid, etc.) of the ARDF for testing. (☛ 5.1.5) Press 1 to switch on or 0 to switch off.
6009		DF Free Run	Performs a free run with the ARDF for duplex and stamp testing. Input the number for the item you want to check, and then press 1 to start. 1: To Start, 0: To cancel This is a general free run controlled from the copier. For more detailed free run modes, see the ARDF manual.
	1	Duplex Mode	
	2	Stamp Mode	
6010*		DF Stamp Position Adjustment	Adjusts the horizontal position of the stamp on the scanned originals. [–7~+7 / **0** / 0.5 mm steps]
6016*		Original Size Decision Priority	Sets detection of an original size that is larger than the size above the size assigned to the original detection sensor which otherwise may not be possible. This provides an alternate selection for detection, other than that assigned with SP5-131. **0** / 1 0: Allows settings shaded in table below. 1: Allows settings not shaded in table below.

	Setting	
Bit	**0**	**1**
7	A4 (L)	LT (L)
6	11" x 15"	DLT (L)
5	DLG (L)	11" x 15"
4	LT (S)	US Exec (S)
3	LT (L)	8* x 10" (L)
2	LG (L)	F4 (L)
1	A4 (L)	16K (L)
0	8K (L)	DLT (L)

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

SP6	Mode Number		Function and [Setting]
6105*		Staple Position Adjustment	Adjusts the staple position in the main scan direction when using the two-tray finisher. [–3.5~+3.5 / **0.0** / 0.5 mm step] *Press # to toggle ±. A larger value shifts the staple toward the edge of the paper.*
6113*		Punch Hole Adjustment	Adjusts the punch hole position. [–7~+7 / **0** / 0.5 mm steps] *Press # to toggle ±. A larger value shifts the holes toward the edge of the paper.*
	1*	2-Holes	2-hole punches for Japan, North America, Europe, and 4-hole punches for Northern Europe.
	2*	3-Holes	3-hole punches for North America, and 4-hole punches for Europe.
6902*		Fold Position Adjustment	**Japan Only**

SP7-xxx: Data Log

SP7	Mode Number		Function and [Setting]
7001*		Main Motor Operation Time	The number of prints and drive time for drum revolutions can be obtained by counting the main motor revolution time. If the amount of the time required for the drum to revolve to print 1 copy increases, this data combined with the number of copies can be used to analyze problems and could be useful for future product development. Display: 00000000~99999999 min.
7002*		Original Counter	Select a number to display the total original count (number of originals fed) for the selected item.
	1*	Total Counter	
	2*	Copier	
	3*	Fax	
	4*	Document Box	
	5*	Scanner	
	6*	Others	
7003*		Print Counter	Select a number to display the total print count for the selected item.
	1*	Total Counter	
	2*	Copier	
	3*	Fax	
	4*	Printer	
	5*	Others	
7006*		C/O, P/O Counter	Displays the number of copies per original when making more than 10 copies. *For example, if you make 15 copies of a 3 page original document, for a total of 45 sheets, then the counter would be 15 (5 copies counted from 11 to 15 x 3 originals). No count will be returned for 1~10 copies of an original.*
	1*	C/O (Copies/Original)	
	2*	P/O (Prints/Original)	
7007*		Other Counters	
	1*	Duplex Counter	Displays the count total for the selected item.
	2*	A3/DLT Counter	
	3*	Staple Counter	
	4*	Scan Counter	
7101*		Copy Counter: Paper Size	Displays the total number of prints by paper size.
	5*	A4 H (Sideways)	
	6*	A5 H (Sideways)	
	14*	B5 H (Sideways)	
	38*	LT H (Sideways)	
	44*	HLT H (Sideways)	
	132*	A3 V (Lengthwise)	
	133*	A4 V (Lengthwise)	
	134*	A5 V (Lengthwise)	
	141*	B4 V (Lengthwise)	
	142*	B5 V (Lengthwise)	
	160*	DLT V (Lengthwise)	
	164*	LG V (Lengthwise)	
	166*	LT V (Lengthwise)	
	172*	HLT V (Lengthwise)	

SP7	Mode Number		Function and [Setting]
7101*	255*	Others	
7201*		Total Scan Counter	Displays the total number of originals scanned.
7204*		Copy Counter: Paper Tray	Displays the total number of sheets fed from each paper feed tray.
	1*	Paper Tray 1	Copier
	2*	Paper Tray 2	Copier
	3*	Paper Tray 3	Paper Tray Unit (Option)
	4*	Paper Tray 4	Paper Tray Unit (Option)
	5*	LCT	Large Capacity Tray (Option)
	6*	By-Pass	Copier
7205*		Total ADF Counter	Displays the total number of originals fed by the ARDF.
7206*		Staple Counter	Display the total number of staples fired.
	1*	Normal Staple	
	2*	Booklet Staple	**Japan Only**
7209*		Punch	Displays the total times the punch has fired.
7301*		Copy Count: Magnification	Displays the total number of prints by magnification rate.
	1*	Reduce 25%-49%	
	2*	Reduce 50%~99%	
	3*	Full Size	
	4*	Enlarge 101%~200%	
	5*	Enlarge 201%~400%	
	6*	Direct Mag. 2	
	7*	Direct Size Mag. mm (inch)	
	8*	Auto Reduce/Enlarge	
7304*		Copy Counter: Copy Mode	Displays the total number of prints by copy operation mode.
	1*	Original Mode: Text	
	2*	Original Mode: Text/Photo	
	3*	Original Mode: Photo	
	4*	Original Mode: Generation	
	5*	Original Mode: Pale	
	6*	Punch	
	7*	Repeat	
	8*	Sort	
	9*	Staple	
	10*	Series	
	11*	Erase	
	12*	Duplex	
	13*	ADF	
	14*	Double Copy	
	15*	Duplex Original	
	16*	Interrupt Copy	
	17*	Combine 1 Side	
	18*	Combine 2 Side	
	19*	Booklet	
	20*	Magazine	
	21*	Batch	

SP7	Mode Number		Function and [Setting]
7304*	22*	SADF	Displays the total number of prints by copy operation mode.
	23*	Mixed Sizes	
	24*	Stamp	
	25*	Cover Page/Chapter Page	
	26*	Slip Sheet	
7305*		Copy Counter – Set Number	Displays the total number of prints for multiple copy jobs.
	1*	1 to 1	
	2*	1 to 2~5	
	3*	1 to 6~10	
	4*	1 to 11~20	
	5*	1 to 21~50	
	6*	1 to 51~100	
	7*	1 to 101~300	
	8*	1 to 301~ Over	
7306*		Job Counter – Copy Mode	Displays the total number of prints based on the job mode.
	1*	Sort	
	2*	Staple	
	3*	Punch	
	4*	Reserve Copy	
	5*	Check Copy	
7320*		Document Server: Scan Storage	Displays the original count stored on the document server.
	1*	Scanning Count	
7321*		Document Server: Each Size of Originals	Displays the number of originals by paper size scanned at the copy server.
	4*	A3	
	5*	A4	
	6*	A5	
	13*	B4	
	14*	B5	
	32*	DLT	
	36*	LG	
	38*	LT	
	44*	HLT	
	128*	Others	
7323*		Document Server: Each Size of Printouts	Displays the number of prints by paper size.
	5*	A4 (S)	
	6*	A5 (S)	
	14*	B5 (S)	
	38*	LT (S)	
	44*	HLT (S)	
	128*	Other	
	132*	A3 (L)	
	133*	A4 (L)	
	134*	A5 (L)	

SP7	Mode Number		Function and [Setting]
7323*	141*	B4 (L)	Displays the number of prints by paper size.
	142*	B5 (L)	
	160*	DLT (L)	
	164*	LG (L)	
	166*	LT (L)	
	172*	HLT (L)	
7324*		Document Server: Print Job Counter	Displays the number of jobs classed by job content.
	1*	Duplex	
	2*	Sort	
	3*	Staple	
	4*	Punch	
	5*	Check Copy	
	6*	Print 1st Page	
7325*		Document Server: Job Counter – Page Number	Displays the number of print jobs classed by size of the job.
	1*	1-page	
	2*	2-pages	
	3*	3~5 pages	
	4*	6~10 pages	
	5*	over 11 pages	
7326*		Document Server: Job Counter – File Number	Displays the number of print jobs classed by the number of files.
	1*	1 file	
	2*	2~5 files	
	3*	6~10 files	
	4*	over 11 files	
7327*		Document Server: Job Counter – Set Number	Displays the number of print jobs classed by the set sizes.
	1*	1 to 1	
	2*	1 to 2~5	
	3*	1 to 6~10	
	4*	1 to 11~20	
	5*	1 to 21~50	
	6*	1 to 51~100	
	7*	1 to 101~300	
	8*	1 to 301~ over	
7328*		Document Server: Print Counter – Print Mode	Displays the number of prints by mode.
	6*	Punch	
	8*	Sort	
	9*	Staple	
	12*	Duplex	
	19*	Booklet	
	20*	Magazine	
	24*	Stamp	
	25*	Cover/Chapter Page	
	26*	Slip Sheet	

SP7	Mode Number		Function and [Setting]
7401*		Total SC Counter	Displays the total number of service calls that have occurred. Display range: 0000~9999
7403*		SC History	Displays the most recent service calls successive groups of 10.
	1*	Latest	
	2*	Latest 1	
	3*	Latest 2	
	4*	Latest 3	
	5*	Latest 4	
	6*	Latest 5	
	7*	Latest 6	
	8*	Latest 7	
	9*	Latest 8	
	10*	Latest 9	
7502*		Total Paper Jam Counter	Displays the total number of copy jams. Display range: 0000~9999
7503*		Total Original Jam Counter	Displays the total number of original jams. Display range: 0000~9999
7504*	Paper Jam Counter by Jam Location		Displays the total number of copy jams by location. Display range: 0000~9999 *A "Paper Late" error occurs when the paper fails to activate the sensor at the precise time. A "Paper Lag" paper jam occurs when the paper remains at the sensor for longer than the prescribed time.*
	Paper Late Error No.	**Paper Lag Error No.**	**Error**
	1*		At Power On
	3*		1st Paper Feed Sensor
	4*		2nd Paper Feed Sensor
	5*		3rd Paper Feed Sensor
	6*		4th Paper Feed Sensor
	7*	57*	LCT Tray Relay Sensor
	8*	58*	Transport sensor 1
	9*	59*	Transport sensor 2
	10*	60*	Transport sensor 3
		61*	Transport sensor 4
	13*	63*	Registration Sensor
	14*	64*	Fusing Exit Sensor
	16*	66*	Exit Entrance Sensor
	17*	67*	Relay Sensor 1 (option)
	18*	68*	Relay Sensor 2 (option)
	19*	69*	Duplex Entrance Sensor
	23*	73*	Duplex Exit Sensor
	24*	74*	1-Bin Tray Sensor
	25*		Finisher Entrance
	26*		Finisher Proof Tray
	27*		Finisher Shift Tray

SP7	Mode Number		Function and [Setting]
7504*	28*		Finisher Staple Tray
	29*		Finisher Tray
	30*		Mailbox Entrance Sensor
	31*		Mailbox Proof Tray Exit Sensor
	32*		Mailbox Relay Sensor
	33*		Mailbox Exit Sensor
	35*		Booklet Finisher **(Japan Only)**
	36*		
	37*		
	38*		
	39*		
	40*		
	41*		
7505*	Total Original Jam by Location		Displays the total number of original jams by location. These jams occur when the original does not activate the sensors. A “Paper Late” error occurs when the paper fails to activate the sensor at the precise time. A “Paper Linger” paper jam occurs when the paper remains at the sensor for longer than the prescribed time.
	1*		At Power On
	Paper Late Error No.	**Paper Lag Error No.**	**Error Location**
	3	53	Skew Correction Sensor
	4	54	Interval Sensor
	5	55	Registration Sensor
	6	56	Relay Sensor
	7	57	Inverter Sensor
7506*		Jam Count by Copy Size	Displays the total number of copy jams by paper size.
	5*	A4 H (Sideways)	
	6*	A5 H (Sideways)	
	14*	B5 H (Sideways)	
	38*	LT H (Sideways)	
	44*	HLT H (Sideways)	
	132*	A3 V (Lengthwise)	
	133*	A4 V (Lengthwise)	
	134*	A5 V (Lengthwise)	
	141*	B4 V (Lengthwise)	
	142*	B5 V (Lengthwise)	
	160*	DLT V (Lengthwise)	
	164*	LG V (Lengthwise)	
	166*	LT V (Lengthwise)	
	172*	HLT V (Lengthwise)	
	255*	Others	

<table>
<tr><th>SP7</th><th colspan="2">Mode Number</th><th colspan="2">Function and [Setting]</th></tr>
<tr><td rowspan="12">7507*</td><td></td><td>Copy Jam History (Transfer Sheet)</td><td colspan="2" rowspan="12">Displays the copy jam history of the transfer unit in groups of 10, starting with the most recent 10 jams.
Sample Display:
CODE: 007
SIZE: 05h
TOTAL: 0000334
DATE: Mon Mar 15 11:44:50 2000
where:
CODE is the SP7-505-*** number (see above.
SIZE is the ASAP paper size code in hex.
TOTAL is the total jam error count (SP7-003)
DATE is the date the previous jam(s) occurred.</td></tr>
<tr><td>1*</td><td>Last</td></tr>
<tr><td>2*</td><td>Last 1</td></tr>
<tr><td>3*</td><td>Last 2</td></tr>
<tr><td>4*</td><td>Last 3</td></tr>
<tr><td>5*</td><td>Last 4</td></tr>
<tr><td>6*</td><td>Last 5</td></tr>
<tr><td>7*</td><td>Last 6</td></tr>
<tr><td>8*</td><td>Last 7</td></tr>
<tr><td>9*</td><td>Last 8</td></tr>
<tr><td>10*</td><td>Last 9</td></tr>
<tr><td colspan="3" rowspan="15"></td><td>Paper Size</td><td>ASAP Code (hex)</td></tr>
<tr><td>A4 (S)</td><td>05</td></tr>
<tr><td>A5 (S)</td><td>06</td></tr>
<tr><td>B5 (S)</td><td>0E</td></tr>
<tr><td>LT (S)</td><td>26</td></tr>
<tr><td>HLT (S)</td><td>2C</td></tr>
<tr><td>A3 (L)</td><td>84</td></tr>
<tr><td>A4 (L)</td><td>85</td></tr>
<tr><td>A5 (L)</td><td>86</td></tr>
<tr><td>B4 (L)</td><td>8D</td></tr>
<tr><td>B5 (L)</td><td>8E</td></tr>
<tr><td>DLT (L)</td><td>A0</td></tr>
<tr><td>LG (L)</td><td>A4</td></tr>
<tr><td>LT (L)</td><td>A6</td></tr>
<tr><td>HLT (L)</td><td>AC</td></tr>
<tr><td>Others</td><td>FF</td></tr>
<tr><td rowspan="11">7508*</td><td></td><td>Original Jam History</td><td colspan="2" rowspan="11">Displays the original jam history in groups of 10, starting with the most recent 10 jams.
Sample Display:
CODE: 007
SIZE: 05h
TOTAL: 0000334
DATE: Mon Mar 15 11:44:50 2000
where:
CODE is the SP7-505-*** number (see above.
SIZE is the ASAP paper size code in hex.
TOTAL is the total error count (SP7-003-001)
DATE is the date the previous jam(s) occurred.</td></tr>
<tr><td>1*</td><td>Last</td></tr>
<tr><td>2*</td><td>Last 1</td></tr>
<tr><td>3*</td><td>Last 2</td></tr>
<tr><td>4*</td><td>Last 3</td></tr>
<tr><td>5*</td><td>Last 4</td></tr>
<tr><td>6*</td><td>Last 5</td></tr>
<tr><td>7*</td><td>Last 6</td></tr>
<tr><td>8*</td><td>Last 7</td></tr>
<tr><td>9*</td><td>Last 8</td></tr>
<tr><td>10*</td><td>Last 9</td></tr>
<tr><td>7801</td><td></td><td>ROM No./Firmware Version</td><td colspan="2">Displays the ROM number and firmware version numbers.</td></tr>
<tr><td>7803*</td><td></td><td>PM Counter Display</td><td colspan="2">Displays the PM counter since the last PM.</td></tr>
<tr><td>7804</td><td></td><td>PM Counter Reset</td><td colspan="2">Resets the PM counter. To reset, press ①.</td></tr>
<tr><td>7807</td><td></td><td>SC/Jam Counter Reset</td><td colspan="2">Resets the SC and jam counters. To reset, press ①.
This SP does not reset the jam history counters: SP7-507, SP7-508.</td></tr>
<tr><td>7808</td><td></td><td>Counter Reset</td><td colspan="2">Resets all counters except SP7-003-***, SP7-006-***. To reset, press ①.</td></tr>
</table>

SP7	Mode Number		Function and [Setting]
7810		Access Code Clear	Use to clear the access code if the customer forgets the code. After clearing the code is reset for Null and the password entry display does not open. To clear, press ①.
7811		Original Count Clear	Clears the original total display, displayed with SP7-002-***. To clear, press ①.
7816		Print Counter Reset	Resets the total copy count by paper tray. To reset, press ①. Use these SP modes when replacing the pick-up, feed, and separation rollers.
	1	Tray1	
	2	Tray2	
	3	Tray3	
	4	Tray4	
	5	LCT	
	6	By-pass	
7822		Copy Counter Reset Magnification	Resets all counters of SP7-301 (Copy Count: Magnification). To reset, press ①.
7825		Total Counter Reset	Resets all electronic counters. To reset, press ①. This SP mode is usually performed at installation
7826*		MF Device Error Count	This display is for the Japanese version only. **Japan Only**
7827		MF Device Error Count Clear	This SP is for the Japanese version only. (Clears SP7-826.) **Japan Only**
7832		Self-Diagnosis Result Display	Execute to open the "Self-Diagnose Result Display" to view details about errors. Use the keys on in the display on the touch-panel to scroll through all the information. If no errors have occurred, you will see the "No Error" notation.
7904		Copy Counter Reset: Copy Mode	Resets all counters for SP7-301, SP7-304. To reset, press ①.
7905		Job Counter Reset: Set Number	Resets all counters for SP7-305. To reset, press ①.
7907		Job Counter Reset: Copy Mode	Resets all counters for SP7-306. To reset, press ①.
7908		Job Counter Reset: Originals	Resets the counter for SP7-002-2. To reset, press ①.
7920		Document Server: Scan Storage Reset	Clears the count for SP7-320. To reset, press ①.
7921		Document Server: Original CounterReset	Clears the count for SP7-321. To reset, press ①.
7923		Document Server: Print Counter Reset by Size	Clears the count for SP7-323. To reset, press ①.
7924		Document Server: Print Job Counter Reset	Clears the count for SP7-324. To reset, press ①.
7925		Document Server: Job Counter Reset – Page Number	Clears the count for SP7-325. To reset, press ①.
7926		Document Server: Job Count Reset – File Number	Clears the count for SP7-326. To reset, press ①.
7927		Document Server: Job Counter Reset – Set Number	Clears the count for SP7-327. To reset, press ①.
7928		Document Server: Print Count Reset – Print Mode	Clears the count for SP7-328. To reset, press, ①.

SP7	Mode Number	Function and [Setting]	
7930*	Copy Document Server: All Counter Clear	Execute this SP to clear the following SP modes:	
		SP7-301	Copy Count: Magnification
		SP7-304	Copy Count: Copy Mode
		SP7-305	Copy Counter: Copy Mode
		SP7-306	Job Counter: Copy Mode
		SP7-320	Doc. Server: Scan Storage
		SP7-321	Doc. Server: Original Counter
		SP7-323	Doc. Server: Paper Size Counter
		SP7-324	Document Server: Job Counter
		SP7-325	Doc. Server: Job Counter – Page No.
		SP7-326	Doc. Server: Job Counter – File No.
		SP7-327	Doc. Server: Job Counter – Set No.
		SP7-328	Doc. Server: Count by Mode

5.1.3 TEST PATTERN PRINTING: SP2-902

NOTE: Always print a test pattern to confirm correct operation of the machine.

1. Enter the SP mode and select SP2-902.
2. Press ② or ③.
   - ② IPU Test Print
   - ③ Test Pattern
3. Enter the number for the test pattern that you want to print and press #. (See the tables below.)
4. When you are prompted to confirm your selection, press Yes. This selects the test pattern for printing.
5. Press Copy Window to open the copy window and then select the settings for the test print (paper size, etc.)
6. Press Start ◇ twice. (Ignore the "Place Original" messages) to start the test print.
7. Press SP Mode (highlighted) to return to the SP mode display.

Test Pattern Table (SP2-902-2: IPU Test Print)

No.	Test Pattern	No.	Test Pattern
0	None	8	Grayscale (Horizontal)
1	Vertical Line (1-dot)	9	Grayscale (Vertical)
2	Horizontal Line (1-dot)	10	Cross Pattern (8)
3	Vertical Line (2 dot)	11	Cross Shape
4	Horizontal Line (2-dot)	12	Argyle Pattern
5	Alternate Dot Pattern	13	Cross Pattern (256)
6	Grid Pattern (1-dot)	14	Cross Pattern (64)
7	Vertical Strips		

Test Pattern Table: SP2-902-3 Printing Test Patterns

No.	Test Pattern	No.	Test Pattern
0	None	20	Horizontal Line (1-dot) (Reversed LD1, LD2)
1	Vertical Line (1-dot)	21	Grid Pattern (1-dot) (Reversed LD1, LD2)
2	Horizontal Line (1-dot)	22	Grid Pattern (1-dot pair) (Reversed LD1, LD2)
3	Vertical Line (2-dot)	23	Independent Pattern (1-dot) (Reversed LD1, LD2)
4	Horizontal Line (2 dot)	24	3 Grayscale
5	Grid Pattern (1-dot)	25	Grayscale (Horizontal)
6	Grid Pattern (1-dot pair)	26	Grayscale (Vertical)
7	(not used)	27	Grayscale (Vertical/Horizontal)
8	(not used)	28	Grayscale (Grid)
9	Full Dot Pattern	29	Grayscale (Horizontal Extension)
10	Black band	30	Grayscale (Vertical Extension)
11	Trimming Area	31	Grayscale (Horizontal Margin)
12	Trimming Area (2-dot)	32	Grayscale (Vertical Margin)
13	Argyle Pattern	33	Grayscale (Vertical/Horizontal Margin)
14	Argyle Pattern (2-dot_)	34	Grayscale (Horizontal Extension Margin)
15	Hound's Tooth Check (2-dot Horizontal)	35	Grayscale (Vertical Extension Margin)
16	Checker Flag Pattern	36	White Pattern
17	Point Black Pattern	37	Grid (1-dot pair) (OR Outside Data 1)
18	Black Band (Vertical)	38	Trimming Area (OR Outside Data)
19	Independent Pattern (4-dot)		

5.1.4 INPUT CHECK

Main Machine Input Check: SP5-803

1. Enter the SP mode and select SP5-803.
2. Enter the number (1 – 13) for the item that you want to check. A small box will be displayed on the SP mode screen with a series of 0's and 1's.
   The meaning of the display is as follows.

0 0 0 0 0 0 0 0
Bit 7 6 5 4 3 2 1 0

3. Check the status of each item against the corresponding bit numbers listed in the table below.

Number	Bit	Description	Reading	
			0	1
1: Paper Feed 1 (Upper Tray)	7	Fusing Exit Sensor	Activated	Deactivated
	6	Near End Sensor 2	Activated	Deactivated
	5	Near End Sensor 1	Activated	Deactivated
	4	Not Used	---	---
	3	Paper Size Sensor 4	Activated	Deactivated
	2	Paper Size Sensor 3	Activated	Deactivated
	1	Paper Size Sensor 2	Activated	Deactivated
	0	Paper Size Sensor 1	Activated	Deactivated
2: Paper Feed 2 (Lower Tray	7	Duplex Unit Set Sensor	Unit set	Unit not set
	6	Near End Sensor 2	Off	On
	5	Near End Sensor 1	Off	On
	4	Not used	---	---
	3	Paper Size Sensor 4	Activated	Deactivated
	2	Paper Size Sensor 3	Activated	Deactivated
	1	Paper Size Sensor 2	Activated	Deactivated
	0	Paper Size Sensor 1	Activated	Deactivated
3: Registration and Others	7	Zero Cross Signal	Detected	Not detected
	6	Transfer Belt Unit HP Sensor	Not present	Present
	5	Exhaust Fan Lock Signal	Not locked	Locked
	4	Cooling Fan Lock Signal	Not locked	Locked
	3	Main Motor Lock Signal	Not locked	Locked
	2	Toner Overflow Sensor	Tank not full	Tank full
	1	Cover Open	Cover closed	Cover opened
	0	Registration Sensor	Paper detected	Paper not detected

Number	Bit	Description	Reading	
			0	1
4: By-pass Feed	7	Duplex reverse path door	Closed	Open
	6	Paper End Sensor	Paper detected	Paper not detected
	5	Not used		
	4	Paper Size Sensor 4, By-pass	Activated	Deactivated
	3	Paper Size Sensor 3, By-pass	Activated	Deactivated
	2	Paper Size Sensor 2, By-pass	Activated	Deactivated
	1	Paper Size Sensor 1, By-pass	Activated	Deactivated
	0	Unit Set Signal	Yes	No
5: Relay Unit (Bridge Unit)	7	Not used	Yes	No
	6	Unit Set Signal	Connected	Not connected
	5	Paper Sensor	Paper detected	Paper not detected
	4	Relay Sensor	Paper detected	Paper not detected
	3	Exit Sensor	Paper detected	Paper not detected
	2	Left Cover Switch	Switch pressed (cover closed)	Switch not pressed
	1	Middle Cover Switch	Switch pressed (cover closed)	Switch not pressed
	0	Right Cover Switch	Switch pressed (cover closed)	Switch not pressed
6: Unit Set	7	Feed Motor Lock	No	Yes
	6	F-Gate Signal	Active	Not active
	5	Height Sensor	Feed height	Not feed height
	4	Paper Exit Sensor	Paper detected	Paper not detected
	3	Fusing Unit	Detected	Not detected
	2	Total Counter	Not detected	Detected
	1	Key Counter	Detected	Not detected
	0	Key Card Present	Detected	Not detected
7: Paper End	7	Front cover/open closed	Open	Closed
	6	Vertical feed path	Clear	Not clear
	5	2nd Tray Height Sensor	Paper not at upper limit	Paper at upper limit
	4	1st Tray Height Sensor	Paper not at upper limit	Paper at upper limit
	3	Lower Relay Sensor	Paper detected	Paper not detected
	2	Upper Relay Sensor	Paper detected	Paper not detected
	1	Lower Paper End Sensor	Paper not detected	Paper detected
	0	Upper Paper End Sensor	Paper not detected	Paper detected

Number	Bit	Description	Reading			
			0			1
8: DIP Switches	7	Dip Switch - 8	On			Off
	6	Dip Switch - 7	On			Off
	5	Dip Switch - 6	On			Off
	4	Dip Switch - 5	On			Off
	3	Dip Switch - 4	On			Off
	2	Dip Switch - 3	On			Off
	1	Dip Switch - 2	On			Off
	0	Dip Switch - 1	On			Off
9: Duplex Unit	7	Not used				
	6	Right cover open/closed	Closed			Open
	5	1-Bin Unit Set	Detected			Not detected
	4	LD, HP sensor	Positioned			Not positioned
	3	Exit Sensor (Jam)	Paper detected			Paper not detected
	2	Entrance Sensor (Jam)	Paper detected			Paper not detected
	1	Paper End Sensor	Paper detected			Paper not detected
	0	Duplex Unit Switch	Cover closed			Cover open
10: Remainder of Feed Tray 1	7	Tray 4: Bit 1				
	8	Tray 4: Bit 0	**Bit 1**	**Bit 0**		**Capacity**
	5	Tray 3: Bit 1	1	1		Full
	4	Tray 3: Bit 0	1	0		50% or more
	3	Tray 2: Bit 1	0	1		10% or more
	2	Tray 2: Bit 0	0	0		Out, or tray not set
	1	Tray 1: Bit 1				
	0	Tray 1: Bit 0				
11: Remainder of Feed Tray 2	7	By-pass Yes/No				
	6	Not Used				
	5	Not Used				
	4	Not Used				
	3	Not Used	**Bit 2**	**Bit 1**	**Bit 0**	**Capacity**
	2	LCT: Bit 2	1	1	1	Full
	1	LCT: Bit 1	1	0	0	80% or more
	0	LCT: Bit 0	0	1	1	50% or more
			0	1	0	30% or more
			0	0	0	10% or more

Service Tables

Number	Bit	Description	Reading	
			0	1
12: Full Exit Tray 1	7	Mailbox 9-bin	Not full or no tray	Full
	6	Mailbox 8-bin	Not full or no tray	Full
	5	Not used	-	-
	4	Finisher: Shift Tray 1	Not full or no tray	Full
	3	Finisher: Shift Tray 2	Not full or no tray	Full
	2	Not used	-	-
	1	1-Bin Exit	Not full or no tray	Full
	0	Machine Exit	Not full or no tray	Full
13: Full Exit Tray 2	7	Mailbox 7-bin	Not full or no tray	Full
	6	Mailbox 6-bin	Not full or no tray	Full
	5	Mailbox 5-bin	Not full or no tray	Full
	4	Mailbox 4-bin	Not full or no tray	Full
	3	Mailbox 3-bin	Not full or no tray	Full
	2	Mailbox 2-bin	Not full or no tray	Full
	1	Mailbox 1-bin	Not full or no tray	Full
	0	Mailbox Proof Tray	Not full or no tray	Full

Table 1: By-pass Feed Table Paper Size Data

Number.	Bit 4	Bit 3	Bit 2	Bit 1	Paper Width
4: By-pass	1	1	1	1	Post Card
	1	1	1	0	B6 lengthwise
	1	1	0	1	B5 lengthwise
	1	1	0	0	A5 lengthwise / 5.5”
	1	0	1	1	B4 lengthwise
	1	0	0	1	A4 lengthwise / 8.5” / 8”
	0	1	1	1	A3 lengthwise
	0	0	1	1	11” x 17”

ARDF Input Check: SP6-007

1. Enter the SP mode and select SP6-007.
2. Enter the number (1 – 13) for the item that you want to check. A small box will be displayed on the SP mode screen with a series of 0's and 1's.
   The meaning of the display is as follows.

0 0 0 0 0 0 0 0
Bit 7 6 5 4 3 2 1 0

3. Check the status of each item against the corresponding bit numbers listed in the table below.

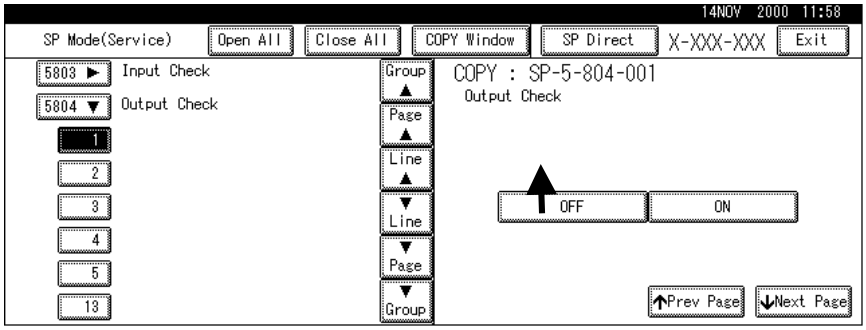
Group	Bit No.	Description	Reading	
			0	1
1	7	Original width sensor 4	Paper not detected	Paper detected
	6	Original width sensor 3	Paper not detected	Paper detected
	5	Original width sensor 2	Paper not detected	Paper detected
	4	Original width sensor 1	Paper not detected	Paper detected
	3	Skew correction sensor	Paper not detected	Paper detected
	2	Original length sensor 1	Paper not detected	Paper detected
	1	Original length sensor 2	Paper not detected	Paper detected
	0	Original LG sensor	Paper not detected	Paper detected
2	7	Original stopper HP sensor	Original stopper up	Original stopper down
	6	Pick-up HP sensor	Cover closed	Cover opened
	5	Top cover Sensor	Cover closed	Cover opened
	4	Lift sensor	Pick-up roller up	Pick-up roller down
	3	Inverter sensor	Paper not detected	Paper detected
	2	Exit sensor	Paper not detected	Paper detected
	1	Registration sensor	Paper not detected	Paper detected
	0	Interval Sensor	Paper not detected	Paper detected

5.1.5 OUTPUT CHECK

NOTE: Motors keep turning in this mode regardless of upper or lower limit sensor signals. To prevent mechanical or electrical damage, do not keep an electrical component on for a long time.

Main Machine Output Check: SP5-804

1. Open SP mode 5-804.
2. Select the SP number that corresponds to the component you wish to check. (Refer to the table on the next page.)
3. Press On then press Off to test the selected item.



B004S502.WMF

NOTE: You cannot exit and close this display until you press off to switch off the output check currently executing. Do not keep an electrical component switched on for a long time.

SP5-804 Output Check Table

No.	Description	No.	Description
1	1st Paper Feed Cl.	45	Duplex Junction Gate Solenoid ()
2	2nd Paper Feed Cl.	46	Not used
3	3rd Paper Feed Cl. (PTU)	47	Relay Junction Gate Solenoid
4	4th Paper Feed Cl. (PTU)	48~49	Not used
5	By-pass Paper Feed Cl.	50	Tray Junction Gate Solenoid
6	LCT Paper Feed Cl.	51	Stapler Junction Gate Solenoid
7 ~ 12	Not used	52	Positioning Roller Solenoid (Finishers)
13	By-pass Pick-up Solenoid	53~55	Not used
14	LCT Pick-up Solenoid	56	Toner Bottle Motor
15~16	Not used	57	Transfer Belt Positioning Clutch
17	Transport Motor 1	58~61	Not used
18	Transport Motor 2	62	Quenching Lamp
19	Exit Motor	63	Charge Bias
20	Staple Motor	64~66	Not used
21	Punch Motor	67	Development Bias
22 ~ 24	Not used	68	Not used
25	LCT Motor	69	Transfer Belt Voltage
26	Bank Motor (Paper Tray Unit)	70	ID Sensor LED
27	Not used	71~74	Not used
28	Main Motor	75	Exhaust Fan Motor
29	Duplex Transport Motor	76	Electrical Equipment Cooling Fan Motor
30	Duplex Inverter Motor – Rev.	77	Not used
31	Duplex Inverter Motor – Fwd	78	Relay Fan Motor
32	Feed/Development Motor	79~84	Not used
33~34	Not used	85	Total Counter
35	Bank Relay Clutch (Paper Tray Unit)	86~89	Not used
36	Relay Clutch	90	LD (Laser Diode)
37	Not used	91	Not used
38	LCT Relay Clutch	92	Shift Tray Lift Motor (Finishers)
39	Registration Clutch	93	Jogger Motor
40	Development Clutch	94	Stapler Unit Motor
41	Exit Junction Gate Solenoid (Upper Unit)	95	Stack Feed Out Motor (Finishers)
42	Duplex Junction Gate Solenoid (Lower Unit)	96	Shift Motor (Finishers)
43~44	Not used	97	Stapler Rotation Motor (Two-Tray Finisher)
		98 ~ 99	Not used

ARDF Output Check: SP6-008)

1. Open SP mode SP6-008.
2. Select the SP number that corresponds to the component you wish to check. (Refer to the table below.)
3. Press On then press Off to test the selected item. You cannot exit and close this display until you click Off to switch off the output check currently executing.

No.	Description
1	Feed Motor (Forward)
2	Feed Motor (Reverse)
3	Drive Motor (Forward)
4	Inverter Motor (Forward)
5	Inverter Motor (Reverse)
6	Feed Clutch
7	Inverter Solenoid
8	Pick-up Motor (Forward)
9	Pick-up Motor (Reverse)

5.1.6 SMC PRINT OUT LISTS: SP5-990

1. Open SP mode 5-990 and select the number corresponding to the list that you wish to print.

SMC (System Parameter and Data Lists)	
1	All Data List
2	SP Mode Data List
3	UP Mode Data List
4	Logging Data List
5	Self-Diagnostics Results List
7	NIB Summary
21	Copy UP Mode List
22	Scanner SP Mode List
23	Scanner UP Mode List

2. Press # and then press Yes to confirm the selection of the list that you want to print.
3. Press Copy Window to return to the copy window.
4. Select the paper size and press Start twice to print the list.
5. After printing the list, press SP Mode (highlighted) to return to the SP mode display.
6. Press Exit twice to close the SP Mode screen and return to copy mode.

List Contents

Here is a brief summary of what is contained on the Logging Data List.

• System Counts	
Total Count **CE Count** **PM Count**	
Count Timing	Printed outputs completed.
No Counts	White copied both sides, SMC prints, free runs, DF jams not counted.
Other	Single count only, even if double-count selected. (**Japan only**: (1) Double count setting cannot be performed, (2) Abnormal coin operations are counted.)
ARDF Feed-ins	
Count Timing	Original feed-ins, originals inverted completed.
No Counts	---
Other	Feed-in jams.
Scan Starts	
Count Timing	Engine starts for scanning, image write operations started.
No Counts	Prints from external video.
Other	Prints from sources other than scanning operation are counted. Examples: Less than 2 retention copies, SMC prints, white copies
Staples	
Count Timing	Staple engine cycles completed, number of staples fired.
No Counts	Staple jams.
Other	---
Prints by Paper Feeds	
Count Timing	Paper feeds initiated.
No Counts	White duplex copies, SMC prints, free runs, ARDF jams.
Other	Jams that interfered with the total count. Trays are counted started from the Duplex Tray.
Prints by Paper Size	
Count Timing	Paper feed starts.
No Counts	White duplex copies, SMC prints, free runs, ARDF jams.
Other	Jams that interfered with the total count.
Scanner SCs	
Count Timing	SC10n, SC12n occurences counted.
No Counts	---
Other	---
IPU SCs	
Count Timing	SC19n occurences counted.
No Counts	---
Other	---
Printer SCs	
Count Timing	SC30n, SC32n, SC35, SC39n, SC40n, SC42n, SC44n, SC49n, SC52n, SC54n, SC72n occurences counted.
No Counts	---
Other	---

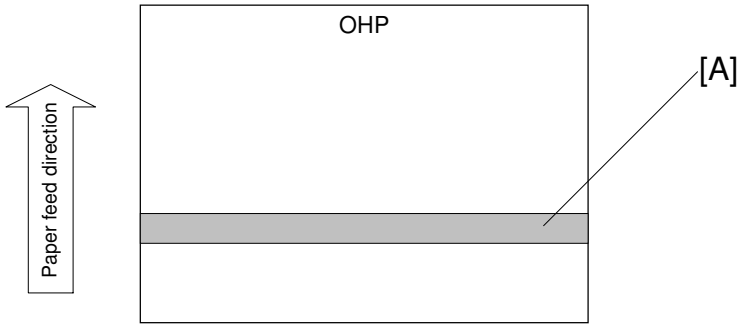
• System Counts	
Other SCs	
Count Timing	SC's generated other than those listed above for Scanner, IPU, Printer.
No Counts	---
Other	---
Operation Time	
Count Timing	Operation time of the main motor in increments of 100 ms.
No Counts	---
Other	Counts scanner and ARDF operation time when these devices are operating alone so these counts will not match the time count for drum rotation.
• Application Software Counts	
Original Total for Copy Application	
Count Timing	Counts the number of times the size of an original is detected for every original feed-in.
Other	For double-sided originals, counts 1 the first time the backside is set. Inverting is not counted. This count is different from the ADF Feed-ins reading described above.
Copy Total for Copy Application	
Count Timing	Feed-ins started.
Other	Blank (white) pages output.
• Mode Counts for Copy Application	
Copies by Magnifications **Reduction (25%~49%)** **Reduction (50%~99%)** **1:1** **Enlargement (101%~200%)** **Enlargement (201%~400%)** **Custom (Paper, dimensions, area, etc.)**	
Count Timing	Number of executions for each magnification category.
Other	Also counts white (blank) copies, and the number of times the operation panel keys are operated for zooming. For example, an AMS 71% copy is not counted for 50%~90%.
Copies by Color **Black Copies** **Red Copies** **Blue Copies** **2-Color Copies**	
Count Timing	Feed-in starts for each category. Counts according to the selection information of the basic screen.
Other	Also counts white sheets according to the mode.
Copies by Quality Mode **Text/Photo Mode** **Photo Mode** **Photo Original Mode** **Pencil Original Mode**	
Count Timing	Feed-in starts for each category. Counts according to the selection information of the basic screen.

• **Mode Counts for Copy Application**	
Other	Also counts white sheets according to the mode.
Copies by Print Function	
Job No.	
Stamp	
User Stamp	
User Pattern	
Date Stamp	
Page Numbering	
Count Timing	Feed-in starts for each category. (Counts according to the print tags for each function in the selection information.)
Other	Counts even white sheets (blanks) according to the selected mode. The feed-times of first pages without stamps, for example, are also counted. User patterns are also counted when user stamp is selected or when pattern mode is selected.
Into1 Function Copies	
Count Timing	Feed-ins for multiple page per sheet printing (2-up, 4-up, etc).
Other	White sheets (blank) for each mode.
Copies by Editing Mode	
Center Erase	**Mirror**
Color Erase	**Skew**
All Edit	**Shadow Effect**
Pen Area Edit	**Screening**
Editor Edit	**Gradation**
Synthesis	**Background Gradation**
Nega/Posi	**Repeat, Double Copy**
Center Erase	**Internal, External Color**
Center Fill	**Internal, External Erase**
Count Timing	Feed-ins for each edit mode.
Other	White sheets (blank) for each mode. In the Editor Edit mode, the edit and file are counted during fill execution.
Mode Program	
Count Timing	Mode program calls.
Other	---
High Speed	
Count Timing	Feed-in starts while the high speed key is selected.
Other	White sheets (blank) while the high speed key is selected.
Image Rotation	
Count Timing	Feed-in starts for user image rotation, stapler rotation, and duplex rotation.
Other	White sheets (blank) for the selected mode.
Auto Start	
Count Timing	Copy feed-ins for Auto Start mode.
Other	White sheets (blank) for the high speed mode are also counted..
Electronic Collate	
Count Timing	Feed-ins with the collate function selected.

• Mode Counts for Copy Application	
Other	Output to the rotational stacker are not counted. White sheets (blanks) for the high speed mode are also counted.
Mechanical Collate	
Count Timing	Feed-in starts with “Sort” selected on the finisher.
Other	Counts even for stapling. White sheets (blanks) for the high speed mode are also counted.
Stapler	
Count Timing	Feed-in starts with “Staple” selected on the finisher.
Other	Not counted for the Collate mode.

5.1.7 NIP BAND WIDTH ADJUSTMENT: SP1-109

When paper wrinkling or image offset occurs, the pressure from the pressure roller



A231M509.WMF

can be adjusted by changing the position of the pressure springs. At this time, the nip bandwidth can also be checked with SP1-109.

1. Execute SP5-802 to perform a free run of about 50 sheets.
2. Open SP1-109-1, press #, and then press Yes to confirm the selection.
3. Press Copy Window to return to the copy window.
4. Place an OHP sheet (A4/8.5" x 11" sideways) on the by-pass feed tray.
5. Press Start twice. The OHP sheet stops in the fusing unit for about 10 seconds, then it exits automatically.
6. Check the nip bandwidth [A]. The relationship between the position of the pressure spring and the bandwidth is as follows.
   NOTE: Check the nip bandwidth around the center of the OHP.

Pressure spring position	Nip width
Upper (default position)	6.0 ± 0.5 mm
Lower	6.5 ± 0.6 mm

If the width is out of the above specification, the pressure spring should be replaced.

5.1.8 MEMORY ALL CLEAR: SP5-801

Executing Memory All Clear resets all the settings stored in the NVRAM to their default settings except the following:

SP7-003-1:	Electrical total counter value
SP5-811-1:	Machine serial number
SP5-907:	Plug & Play Brand Name and Production Name Setting

1. Execute SP5-990 to print out all SMC Data Lists.
2. Open SP mode 5-801.
3. Press the number for the item that you want to initialize. The number you select determines which application is initialized. For example, press 1 if you want to initialize all modules or select the appropriate number from the table below.

No.	What It Initializes	Comments
1	All modules	Initializes items 2 ~ 12 below.
2	Engine	Initializes all registration settings for the engine and processing settings.
3	SCS (System Control Service)/SRM	Initializes default system settings, CSS settings, operation display coordinates, and ROM update information.
5	MCS (Memory Control Service)	Initializes the automatic delete time setting for stored documents.
6	Copier application	Initializes all copier application settings.
7	Fax application	Initializes the fax reset time, job login ID, all TX/RX settings, local storage file numbers, and off-hook timer.
8	Printer application	Initializes the printer defaults, programs registered, the printer SP Bit SW, and printer CSS counter.
9	Scanner application	Initializes the scanner defaults for the scanner and all the Scanner SP modes.
10	Network application	Deletes the NFA management files and thumbnails, and initializes the JOB login ID.
11	NCS (Network Control Service)	Initializes the system defaults and interface settings (IP addresses also), the SmartNetMonitor for Admin, WebStatusMonitor settings, and the TELNET settings.
12	R-FAX	Initializes the Job login ID, SmartNetMonitor for Admin, Job History, and local storage file numbers.

4. Press Execute, and then follow the prompts on the display to complete the procedure.
5. Make sure that you perform the following settings:
   - Do the laser beam pitch adjustment (SP2-109).
   - Do the printer and scanner registration and magnification adjustments (☛ 3.21 Replacement and Adjustment, “Copy Adjustments”).
   - Do the touch screen calibration (☛ 3.21.4 Replacement and Adjustment, “touch screen calibration”).

- Referring to the SMC data lists, re-enter any values, which had been changed from their factory settings.
- Do SP 3-001-2 (ID Sensor Initial Setting) and SP4-911-1 (HDD media check).

6. Check the copy quality and the paper path, and do any necessary adjustments.

5.1.9 SOFTWARE RESET

The software can be reboot when the machine hangs up. Use the following procedure.

Turn the main power switch off and on.

-or-

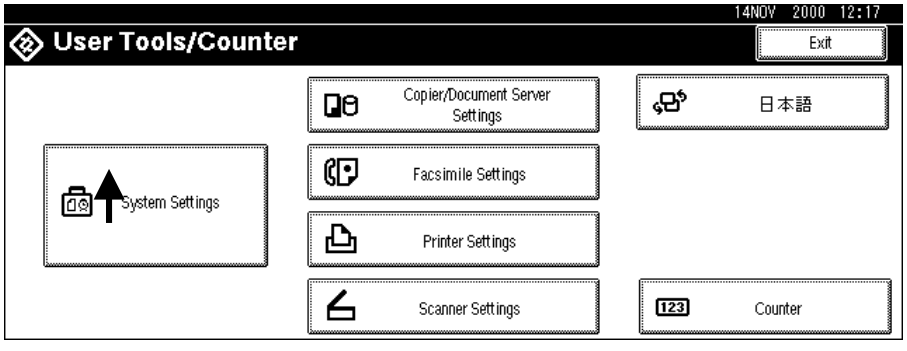
Press and hold down ⓒ ⓗ together for over 10 seconds. When the machine beeps once release both buttons. After “Now loading. Please wait” is displayed for a few seconds the copy window will open. The machine is ready for normal operation.

5.1.10 SYSTEM SETTINGS AND COPY SETTING RESET

System Setting Reset

The system settings in the UP mode can be reset to their defaults. Use the following procedure.

1. Press User Tools/Counter ◈/123.
2. Hold down ⓗ and then press System Settings.
   NOTE: You must press ⓗ first.



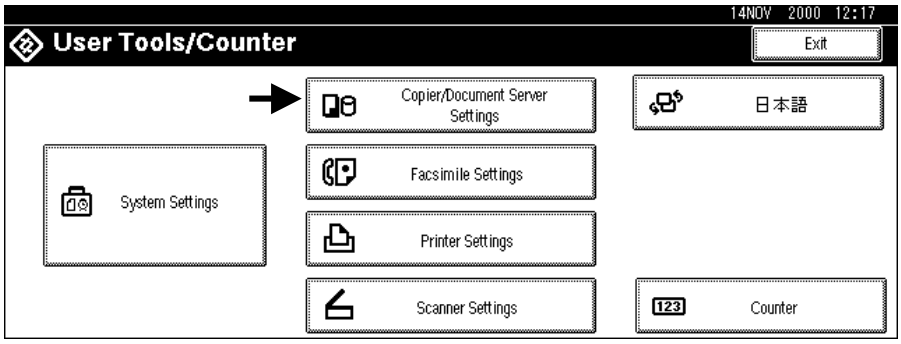
B004S503.WMF

3. When the message prompts you to confirm that you want to reset the system settings, press Yes.
4. When the message tells you that the settings have been reset, press Exit.

Copier Setting Reset

The copy settings in the UP mode can be reset to their defaults. Use the following procedure.

1. Press User Tools/Counter.
2. Hold down # and then press Copier/Document Server Settings.
   NOTE: You must press # first.

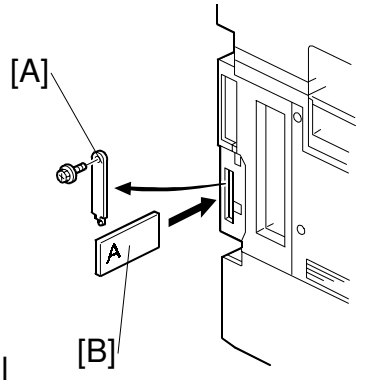


B004S504.WMF

3. When the message prompts you to confirm that you want to reset the Copier Document Server settings, press Yes.
4. When the message tells you that the settings have been reset, press Exit.

5.2 SOFTWARE DOWNLOAD

1. Turn off the main power switch.
2. Remove the IC card [A] cover.
3. Insert the IC card [B] containing the software you wish to download into the card slot of the controller.
4. Turn on the main power.
5. Follow the instructions displayed on the LCD panel
6. Monitor the downloading status on the operation panel.
   - While downloading is in progress, the LCD will display “Writing”. When downloading has been completed, the panel will display “OK”.
   - For operation panel software, the Start key lights red while downloading is in progress, and then lights green again after downloading is completed.



B004I015.WMF

⚠CAUTION

Never switch off the power while downloading. Switching off the power while the new software is being downloading will damage the boot files in the controller.

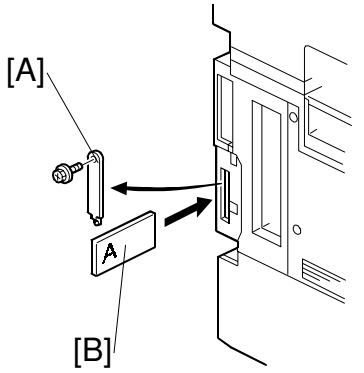
7. After confirming that downloading is completed, turn off the main power and remove the IC card.
8. If more software needs to be downloaded, repeat steps 1 to 7.
9. Turn the main power on and confirm that the new software loads and that the machine starts normally.

5.3 UPLOADING/DOWNLOADING NVRAM DATA

The content of the NVRAM can be uploaded to and downloaded from a flash memory card.

5.3.1 UPLOADING NVRAM DATA (SP5-824)

1. Turn off the main switch.
2. Remove the IC card cover [A].
3. Plug the flash memory card [B] into the card slot.
4. Turn on the main switch.
5. Execute SP5-824.
6. Press ① to start uploading the NVRAM data.



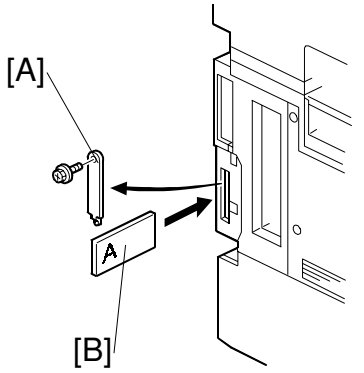
B004I015.WMF

5.3.2 DOWNLOADING NVRAM DATA (SP5-825)

The following data are not downloaded from the flash card:

- Total count categories (SP7-003-*** Copy Counter)
- C/O, P/O Counter (SP7-006-*** C/O, P/O Count Display)
- Dupelx, A3/DLT/Over 420 mm, Staple and Scanner application scanning counters (system settings).

1. Turn off the main switch.
2. Remove the IC card cover [A].
3. Plug the flash memory card [B] into the card slot.
4. Turn on the main switch.
5. Execute SP5-825.
6. Press ① to start downloading the NVRAM data.



B004I015.WMF

Note that the following errors could occur during downloading:

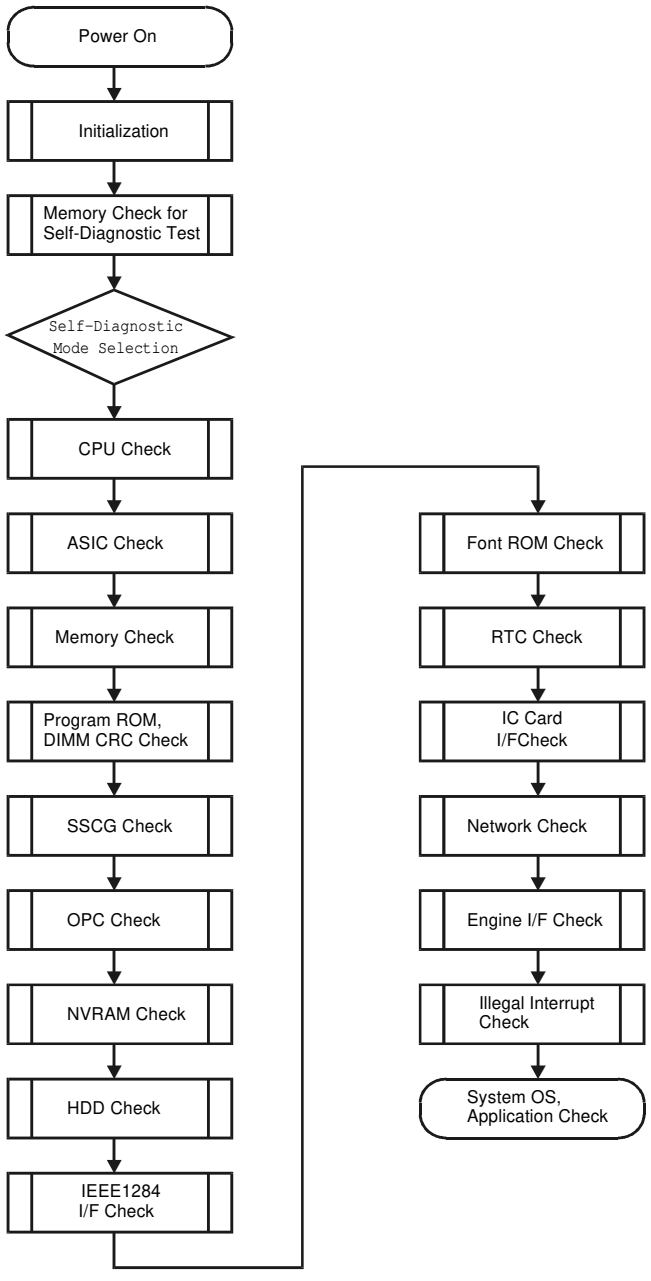
- If a card is not installed in the card slot and a message tells you that downloading cannot proceed, you cannot execute downloading, even by pressing ①.
- If the correct card for the NVRAM data is not inserted in the card slot, after you press ① a message will tell you that downloading cannot proceed because the card is abnormal and the execution will halt.

5.4 SELF-DIAGNOSTIC MODE

5.4.1 SELF-DIAGNOSTIC MODE AT POWER ON

As soon as the main machine is powered on, the controller waits for the initial settings of the copy engine to take effect and then starts an independent self-diagnostic test program. The self-diagnostic test follows the path of the flow chart shown below and checks the CPU, memory, HDD, and so on. An SC code is displayed in the touch panel if the self-diagnostic program detects any malfunction or abnormal condition.

Self-Diagnostic Test Flow



B004S516.WMF

Service Tables

5.4.2 DETAILED SELF-DIAGNOSTIC MODE

In addition to the self-diagnostic test initiated every time the main machine is powered on, you can set the machine in a more detailed diagnostic mode manually in order to test other components or conditions that are not tested during self-diagnosis after power on. The following device is required in order to put the machine in the detailed self-diagnosis mode.

No.	Name
G02119350	Parallel Loopback Connector

Executing Detailed Self-Diagnosis

Follow this procedure to execute detailed self-diagnosis.

1. Switch off the machine, and connect the parallel loopback device to the Centronics I/F port.
2. Hold down #, press and hold down *, and then while pressing both keys at the same time, switch on the machine.

   You will see “Now Loading” on the touch-panel, and then you will see the results of the test.

A report like the one below is printed every time a detailed self-diagnostic test is executed, whether errors were detected or not.

MODEL NAME XXXX

Self-Diagnosis Report

Serial No. : ACLD000034 Firmware P/# : ACP82XXXX [1/1]
Firmware Version : 2.49.01 Wed Nov 22 13:15:30 2000

[System Construction]

Kernel Version	: NetBSD 1.3.3 (SHINYOKOHAMA_ROM) #0: Sat Nov 11 16:15:35 JST 2000		
CPU System Bus Clock	: 100.0 MHz	CPU Pipeline Clock	: 200.0 MHz
Board Type	: 7	ASIC Version	: 1397306160
RTC Existence	: existence	RAM Capacity	: 100.663296 MB
HDD Existence	: existence	HDD Model	:

[Total Counter]

0001000

[Program No. @]

MAIN	: ACP82XXXX	ENGINE	: Ver1.96
LCDC	: V1.39	PI	:
ADF	: B3515620B	SIB	: B0045383
FIN	:	FIN_SDL	:
BANK	: A6825150	LCT	:
MBX	:	FCU	:
DPX	:		

[Error List @@@]

SCCODE (ERROR CODE)	SC CODE (ERROR CODE)	SC CODE (ERROR CODE)	SC CODE (ERROR CODE)
SC835 (110C)	SC820 (0001)	SC820 (0002)	SC820 (0003)
SC820 (0004)	SC820 (0005)		

B004S515.WMF

Service Tables

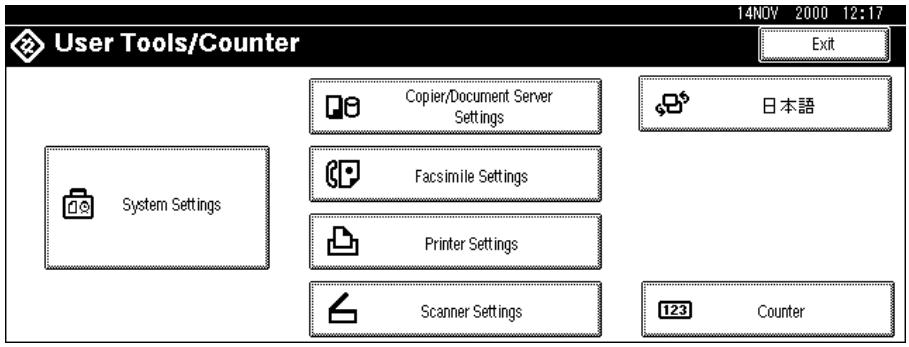
5.5 USER PROGRAM MODE

The user program (UP) mode is accessed by users and operators, and by sales and service staff. UP mode is used to input the copier's default settings. The default settings can be reset at any time by the user. (☛ 5.1.10)

5.5.1 HOW TO USE UP MODE

UP Mode Initial Screen: User Tools/Counter Display

To enter the UP mode, press User Tools/Counter [◈/123].

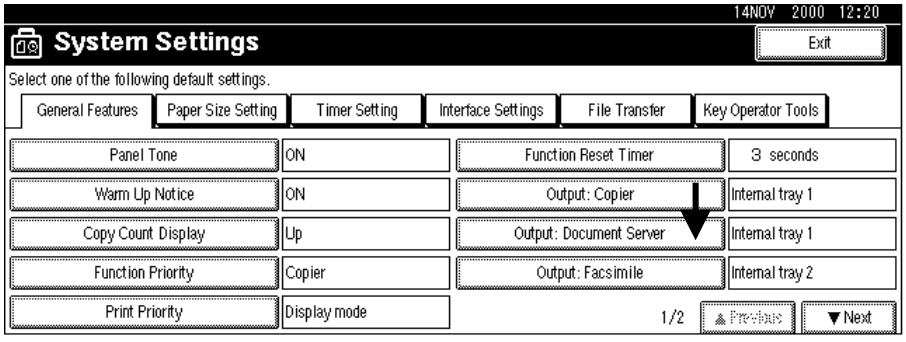


B004S505.WMF

System Settings

In the User Tools/Counter display, press System Settings.

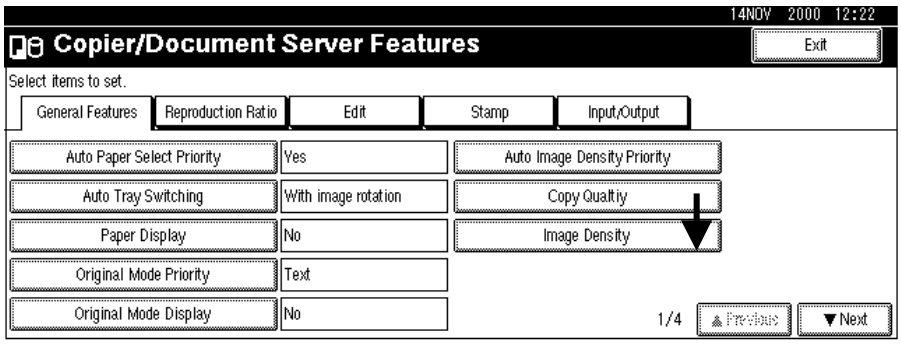
Click a tab to display the settings. If the Next button is lit in the lower right corner, press to display more options. Perform the settings, press Exit to return to the User Tools/Counter display, and then press exit to return to the copy window.



B004S506.WMFF

Copier/Document Server Features

In the User/Tools Counter display, press Copy/Document Server Settings.

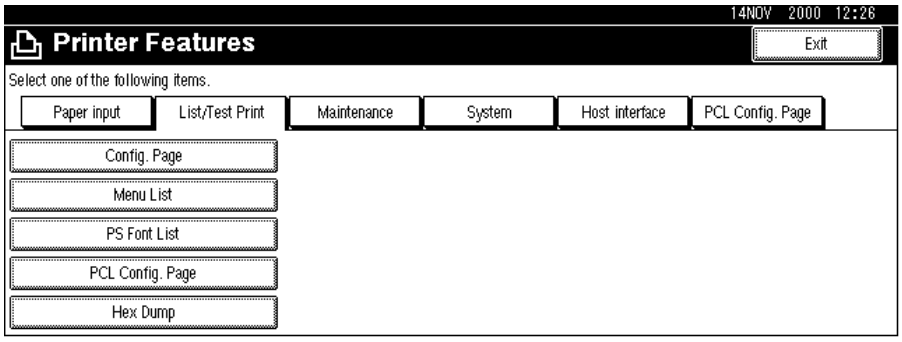


B004S507.WMF

Click a tab to display the settings. If the Next button is lit in the lower right corner, press to display more options. Perform the settings, press Exit to return to the User Tools/Counter display, and then press Exit to return to the copy window.

Printer, Facsimile, Scanner Settings

In the User/Tools Counter display, press Printer Settings, Facsimile, or Scanner Settings to open the appropriate screen and then click the tab to display more settings. The screen below shows the Printer Features screen.

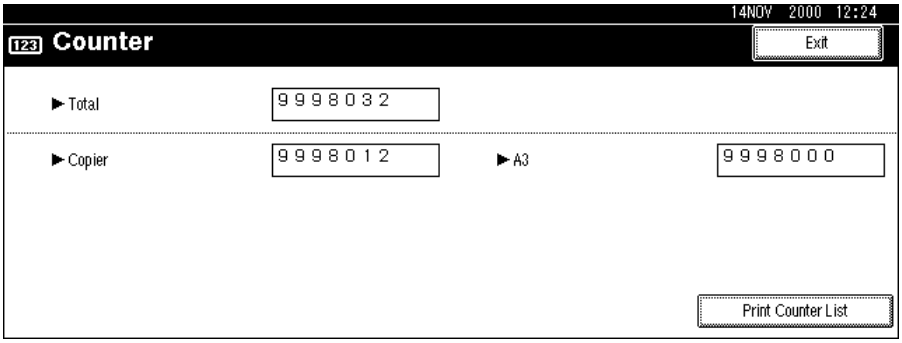


B004S509.WMF

Service Tables

Counter

In the User/Tools Counter display, press Counter.



B003SL07.WMF

View the settings, press Print Counter Exit to return to the User Tools/Counter display, and then press Exit to return to the copy window.

5.6 DIP SWITCHES

Controller: DIP SW2

DIP SW No.	ON	OFF
1	IC Card Boot	System ROM Boot
2	Keep at “OFF”	
3		
4		

I/O Board: DIP SW101

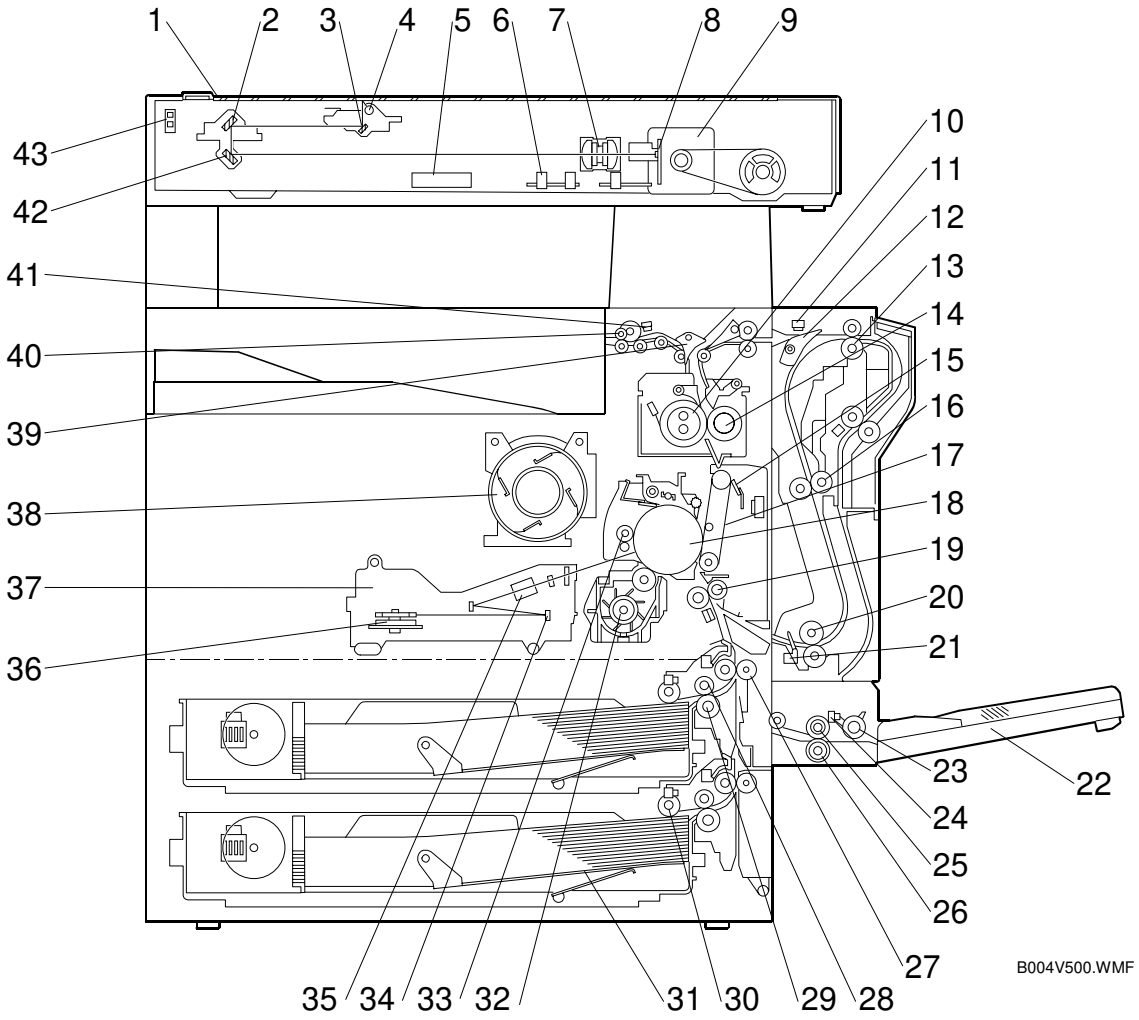
DIP SW No.	Function	ON		OFF	
1	Copy Speed	35 cpm (180 mm/s)		45 cpm (230 mm/s)	
2	Jam Detection (see Note)	Off		On	
3	SC Generation	Disabled		Enabled	
4	Not used	OFF (Do not change)			
5	Not used	OFF (Do not change)			
6 7	Destination	OFF Japan OFF	ON North America OFF	OFF Europe ON	ON Not used ON
8	Not used	OFF (Do not change)			

NOTE: Disabling jam detection is effective only for the main machine (not for the options).

6. DETAILED SECTION DESCRIPTIONS

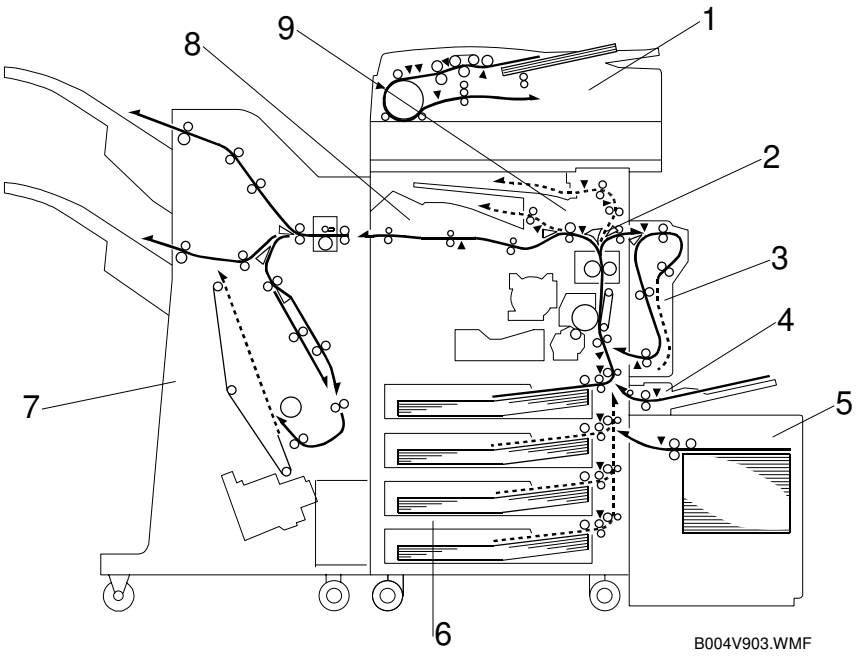
6.1 OVERVIEW

6.1.1 COMPONENT LAYOUT



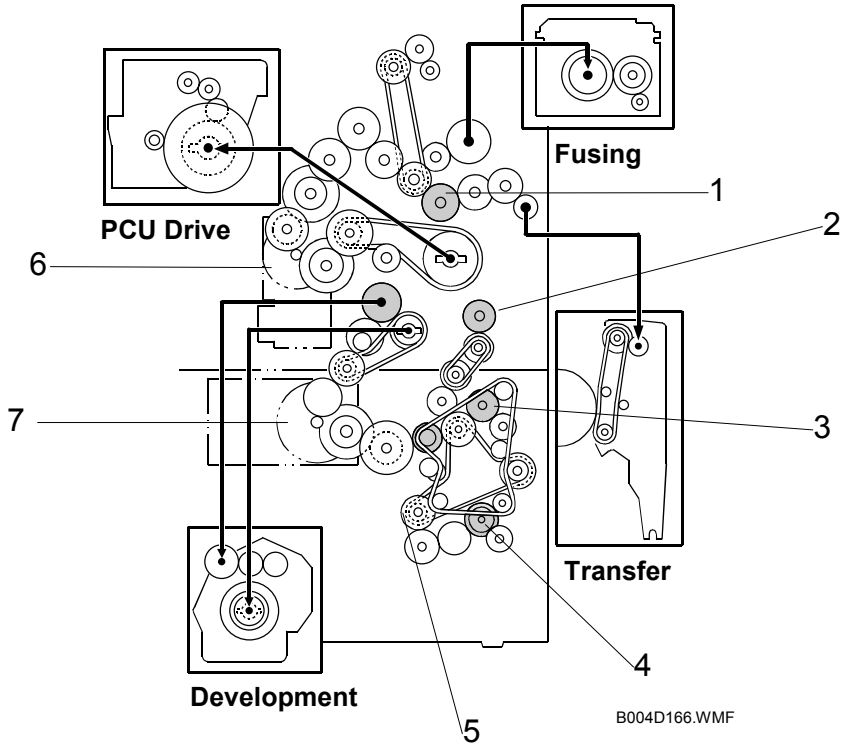
1 Exposure Glass
2 2nd Mirror
3 1st Mirror
4 Exposure Lamp
5 Original Width Sensors
6 Original Length Sensors
7 Lens
8 SBU
9 Scanner Motor
10 Hot Roller
11 Entrance Sensor
12 Inverter Gate
13 Inverter Roller
14 Pressure Roller
15 Transfer Belt Cleaning Blade
16 Upper Transport Roller
17 Transfer Belt
18 OPC Drum
19 Registration Roller
20 Lower Transport Roller
21 Duplex Exit Sensor
22 By-pass Tray
23 By-pass Pick-up Roller
24 By-pass Paper End Sensor
25 By-pass Paper Feed Roller
26 By-pass Separation Roller
27 Upper Relay Roller
28 Feed Roller
29 Separation Roller
30 Pick-up Roller
31 Bottom Plate
32 Development Unit
33 Charge Roller
34 Fθ Mirror
35 Barrel Toroidal Lens (BTL)
36 Polygonal Mirror Motor
37 Laser Unit
38 Toner Bottle Holder
39 Exit Junction Gate
40 Exit Roller
41 Paper Exit Sensor
42 3rd Mirror
43 Scanner HP Sensor

6.1.2 PAPER PATH



1 ARDF
2 Interchange unit
3 Duplex unit
4 By-pass tray
5 Large Capacity Tray (LCT)
6 Paper tray unit
7 Two-Tray Finisher
8 Bridge unit
9 1-Bin Tray

6.1.3 DRIVE LAYOUT

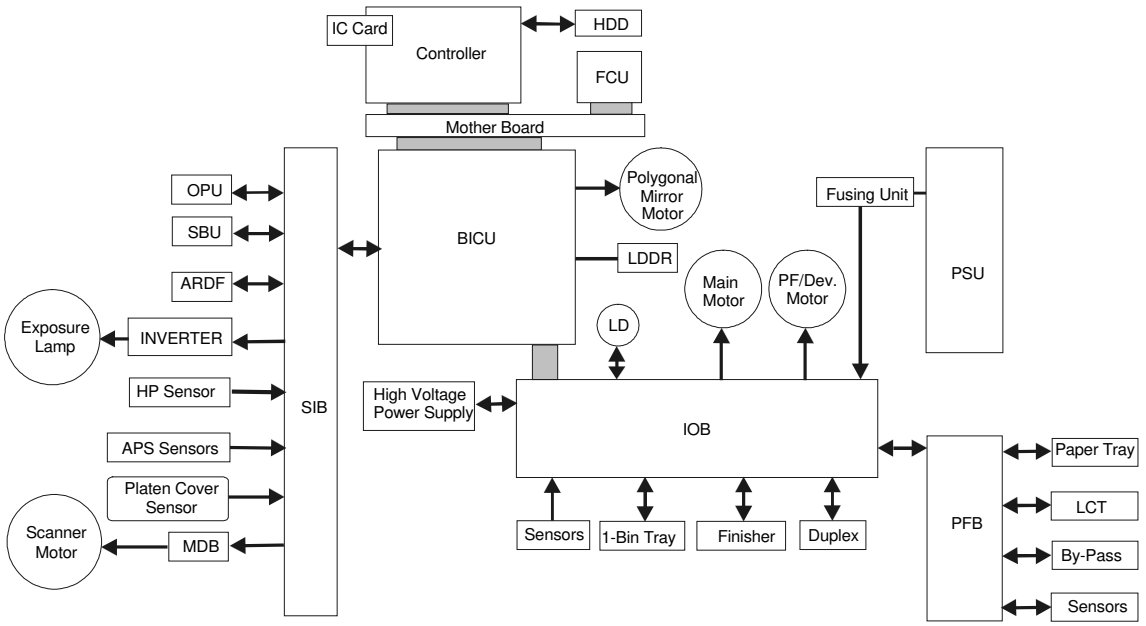


1	Transfer Belt Contact Clutch	5	Relay Clutch
2	Registration Clutch	6	Main Motor
3	Upper Paper Feed Clutch	7	Paper Feed/Development Motor
4	Lower Paper Feed Clutch		

In this machine, the development unit is provided with its own motor, separate from the main motor.

6.2 BOARD STRUCTURE

6.2.1 BLOCK DIAGRAM



B004D511.WMF

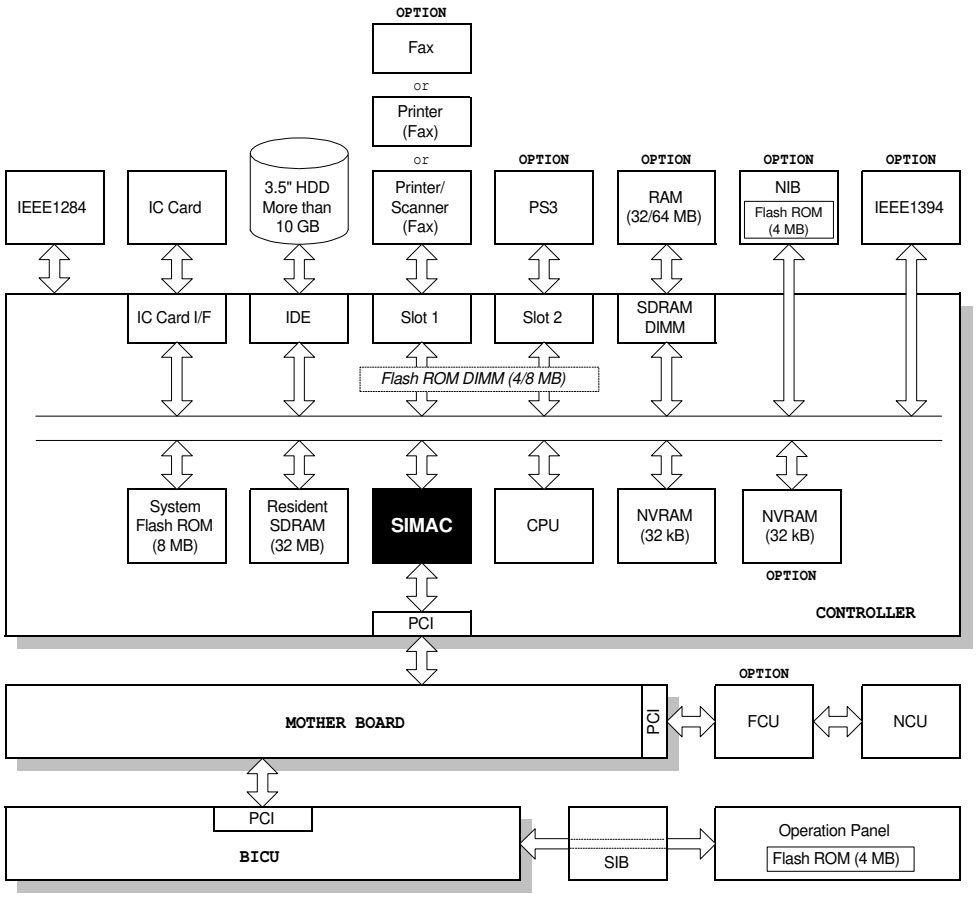
This machine uses the GW (Grand Workware) architecture, which allows the copier to be expanded as an MFP by installing simple modular components (ROM DIMMs) on the controller board. The BICU and Controller are connected to the FCU and other components via a PCI bus.

1. **Controller (Main Board)**
   Takes charge of controlling memory and all peripheral devices.
2. **BICU (Base Engine and Image Control Unit)**
   This is the engine control board. It controls the following functions.
   - Engine sequence
   - Timing control for peripherals
   - Image processing, video control

Detailed Descriptions

3. **IOB (Input/Output Board)**
   The IOB handles the following functions:
   - Drive control for the sensors, motors, and solenoids of the main unit
   - PWM control for the high voltage supply board
   - Serial interface with peripherals
   - Fusing control
4. **PFB (Paper Feed Control Board)**
   Controls paper feed.
5. **SIB (Scanner Interface Board)**
   Controls the scanner, and serves as the signal I/F board for the SBU and the OPU. The SIB passes signals between the BICU and the scanner unit components, and transmits video signals from the SBU to the BICU.
6. **OPU (Operation Panel Unit)**
   Controls operation panel and display.
7. **SBU (Sensor Board Unit)**
   Receives analog signals from the CCD and converts them into digital signals.
8. **LDDR (Laser Diode Driver)**
   The LD driver circuit board.
9. **MDB (Motor Drive Board)**
   Controls the scanner motor.
10. **Mother Board**
    This board interfaces the controller and the BICU and FCU.
11. **FCU (Facsimile Control Unit)**
    Controls fax communications and fax features.

6.2.2 CONTROLLER



B004D512.WMF

The controller employs GW (Grand Workware) architecture that allows the board to control all applications, including copier, printer, scanner, and fax applications. To add the optional printer, scanner, or fax applications, ROM DIMMs must be installed on the controller. The fax option, however, requires FCU and NCU installation also.

The following systems and application software can be downloaded from the Controller IC Card.

- Controller (System OS/Copier)
- Operation panel
- BICU (engine control)
- Printer
- Scanner
- Fax
- PostScript 3
- NIB
- FCU

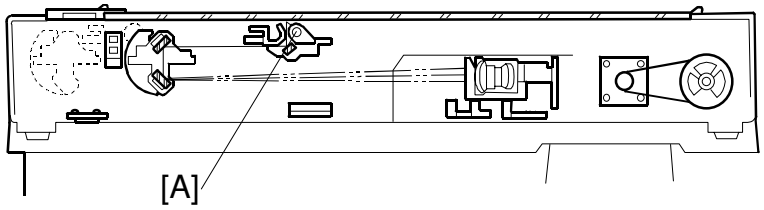
For details about how to download software from an IC card, see “Software Download” in Chapter 5.

1. **CPU**. Employs QED RM5231. Clock frequency: 200 MHz.
2. **ASIC: SIMAC**. Uses a dedicated chip developed for use with GW architecture. The CPU and memory I/F employ a 100 MHz bus (32 bit). These components perform CPU and I/F control and also control all of the following functions: memory, local bus, interrupts, PCI bus, video data, HDD, network, operation panel, IEEE1284, and image processing.
3. **SDRAM**. Comprises a 32 MB RAM chip, expandable with a 32 MB or 64 MB SDRAM.
4. **System Flash ROM**. Provided with an 8 MB Flash ROM for the system OS and copier application.
5. **Flash ROM DIMM Slots**. Two slots are provided for two ROM DIMMs (4 MB or 8MB). Expansion slots provided for the optional printer, scanner, facsimile, and PostScript 3 applications.
6. **NVRAM**. 32 KB of NVRAM are provided for the system. NVRAM stores many settings, including OS System log information, copier calendar, current system settings, user accounts (max. 100) and all settings for the fax, printer, scanner, and network. NVRAM also has the RTC (Real Time Clock) for time management.
   NOTE: Optional NVRAM, which can store to 400 user accounts, can be installed on the controller.
7. **HDD.** A 3.5" HDD (more than 10 GB) can be connected using an IDE I/F. The hard disk is partitioned as shown below.

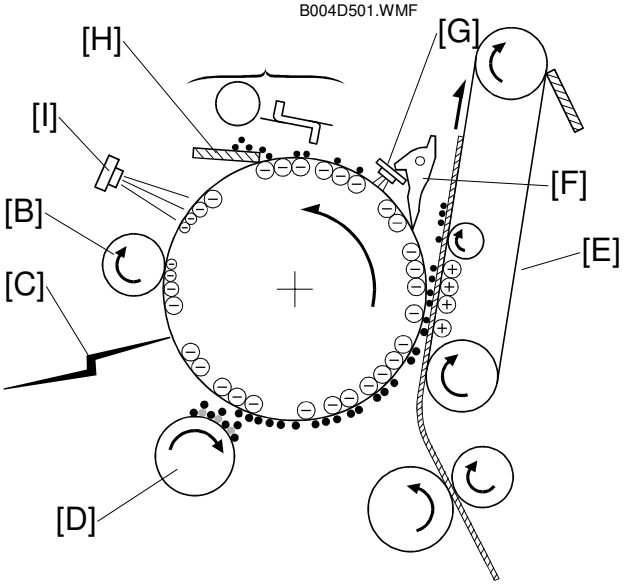
Partition	Size	Function	Power OFF	Comment
File System 1	500 MB	Downloaded fonts, forms.	Remains	
File System 2	200 MB	Job spooling area.	Erased	
File System 3	1500 MB	Work data area	Remains	Used for document server application.
Image TMP	2780 MB	Collation, sample print, protected print.	Erased	Commonly used area for applications. Stores copy, printer, fax, and scanner data. Storage capacity: About 9000 pages (3,000 files)
Image LS*[1]	4320 MB	Document server, local storage archive	Remains	
Image Area Management	100MB	Stores image area information	Remains	
Job Log	10 MB	Job log.	Remains	
Total	**10 GB**		Remains	

*[1] When an application uses an image page, first it uses the Image LS area. If this area is in use and not available, then it uses the Image TMP area.

6.3 COPY PROCESS OVERVIEW



B004D501.WMF



B004V101.WMF

Exposure

The xenon lamp [A] exposes the original. The reflected light is passed to the CCD, where it is converted into analog data, processed, and stored in the memory. The data is retrieved and sent to the laser diode for printing

Drum charge

The charge roller [B] gives a negative charge to the organic photoconductive (OPC) drum. The charge remains on the surface of the drum because the OPC layer has a high electrical resistance in the dark.

Laser exposure

Processed data from the scanned original is retrieved from the memory and transferred to the drum by two laser beams [C], which form an electrostatic latent image on the drum surface. The amount of charge remaining as a latent image on the drum depends on the laser beam intensity, controlled by the BICU.

Development

The magnetic developer brush on the development roller [D] contacts the latent image on the drum. Toner particles are electrostatically attracted to the areas of the drum surface where the laser reduced the negative charge on the drum.

Image transfer

Paper is fed into the area between the drum surface and the transfer belt [E] at the proper time to align it with the image on the drum. The transfer bias roller applies a high positive charge to the reverse side of the paper through the transfer belt. This positive charge pulls the toner particles from the drum surface onto the paper while the paper is electrostatically attracted to the transfer belt.

Separation

Paper separates from the drum as a result of the electrical attraction between the paper and the transfer belt. Pick-off pawls [F] help separate the paper from the drum.

ID sensor

The ID sensor [G] measures the reflectivity of the pattern formed by the laser on the surface of the drum. This output signal is used for toner supply control and also measures the drum surface reflectivity, which is used for charge roller voltage control.

Cleaning

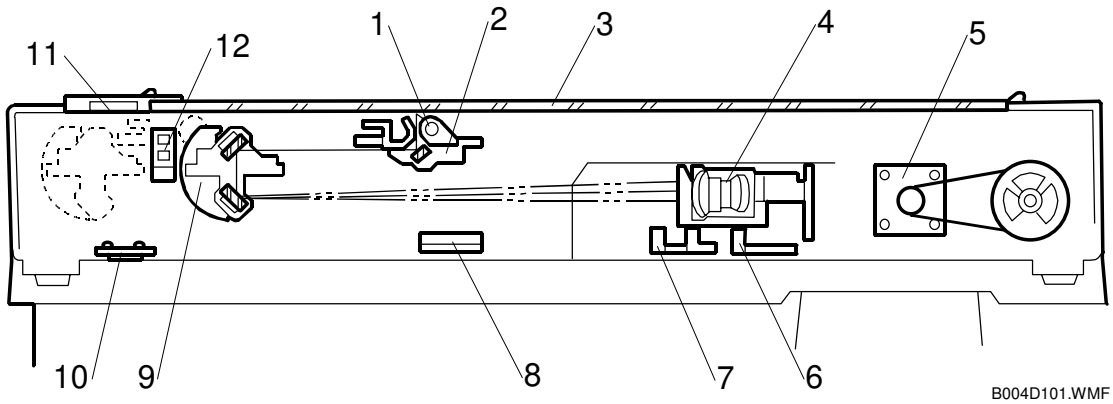
The drum cleaning blade [H] removes any toner remaining on the drum surface after the image is transferred to the paper.

Quenching

Finally, the light from the quenching lamp [I] electrically neutralizes the charge on the drum surface.

6.4 SCANNING

6.4.1 OVERVIEW



1	Exposure lamp	7	Original length sensors 1, 2
2	1st Scanner	8	Original width sensors
3	Exposure glass	9	2nd Scanner
4	Lens block	10	Anti-condensation heater (option)
5	Scanner drive motor	11	Exposure glass (for document feeder)
6	Original length sensor 3	12	Scanner HP sensor

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

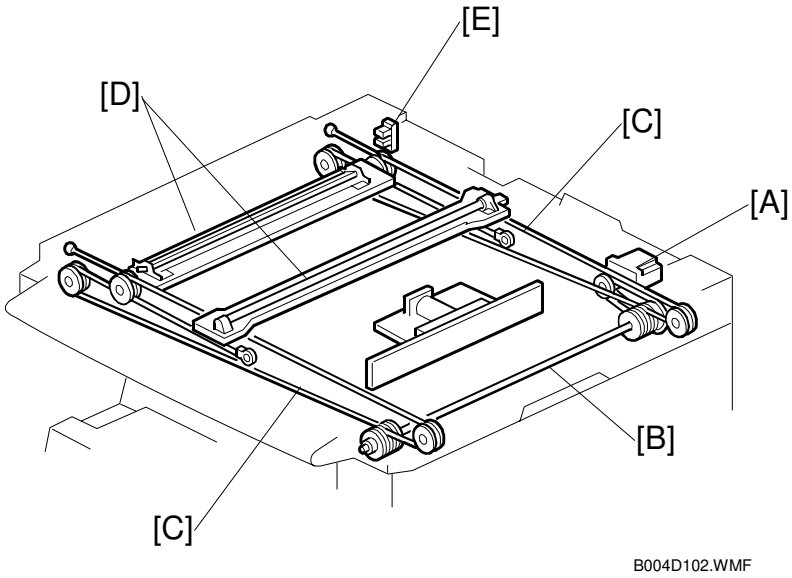
The 1st scanner consists of the exposure lamp, a reflector, and the 1st mirror.

The exposure lamp is energized by a dc supply to avoid uneven light intensity while the 1st scanner moves in the sub scan direction (down the page). The entire exposure lamp surface is frosted to ensure even exposure in the main scan direction (across the page).

The light reflected by the reflector is of almost equal intensity in all directions, to reduce shadows on pasted originals.

When the optional optics anti-condensation heater is installed on the left side of the scanner, it turns on whenever the power cord is plugged in.

6.4.2 SCANNER DRIVE



Book Mode

Scanner drive motor [A] and timing belt drive the scanner drive shaft [B]. The drive shaft drives the pulleys attached to the two scanner wires [C] (front and back). The scanner wires move the 1st and 2nd scanners [D] on their rails. The 2nd scanner speed is half that of the 1st scanner.

The scanner interface board (SIB) controls the scanner drive motor. In full size mode, the 1st scanner speed is 230 mm/s during scanning.

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

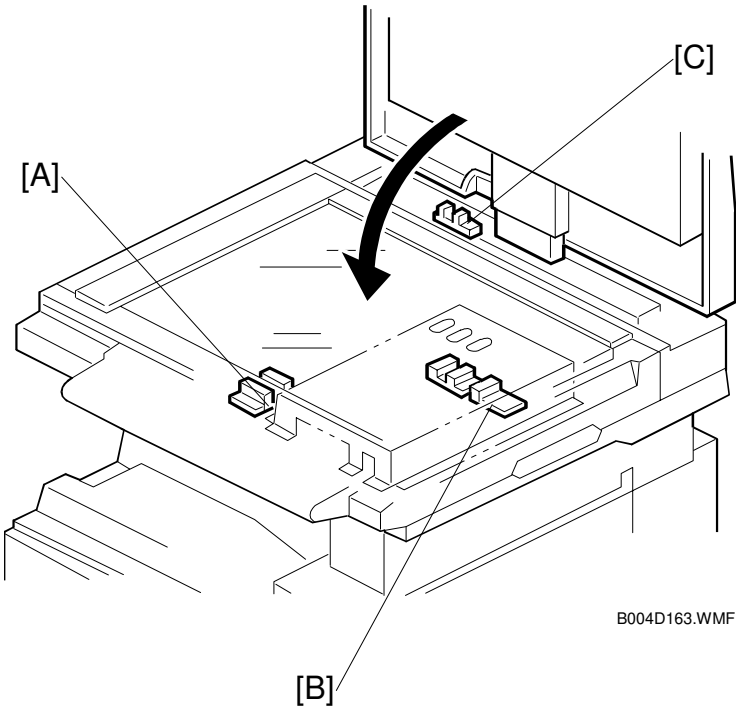
NOTE: Magnification in the sub-scan direction can be adjusted by changing the scanner drive motor speed using SP4-008.

ADF mode

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

NOTE: Magnification in the sub-scan direction can be adjusted by changing the ADF motor speed using SP6-017. In the main scan direction, it can be adjusted with SP2-909, like for book mode.

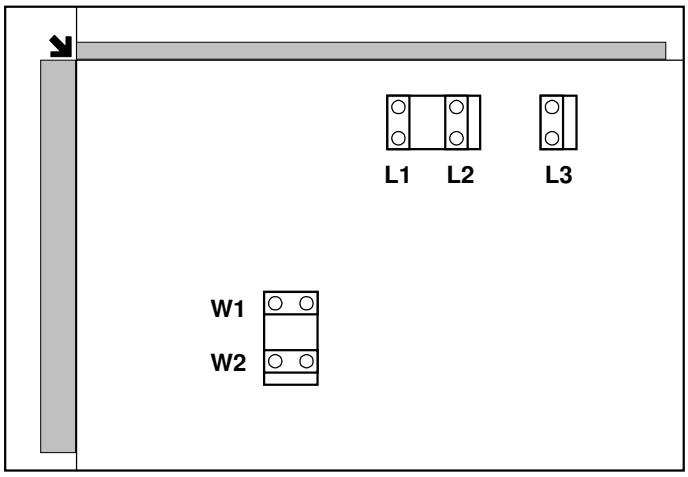
6.4.3 ORIGINAL SIZE DETECTION IN PLATEN MODE



The original width sensors [A] detect the original width, and the original length sensors [B] detect the original length. These reflective photo sensors are referred to collectively as the APS (Auto Paper Select) sensors.

While the power is on, these sensors are active and the original size data is always sent to the CPU. However, the CPU checks the data only when the platen cover sensor [C] is activated after the platen reaches about 15 cm above the exposure glass as it is closed. The main CPU detects the original size by the on/off signals received from the APS sensors.

NOTE: If the copy is made with the platen fully open, the main CPU determines the original size from the sensor outputs after the Start ⓘ key is pressed.



B004D540.WMF

Original Size		Length Sensor			Width Sensor		SP4-301 display
A4/A3 version	**LT/DLT version**	L3	L2	L1	W2	W1	
A3	11” x 17”	O	O	O	O	O	00011111
B4	10” x 14”	O	O	O	X	O	00011101
F4	8.5” x 14” (8” x 13”)	O	O	O	X	X	00011100
A4-L	8.5” x 11”	X	O	O	X	X	00001100
B5-L		X	X	O	X	X	00000100
A4-S	11” x 8.5”	X	X	X	O	O	00000011
B5-S		X	X	X	X	O	00000001
A5-L, A5-S	5.5” x 8.5”, 8.5” x 5.5”	X	X	X	X	X	00000000

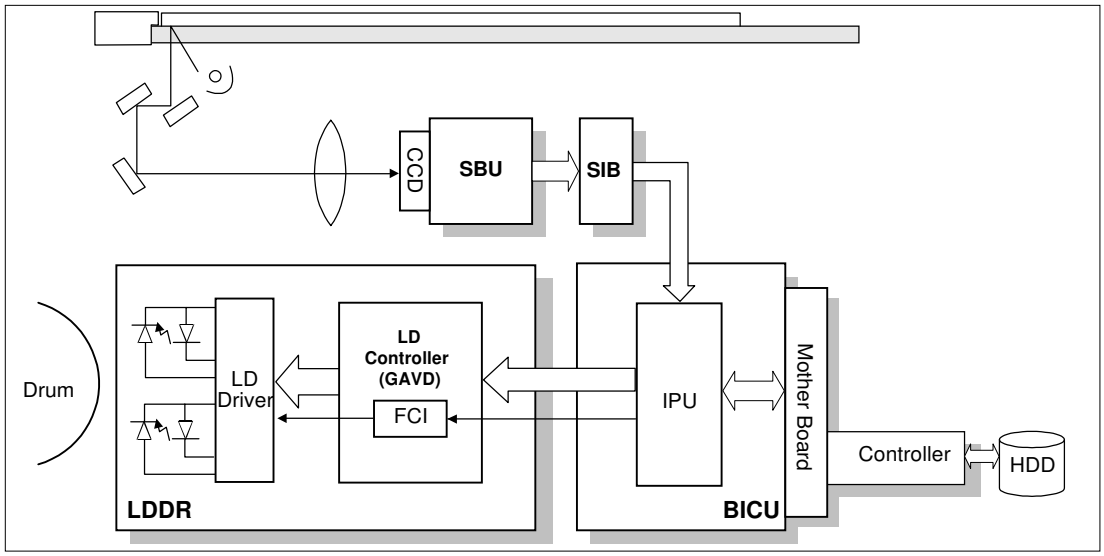
NOTE: L: Lengthwise, S: Sideways, O: Paper present X: Low

For other combinations, "CANNOT DETECT ORIG. SIZE" will be indicated on the operation panel display.

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

However, if the by-pass tray is used, note that the machine assumes that the copy paper is lengthwise (L). For example, if A4 sideways paper is placed on the by-pass tray, the machine assumes it is A3 paper and scans a full A3 area, disregarding the original size sensors.

6.5 IMAGE PROCESSING



B004D532.WMF

6.5.1 OVERVIEW

SBU: The SBU (Sensor Board Unit) converts the analog signal from the CCD to an 8-bit digital signal and sends it to the SIB.

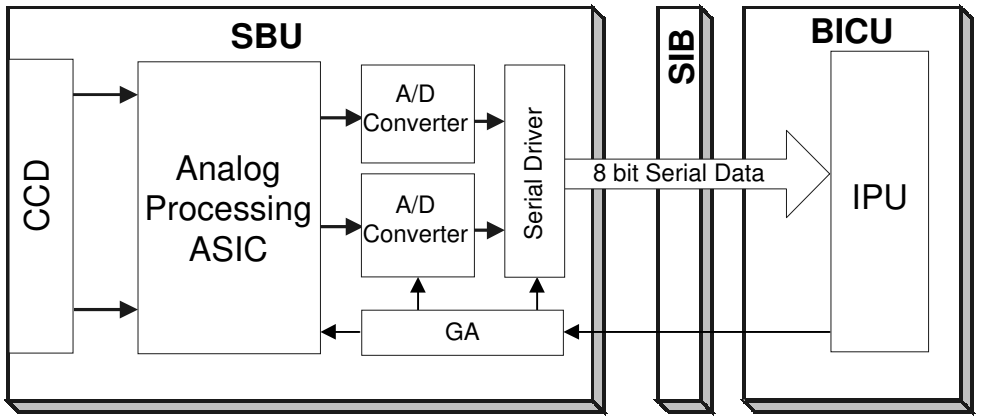
SIB: Relays image signals and controls the scanner.

BICU: The BICU (Base Engine Image Control Unit) performs timing control and command control. The IPU on the BICU processes auto shading, filtering, magnification, γ correction, and gradation. The memory controller performs image compression, decompression, and memory address control (for binary picture processing mode only)

LD Unit: Performs dual channel multi-beam exposure, multiple exposure, and synchronous detection.

Controller: Controls image archiving, controls printing, and secondary image compression/decompression.

6.5.2 SBU (SENSOR BOARD UNIT)



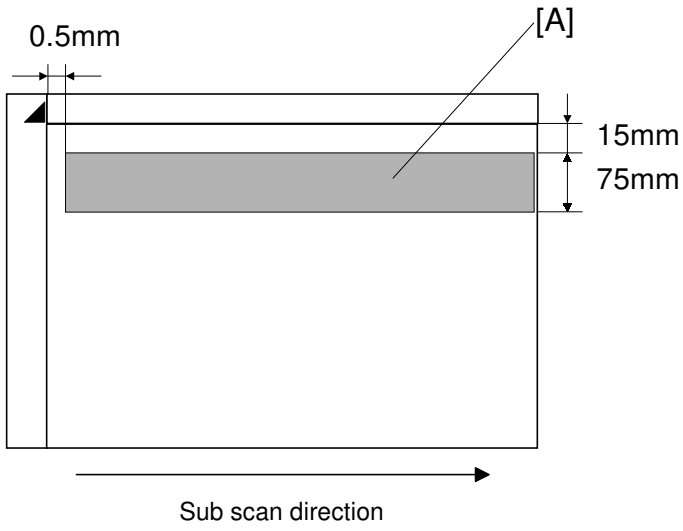
The CCD converts the light reflected from the original into an analog signal. The CCD line has 7200 pixels at a resolution of 600 dpi.

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

1. Z/C (Zero/Clamp)
   Adjusts the black level for even pixels to match the odd pixels.
2. Signal composition
   Analog signals for odd and even pixels from the CCD are merged by a switching device.
3. Signal amplification
   The analog signal is amplified by amplifiers in the AGC circuit. The maximum gains of the amplifiers are controlled by the CPU on the BICU board.

After the above processing, the analog signals are converted to 8-bit signals by the A/D converter. This gives a value for each pixel on a scale of 256 shades of gray. Then, this data goes to the BICU via the SIB.

6.5.3 AUTO IMAGE DENSITY (ADS)



B004D550.WMF

This mode prevents the background of an original from appearing on copies.

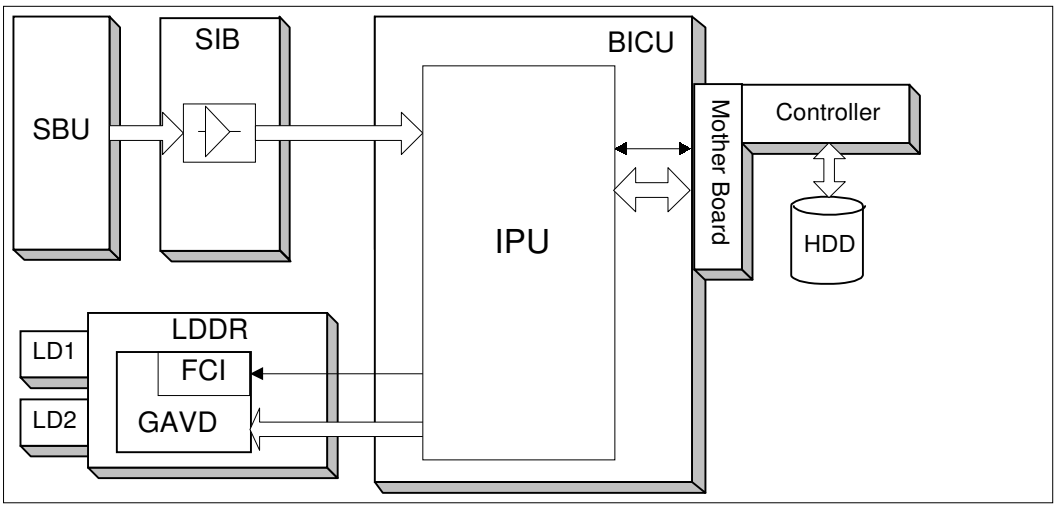
The copier scans the auto image density detection area [A]. This corresponds to a narrow strip at one end of the main scan line, as shown in the diagram. As the scanner scans down the page, the IPU on the BICU detects the peak white level for each scan line, within this narrow strip only. From this peak white level, the IPU determines the reference value for A/D conversion for the scan line. Then, the IPU sends the reference value to the A/D controller on the SBU.

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

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

6.5.4 IPU (IMAGE PROCESSING UNIT)

Overview



B004D520.WMF

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

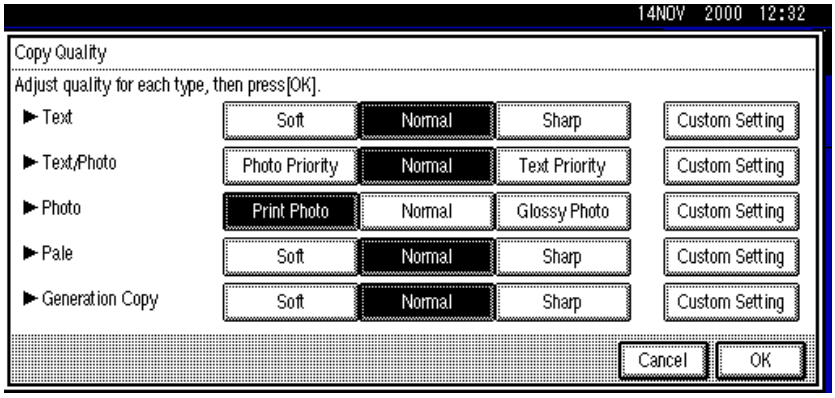
1. Auto shading
2. Filtering (MTF and smoothing)
3. Magnification
4. γ correction
5. Grayscale processing
6. Binary picture processing
7. Error diffusion
8. Dithering
9. Video path control
10. Test pattern generation

The image data then goes to either the LDDR or the HDD depending on the selected copy modes.

6.5.5 IMAGE PROCESSING MODES

The user can select one of the following modes with the User Tools screen: Text, Text/Photo, Photo, Pale, Generation. Each of these modes has a range of different settings (e.g. Soft, Normal, Sharp, etc). For each mode, a Custom Setting options is also available. This Custom Setting holds the values selected with the SP modes, which can be adjusted to meet special requirements that cannot be covered by the standard settings.

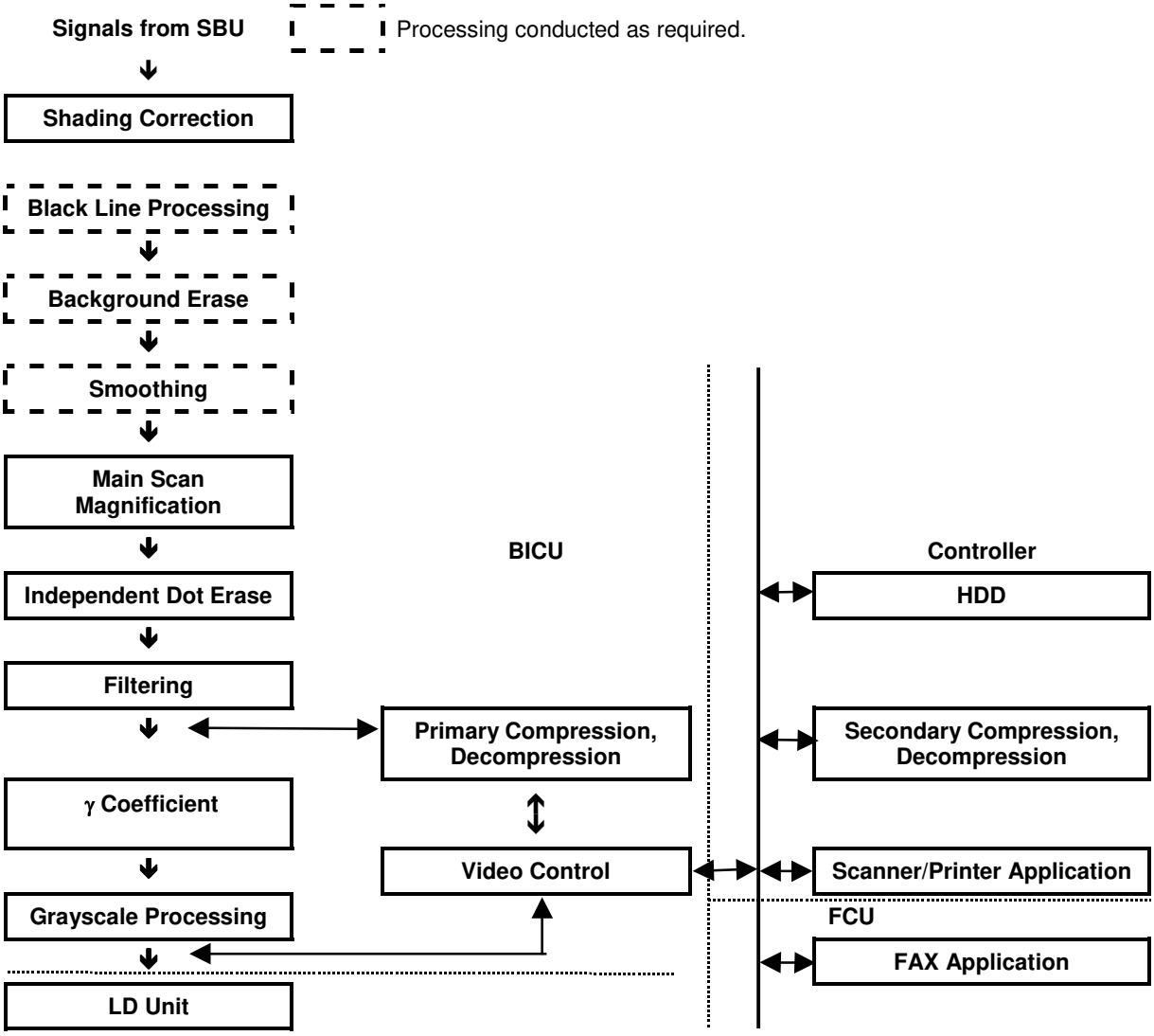
To display this screen, press User Tools/Counter, press Copier/Document Server Settings, press the General Features tab, and then press Copy Quality.



B004D800.WMF

Mode	Function
Text	Best reproduction of text and sharp lines. Ignores background texture. (☛ pg. 6-22)
Text/Photo	Good reproduction of mixed text and photographs with accurate grayscaling, better than that achieved in the Text mode. (☛ pg. 6-23)
Photo	Best possible reproduction of photographs. (☛ pg.6-24)
Pale	Reproduction similar to text mode, but of lower contrast. Ideal for copying thin originals. (☛ pg.6-25)
Generation Copy	Attempts to achieve the best reproduction of copied originals, which have faded due to making copies of copies. (☛ pg.6-26)

General Image Processing Flow



6.5.6 SUMMARY OF IMAGE PROCESSING FUNCTIONS

1. **Shading correction**. Compensates for the possible differences in the amount of light at the edges and center of a scanned image caused by the scanner lens, or scatter among pixels of the CCD.
2. **Black line correction**. Attempts to compensate for black lines in copies caused by dirt on the exposure glass of the optional sheet-through document feeder.
3. **Background erase**. Attempts to eliminate the heavy background texture from copies of newspaper print or documents printed on coarse paper. Elements below the selected threshold level are eliminated.
4. **Smoothing**. Attempts to reproduce halftones with simple, parallel smooth processing. Smoothing the image density reduces the incidence of moiré, but also reduces sharpness.
5. **Main scan magnification**. Adjusts magnification to the desired level by processing adjusting multiple, adjacent pixels in the direction of main scanning. (Adjustment of magnification in the sub scan direction is done by changing the scanning speed.)
6. **Independent dot erase**. Attempts to recognize and eliminate scattered, independent dots in copies. Processes only pixels of high density and eliminates those of low density.
7. **Filtering (MTF filter/smoothing)**. Performs mainly edge enhancement with the MTF filter. Performs smoothing only in the photo mode. The matrix size of the filter is 9 pixels x 7 lines.
8. **Gamma (γ) coefficient**. Controls the image density for images processed with grayscaling. Copy density adjustment is achieved with special notch γ coefficient conversion. The best γ coefficient suited for the selected mode can be stored and adjusted as needed.
9. **Grayscale processing**. Performs reproduction of grayscales, using mainly error diffusion. (In the photo mode, conducts processing with dithering.)

6.5.7 IMAGE PROCESSING STEPS AND RELATED SP MODES

Text Mode

The text mode achieves a quality reproduction of text and sharp lines and ignores background texture. Processing is conducted with a high resolution MTF filter; special processing with the γ coefficient prevents background reproduction and achieves the best reproduction of images with error diffusion. Because the Soft and Normal settings use a weak MTF filter, the quality of the image is improved with the elimination of moiré. The Sharp selection uses an MTF filter stronger than that of the Normal setting, thus increasing the sharpness of lines.

	Image Processing Flow	Related SP Modes
Scanner Image Correction	Shading Correction	
	↓	
Pre-Entry Processing	Background Erase	SP4-903-65 (Background Erase Level)
	↓	
	Smoothing	SP4-903-10 (Pre-Filter Coefficient 25%~64%) SP4-903-11 (Pre-Filter Coefficient 65%~154%)
	↓	
Magnification	Main Scan Direction	SP2-909-01 (Main Scan Magnification)
	↓	
	Independent Dot Erase	SP4-903-60 (Independent Dot Erase Level)
	↓	
Filter Processing	MTF Correction	SP4-903-20~35 (MTF Filter Coefficients, Strength)
	↓	
Density Control	γ Coefficient	
	↓	
Grayscale Processing	Error Diffusion	

Text/Photo Mode

Text/photo mode achieves high quality reproduction of pictures with accurate grayscaling. Processing is conducted with the special γ coefficient which reproduces a wide range of grayscale. Compared with the text mode, text reproduced in the text/photo mode could appear lighter and textured backgrounds could appear on copies, but the incidence of moiré is reduced by the employment of a weak MTF filter. Because Photo Priority uses an MTF filter weaker than that of the Normal setting, the quality of the image is improved with the elimination of moiré. The Text Priority selection uses an MTF filter stronger than that of the Normal setting, thus increasing the sharpness of lines.

	Image Processing Flow	Related SP Modes
Scanner Image Correction	Shading Correction	
	↓	
Pre-Entry Processing	Background Erase	SP4-903-67 (Background Erase Level)
	↓	
	Smoothing	SP4-903-13 (Pre-Filter Coefficient 25%~64%) SP4-903-14 (Pre-Filter Coefficient 65%~154%)
	↓	
Magnification	Main Scan Direction	SP2-909-01 (Main Scan Magnification)
	↓	
	Independent Dot Erase	SP4-903-62 (Independent Dot Erase Level)
	↓	
Filter Processing	MTF Correction	SP4-903-39~54 (MTF Filter Coefficients, Strength)
	↓	
Density Control	γ Coefficient	
	↓	
Grayscale Processing	Error Diffusion	SP4-904-07 (Error Diffusion Pattern)

Photo Mode

Photo mode emphasizes grayscale processing to achieve the best possible reproduction of photographs and eliminate moiré by using the highest density and γ coefficient in the reproduction of grayscales and dithering. Print Photo performs smoothing and dithering for photos copied from magazines, newspapers, etc. The Normal selection uses a higher resolution setting and employs error diffusion but does not use smoothing to improve the appearance of text in photographs. Glossy photo paper employs MTF filter processing and error diffusion to copy glossy or matte photographs and achieves a low incidence of moiré, thus reproducing copies of photographs of high resolution.

Image Processing Flow		Related SP Modes
Scanner Image Correction	Shading Correction	
	↓	
Pre-Entry Processing	Background Erase	SP4-903-66 (Background Erase Level)
	↓	
	Smoothing	SP4-903-12 (Pre-Filter Coefficient)
	↓	
Magnification	Main Scan Direction	SP2-909-01 (Main Scan Magnification)
	↓	
	Independent Dot Erase	Not done in Photo mode
	↓	
Filter Processing	MTF Correction	SP4-903-09 (Filter Selection) SP4-903-37 (Smoothing Filter Coefficient) SP4-903-36 (MTF Filter Coefficient) SP4-903-38 (MTF Filter Strength)
	↓	
Density Control	γ Coefficient	
	↓	
Grayscale Processing	Dither/Error Diffusion	SP4-904-02 (Photo Mode Image Quality Processing – Dither Matrix Type)

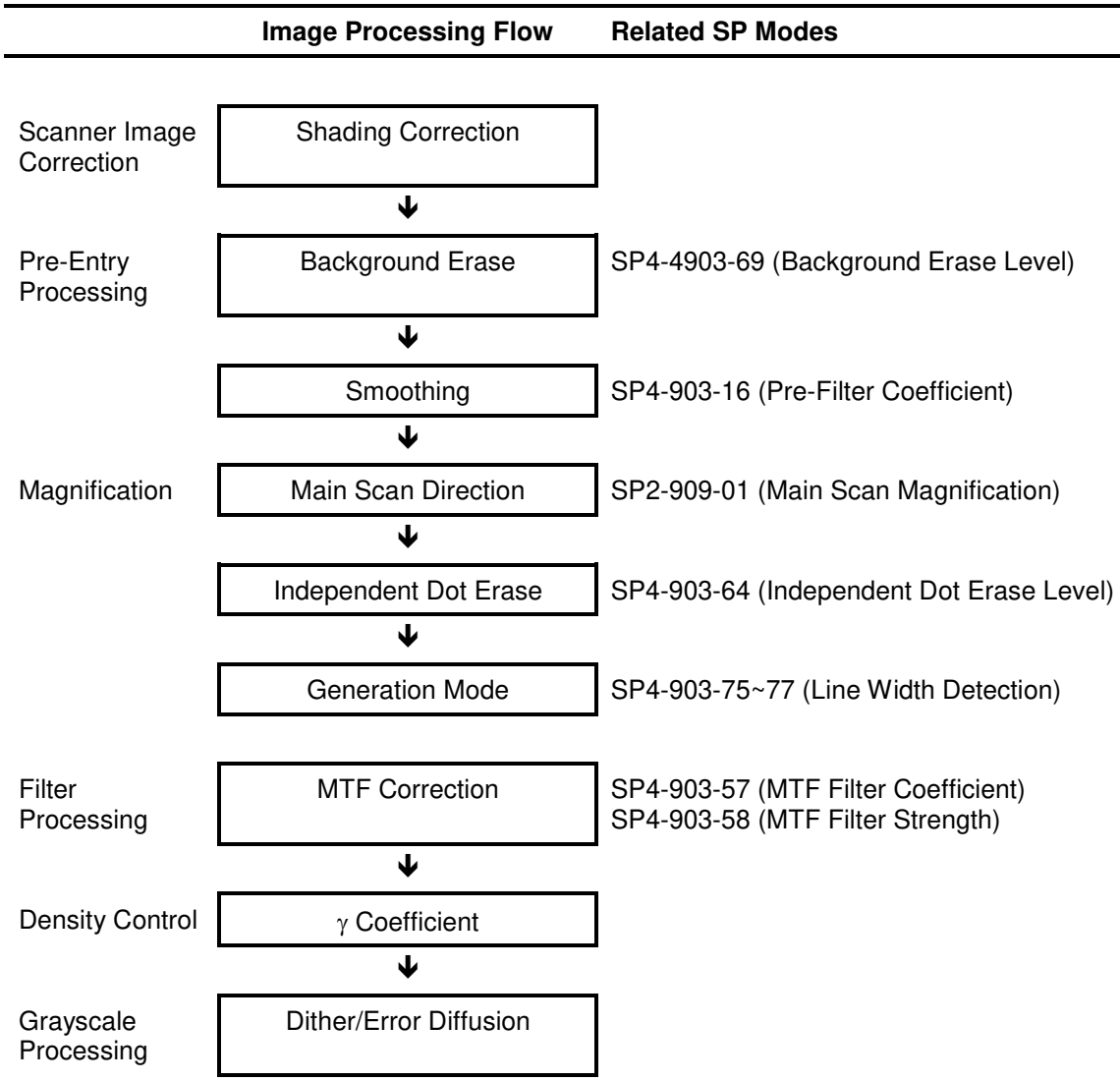
Pale (Low-Density Mode)

Pale achieves image quality comparable with text mode, but of lower contrast. Pale employs an MTF filter stronger than that employed by the text mode and uses a darker γ coefficient, thus increasing the incidence of copying textured backgrounds. Ideal for copying extremely thin originals. Soft employs an MTF filter weaker than Normal, thus achieving a softer image with less moiré. Sharp employs an MTF filter stronger than that of Normal, thus increasing the sharpness of lines.

Image Processing Flow		Related SP Modes
Scanner Image Correction	Shading Correction	
	↓	
Pre-Entry Processing	Background Erase	SP4-903-68 (Background Erase Level)
	↓	
	Smoothing	SP4-903-15 (Pre-Filter Coefficient)
	↓	
Magnification	Main Scan Direction	SP2-909-01 (Main Scan Magnification)
	↓	
	Independent Dot Erase	SP4-903-63 (Independent Dot Erase Level)
	↓	
Filter Processing	MTF Correction	SP4-903-55 (MTF Filter Coefficient) SP4-903-56 (MTF Filter Strength)
	↓	
Density Control	γ Coefficient	
	↓	
Grayscale Processing	Dither/Error Diffusion	

Generation Copy Mode

Generation Copy, based mainly on text mode, aims to achieve the best reproduction of copied originals (so called “generation copies” or copies of copies). This mode employs an MTF filter weaker than that of the text mode to eliminate spurious dots, uses the γ coefficient to smooth the image, and uses generation processing to thicken thin lines. Soft employs an MTF filter weaker than the Normal setting to achieve a softer image with less moiré. Sharp employs an MTF filter stronger than that for Normal to emphasize lines for better image quality.



Auto shading (shading correction)

Auto shading does two things.

- Zeroes the black level for each scan line of data
- Corrects for variations in white level across the main scan.

Background erase

By default, this process is used only in text mode, pale original mode, and generation mode. However, it can be enabled for other modes with SP mode.

Usually, dirty background is erased using the Auto Image Density (ADS) function. However, sometimes, dirty background areas will still appear. These can be erased by this function.

If any low image density data which is lower than a threshold level remains after auto shading, this data will be changed to “0” = white.

The threshold level (erase level) can be changed with the following SP modes.

SP4-903	65	Background Erase Level (Text)
	66	Background Erase Level (Photo)
	67	Background Erase Level (Text /Photo)
	68	Background Erase Level (Pale)
	69	Background Erase Level (Generation)

Independent dot erase

By default, this process is used only in text mode and generation mode to erase independent black dots appearing in the copy or reduce their image density. However, it can be enabled for other modes with the following SP modes.

SP4903	60	Independent Dot Erase Level (Text)
	62	Independent Dot Erase Level (Text/Photo)
	63	Independent Dot Erase Level (Pale)
	64	Independent Dot Erase Level (Generation)

The machine compares each pixel (see the diagram below) with the pixels around the edges of the surrounding 3 x 5 area. If the sum of the pixels at the edges is smaller than the threshold value stored in the SP, the object pixel is changed to 0 (white) or reduced in density to an average of the pixels around the edge, depending on the SP mode setting. Each SP mode has 16 levels as follows.

A= Sum of the pixels at the edges

SP mode value	Function	SP mode value	Function
0	Disabled	8	Disabled
1	If A < 16, the pixel is deleted	9	If A < 16, density is reduced
2	If A < 32, the pixel is deleted	10	If A < 32, density is reduced
3	If A < 48, the pixel is deleted	11	If A < 48, density is reduced
4	If A < 64, the pixel is deleted	12	If A < 64, density is reduced
5	If A < 80, the pixel is deleted	13	If A < 80, density is reduced
6	If A < 96, the pixel is deleted	14	If A < 96, density is reduced
7	If A < 128, the pixel is deleted	15	If A < 128, density is reduced

Pixel density reduction works as follows. For the example in the following drawing, when the SP mode value is “11”, the sum of the pixels around the edge is less than 48, the object pixel value is reduced from “90” to “3” as shown below.

0	0	30
0		7
0	90	0
0		0
0	0	0

A: (0 + 0 + 30 + 7 + 0 + 0 + 0 + 0 + 0 + 0 + 0 + 0) / 12 = 3

B004D503.WMF

Filtering

After auto shading, the image data is processed by both filtering and main scan magnification. However, to reduce the occurrence of moiré in the image, the processing order depends on the reproduction ratio, as follows.

1. 64% reduction or less
   Main Scan Reduction → Filtering
2. 65% reduction or higher
   Filtering → Main Scan Magnification

There are two software filters: MTF and smoothing.

MTF emphasizes lines parallel to the direction of feed. There are four types of MTF setting:

- Filter coefficient for main scan direction
- Filter strength for main scan direction
- Filter coefficient for sub scan direction
- Filter strength for sub scan direction

Refer to the following charts to determine how to make the filters weaker or stronger. The values in bold are the default settings.

Pre-Filter

Pre-Filter smoothes mainly parallel lines in the main scanning direction and extended lines in the sub-scanning direction. The Pre-Filter is a setting intended for use with the Text/Photo modes and cannot be used with the initial settings of other modes. Setting a large value for the Pre-Filter setting greatly increases the smoothing of parallel lines and reduces moiré and spurious “noise” in images, but may also reduce sharpness and lower contrast.

(Weak) 0 (Off) → 1 → 2 → 3 (Strong)

- SP-903-10: Text Mode (25%~64%)
- SP-903-11: Text Mode (65%~154%)
- SP-903-12: Photo Mode
- SP-903-13: Text/Photo Mode (25%~64%)
- SP-903-14: Text/Photo Mode (65%~154%)
- SP-903-15: Low Density Mode
- SP-903-16: Generation Mode (25%~64%)

Text Mode

The following SP modes select the MTF filter coefficient and strength in the main scan direction for text mode.

- SP4-903-20 to SP4-903-23 (25%~64%)
- SP4-903-24 to SP4-903-27 (65%~154%)
- SP4-903-28 to SP4-903-31 (155%~256%)
- SP4-903-32 to SP4-903-35 (257%~400%)

NOTE: Increasing this value strengthens MTF but can also increase the occurrence of moiré and reduce sharpness.

Text mode: 25 ~ 64 %			
MTF strength	Weakest (Soft)	←Default→	Strongest (Sharp)
Main scan: Filter coefficient (SP4903-20)	0	**9**	15
Sub scan: Filter coefficient (SP4903-21)	0	**13**	13
Main scan: Filter strength (SP4903-22)	0	**2**	7
Sub scan: Filter strength (SP4903-23)	0	**2**	7

Text mode: 65 ~ 154 %			
MTF strength	Weakest (Soft)	←Default→	Strongest (Sharp)
Main scan: Filter coefficient (SP4903-24)	0	**12**	15
Sub scan: Filter coefficient (SP4903-25)	0	6	**13**
Main scan: Filter strength (SP4903-26)	0	**2**	7
Sub scan: Filter strength (SP4903-27)	0	**2**	7

Text mode: 155 ~ 256 %			
MTF strength	Weakest (Soft)	←Default→	Strongest (Sharp)
Main scan: Filter coefficient (SP4903-28)	0	**14**	15
Sub scan: Filter coefficient (SP4903-29)	0	6	**13**
Main scan: Filter strength (SP4903-30)	0	**2**	7
Sub scan: Filter strength (SP4903-31)	0	**2**	7

Text mode: 257 ~ 400 %			
MTF strength	Weakest (Soft)	←Default→	Strongest (Sharp)
Main scan: Filter coefficient (SP4903-32)	0	**14**	15
Sub scan: Filter coefficient (SP4903-33)	0	6	**13**
Main scan: Filter strength (SP4903-34)	0	**2**	7
Sub scan: Filter strength (SP4903-35)	0	**2**	7

Photo Mode

Either MTF or smoothing can be used.

To use MTF, set SP4-903-9 to 0 then use SP4-903-36 and SP4-903-38 to set the filter coefficient and strength for scanning grayscale images.

Photo mode			
MTF strength	Weakest (Soft)	←Default→	Strongest (Sharp)
Main scan: Filter coefficient (SP4903-36)	**0**	4	6
Filter strength (SP4903-38)	0	**1**	7

To use smoothing, set SP4-903-9 to 1 then use SP4-903-37 to select the setting for smoothing.

Photo mode			
Smoothing filter	Weakest (Soft)	←Default→	Strongest (Sharp)
Smoothing filter coefficient (SP4903-37)	0	**2**	7

Text/Photo Mode

The following SP modes selects the MTF filter coefficient and strength in the main scan direction for text/photo mode.

- SP4-903-39 to SP4-903-42 (25%~64%)
- SP4-903-43 to SP4-903-46 (65%~154%)
- SP4-903-47 to SP4-903-50 (155%~256%)
- SP4-903-51 to SP4-903-54 (257%~400%)

Text/Photo mode 25~64%			
MTF strength	Weakest (Soft)	←Default→	Strongest (Sharp)
Main scan: Filter coefficient (SP4903-39)	0	**9**	16
Sub scan: Filter coefficient (SP4903-40)	0	**10**	13
Main scan: Filter strength (SP4903-41)	0	**1**	7
Sub scan: Filter strength (SP4903-42)	0	**1**	7

Text/Photo mode 65~154%			
MTF strength	Weakest (Soft)	←Default→	Strongest (Sharp)
Main scan: Filter coefficient (SP4903-43)	0	**10**	15
Sub scan: Filter coefficient (SP4903-44)	0	6	**13**
Main scan: Filter strength (SP4903-45)	0	**1**	7
Sub scan: Filter strength (SP4903-46)	0	**1**	7

Text/Photo mode 155~256%			
MTF strength	Weakest (Soft)	←Default→	Strongest (Sharp)
Main scan: Filter coefficient (SP4903-47)	0	**14**	15
Sub scan: Filter coefficient (SP4903-48)	0	6	**13**
Main scan: Filter strength (SP4903-49)	0	**1**	7
Sub scan: Filter strength (SP4903-50)	0	**1**	7

Text/Photo mode 257~400%			
MTF strength	Weakest (Soft)	←Default→	Strongest (Sharp)
Main scan: Filter coefficient (SP4903-51)	0	**9**	15
Sub scan: Filter coefficient (SP4903-52)	0	**10**	13
Main scan: Filter strength (SP4903-53)	0	**2**	7
Sub scan: Filter strength (SP4903-54)	0	**2**	7

Low Density Mode

The following SPs control MTF for low density (pale) original mode.

Low density mode			
MTF strength	Weakest (Soft)	←Default→	Strongest (Sharp)
Filter coefficient (SP4903-55)	0	**1**	6
Filter strength (SP4903-56)	0	**3**	7

Generation Mode

The following SPs control MTF for generation mode.

Generation mode			
MTF strength	Weak (Soft)	←Default→	Strong (Sharp)
Filter coefficient (SP4903-57)	0	**3**	6
Filter strength (SP4903-58)	0	**1**	7

Main scan magnification and reduction

Reduction and enlargement in the sub scan direction is achieved by changing the scanner speed. However, reduction and enlargement in the main scan direction are handled by the IPU chip.

To reduce or enlarge an image, imaginary points are calculated that would correspond to a physical enlargement or reduction of the image. The image density is then calculated for each of the imaginary points based on the image data of the nearest four true points. The calculated image data then becomes the new (reduced or enlarged) image data.

γ correction

Gamma (γ) correction ensures accurate generation of the various shades in the gray scale from black to white, accounting for the characteristics of the scanner and printer.

Scanner gamma correction corrects the data output to the IPU to account for the characteristics of the scanner (e.g., CCD response, scanner optics).

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

The data for the scanner and printer gamma correction are fixed and stored in the memory. There are no SP adjustments in this machine.

Gradation processing

These are three types of gradation processing:

1. **Grayscale processing**: This has 256 output levels for each pixel.
2. **Error diffusion**: In text/photo mode, this is used with grayscale processing.
3. **Dithering**: In photo mode, this is used with grayscale processing.

These three processes are used as follows.

Text mode	Grayscale processing
Text/photo mode:	Error diffusion (256 levels)
Photo mode:	Dithering (256 levels)
Generation mode:	Grayscale processing + line width correction
Pale mode	Grayscale processing

Type 1: Grayscale processing. As stated above, this process generates up to 256 image density levels for each pixel. To realize this, this machine uses a form of pulse width modulation. In this machine, pulse width modulation consists of the following processes:

- Laser diode pulse positioning
- Laser diode power/pulse width modulation

Laser diode power and pulse width modulation is performed by the laser diode drive board (LDDR). Briefly, the width of the laser pulse for a pixel depends on the output level (from 0 to 255) required for the pixel.

This machine can also change the laser pulse position (at the left side of the pixel, at the center, or at the right side) automatically, depending on the location of the image pixel so that the edges of characters and lines become clearer. There is no SP mode adjustment for this, unlike in some earlier models.

Note that binary picture processing (one bit per pixel) is not used for copy mode. However, it is used for printer and fax mode. In binary picture processing, each pixel is converted from 8-bit to 1-bit in accordance with a threshold value. The threshold value can be adjusted with SP 4-904-12.

Type 2: Error diffusion. This is used only in text/photo mode. The error diffusion process 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 then compared with an error diffusion matrix. Separate error diffusion matrixes are used for copy mode and fax mode.

1. Grayscale processing mode
   The output image signal level has 9 levels (from white to black). There is only one matrix available.
2. Binary picture processing mode
   The output image signal level has just 2 levels (white and black).

Type 3: Dithering. This is only used in photo mode. Each pixel is compared with a pixel in a dither matrix. Several matrixes are available, to increase or decrease the detail on the copy.

1. Grayscale processing mode
   The matrix type can be selected with SP4-904-2.
2. Binary picture processing
   The matrix type can be selected with SP4-904-18.

Line width correction

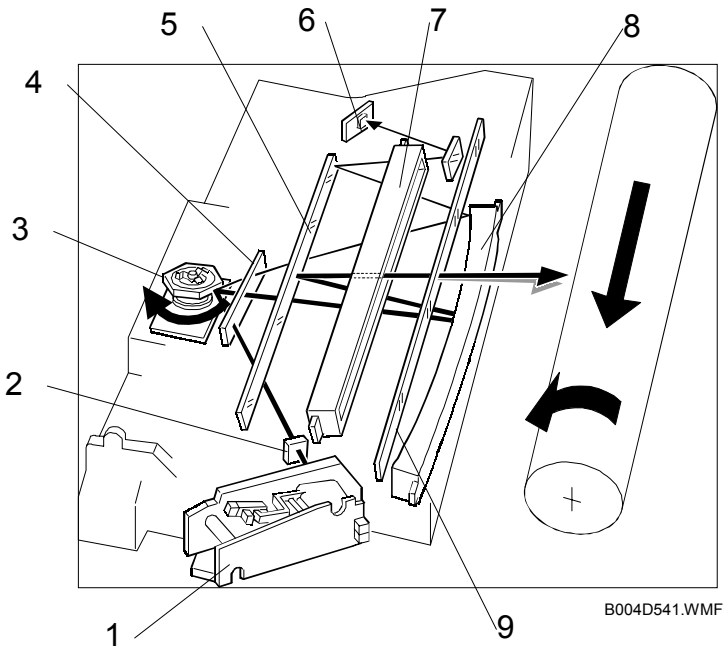
This function is effective only in Generation Copy mode.

Usually, lines will bulge in the main scan direction as a result of the negative/positive development system that is used in this model. So, pixels on edges between black and white areas are compared with adjacent pixels, and if the pixel is on a line, the line thickness will be reduced.

The line width correction type can be selected with SP4-903-75~77.

6.6 LASER EXPOSURE

6.6.1 OVERVIEW



1 LD unit
2 Cylindrical lens
3 Polygonal mirror
4 Shield glass
5 Mirror
6 Synchronization detector
7 BTL (Barrel Toroidal Lens)
8 F-theta mirror
9 Toner shield glass

This machine uses two laser diodes to produce electrostatic images on an OPC drum. The laser diode unit converts image data from the BICU board into laser pulses, and the optical components direct these pulses to the drum. To produce a high quality copy image, these are 256 gradations for the laser power.

The output path from the laser diode to the drum is shown above. The LD unit outputs two laser beams to the polygon mirror through the cylindrical lens and the shield glass.

Each surface of the polygon mirror reflects two full main scan lines. The laser beams go to the F-theta mirror, mirror, and BTL (barrel toroidal lens). Then these laser beams go to the drum through the toner shield glass. The laser synchronization detector determines the main scan starting position.

NOTE: The front door and upper right door (transfer door) are equipped with safety switches that automatically shut down the laser unit when either door is opened.

6.6.2 AUTO POWER CONTROL (APC)

The LD driver on the LDDR drives the laser diode. Even if a constant electric current is applied to the laser diode, the intensity of the output light changes with the temperature. The intensity of the output decreases as the temperature increases.

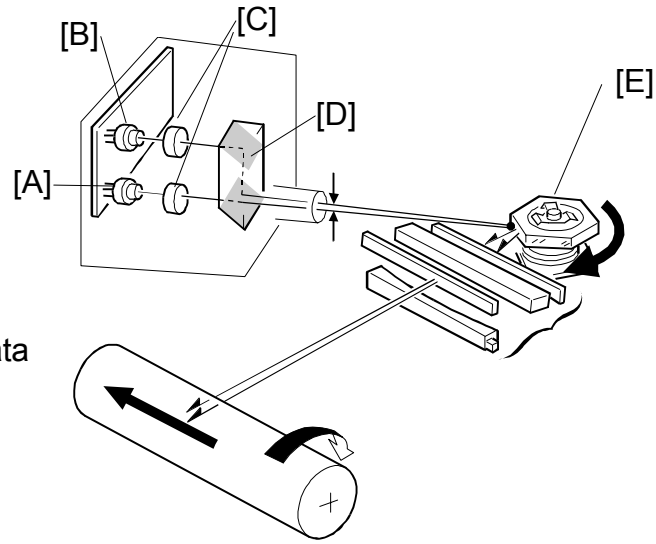
In order to keep the output level constant, the LDDR monitors the electrical current passing through the photodiode (PD). Then it increases or decreases the current to the laser diode as necessary, comparing it with the reference level. This auto power control is done just after the machine is turned on and during printing while the laser diode is active.

The reference levels are adjusted on the production line. Do not touch the variable resistors on the LDDR in the field.

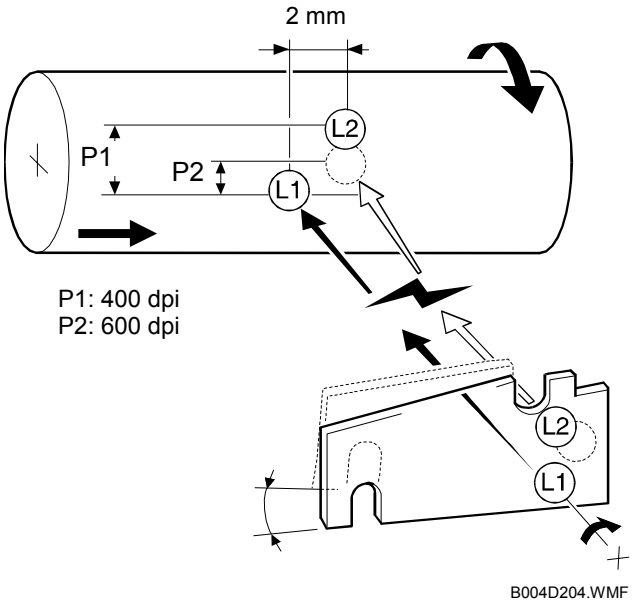
6.6.3 DUAL BEAM WRITING

This LD unit employs two laser diodes [A] (LD) and [B] (L2). Each face of the polygon mirror writes two main scan lines, and twelve main scans are produced when the polygon mirror rotates once. This reduces polygon motor rotation speed, reduces noise generated by the polygon motor, and reduces the frequency of the image data clock.

The two laser beams follow the path: collimating lenses [C] ➔ prism [D] ➔ polygon mirror [E]



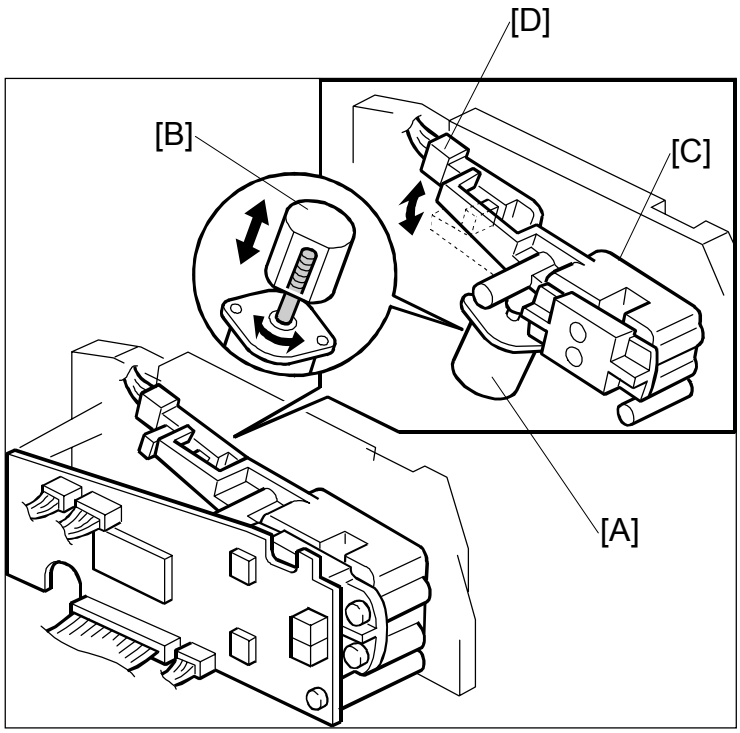
B004D203.WMF



B004D204.WMF

The two laser beams arrive on the drum surface about 2 mm apart in the main scan direction and about 0.06 mm apart (at 400 dpi) in the sub scan direction. The two-mm difference in the main scan direction allows the machine to detect the laser synchronization signal for each beam.

6.6.4 LASER BEAM PITCH CHANGE MECHANISM



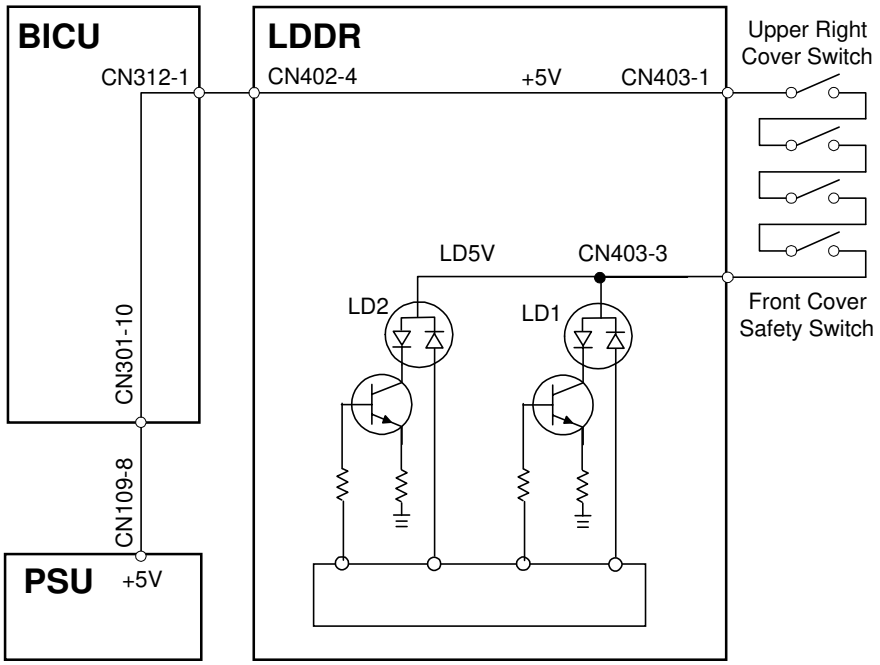
B004D543.WMF

When the LD positioning motor [A] turns, the metal block [B] in contact with the LD unit housing [C] moves up and down and changes the position of L2 (L1 does not move).

Both LD unit positions are at fixed distances from the LD unit home position sensor [D].

Usually, the LD unit moves directly to the proper position. However, when the number of times that the resolution has changed reaches the value of SP2-109-5 (Auto Pitch Adjustment Interval), the LD unit moves to the home position, and this re-calibrates the LD unit positioning mechanism.

6.6.5 LD SAFETY SWITCHES

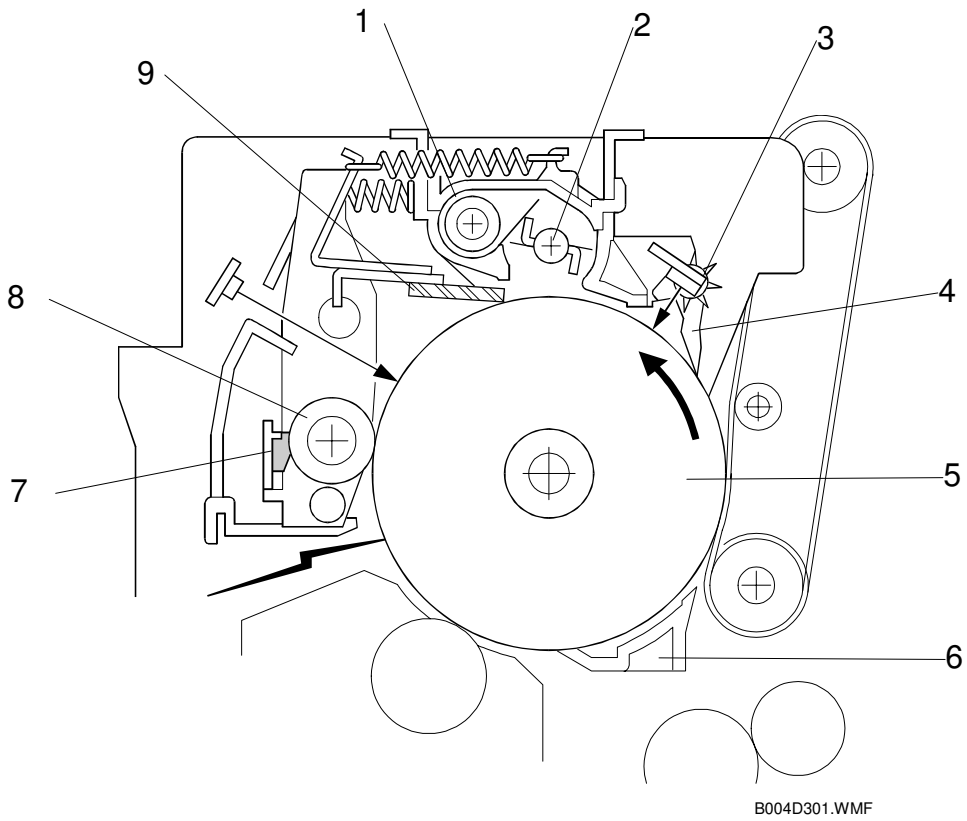


B004D505.WMF

To ensure personal safety and to prevent the laser beam from inadvertently switching on during servicing, power to the laser diode is switched off when the front cover or upper right cover is opened. Four safety switches are installed in series on the LD5 V line from the power supply unit (PSU) via the BICU board.

6.7 PHOTOCONDUCTOR UNIT (PCU)

6.7.1 OVERVIEW

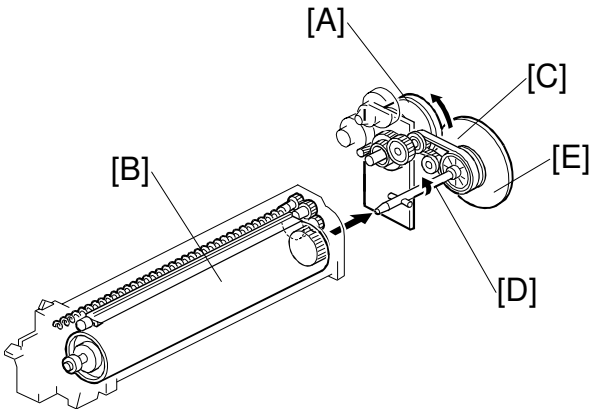


1 Toner Collection Coil
2 Toner Collection Plate
3 Spur
4 Pick off Pawl
5 OPC Drum (ϕ60 mm)
6 Transfer Entrance Guide
7 Charge Roller Cleaning Pad
8 Charge Roller
9 Cleaning Blade

6.7.2 DRIVE MECHANISM

The drive from the main motor [A] is transmitted to the drum [B] through a series of gears, a timing belt [C], and the drum drive shaft [D].

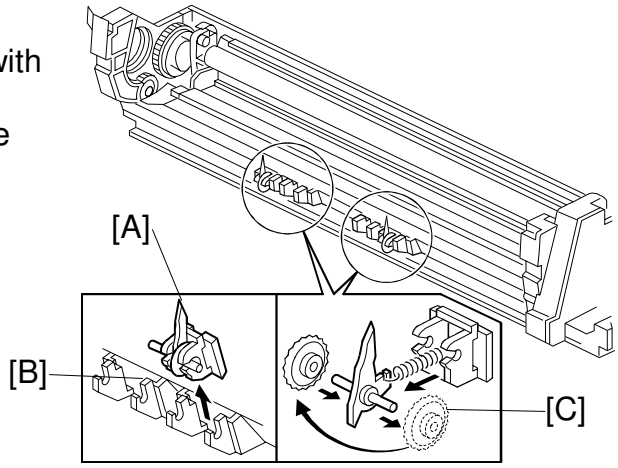
The main motor has a drive controller, which outputs a motor lock signal when the rotation speed is out of the specified range. The flywheel [E] on the end of the drum drive shaft stabilizes the rotation speed (this prevents banding and jitter on copies).



B004D302.WMF

6.7.3 DRUM PAWLS

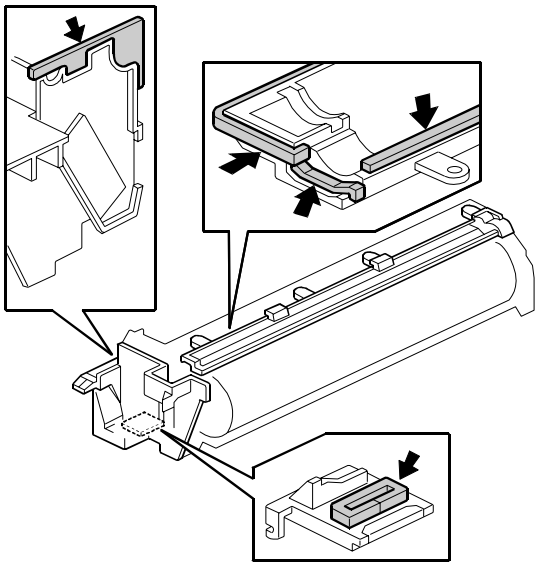
The pick-off pawls [A], mounted in the holders [B] on the drum and in contact with the drum, strip paper from the drum if it has not yet separated. The gears [C] are removable, and the positions of the holders can be adjusted.



B004R305.WMF

6.7.4 DRUM TONER SEALS

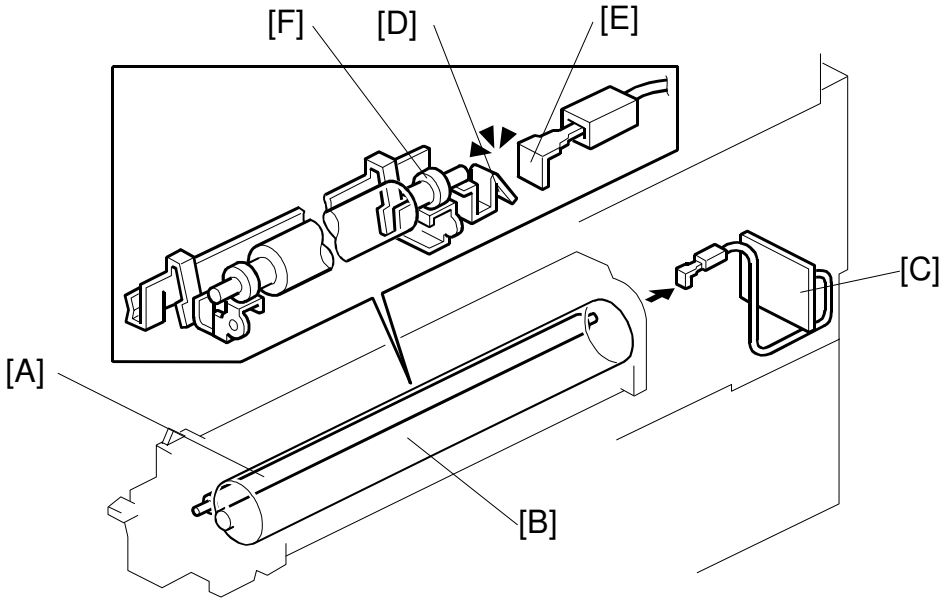
Seals have been added to the structure of the PCU (photoconductor unit) to further prevent toner leakage.



B004D902.WMF

6.8 DRUM CHARGE

6.8.1 OVERVIEW

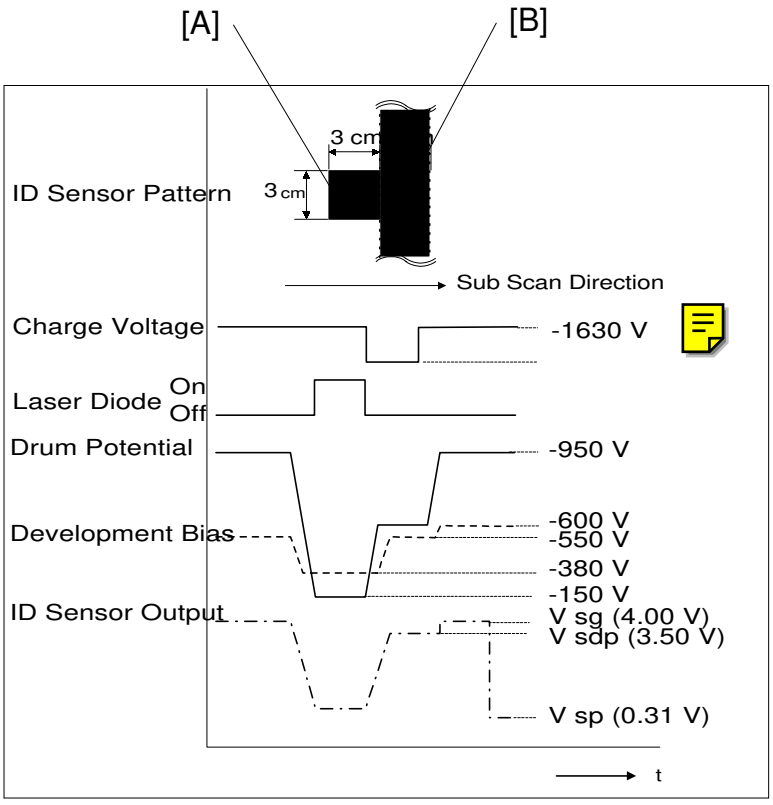


This copier uses a drum charge roller to charge the drum.

The drum charge roller [A] contacts the surface of the drum [B] to give it a negative charge. The high voltage supply board [C] supplies a negative dc voltage to the drum charge roller through the charge roller terminal [D], bias plate [E], and the rear roller bushing [F] to give the drum surface a negative charge of –950V.

6.8.2 CHARGE ROLLER VOLTAGE CORRECTION

Correction for Environmental Conditions



B004D506.WMF

The voltage transferred from roller to drum could vary with the temperature and humidity around the drum charge roller. The lower the temperature or humidity, the higher the applied voltage required.

The ID sensor measures the effects of ambient conditions, and any small change in drum potential caused by changes in temperature/humidity is reflected in the amount of toner transferred to the drum.

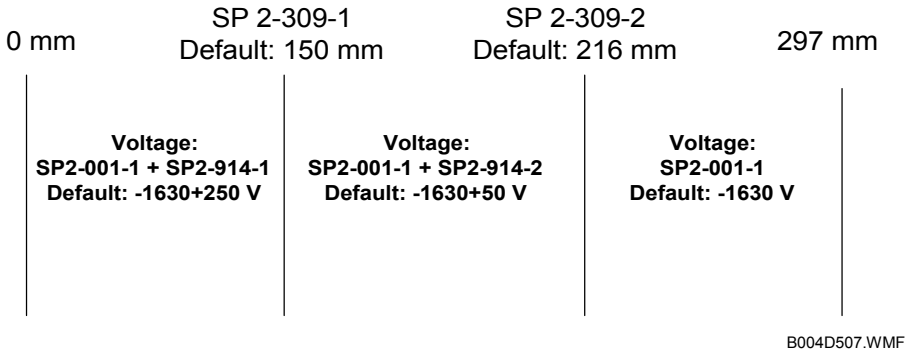
This measurement is done immediately after the ID sensor pattern for toner density control. After creating ID sensor pattern [A], another pattern [B] is made. To do this, the LD switches off, the charge roller voltage drops, and the drum potential is reduced to -600V. At the same time, development bias returns to -550V. The drum potential is now slightly higher than the development bias, so only a very small amount of toner transfers to the drum. The ID sensor measures the density of pattern [B], and Vsdp, the output voltage, is compared with Vsg which was read from the bare drum at the same time.

Correction for paper width and thickness (by-pass tray only)

The by-pass tray can be used for non-standard paper narrower than sizes accepted by the paper trays. Thicker paper, OHP sheets, etc. can also be loaded in the by-pass tray but adjustments must be performed with the SP modes listed below in order to avoid jams and copy quality problems.

SP Mode	SP Name	
SP2-001-1	Charge Roller Bias Adjustment	Width 216 - 297 mm (Default: -1630V)
SP2-309-1	Paper Lower Width [a]	Width limit (Default: 150 mm)
SP2-309-2	Paper Upper Width [b]	Width limit (Default: 216 mm)
SP2-914-1	Cα	Adjust 10V/step (Default: 250V)
SP2-914-2	Cβ	Adjust 10V/step (Default: 50V)

The way that these SP modes are used is shown below.

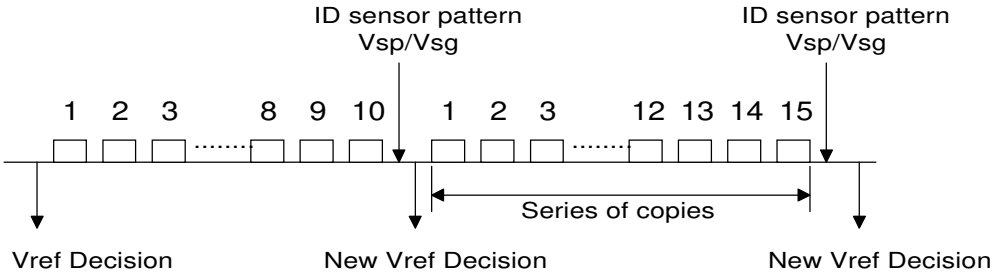


For example, with the default settings, if the paper width fed from the by-pass tray is 200 mm, the charge roller voltage will be –1630 + 50 V.

6.8.3 ID SENSOR PATTERN PRODUCTION TIMING

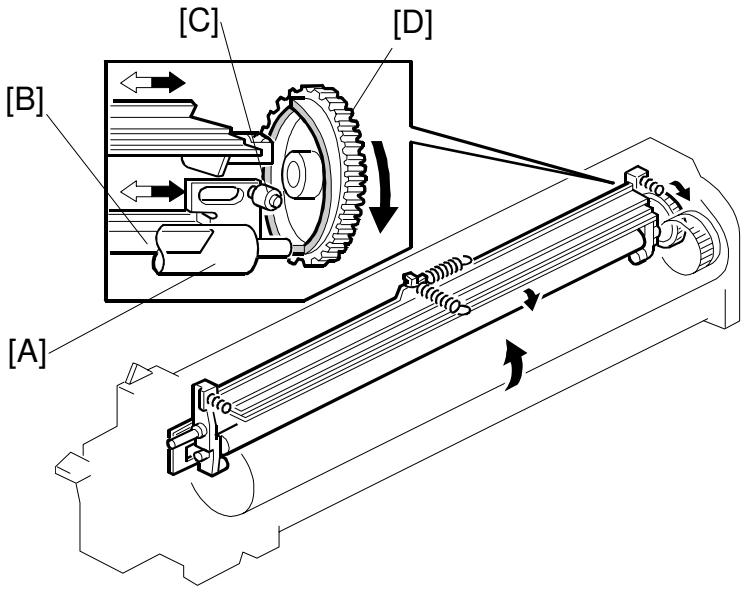
An ID sensor pattern is created after the main machine is powered on, and after finishing a job of 10 or more sheets.

The ID sensor pattern production interval can be adjusted with SP2-210 (ID Sensor Pattern Interval).



B004D535.WMF

6.8.4 DRUM CHARGE ROLLER CLEANING

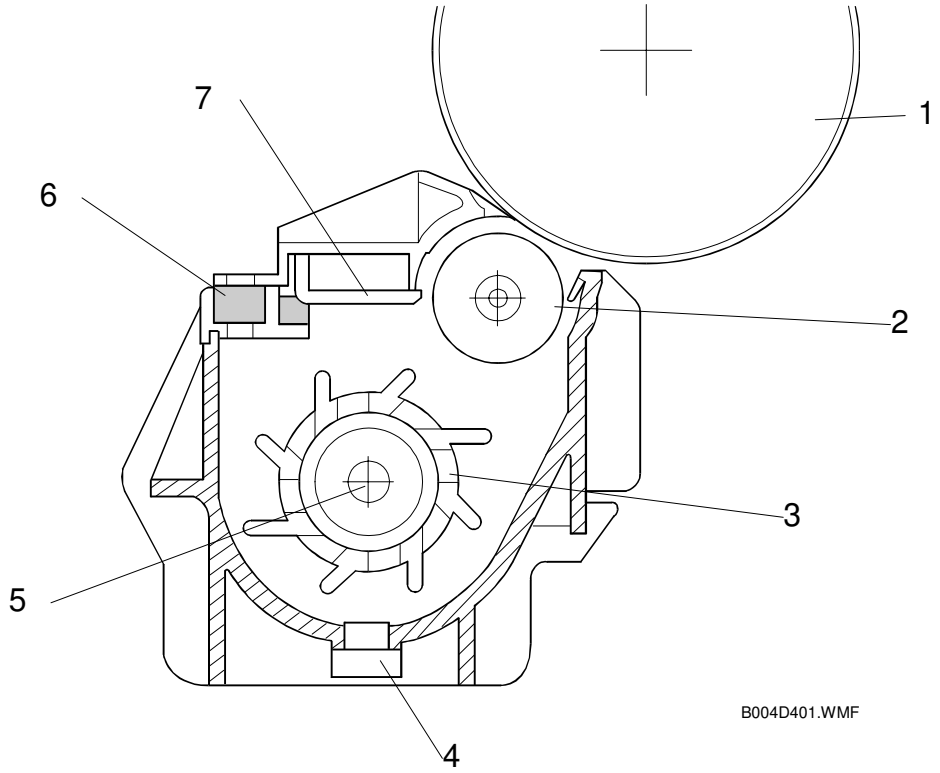


B004D303.WMF

The drum charge roller [A], always in contact with the drum, gets dirty easily, so the cleaning pad [B] also remains in contact with the charge roller to clean it. The pin [C] in contact with the cam gear [D] enables the gear to move the cleaning pad from side to side and improve cleaning.

6.9 DEVELOPMENT

6.9.1 OVERVIEW



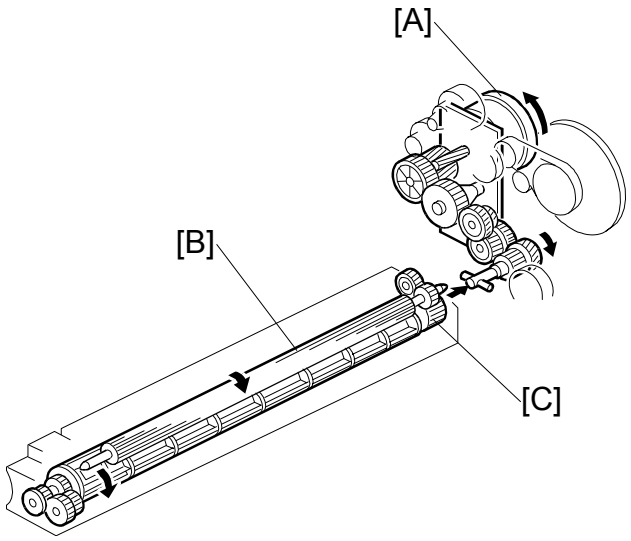
1 Drum
2 Development Roller
3 Paddle Roller
4 TD Sensor
5 Mixing Auger
6 Development Filter
7 Doctor Blade

6.9.2 DRIVE MECHANISM

The feed/development motor [A] drives the development roller [B] through the gears and the paddle roller gear [C].

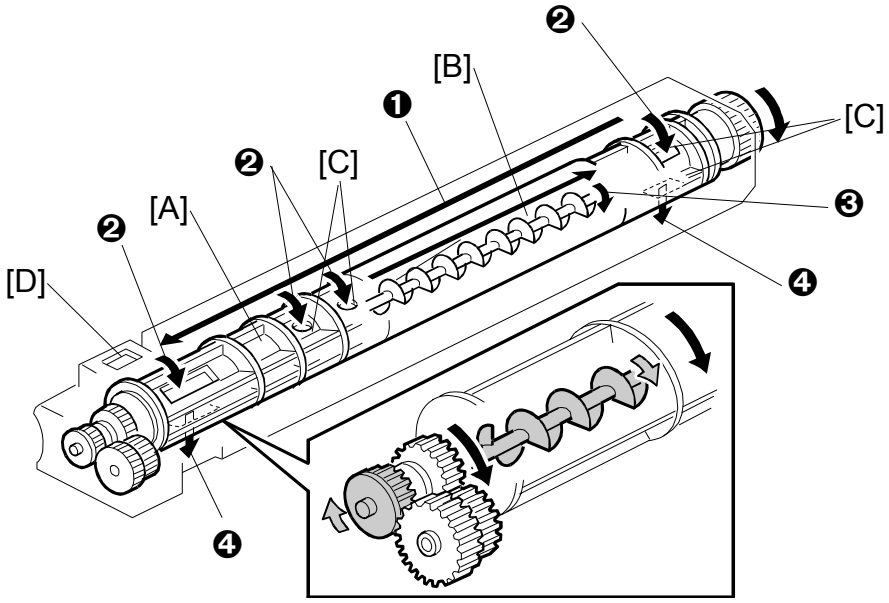
The drive shaft engages and disengages the paddle roller gear when the development unit is inserted into and removed from the machine.

NOTE: The development drive gears are helical gears, quieter than normal gears.



B004D402.WMF

6.9.3 DEVELOPER MIXING



B004D403.WMF

The dual mixing roller consists of the outer paddle [A] and the inner auger [B].

The outer paddle moves developer to the front ❶ and supplies it to the development roller. Developer that spills off by the doctor blade ❷ passes through the holes [C] in the outer paddle, and is transported to the rear ❸ by the inner auger.

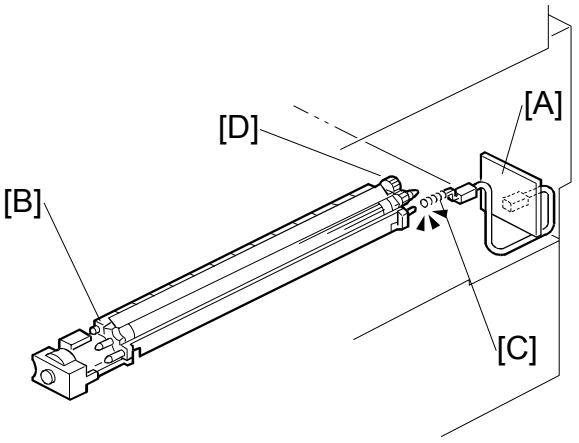
While the dual mixing roller is moving the developer, some developer also passes back to the development unit through the holes in the bottom of the paddle roller ❹. New toner from the toner bottle and recycled toner from the toner collection coil both enter the development unit at [D].

6.9.4 DEVELOPMENT BIAS

Mechanism

Black areas of the latent image are at a low negative charge (about –150 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 [A] applies a bias of –600 volts to the development roller throughout the image development process. The bias is applied to the development roller shaft [B] through the bias terminal spring [C] and bias terminal [D].



B004D404.WMF

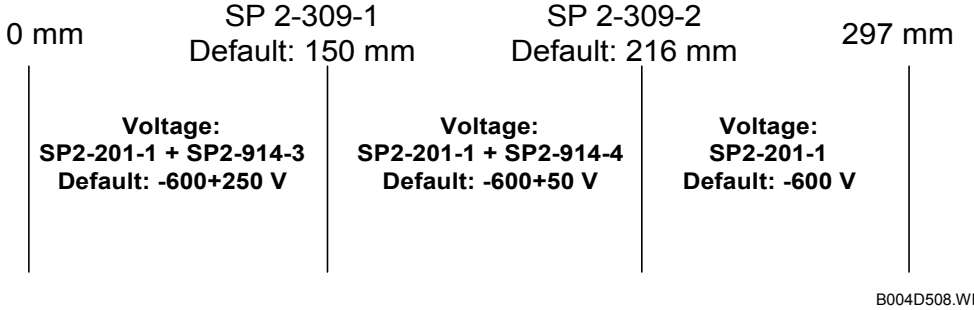
The development bias voltage (-600 V) can be adjusted with SP2-201 (Development Bias).

Correction for paper width and thickness (by-pass tray only)

The by-pass tray can be used for non-standard paper narrow than sizes accepted by the paper trays. Thicker paper, OHP sheets, etc. can also be loaded in the by-pass tray but adjustments must be performed with the SP modes listed below in order to avoid jams and misfeeds.

SP Mode	SP Name	
SP2-201-1	Development Bias	Width 216 - 297 mm (Default: -600V)
SP2-309-1	Paper Lower Width [a]	Width limit (Default: 150 mm)
SP2-309-2	Paper Upper Width [b]	Width limit (Default: 216 mm)
SP2-914-3	Process Control Setting (Bγ)	Adjust 10V/step (Default: 250V)
SP2-914-4	Process Control Setting (Bδ)	Adjust 10V/step (Default: 50V)

The way that these SP modes are used is shown below.

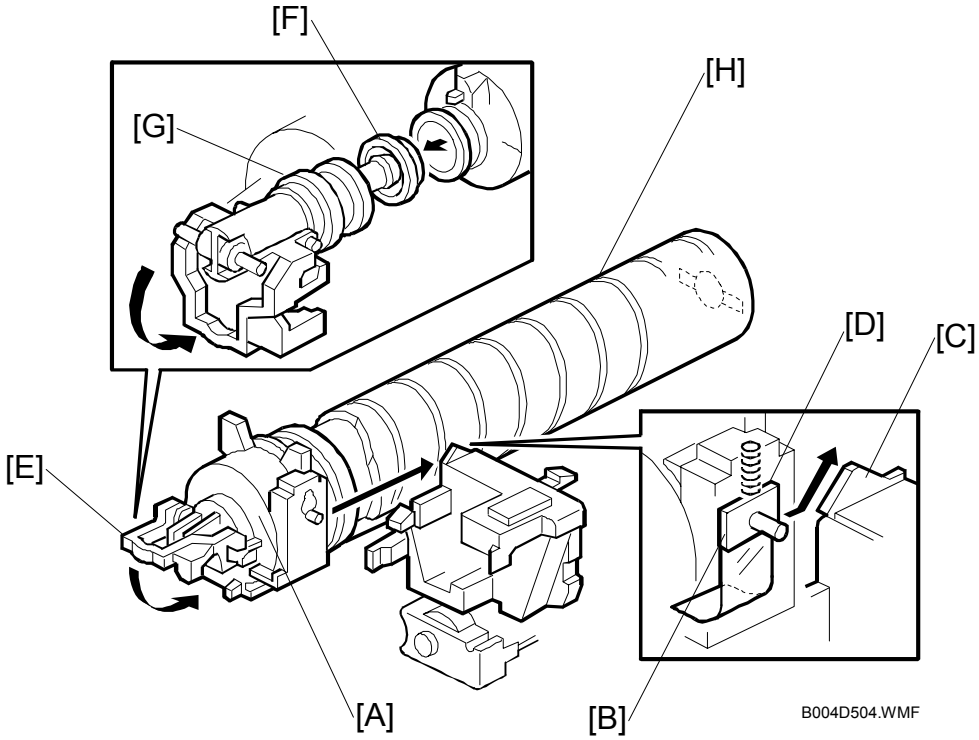


B004D508.WMF

For example, with the default settings, if the paper width fed from the by-pass tray is 200 mm, the development bias voltage will be –600 + 50 V.

6.9.5 TONER SUPPLY

Toner bottle replenishment mechanism



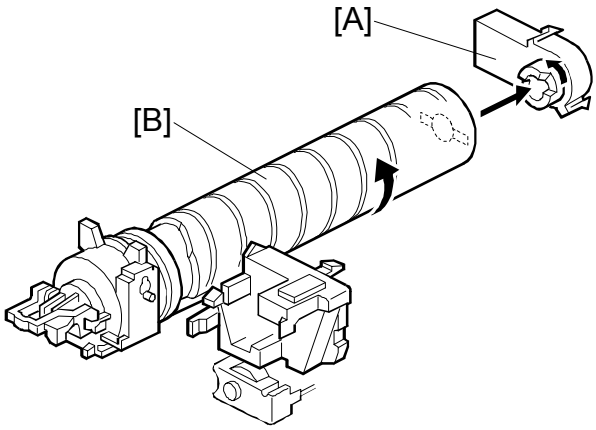
When the toner bottle is installed in the bottle holder [A], pin [B] slides up the side of the PCU [C], pulling out the toner shutter [D]. When the toner bottle holder lever [E] is returned to its original position, the cap [F] pulls away and is kept in place by the chuck [G].

The toner bottle holder lever [E] cannot be lowered when a toner bottle is not installed in the holder. This prevents toner falling out of the holder unit as a result of lowering the handle with no toner bottle installed.

The toner bottle has a spiral groove [H], which rotates the bottle to move toner to the development unit. When the bottle holder unit is pulled out, the chuck [G] releases the toner bottle cap and the toner shutter [D] closes and blocks the opening.

Toner supply mechanism

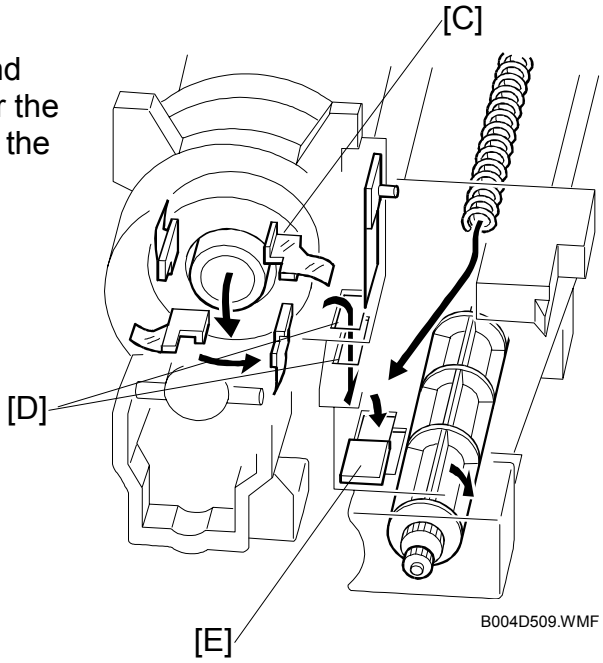
The toner supply motor [A] rotates the toner bottle [B] and the mylar blades [C] (see below).



B004D545.WMF

Toner falls into the toner bottle holder, and the toner supply mylar blades [C] transfer the toner to slit [D]. Installing the PCU opens the shutter [E].

The toner falls into the development unit through the slit.



B004D509.WMF

Toner density control

There are two modes for controlling and maintaining constant toner supply: sensor control (both direct and indirect) and image pixel count control. The mode can be changed with SP2-208-1 (Toner Supply Mode).

NOTE: The factory setting is sensor control mode; image pixel count mode should only be used temporarily until a defective TD or ID sensor can be replaced.

Sensor Control Mode

In the sensor control mode, the amount of toner required to print the page is calculated by the CPU; it adds up the image data value of each pixel and converts the sum to a value between 0 and 255. (255 would mean a completely black page.)

The machine must vary toner supply for each copy in order to maintain the correct amount of toner in the developer and to account for changes in drum reflectivity due to changes in temperature and humidity. The CPU uses data from the TD sensor and ID sensor to determine whether or not the toner supply motor should be switched on and to calculate how long it should remain on in order to supply more toner to the mixture in the development unit.

TD Sensor. When new developer of standard toner concentration is installed, namely 20 g of toner per 500 g of developer (4.0% by weight), the TD sensor must be set to its initial setting of 4.0V with SP2-801. This initial setting is used as the toner supply reference voltage or Vref. For every copy cycle, the TD sensor directly checks the toner density in the developer mixture, and after 10 copies these 10 readings are averaged and this value becomes TD sensor output voltage Vt(10).

The machine compares Vt(10) with Vref. If Vt(10) is greater than Vref, the toner concentration in the development unit judged to be low. When Vt(10) is detected to be greater than Vref 20 times, then this indicates that the toner concentration is consistently low, Vref is incremented by 0.1V, and the conditions are checked again. The result of this check determines the value of K, the toner supply rate coefficient, which is one of the factors that is used in the toner supply motor on-time calculation.

ID Sensor. In addition to comparing Vt(10) from the TD sensor and Vref, after every 10 copies the ID sensor, located at the lower right area of the drum, checks both the reflectivity (Vsg) and the pattern on the drum (Vsp), created by the laser diodes and charge roller. If the reflected light is too strong, this indicates that toner is low and toner is added to the development unit. (The frequency of these checks can be adjusted with SP2-210 (ID Sensor Pattern Interval).

Image Pixel Count Mode

This mode should only be used only as a temporary measure while waiting for replacement parts, such as a TD sensor. This mode controls the toner supply amount using the same method for determining the toner bottle motor on time. However, the values that were in effect when the toner density control mode was changed over to image pixel count mode with SP2-208-1 (Toner Supply Mode) remain in effect and cannot be changed.

6.9.6 TONER NEAR END/END DETECTION

The toner near-end condition is detected based on the Vt(10) output from the TD sensor. If the difference between Vref (toner supply reference voltage) and Vt (10) is less than or equal to –0.45, then toner concentration is judged be very low and K (the toner supply coefficient) is set to 0.25, the machine enters the toner near end condition and the machine switches on the toner supply motor.

If a difference greater than –0.45 is detected, then toner concentration is judged as low but the machine does another test by comparing Vref and Vt (10). If the machine determines that Vt (10) is greater than Vref 40 times, the toner supply motor switches on and remains on for twice the time that Vt (10) was greater than Vref. If the toner concentration is still low, then the machine enters the toner near end condition.

The final toner end is detected using the ID sensor. If the ID sensor detects that the ID sensor pattern is very light (Vsp drops below 2.0V), then the sensor triggers the toner end condition.

If Vsp is less than 2.0V, the density of the ID sensor pattern is very light, so the machine detects the toner end condition. However, if Vsp remains higher than 2.0V but 90 copies have been made after toner near end was determined, the machine enters the toner end condition.

NOTE: The number of copies between toner near-end and toner end can be changed with SP2-213. The default is 90 copies.

6.9.7 TONER END RECOVERY

If the front door is opened and then closed while a toner near end/end condition exists, the machine will attempt to recover. When the front door is closed, the toner supply motor turns on to supply toner. The machine checks the TD sensor output 2 seconds after the main motor turns on (Vtp), and the sensor is checked again every 1 second (Vtp^1)

The machine detects the toner concentration using Vref, Vt (10), Vtp, and Vtp^1. If the toner concentration is still too low, the toner supply motor remains on for another 10 seconds while the machine checks Vt. If toner concentration is judged to be at the standard level, then the toner near end/end condition is cancelled and K (toner supply coefficient) is reset. If toner concentration has not reached the standard level, the toner supply motor rotates continuously until it does (maximum motor on time is 16 seconds) and then it will switch off.

6.9.8 TONER SUPPLY WITH ABNORMAL SENSORS

The TD sensor is checked every copy. If the readings from the TD sensor become abnormal during a copy job, the machine holds the GAIN factor constant (GAIN is normally calculated from TD sensor readings) to allow toner supply to vary with only pixel count for the rest of the copy job. Then at the end of the copy job, an SC code is generated and the machine must be repaired.

The ID sensor is checked every 10 copies. If readings become abnormal, an SC code is generated and the machine must be repaired. If this happens during a copy job, Vref is not changed, the copy job is allowed to finish, and then the SC code is generated.

If spare parts are not available, the technician can use SP2-208-1 to temporarily put the machine in image pixel count mode. (☛ Chapter 5 Service Tables)

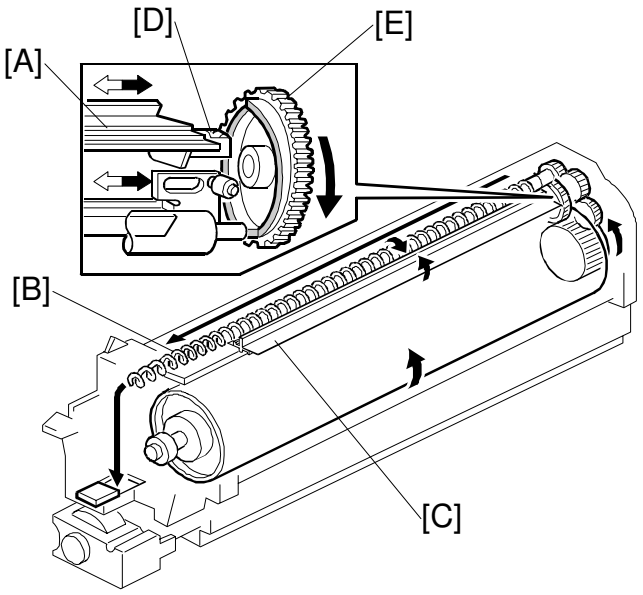
6.10 DRUM CLEANING AND TONER RECYCLING

6.10.1 DRUM CLEANING

This machine employs a counter blade system. After the image is transferred to paper, a cleaning blade [A] removes any toner remaining on the drum. The toner collection coil [B] carries scraped off toner to the toner collection plate [C].

The collar [D] on the cleaning blade bracket contacts the outer rim of cam gear [E], which moves the cleaning blade side to side. This side-to-side movement disperses accumulated toner to prevent early blade edge wear at one location.

The drum reverses about 5 mm after every copy job to remove particles on the edge of the cleaning blade.

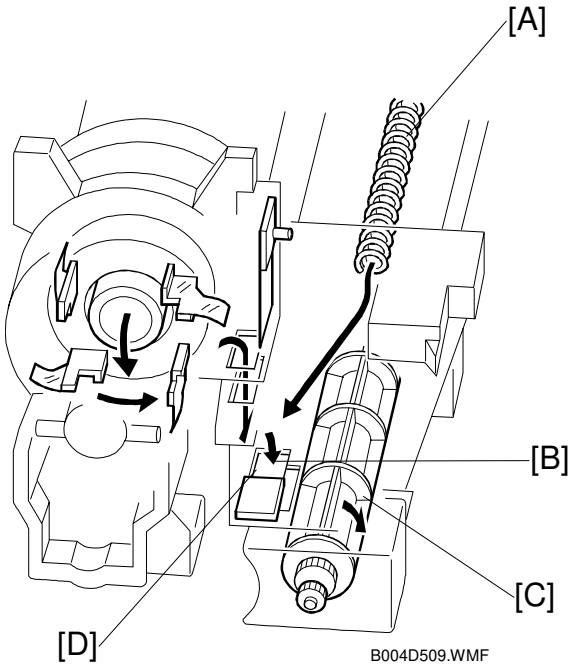


B004D547.WMF

6.10.2 TONER RECYCLING

Toner collected by the toner collection coil [A] is transported to the opening [B]. This toner falls into the development unit with new toner coming from the toner bottle. The paddle roller [C] mixes the collected toner with the new toner.

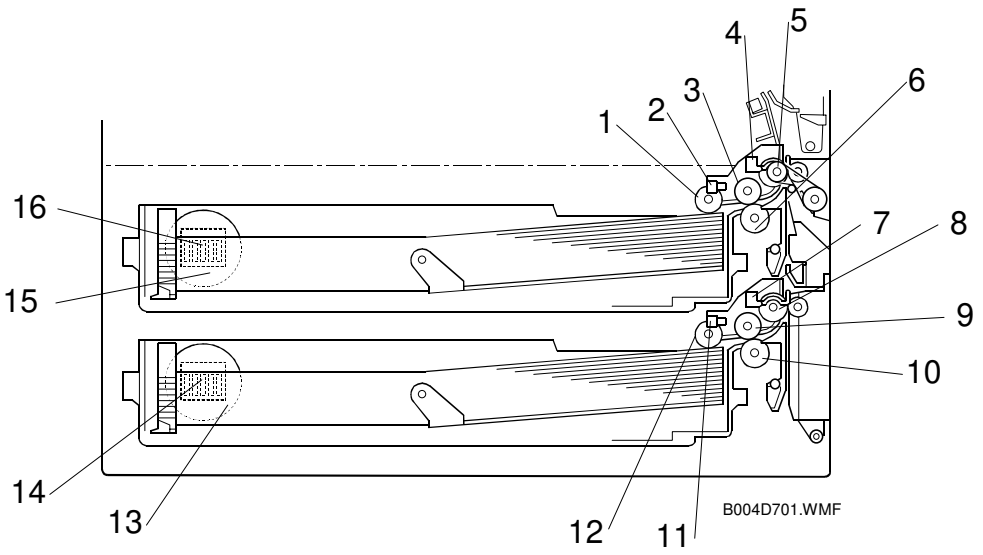
NOTE: A screen filter [D) has been added to strain out paper dust and other foreign matter.



B004D509.WMF

6.11 PAPER FEED

6.11.1 OVERVIEW



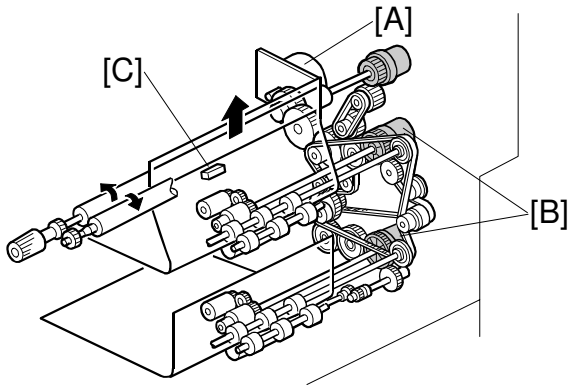
1	Upper pick-up roller	9	Lower paper feed roller
2	Upper paper height sensor	10	Lower separation roller
3	Upper paper feed roller	11	Lower paper height sensor
4	Upper relay sensor	12	Lower pick-up roller
5	Upper relay roller	13	Lower paper size dial
6	Upper separation roller	14	Lower paper size switch
7	Lower relay sensor	15	Upper paper size dial
8	Lower relay roller	16	Upper paper size switch

Each paper tray, which employs the FRR system, can hold 500 sheets. Two relay sensors, positioned above each set of relay rollers, detect paper jams. A selection dial allows you to select the setting for the size of the paper loaded in the tray.

6.11.2 PAPER FEED DRIVE

The feed/development motor [A] drives the pick-up and feed mechanism of both the upper and second paper feed stations through gears and the paper feed clutches [B].

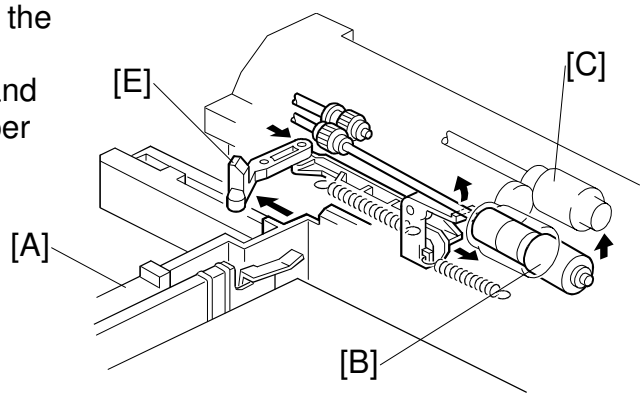
When the paper feed clutch turns on, the pick-up roller, paper feed roller, and separation roller start rotating to feed the paper. The paper feed clutch stays on until shortly after the registration sensor [C] actuates.



B004D703.WMF

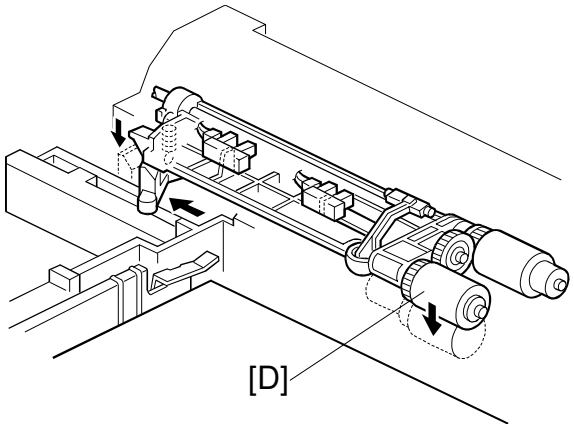
6.11.3 PICK-UP AND SEPARATION ROLLER RELEASE MECHANISM

When the paper tray [A] is not inside the machine, the separation roller [B] is away from the paper feed roller [C] and the pick-up roller [D] stays in the upper position.



B004D704.WMF

When the paper tray is set into the machine, it pushes the release lever [E]. This causes the pick-up roller [D] to go down and the separation roller [B] to move up and contact the paper feed roller.

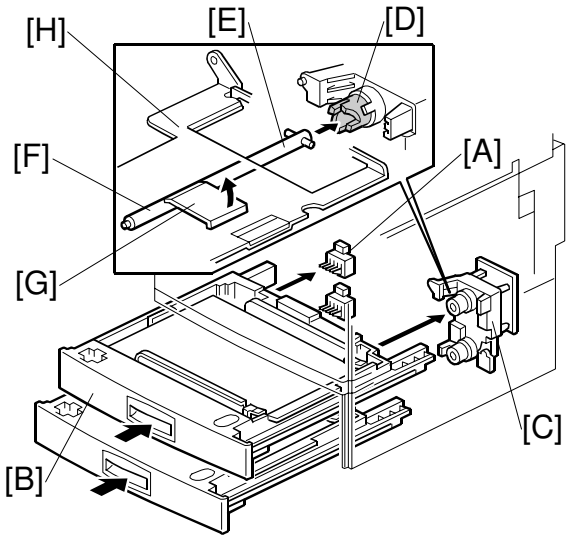


B004D763.WMF

Detailed Descriptions

6.11.4 PAPER LIFT

The paper size switch [A] detects when the paper tray [B] is set in the machine, and the tray lift motor [C] rotates, and the coupling gear [D] on the tray lift motor engages the pin [E] on the lift arm shaft [F]. Then the tray lift arm [G] lifts the tray bottom plate [H].

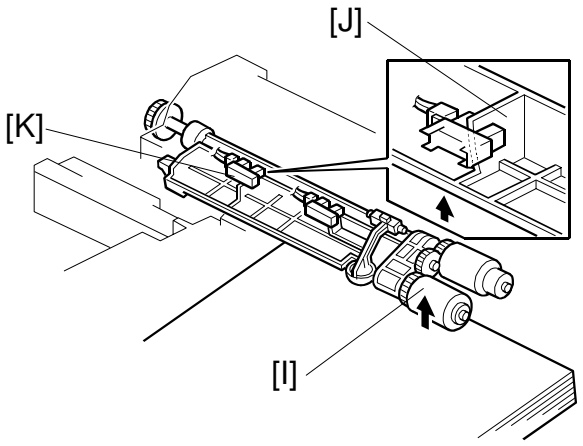


B004D702.WMF

When the paper tray is set in the machine, the pick-up roller [I] lowers. When the top sheet of paper reaches the proper height for paper feed, the paper pushes up the pick-up roller, and the actuator [J] on the pick-up roller supporter activates the paper height sensor [K] to stop the tray lift motor.

After several paper feed cycles, the paper level gradually lowers and the paper height sensor is de-activated. The tray lift motor turns on again until this sensor is activated again.

When the paper tray is removed from the machine, the tray lift motor coupling gear disengages the pin on the lift arm shaft, and the tray bottom plate then drops under its own weight.

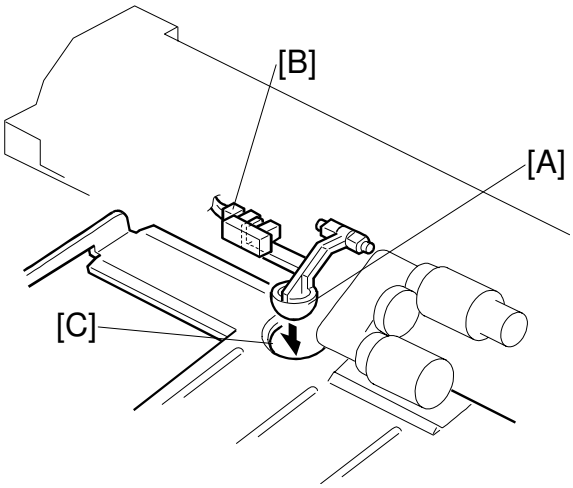


B004D526.WMF

6.11.5 PAPER END DETECTION

If there is paper in the paper tray, the paper end feeler [A] is raised by the paper stack, and the paper end sensor [B] is deactivates.

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



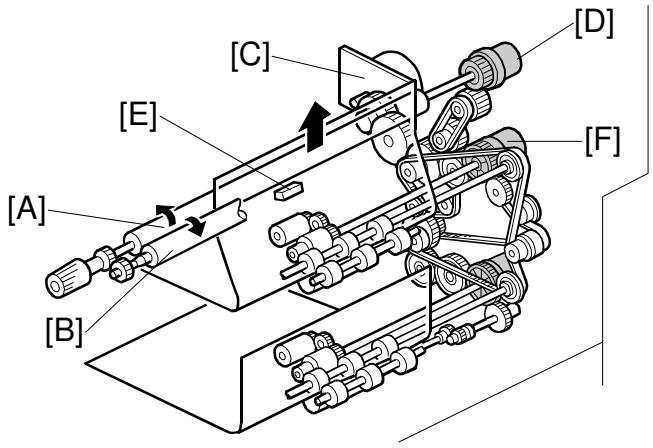
B004D706.WMF

6.11.6 PAPER REGISTRATION

The registration drive roller [A] and idle roller [B] correct the skew of the transferred paper to ensure that the leading edge of the paper is positioned correctly on the OPC.

The paper feed/development motor [C] drives the registration mechanism.

The registration sensor [E] is positioned just before the registration rollers. When the leading edge activates the registration sensor, the registration clutch is off and the registration rollers are not turning.



B004D703.WMF

However, the relay clutch [F] remains on slightly longer. This delay allows time for the paper to press against the registration rollers and buckle slightly to correct skew.

Next, the registration clutch [D] actuates and the relay clutch re-actuates at the proper time to align the paper with the image on the drum. The registration rollers then feed the paper to the image transfer section.

NOTE: The registration sensor is also used for paper misfeed detection.

6.11.7 PAPER SIZE DETECTION

The paper size switch includes four microswitches. Actuators behind the paper size dial actuate the sensors.

Each paper size has its own actuator, with a unique combination of notches. To determine the paper size, the CPU reads which switches the actuator has turned off.

The CPU disables paper feed from a tray if the paper size cannot be detected. If the paper size actuator is broken, or if there is no tray installed, the printer control board recognizes that the paper tray is not installed.

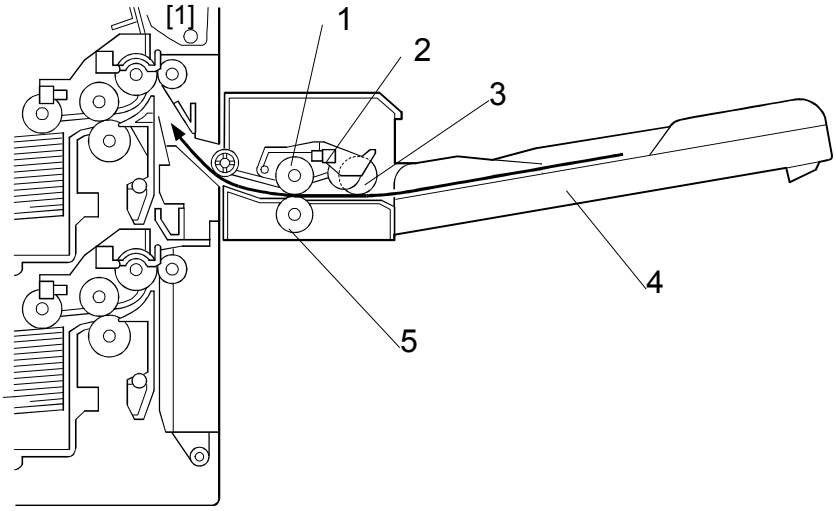
When the paper size actuator is at the "*" mark, the paper tray can be set up to accommodate one of a wider range of paper sizes by using one of the user tools on the machine's operation panel.

Models		Paper Size Switch			
North America	**Europe/Asia**	**1**	**2**	**3**	**4**
8 1/2" x 13" Portrait	A3 Portrait	ON	ON	OFF	ON
A4 Landscape	A4 Landscape	ON	ON	ON	ON
A4 Portrait	A4 Portrait	ON	OFF	ON	ON
11" x 17" Portrait	A5 Portrait	OFF	OFF	ON	ON
8 1/2" x 14" Portrait	8" x 13" Portrait	ON	OFF	OFF	OFF
8 1/2" x 11" Portrait	8 1/2" x 11" Portrait	ON	ON	OFF	OFF
8 1/2" x 11" Landscape	8 1/2" x 11" Landscape	ON	OFF	ON	OFF
*	*	ON	ON	ON	OFF

ON: Pushed OFF: Not Pushed

6.12 BY-PASS TRAY

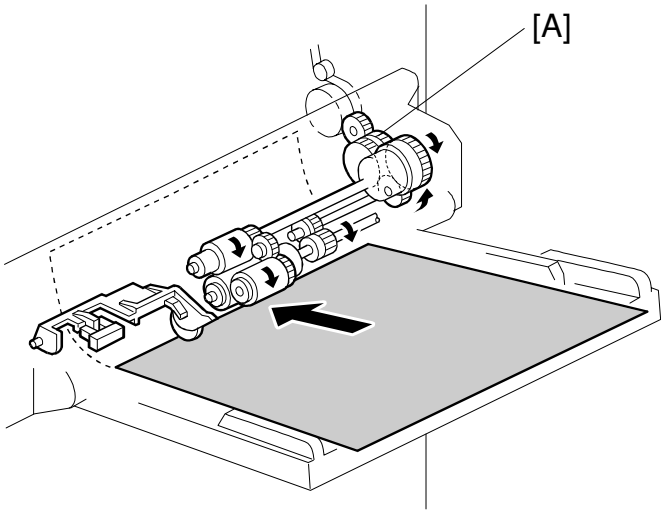
6.12.1 OVERVIEW



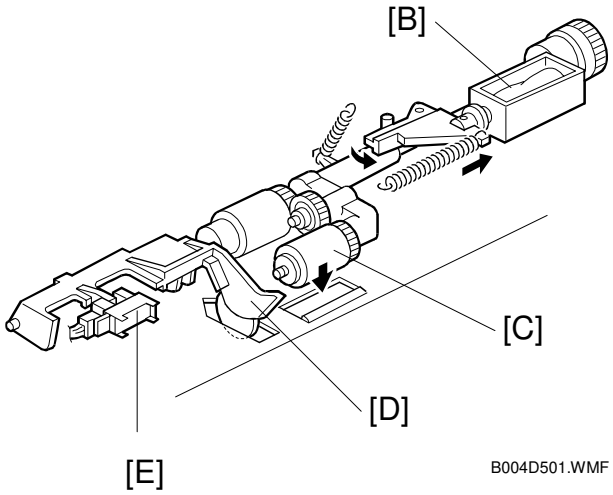
B004D168.WMF

1	Paper feed roller
2	Paper end sensor
3	Pick-up roller
4	By-pass tray
5	Separation roller

6.12.2 BY-PASS TRAY OPERATION



B004D500.WMF

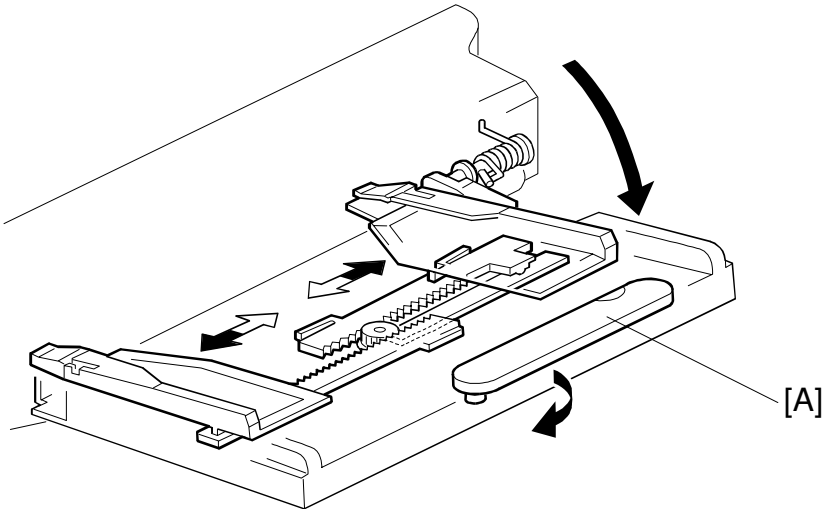


B004D501.WMF

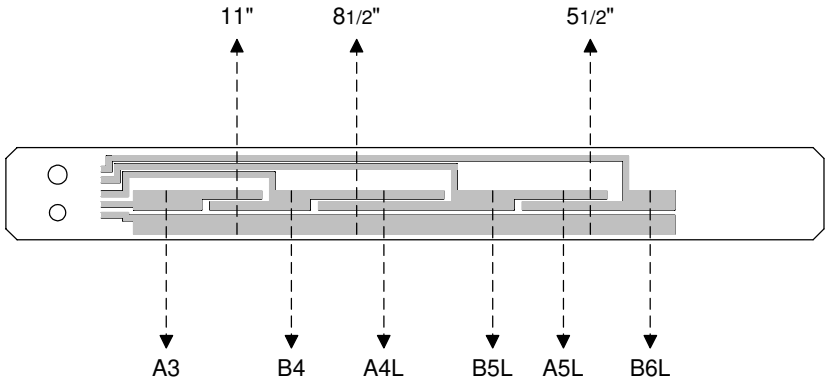
The by-pass unit is directly driven by the copier through gear [A].

When the print key is pressed, the pick-up solenoid [B] turns on and the pick-up roller [C] moves onto the paper. When the by-pass tray runs out of paper, the paper end feeler [D] drops into the cutout in the by-pass tray and the paper end sensor [E] is activated.

6.12.3 BY-PASS PAPER SIZE DETECTION



B004D522.WMF



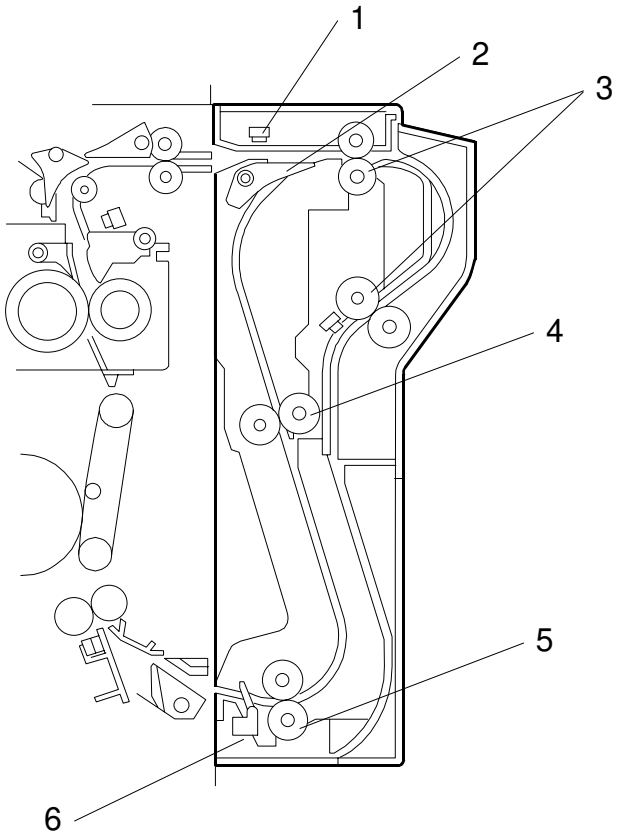
B004D523.WMF

The paper size sensor board [A] monitors the paper width.

The rear side fence is connected to the terminal plate. The pattern for each paper width is unique. Therefore, the copier determines which paper has been placed in the by-pass tray by the signal output from the board. However, the copier does not determine the paper length from the by-pass tray hardware.

6.13 DUPLEX UNIT

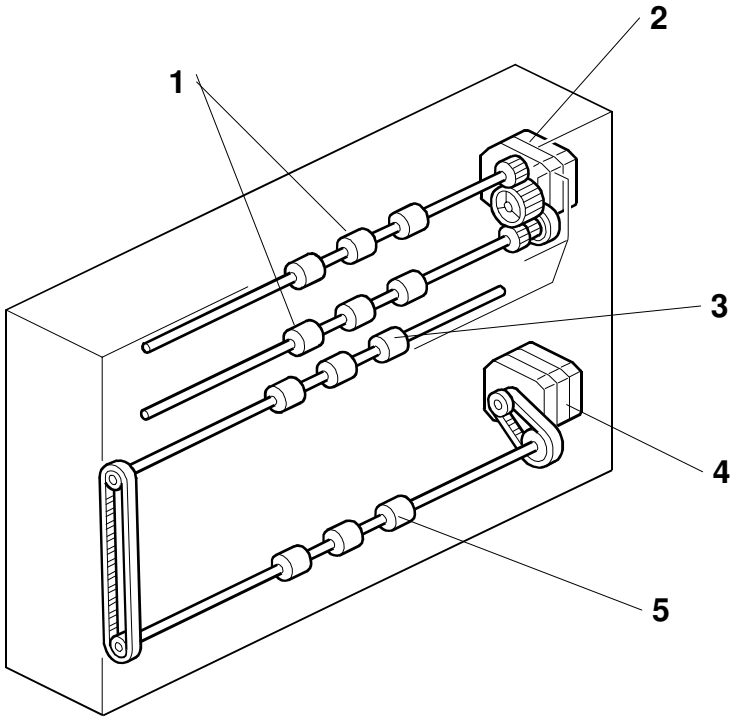
6.13.1 OVERVIEW



B004D101.WMF

1	Entrance sensor	4	Upper transport roller
2	Inverter gate	5	Lower transport roller
3	Inverter roller	6	Exit sensor

6.13.2 DUPLEX DRIVE LAYOUT



B004D103.WMF

1	Inverter roller	4	Transport motor
2	Inverter motor	5	Lower transport roller
3	Upper transport roller		

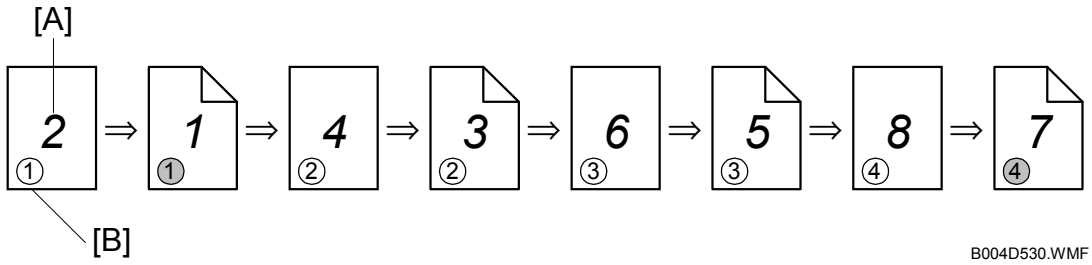
6.13.3 DUPLEX BASIC OPERATION

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

Longer than A4 lengthwise/LT lengthwise

The duplex unit can store only one sheet of copy paper.

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

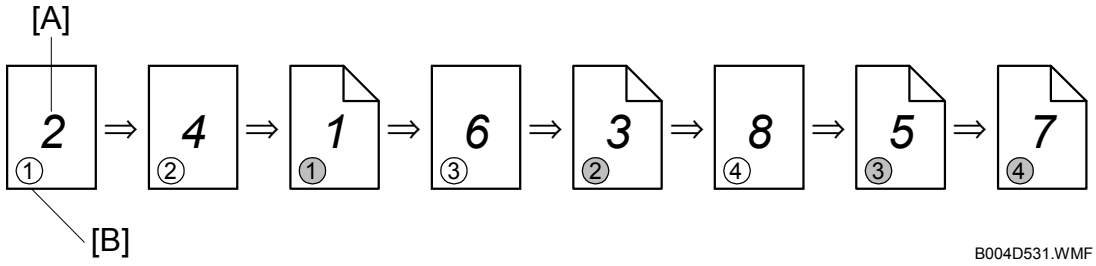


B004D530.WMF

Up to A4 lengthwise/LT lengthwise

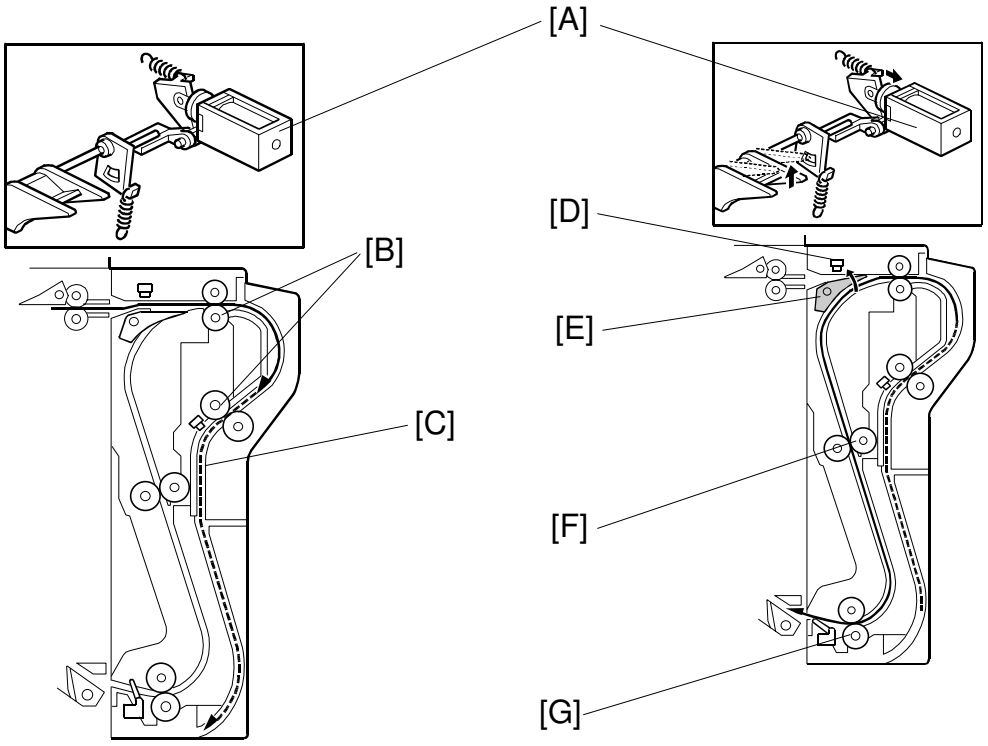
The duplex unit can store two sheets of copy paper

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



B004D531.WMF

6.13.4 DUPLEX UNIT FEED IN AND EXIT MECHANISM



B004D104.WMF

B004D105.WMF

Feed-in

The inverter gate solenoid [A] stays off and the inverter rollers [B] rotate clockwise. A sheet of paper is sent to the inverter section [C].

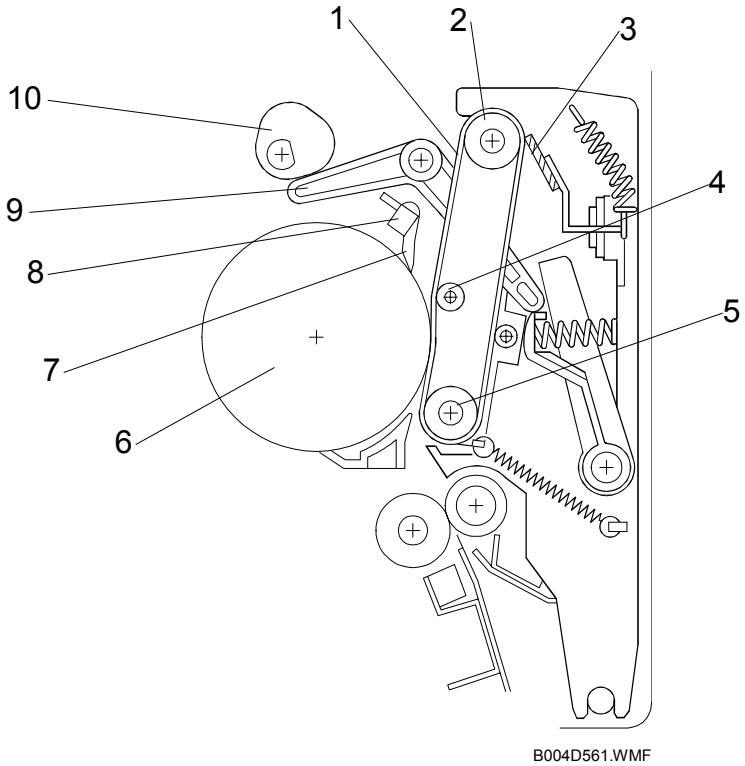
NOTE: The cover guide has been eliminated in order to accommodate paper sizes longer than A4/LT in the reverse feed path which has been lengthened in the design of this machine.

Inversion and Exit

The inverter gate solenoid turns on and the inverter motor turns on in reverse shortly after the trailing edge of the paper passes through the entrance sensor [D]. As a result, the inverter gate [E] is opened and the inverter roller rotates counterclockwise. The paper is sent to the copier through the upper and lower transport rollers [F, G].

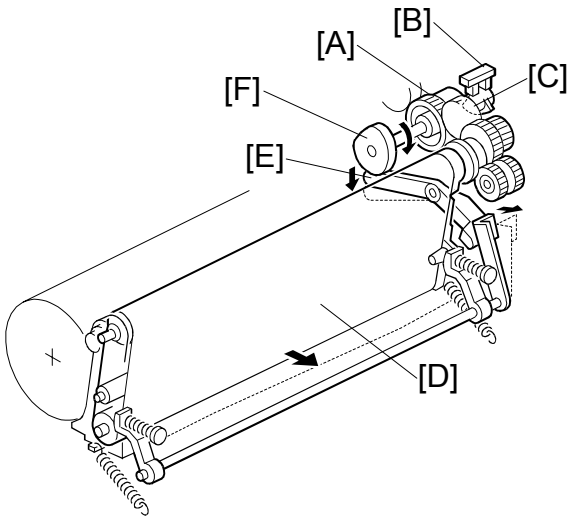
6.14 IMAGE TRANSFER AND PAPER SEPARATION

6.14.1 OVERVIEW



1	Transfer belt	6	OPC
2	Drive roller	7	Pick-off pawls
3	Transfer belt cleaning blade	8	ID sensor
4	Transfer roller	9	Contact lever
5	Idle roller	10	Transfer belt contact clutch/cam

6.14.2 BELT DRIVE MECHANISM



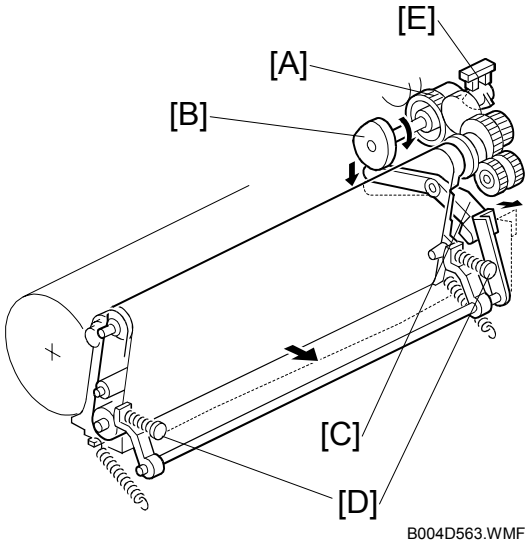
B004D563.WMF

After the main motor switches on during copying, the transfer belt contact clutch [A] switches on after a specified interval and the cam [F] makes a half-turn to raise the contact lever [E] and bring the transfer belt [D] into contact with the drum.

The actuator [C], on the same axis as the cam, and the transfer belt position sensor [B] detect whether the drum and transfer belt are in contact.

When the main motor is off, or when the ID sensor pattern is being measured, the transfer belt unit separates from the drum. The ID sensor pattern must not be transferred to the belt. Also, the transfer belt and drum must not remain in contact for too long, to prevent contamination of the drum with oil or other foreign material from the transfer belt.

6.14.3 TRANSFER BELT UNIT CONTACT MECHANISM



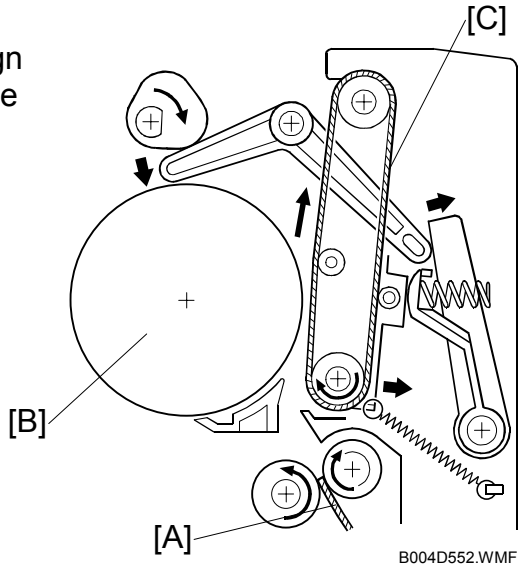
B004D563.WMF

The belt contact and release mechanism consists of the belt contact clutch [A], cam [B], and contact lever [C]. The belt contact clutch turns on and the cam attached to the clutch rotates half a complete rotation. The contact lever, riding on the cam, is lifted up and the springs [D] push the belt into contact with the drum.

The transfer belt position sensor [E] detects the home position of the cam (this is when the belt is away from the drum). The belt must be released from the drum between copy jobs in order to prevent the ID sensor pattern from being rubbed off and to prevent contamination of the drum from the surface of the belt.

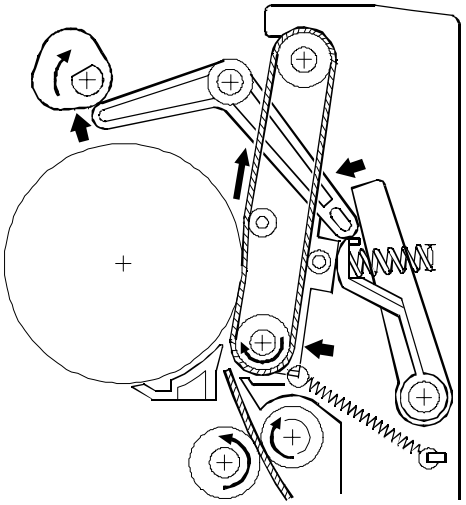
6.14.4 IMAGE TRANSFER AND PAPER SEPARATION MECHANISM

When the registration clutch switches on to align the leading edge of the paper [A] with the image on the drum [B], the transfer belt is [C] is away from the drum.



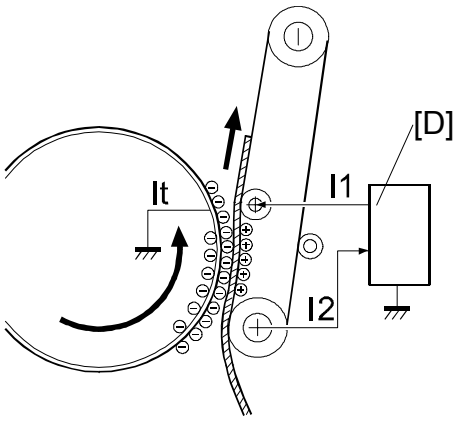
B004D552.WMF

At the designated time after the main motor switches on, the transfer belt contact clutch switches on and the transfer belt touches the drum.


B004D553.WMF

When the paper enters the gap between the belt and the drum, the high voltage supply board [D] applies a high positive current to the belt to transfer the image to the paper.

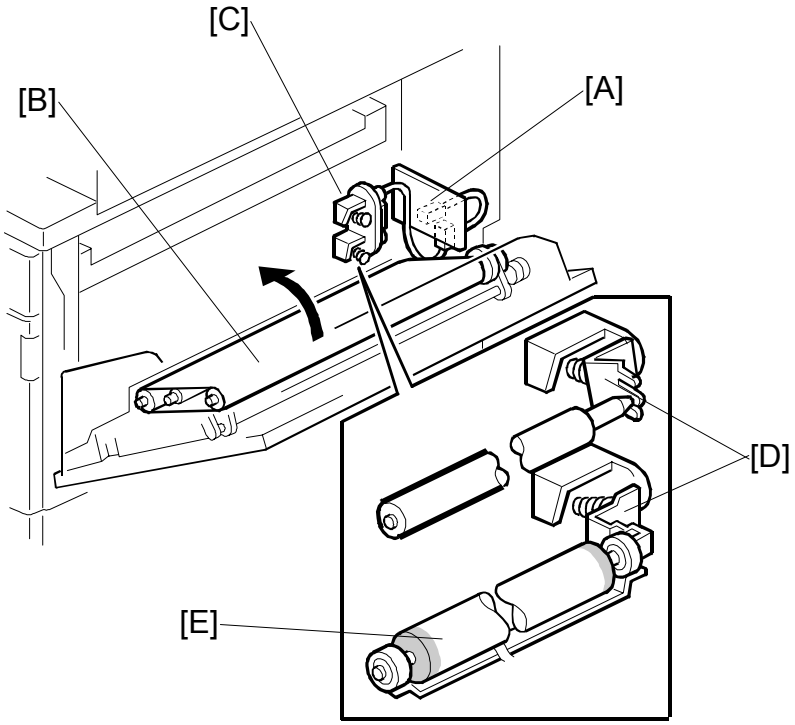
After receiving the image from the drum, the paper is fed by the belt. The paper moves to the end of the transfer belt unit, where it separates from the belt as the belt curves away. Then the paper moves on to the fusing unit.



B004D521.WMF

6.14.5 TRANSFER BELT CHARGE

Mechanism



B004D564.WMF

The high voltage supply board [A] applies a positive current to the transfer belt [B] through the terminal block [C], terminal plate [D], and the bias roller [E].

The high voltage supply board adjusts the current to the roller to keep a small but constant current flow to ground through the belt, paper, and drum. If this current is not kept constant, efficiency of toner transfer and paper separation will vary with paper thickness, type, environmental condition, or changes in transfer belt surface resistance.

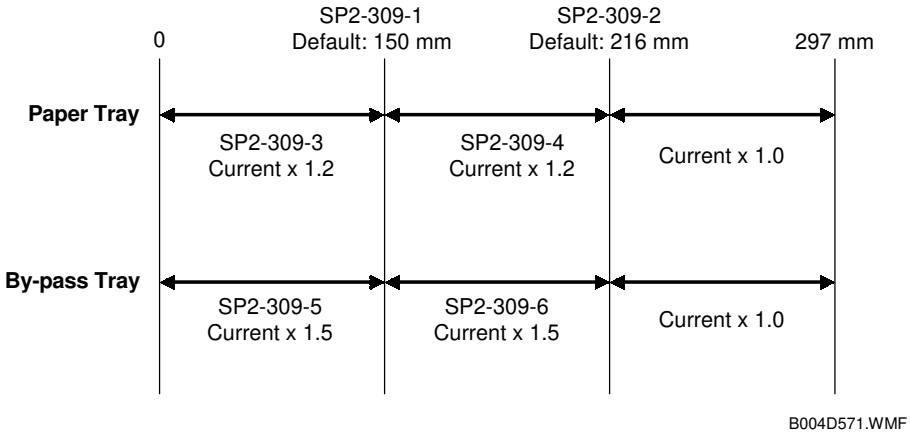
Correction for paper width and thickness

A range of SP modes is available in order to adjust the machine so it can handle papers of non-standard size and thickness.

For paper width, there are two thresholds. The factory settings are 150 mm (5.9") and 216 mm (8.5"). Below 216 mm, the transfer current can be increased. By default, the current is multiplied by 1.2 for the main machine paper trays. For paper widths below 150 mm, the transfer current can be set higher, but by default it is kept the same as the current for paper widths below 216 mm. The higher current allows for the tendency of the current to flow directly from the transfer belt to the drum and not through the paper which could cause an insufficient amount of toner to transfer to narrow width paper.

Thick paper must be fed from the by-pass tray because SP modes are available only for the by-pass tray in order to accommodate thick paper. By default, the current for paper narrower than 216 mm is 1.5 times the normal current.

This illustration shows the SP modes, which control these currents. The base transfer current (' current' in the diagram) depends on SP 2-301. This is different for various parts of the image, and is different for the by-pass tray; see the next page for details.



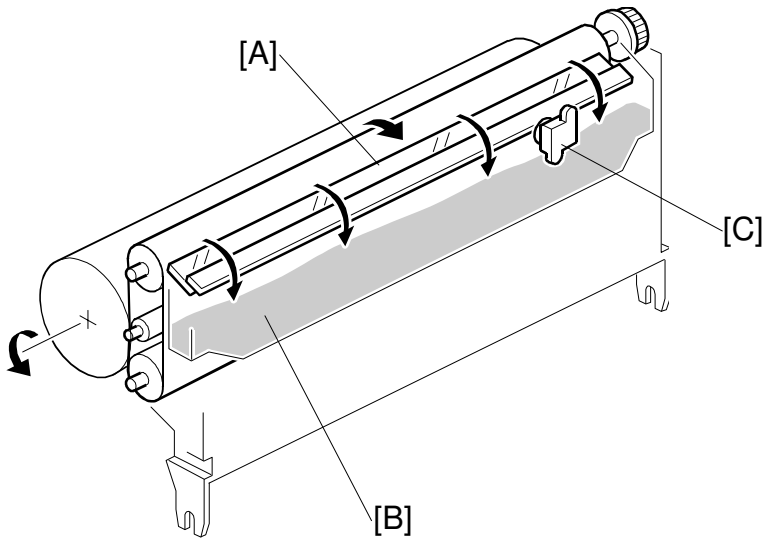
Currents applied to leading edge and image areas, and for by-pass feed

Transfer current can also be adjusted for the leading edge and the image area, and for by-pass feed. The timing for starting to apply leading edge current, for the switchover from leading edge current to image area current, and for switching off at the trailing edge can also be changed.

The table below lists the SP modes you can use to adjust these settings.

SP2-301 Transfer Current Adjustment		
Image areas	SP2-301-1	1st Side of Paper
	SP2-301-2	2nd Side of Paper
	SP2-301-4	By-pass Feed
Leading edge areas	SP2-301-3	Leading Edge
	SP2-301-5	Leading Edge By-pass Feed
SP2-911 Transfer Current Timing		
Timing	SP2-911-1	On Timing (at leading edge)
	SP2-911-2	Switch Timing (from leading edge to image area current
	SP2-911-3	Off Timing (at trailing edge)

6.14.6 TRANSFER BELT CLEANING MECHANISM

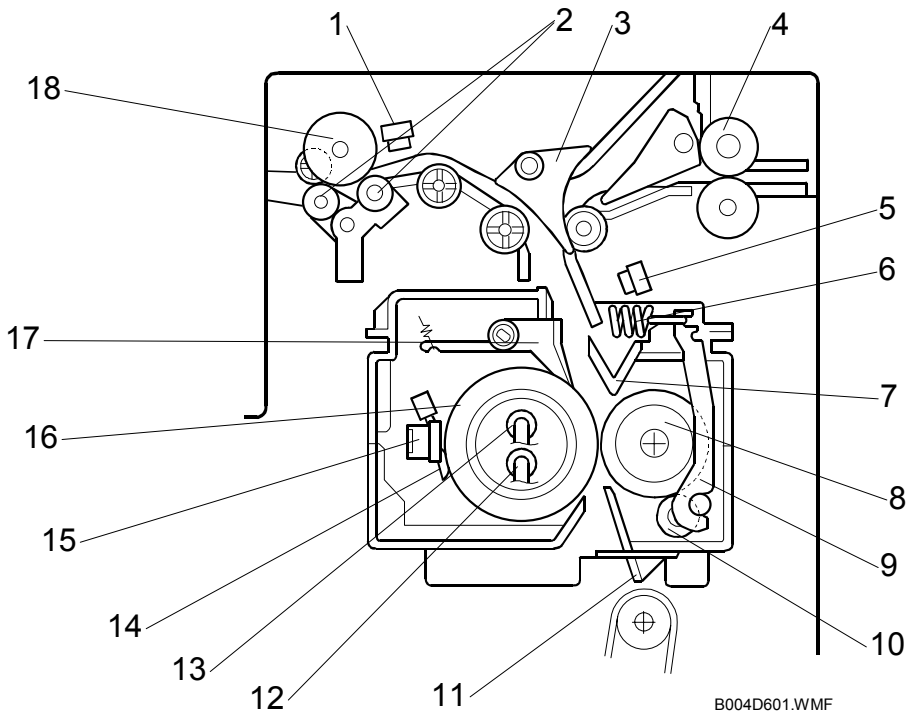


The cleaning blade [A], always in contact with the transfer belt, scrapes off toner and paper dust remaining on the transfer belt.

Scraped off toner and paper dust falls into the toner collection tank [B] in the transfer belt unit. This toner is not recycled. When the toner overflow sensor [C] detects toner overflow, the toner overflow indicator lights. Up to 999 copies can be made before the toner overflow condition shuts down the machine.

6.15 IMAGE FUSING AND PAPER EXIT

6.15.1 OVERVIEW

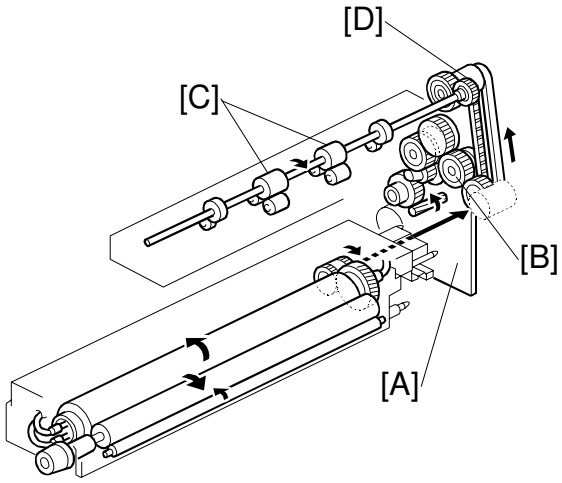


1	Paper exit sensor	10	Cleaning roller
2	De-curler rollers	11	Entrance guide
3	Junction gate	12	Fusing lamp (center)
4	Idle roller (duplex unit)	13	Fusing lamp (ends)
5	Fusing unit exit sensor	14	Thermistors (central/end)
6	Spring	15	Thermostat (central)
7	Fusing exit guide plate	16	Hot roller
8	Pressure roller	17	Hot roller strippers
9	Pressure arm	18	Exit roller

Detailed Descriptions

6.15.2 FUSING DRIVE

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

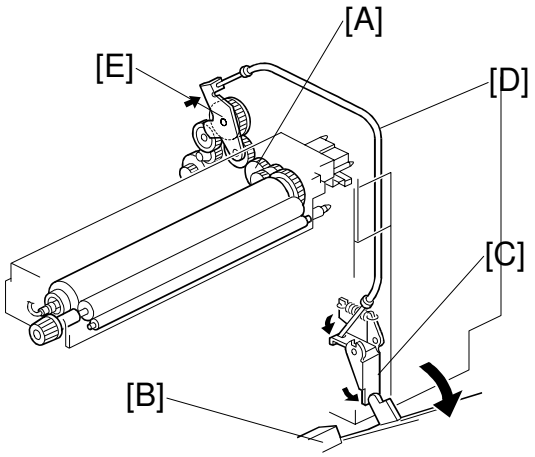


B004D603.WMF

6.15.3 FUSING DRIVE RELEASE MECHANISM

The fusing unit drive release mechanism automatically disengages the fusing unit drive gear [A] when the right door [B] is opened.

When the right cover is opened, the actuator plate [C] pulls release wire [D]. The wire pulls the fusing drive gear bracket [E] and the fusing unit drive is disengaged.

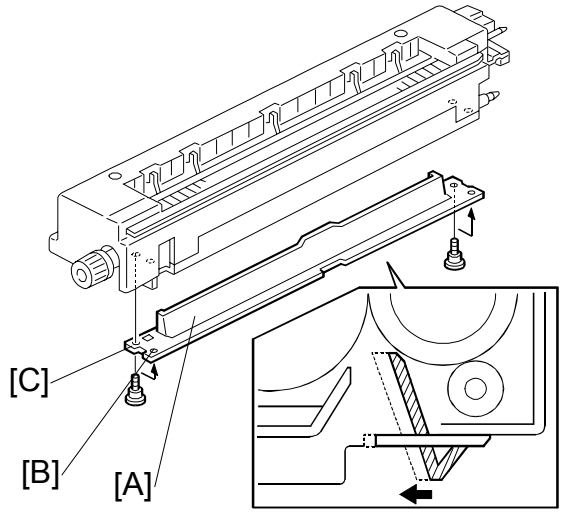


B004D605.WMF

6.15.4 FUSING ENTRANCE GUIDE SHIFT MECHANISM

The entrance guide [A] has two holes on each side to adjust for paper thickness to prevent creasing. Normally, the left screw hole [C] on each side is used.

For *thin* paper, use screw holes [B] to move the entrance guide to the left. This setting allows more direct access to the gap between the hot and pressure rollers, and prevents thin paper from buckling against the hot roller which can cause blurring at the leading edge of the copy.



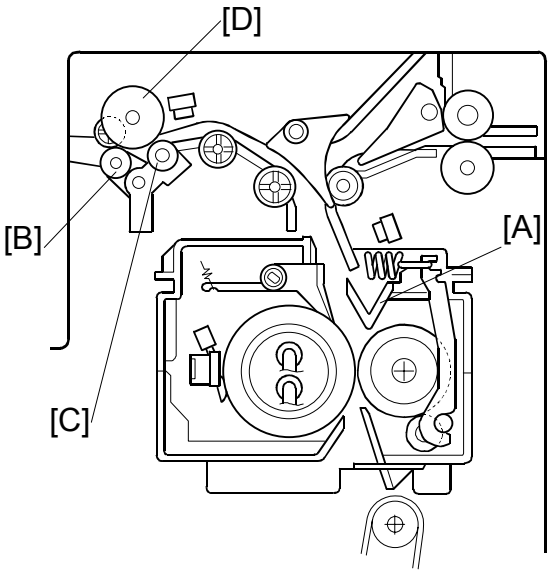
B004D169.WMF

6.15.5 EXIT GUIDE PLATE AND DE-CURLER ROLLERS

The exit guide plate [A] also functions as a pressure roller stripper. The exit guide plate can be moved in order to remove jammed paper.

Stacking has been improved by mounting a face-curl correction mechanism at the paper exit roller.

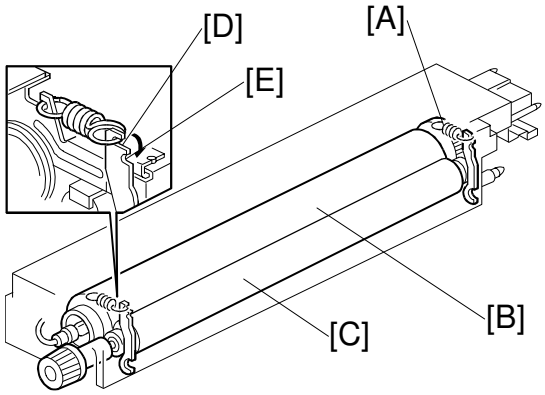
Two de-curler rollers [B] and [C] have been added under the exit roller [D] to correct the curl that paper acquires during transport through the fusing unit.



B004D601.WMF

6.15.6 PRESSURE ROLLER

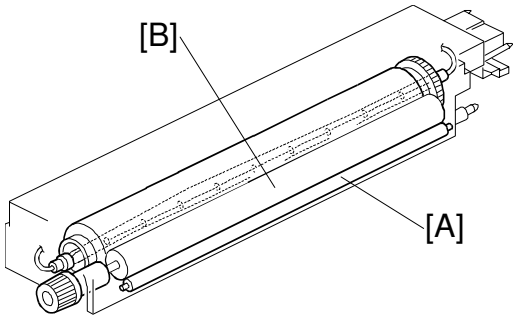
The pressure springs [A] apply constant pressure between the hot roller [B] and the pressure roller [C]. The applied pressure can be changed by adjusting the position of the pressure springs. The left position [D] is the normal setting, and the right position [E] increases the pressure to prevent insufficient fusing by the fusing unit.



B004D663.WMF

6.15.7 CLEANING MECHANISM

The cleaning roller [A], in constant contact with the pressure roller [B], collects toner and paper dust from the surface of the pressure roller. Because the cleaning roller is metal, it can collect adhering matter better than the pressure roller, which is coated with Teflon.

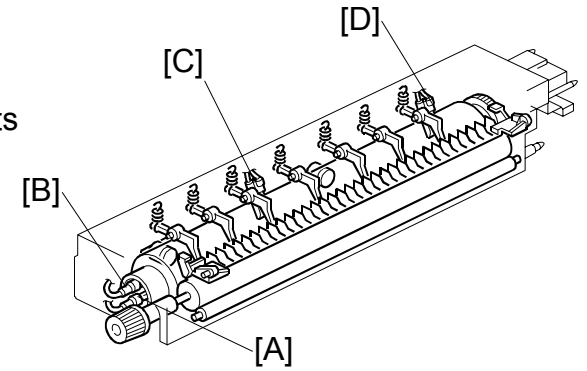


B004D515.WMF

6.15.8 FUSING TEMPERATURE CONTROL

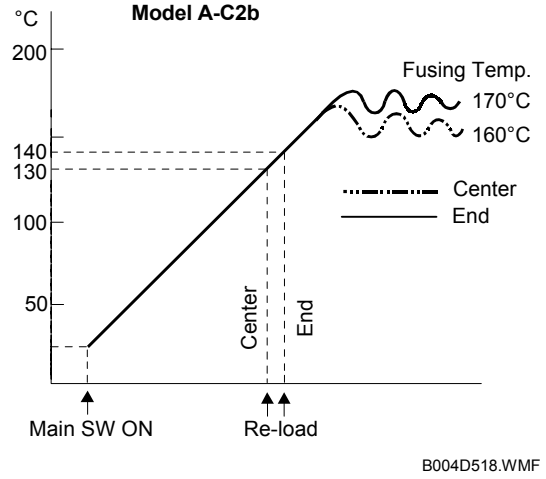
The fusing unit has two fusing lamps: the first fusing lamp (center: 650W) [A] heats the center of the fusing roller, and the second fusing lamp (ends: 550W) [B] heats both ends of the hot roller. This arrangement ensures even heat on all surfaces of the roller.

In order to control the temperature of the roller, two high response thermistors are attached to the unit, one near the center [C] and one at the end [D] of the hot roller.

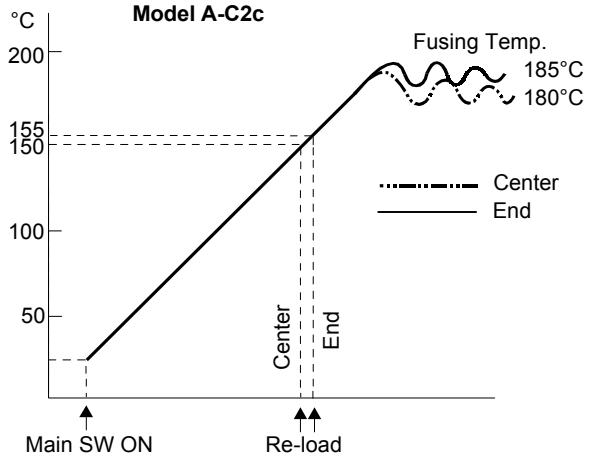


B004D602.WMF

Temperature Control



B004D518.WMF



B004D519.WMF

There are two types of temperature control:

- On/off control (Default)
- Phase control.

Either mode can be selected with SP1-104 (Fusing Temperature Control).

After the machine is powered on, the CPU checks the ac frequency for 500 ms, in case phase control is selected later for the temperature control, and then switches on the fusing lamp.

As soon as both the center and end thermistors detect the print ready temperature (also known as the “re-load” temperature), the machine can operate. The “reload” temperature is 30C below the fusing temperature (this depends on SP1105-05, 06). As soon as the thermistors detect the fusing temperature, the CPU switches the lamps off but frequently switches on/off again in order to maintain the fusing temperature.

Fusing Idling Temperature

If copies are not sufficiently fused soon after the main power switch is turned on, fusing idling should be enabled with SP1-103-1.

When fusing idling is enabled, it is done when the temperature reaches the print ready ('re-load') temperature. The re-load temperature can be adjusted with SP1-105-5, 6.

In the opposite case, even if fusing idling is disabled, it is done when the temperature at power-up ≤ 15°C

The fusing idling time is as follows.

Temperature at power-on	Fusing Idling Mode		
	0: Disabled	**1: Enabled**	SP1-103-1
15°C or less	30 s	30 s	SP1-103-2
Higher than 15°C	Not done	30 s	

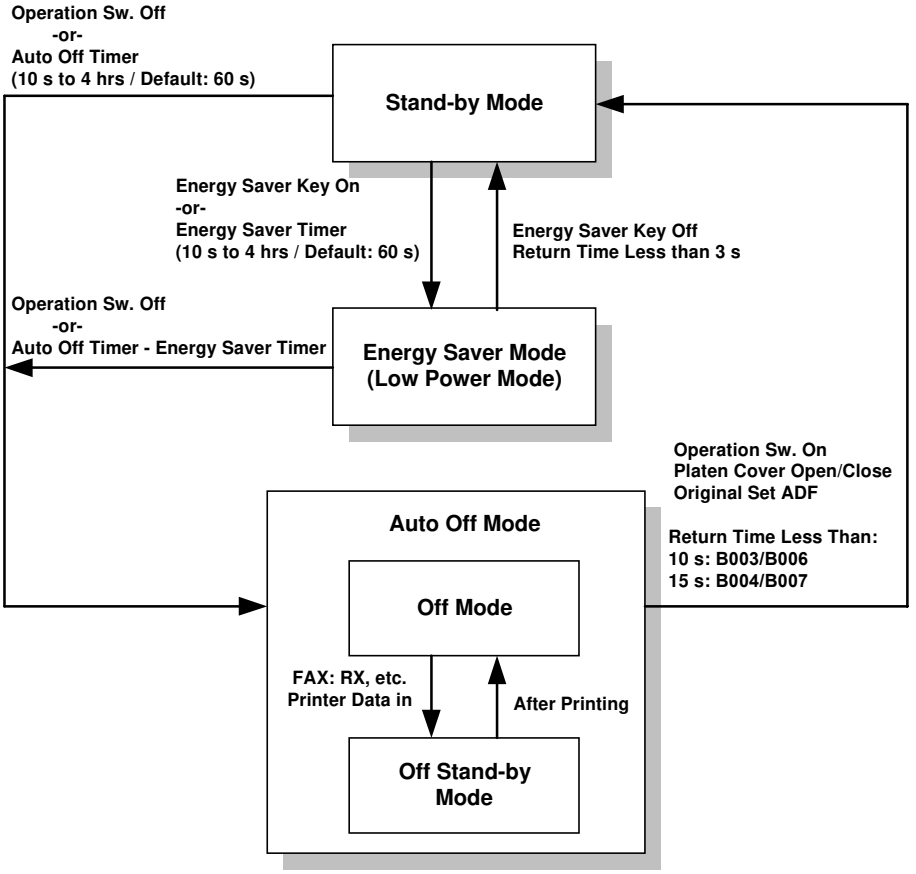
6.15.9 OVERHEAT PROTECTION

If the hot roller temperature becomes greater than 250°C, the CPU cuts off the power to the fusing lamp, and SC543 (Fusing Overheat Error) will be displayed.

Even if the thermistor overheat protection fails, there is a thermostat in series with the common ground line of the fusing lamp. If the temperature of the thermostat reaches 210°C, the thermostat opens, removing power from the fusing lamp. At the same time, the copier stops operating. At this time, SC542 (Fusing Temperature Warm-up Error) will be displayed.

6.16 ENERGY SAVER MODES

6.16.1 OVERVIEW



B004D604.WMF

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

This machine has two types of energy saver mode as follows.

1) Energy saver mode
2) Auto Off mode

These modes are controlled by the following UP and SP modes.

- Energy timer (UP mode)
- Auto off timer (UP mode)
- Auto off disabling (SP mode)

6.16.2 ENERGY SAVER MODE

Entering the energy saver mode

The machine enters energy saver mode when one of the following is done.

- The Clear Mode/Energy Saver Key is held down for a second.
- The energy saver timer runs out after the end of a job.

What happens in energy saver mode

When the machine enters energy saver mode, the fusing lamp drops to a certain temperature, and the operation panel indicators are turned off except for the Energy Saver LED and the Power LED.

If the CPU receives the image print out command from an application (e. g. to print incoming fax data or to print data from a PC), the fusing temperature rises to print the data.

Return to stand-by mode

If one of the following is done, the machine returns to stand-by mode:

- The Clear Mode/Energy Saver Mode key is pressed
- Any key on the operation panel or touch panel screen is pressed
- An original is placed in the ADF
- The ADF is lifted
- A sheet of paper is placed in the by-pass feed table

The recovery time from energy saver mode is about 3 s.

Mode	Operation Switch	Energy Saver LED	Fusing Temp.	+24V	System +5V
Energy Saver	On	On	B003/B006: 130°C B004/B007: 150°C	On	On

6.16.3 AUTO OFF MODE

There are two Auto Off modes: Off Stand-by mode and Off mode. The difference between Off Stand-by mode and Off mode is the machine's condition when the machine enters Auto Off mode.

Entering off stand-by and off modes

The machine enters the Off Stand-by mode or Off mode when one of the following is done.

- The auto off timer runs out
- The operation switch is pressed to turn the power off

If one or more of the following conditions exits, the machine enters Off Stand-by mode. If none of these conditions exist, the machine enters Off Mode.

- Error or SC condition
- An optional G4 unit is installed
- Image data is stored in the memory
- During memory TX or polling RX
- The handset is off hook
- An original is in the ADF
- The ADF is open

Off Stand-by mode

The system +5V is still supplied to all components. When the machine detects a ringing signal or receives a stream of data for a print job, the +24V supply is activated and the machine automatically prints the incoming message or executes the print job.

Off Mode

The system +5V supply also turns off. However, +5VE (+5V for energy saver mode) is still activated. When the machine detects a ringing signal, off-hook signal, or receives a print job, the machine returns to the Off Stand-by mode and the system +5V and +24V supplies are activated.

Returning to stand-by mode

The machine returns to stand-by mode when the operation switch is pressed. The recovery time is about 10 s (B003/B006) or 15 s for the (B004/B007).

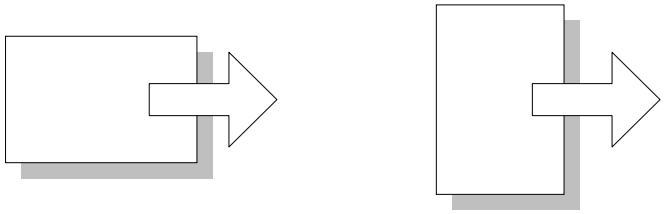
Mode	Operation Switch	Energy Saver Mode	Fusing Lamp	+24V	System +5V	Note
Off Stand-by	Off	Off	Off (On when printing)	On	On	
Off	Off	Off	Off	Off	Off	+5VE is supplied

SPECIFICATIONS

1. GENERAL SPECIFICATIONS

Configuration	Desktop		
Copy Process	Dry electrostatic transfer system		
Original	Sheet/Book		
Original Size	Maximum A3/11" x 17"		
Copy Paper Size	Paper tray, Duplex:	A3/11" × 17" - A5 (L)	
	By-pass tray:	A3/11" × 17" - A6 (L)	
	Non-standard sizes:	Width: 100 - 305 mm (3.9" - 12") Length: 148 - 432 mm (5.8" – 17.0")	
Copy Paper Weight	Paper Tray /Duplex:	64 - 105 g/m^2 (20 - 28 lb)	
	By-pass:	52 - 163 g/m^2 (16 – 44 lb)	
Reproduction Ratios	7R5E:	Metric version (%): 400, 200, 141, 122, 115, 93, 82, 75, 71, 65, 50, 25 Inch version (%): 400, 200, 155, 129, 121, 93, 85, 78, 73, 65, 50, 25	
	Zoom:	25 ~ 400% in 1% steps	
Copying Speed	B003/B006:	35 cpm	(A4/11" × 8.5" (S))
	B004/B007:	45 cpm	(A4/11" × 8.5" (S))
First Copy Time	B003/B006:	4.5 s (1st Tray, A4/11" × 8.5" (S))	
	B004/B007:	3.6 s (1st Tray, A4/11" × 8.5" (S))	
Warm-up Time	B003/B006:	Less than 15 s	
	B004/B007:	Less than 20 s	
Continuous Copy	1~999 (operation panel entry)		
Paper Capacity	1,050 sheets (500 sheets/tray x 2 with 50 sheets in by-pass tray)		
Paper Output	A4/8½ x 11" and smaller	500 sheets	
	B4 and larger:	250 sheets	
Power Source	North America:	120V/60Hz, More than 12 A	
	Europe/Asia:	220 – 240V/50, 60Hz, More than 8A	
Dimensions (W x D x H)	670 mm x 650 mm x 720 mm (26.3” x 25.6” x 28.3”)		
Weight	Less than 78 kg (172 lb)		
Resolution	600 dpi (Scanning and Printing)		
Gradation	256 levels (Scanning and Printing)		
Original Archive	More than 9,000 A4 pages for document server.		
Toner Replenishment	Cartridge exchange (550g)		
Total Counter	Electric counter		

NOTE: The following notations are used to describe the paper feed direction



Lengthwise (L) Sideways (S)

B004V501.WMF

Power Consumption

Mainframe only

	B003/B006	B004/B007
Copying	Less than 1.0 kW	Less than 1.0 kW
Warm-up	Less than 1.5 kW	Less than 1.5 kW
Stand-by	Less than 300 W/h	Less than 300 W/h
Energy Saver Mode	Ave. 140 W/h	Ave. 178 W/h
Auto Off Mode	Ave. 10 W/h	Ave. 10 W/h

Full system (including options)

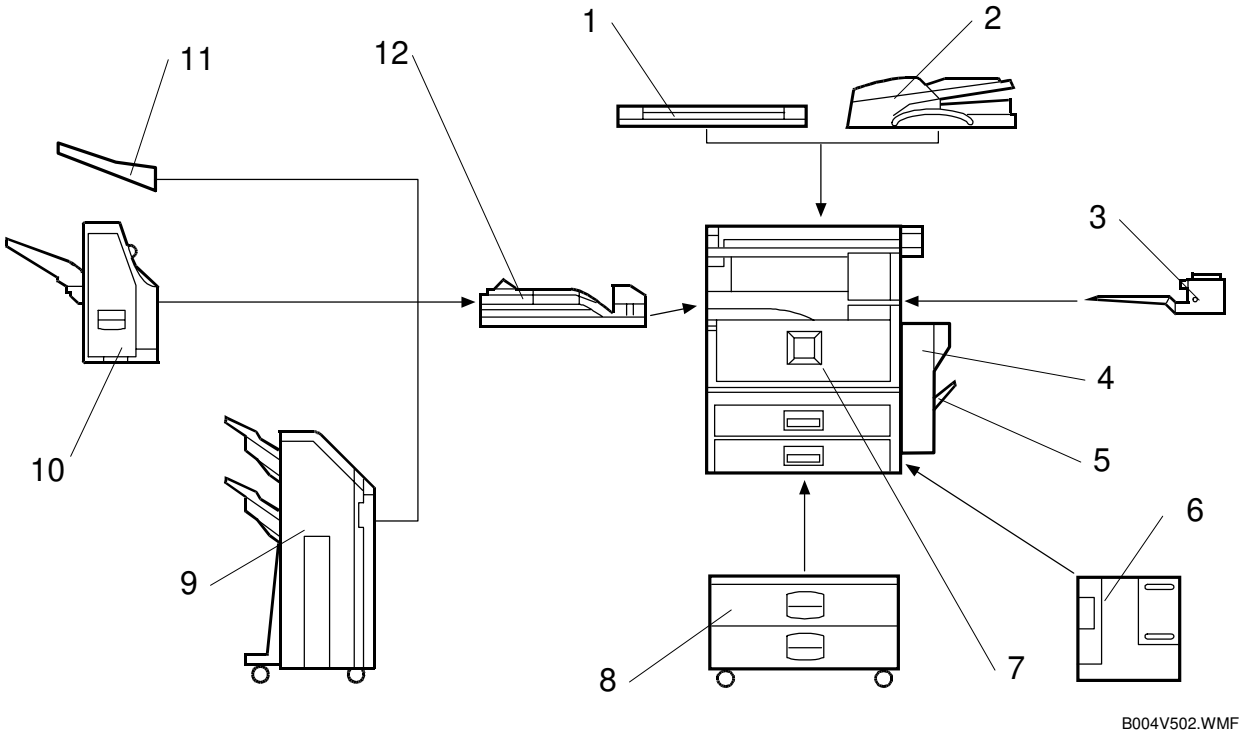
	B003/B006	B004/B007
Copying	Less than 1.3 kW	Less than 1.3 kW
Warm-up	Less than 1.5 kW	Less than 1.5 kW
Stand-by	Less than 500 W/h	Less than 500 W/h
Energy Saver Mode	Ave. 185 W/h	Ave. 223 W/h
Auto Off Mode	Ave. 10 W/h	Ave. 10 W/h

Noise Emission:

Mode	Model	Mainframe Only	Full System
Copying	B003/B006 B004/B007	69 dB(A) or less 70 dB(A) or less	73 dB(A) or less 74 dB(A) or less
Stand-by	B003/B006 B004/B007	42 dB(A) or less 42 dB(A) or less	

NOTE: The above measurements were made in accordance with ISO 7779.
Full system measurements include the ARDF, Finisher and LCT unit.
In the above stand-by condition, the polygonal mirror motor is not rotating.

2. MACHINE CONFIGURATION



1	Platen cover	7	Copier
2	ARDF	8	Paper tray unit
3	One-bin tray	9	Two-tray finisher (2 shift trays)
4	Duplex unit	10	1000-sheet finisher (1 shift tray)
5	By-pass tray	11	External tray
6	LCT (Large Capacity Tray)	12	Bridge unit

NOTE: The Bridge Unit is required for the optional 1000-Sheet Finisher and the Two-Tray Finisher.

Key: Symbol: **U**: Unique option, **C**: Option also used with other products

	Item	Key	Machine Code
Copier	35 cpm Copier Model		B003
	45 cpm Copier Model		B004
	35 cpm Printer Model (USA model only)		B006
	45 cpm Printer Model (USA model only)		B007
	ARDF (See Note 1.)	U	B351
	Platen Cover (See Note 1.)	C	A381
	Paper Tray Unit	C	A682
	LCT (Large Capacity Tray)	C	A683
	1-Bin Tray	U	B376
	Bridge Unit	U	B397
	1000-sheet Finisher (See Note 2.)	C	A681
	Two-tray Finisher (See Note 2.)	U	B352
	Punch Unit (See Note 3.)	C	B377-17 (2/3-hole) US
	Punch Unit (See Note 3.)	C	B377-27 (2/4-hole) Metric
	Punch Unit (See Note 3.)	C	B377-31 (4-hole) Northern Europe
	External Output Tray (See Note 4.)	C	A825
	Key Counter Bracket	C	A674
	User Account Enhance Unit	U	B443
Fax	Fax Option	U	B360
	ISDN Option	U	B367
	G3 Interface Unit	U	B366
	JBIG	C	A892
	Handset (USA model only)	C	A646
Printer/ Scanner	Printer Unit	U	B362
	Printer/Scanner Unit	U	B361
	PostScript3 Unit	U	G577
	Network Interface Board	U	G574
	1394 Interface Unit	C	G590
	Mailbox	C	G909
	Mailbox Bridge Unit	C	G912
	Memory Unit 64 MB	C	G579
	Memory Unit 32 MB	C	G578

Notes

1. The ARDF and platen cover cannot be installed together.
2. The finishers require the paper tray unit and bridge unit.
3. The punch unit requires the two-tray finisher.
4. The external output tray requires the bridge unit.

3. OPTIONAL EQUIPMENT

ARDF

Original Size:	Normal Original Mode: A3 to B6, DLT to HLT Duplex Original Mode: A3 to B5, DLT to HLT
Original Weight:	Normal Original Mode: 40 ~ 128 g/m^2 (11 ~ 34 lb) Duplex Original Mode: 52 ~ 105 g/m^2 (14 ~ 28 lb)
Table Capacity:	80 sheets (80 g/m^2, 20 lb)
Original Standard Position:	Rear left corner
Separation:	Feed belt and separation roller
Original Transport:	Roller transport
Original Feed Order:	From the top original
Reproduction Range:	30 ~ 200% (Sub scan direction only)
Power Source:	DC 24V from the copier
Power Consumption:	Less than 60 W
Dimensions (W × D × H):	570 mm x 518 mm x 150 mm (22.4” x 20.4” x 5.9”)
Weight:	12 kg

PAPER TRAY UNIT

Paper Size:	A5 (L) to A3 HLT (L) to DLT
Paper Weight:	64 g/m^2 ~ 105 g/m^2 (20 lb ~ 28 lb)
Tray Capacity:	500 sheets (80 g/m^2, 20 lb)
Paper Feed System:	FRR
Paper Height Detection:	4 steps (100%, 70%, 30%, Near end)
Power Source:	24 Vdc, 5 Vdc (from the copier) 120 Vac: 115 V version (from the copier) 220 ~ 240 Vac: 224/240 V version (from the copier)
Power Consumption:	50 W
Weight:	Less than 25 kg (55.1 lb)
Size (W x D x H):	540 mm x 600 mm x 270 mm (21.3” x 23.6” x 10.6”)

ONE-BIN TRAY

Paper Size:	A5 (L) to A3 HLT to DLT
Paper Weight:	60 g/m^2 ~ 105 g/m^2 (16 lb ~ 28 lb)
Tray Capacity:	125 sheets (80 g/m^2, 20 lb)
Power Source:	5 Vdc, 24 Vdc (from copier)
Power Consumption:	15 W
Weight:	Less than 4 kg (8.8 lb)
Size (W x D x H):	470 mm x 565 mm x 140 mm (18.5” x 22.2” x 5.5”)

1000-SHEET FINISHER

<table>
<tr><td>Paper Size:</td><td colspan="5">No staple mode:
A3 to A6 (L)
DLT to HLT (L)
Staple mode:
A3, B4, A4, B5 (S)
DLT to LT</td></tr>
<tr><td>Paper Weight:</td><td colspan="5">No staple mode: 52 ~ 157 g/m^2 (14 ~ 42 lb)
Staple mode:64 ~ 80 g/m^2 (17 ~ 20 lb)</td></tr>
<tr><td>Stapler Capacity:</td><td colspan="5">20 sheets (A3, B4, DLT, LG)
30 sheets (A4, B5 (S), LT)</td></tr>
<tr><td>Paper Capacity:</td><td colspan="5">No staple mode:
1,000 sheets (A4/LT or smaller: 80 g/m^2, 20 lb)
500 sheets (A3, B4, DLT, LG: 80 g/m^2, 20 lb)
Staple mode: (80 g/m^2, 20 lb, number of sets)</td></tr>
<tr><td rowspan="2"></td><td>Set Size
Size</td><td colspan="2">2 to 10
2 to 5 | 6 to 10</td><td>11 to 20</td><td>21 to 30</td></tr>
<tr><td>A4/LT (S)
B5 (S)</td><td>100</td><td>85</td><td>40</td><td>25</td></tr>
<tr><td></td><td>A4/LT (L)</td><td colspan="2">50</td><td>25</td><td>15</td></tr>
<tr><td></td><td>A3, B4, DLT, LG</td><td colspan="2">50</td><td>25</td><td>—</td></tr>
<tr><td>Staple positions</td><td colspan="5">1</td></tr>
<tr><td>Staple Replenishment:</td><td colspan="5">Cartridge (3,000 staples/cartridge)</td></tr>
<tr><td>Power Source:</td><td colspan="5">24 Vdc, 5 Vdc (from the copier/printer)</td></tr>
<tr><td>Power Consumption:</td><td colspan="5">48 W</td></tr>
<tr><td>Weight:</td><td colspan="5">21 kg (46.3 lbs)</td></tr>
<tr><td>Dimensions (W x D x H):</td><td colspan="5">568 x 520 x 625 mm (22.4” x 20.5” x 24.6”)</td></tr>
</table>

TWO-TRAY FINISHER

NOTE: The punch unit is an option for this machine.

Paper Size	Normal/Shift Mode: A3 to A5/DLT to HLT (A6L in no shift mode and no staple mode) Staple Mode: A3 to B5/DLT to LT Punch Mode: 2 Holes: A3 to A5/DLT to HLT 3 Holes: A3 to B5/DLT to LT 4 Holes (Europe/Asia) : A3 to A5/ DLT to HLT 4 Holes (North Europe): A3 to B5/DLT to LT
Paper Weight:	Normal/Shift Mode: 52 g/m^2 ~ 163 g/m^2 (14 ~ 43 lb) Staple Mode: 64 g/m^2 ~ 90 g/m^2 (17 ~ 23 lb) Punch mode (All types): 52 g/m^2 ~ 163 g/m^2 (14 ~ 43 lb)
Tray Paper Capacity:	Upper Tray: 500 sheets (A4S ~ A5S/LTS, 80 g/m^2, 20 lb) 250 sheets (A3 ~ A4L/DLT ~ LTL, 80 g/m^2, 20 lb) 100 sheets (A5L/HLT, 80 g/m^2, 20 lb) Lower Tray (Multi-tray Staple Mode): 1500 sheets (A4S/LTS, 80 g/m^2, 20 lb) 750 sheets (A3 ~ B5/DLT ~ LTL, 80 g/m^2, 20 lb) 500 sheets (A5S, 80 g/m^2, 20 lb) 100 sheets (A5L/HLT, 80 g/m^2, 20 lb) Lower Tray (Normal Mode): 2000 sheets (A4S/LTS, 80 g/m^2, 20 lb) 750 sheets (A3 ~ B5/DLT ~ LTL, 80 g/m^2, 20 lb) 500 sheets (A5S, 80 g/m^2, 20 lb) 100 sheets (A5L/HLT, 80 g/m^2, 20 lb)
Stapler Tray Capacity:	No Mixed Original Mode: 50 sheets (A4 ~ B5/LT, 80 g/m^2, 20 lb) 30 sheets (A3 ~ B4/DLT ~ LG, 80 g/m^2, 20 lb) Mixed Original Mode: 30 sheets (A4S/A3, B5S/B4, LTS/DLT, 80 g/m^2, 20 lb)
Staple Position:	4 positions 1 staple: 3 positions (Front, Rear, Rear-Slant) 2 staple: 1 position
Staple Replenishment:	Cartridge (5,000 staples)
Power Source:	24 Vdc (from copier)
Power Consumption:	60 W
Weight:	Less than 53 kg (116.8 lb) (without punch unit) Less than 55 kg (121.3 lb) (with punch unit)
Size (W x D x H):	680 mm x 620 mm x 1030 mm (26.8” x 24.4” x 40.6”)

BRIDGE UNIT

Paper Size:	Standard sizes A6 lengthwise to A3 HLT to DLT Non-standard sizes Width: 100 to 305 mm Length: 148 to 432 mm
Paper Weight:	52 g/m^2 ~ 135 g/m^2, 16 lb ~ 42 lb

LCT

Paper Size:	A4 (S)/LT (S)
Paper Weight:	60 g/m^2 ~ 105 g/m^2, 16 lb ~ 28 lb
Tray Capacity:	1500 sheets (80 g/m^2, 20lb)
Remaining Paper Detection:	5 steps (100%, 75%, 50%, 25%, Near end)
Power Source:	24 Vdc, 5 Vdc (from copier)
Power Consumption:	40 W
Weight:	Less than 17 kg (37.5 lb)
Size (W x D x H):	390 mm x 500 mm x 390 mm (15.4" x 19.7" x 15.4")

MAILBOX

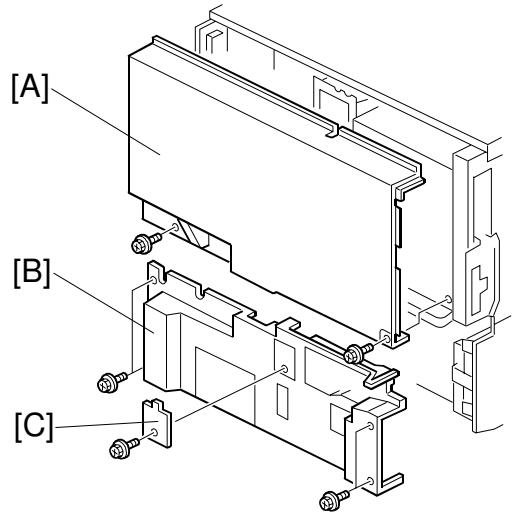
Number of Trays	9 trays + proof tray
Tray Capacity:	Trays and proof tray: 100 sheets (80 g/m^2, 20 lb)
Paper Size for Trays:	Trays: Maximum: A3 or 11" x 17" Minimum: A5 (S) or 11" x 8½ " Proof tray: Maximum: A3 or 11" x 17" Minimum: A6 (S) or 11" x 8½ "
Paper Weight:	Trays: 60 ~ 90 g/m^2 (16 ~ 24 lb) Proof tray: 52 ~ 157 g/m^2 (14 ~ 42 lb)
Power Consumption:	48 W or less (average)
Power Source:	DC24 V, 5 V (from the main unit)
Dimensions (W x D x H):	600 mm x 550 mm x 960 mm (23.6" x 21.7" x 37.8")
Weight:	40 kg (88.2 lb)

NOTE: Specifications are subject to change without notice.

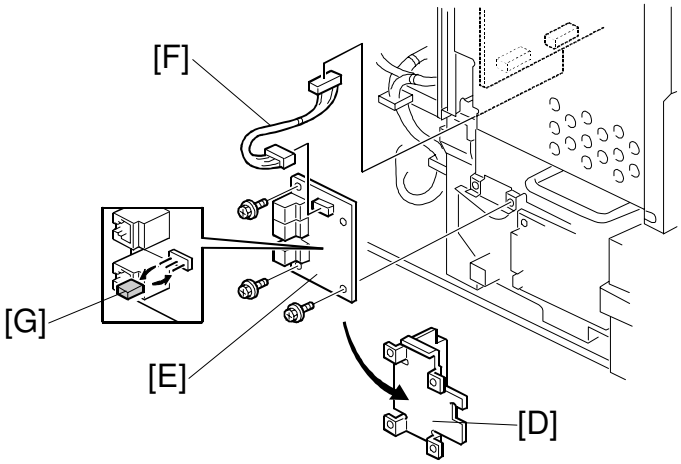
APPENDIX 1 (FOR MODEL A-C2)

1. RSS (REMOTE SERVICE SYSTEM)

1.1 RSS SET UP



B004I551.WMF



B004I552.WMF

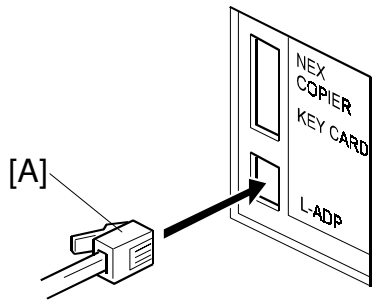
⚠CAUTION

Unplug the machine power cord before starting the following procedure.

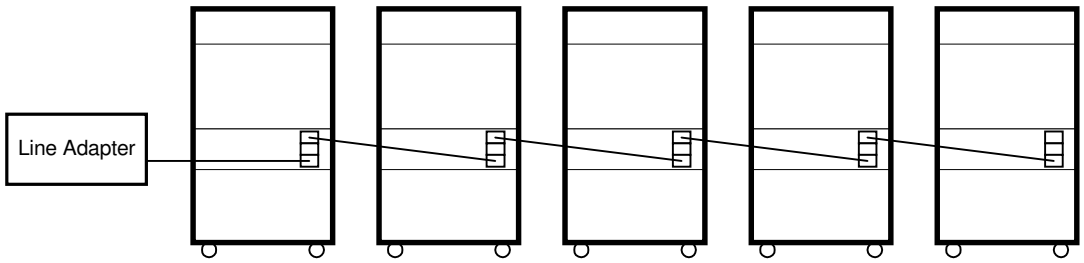
1. Remove the rear upper cover [A] (2 screws).
2. Remove the rear lower cover [B] (4 crews).
3. Remove the CSS cover [C] (1 screw).
4. Remove the bracket [D] (4 screws).
5. Install the RSS board [E] (3 screws).
6. Install the harness [F] between the RSS board and the Mother board.

When connecting only one machine to the line adapter, skips step 7.

7. Set the jumper switch [G] on the RSS board as shown (default setting is 1-2).



B004I553.WMF



A265I900.WMF

Machine No.	1	2	3	4	5
Jumper Set	2-3	2-3	2-3	2-3	1-2
PI device code	0	1	2	3	4

8. Reassemble the machine.
9. Connect the modular cord [A] to the line adapter as shown.
10. Install the line adapter (refer to chapter 2-1 L-ADP Installation Procedure in the CSS Service Manual).
11. Turn on the machine.

When connecting only one machine to the line adapter, skips step 12.

12. Enter the Copier SP mode and set the PI device code with SP5-821 (default 0).
    NOTE: After changing the value, turn the main power switch off and on to enable the PI device code.

1.2 SP MODE SETTING

After installing the machine and line adapter, perform SP5-816-1 (CSS Function On/Off).

Check the value of the following SP modes. Ensure they are set correctly.

NOTE: SP5-507 is only for the Japanese version. Do not change.

- SP5-501-1 (PM Alarm Interval): 150k
- SP5-504 (Jam Alarm Setting): 3
- SP5-508-1 (CE Call - Jam Level 1): 1 (On)
- SP5-508-2 (CE Call - Jam Level 2): 1 (On)
- SP5-508-3 (CE Call - Cover Open): 1 (On)

1.3 CHECKING ITEMS USING RSS

1.3.1 READ ONLY ITEMS

Item
Paper end
Paper jam information
Staple end
Door open
Unit connection condition (Fusing and PCU)
Paper size information
System configuration
Vsg, Vsp, Vsdp, Vt data
Copy counter for user codes
SP7-001~ -003, -101, -204 ~ -206, -301, -304 ~ -305, -320 ~ -328, -401, -402, -502 ~ -507, -801, -803

1.3.2 AUTO CALL AND READ ITEMS

SC Calls

The SC calls are generated according to the SC level as follows. Please note that the SC level of this copier is defined differently from the other copiers.

SC Level	Definition	SC Auto Call Condition
A	Fuser unit SCs which cannot be reset by customer.	SC call is generated immediately
B	SCs caused by incorrect sensor detection which can be reset by turning main power switch off and on.	SC call is generated when SC occurs two times within 10 copies.
C	SCs that disable only the features which use the defective item.	SC call is generated when SC occurs two times within 10 copies.
D	SCs that are not shown on the operation panel.	SC call is not generated.

CC Calls

There are three types of CC calls as follows.

CC Code	Definition
CC 101	When paper jam is detected five times consecutively without completing any copy job, a CC101 is automatically generated.
CC 201	When a paper jam condition is not reset for 15 minutes, CC201 is automatically generated.
CC 202	When a cover open condition is not reset for 15 minutes, CC202 is automatically generated.

Alarm Calls

There are four types of Alarm Calls as follows:

Type	Definition
PM	When the PM counter reaches 80000, a PM Alarm Call is automatically reported to the Concorde system.
Original Count	Alarm call is generated after the specified total number of originals goes through the ARDF.
SC	When 3 SCs (Any level) occur during 1500 sheets copying, an SC Alarm Call is automatically reported to the Concorde system.
Jam	When paper jamming occurs 10 times during 1000 sheets copying, a Jam Alarm Call is automatically reported to the Concorde system.

1.3.3 READ AND WRITE ITEMS

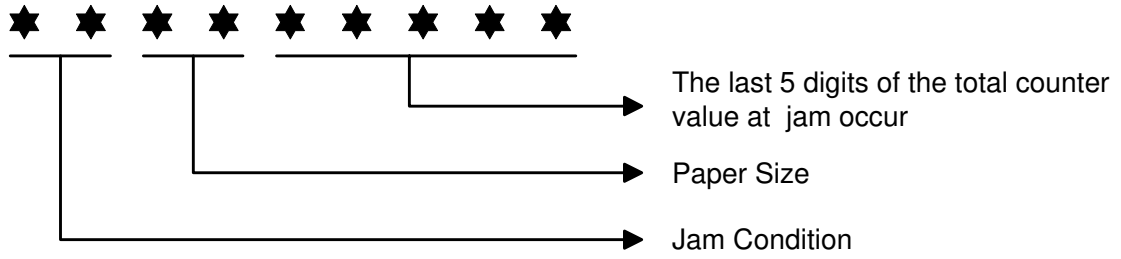
All data for SP modes and UP modes except few modes.

1.3.4 EXECUTE ITEMS

Item	Item
Memory Clear	Copy counter reset
SC reset	Reset counter by each paper tray
PM counter reset	Total operation time reset
SC/jam counters rest	Key operator code reset
Counters reset (except total counter)	Access Code Clear
Original Counter Clear	Print Counter Clear

1.4 JAM HISTORY

The jam history is read in this way.



A265I903.WMF

1.4.1 JAM CONDITION TABLE

Copier

Code	Meaning
01	Jams at power on.
03	Paper does not reach the 1st Paper Feed Sensor
04	Paper does not reach the 2nd Paper Feed Sensor
05	Paper does not reach the 3rd Paper Feed Sensor
06	Paper does not reach the 4th Paper Feed Sensor
07	Paper does not reach the LCT Tray Relay Sensor
08	Paper does not reach the Transport sensor 1
09	Paper does not reach the Transport sensor 2
10	Paper does not reach the Transport sensor 3
13	Paper does not reach the Registration Sensor
14	Paper does not reach the Fusing Exit Sensor

Code	Meaning
16	Paper does not reach the Exit Entrance Sensor
17	Paper does not reach the Relay Sensor 1 (option)
18	Paper does not reach the Relay Sensor 2 (option)
19	Paper does not reach the Duplex Entrance Sensor
23	Paper does not reach the Duplex Exit Sensor
24	Paper does not reach the 1-Bin Tray Sensor
25	Paper does not reach the Finisher Entrance
26	Paper does not reach the Finisher Proof Tray
27	Paper does not reach the Finisher Shift Tray
28	Paper does not reach the Finisher Staple Tray
29	Paper does not reach the Finisher Tray
30	Paper does not reach the Mailbox Entrance Sensor
31	Paper does not reach the Mailbox Proof Tray Exit Sensor
32	Paper does not reach the Mailbox Relay Sensor
33	Paper does not reach the Mailbox Exit Sensor
35	Paper does not reach the Booklet Finisher **(Japan Only)**
36	
37	
38	
39	
40	
41	
57	Paper caught at the LCT Tray Relay Sensor
58	Paper caught at the Transport sensor 1
59	Paper caught at the Transport sensor 2
60	Paper caught at the Transport sensor 3
61	Paper caught at the Transport sensor 4
63	Paper caught at the Registration Sensor
64	Paper caught at the Fusing Exit Sensor
66	Paper caught at the Exit Entrance Sensor
67	Paper caught at the Relay Sensor 1 (option)
68	Paper caught at the Relay Sensor 2 (option)
69	Paper caught at the Duplex Entrance Sensor
73	Paper caught at the Duplex Exit Sensor
74	Paper caught at the 1-Bin Tray Sensor

Document Feeder

Code	Meaning
03	Original does not reach the Skew Correction Sensor
04	Original does not reach the Interval Sensor
05	Original does not reach the Registration Sensor
06	Original does not reach the Relay Sensor
07	Original does not reach the Inverter Sensor
53	Original caught at the Skew Correction Sensor
54	Original caught at the Interval Sensor
55	Original caught at the Registration Sensor
56	Original caught at the Relay Sensor
57	Original caught at the Inverter Sensor

1.4.2 PAPER SIZE

Code	Paper Size	Code	Paper Size
05	A4 sideways	86	A5 lengthwise
06	A5 sideways	87	A6 lengthwise
07	A6 sideways	8D	B4
0E	B5 sideways	8E	B5 lengthwise
0F	B6 sideways	8F	B6 lengthwise
11	Return post card sideways	91	Return post card lengthwise
12	Post card sideways	92	Post card lengthwise
24	8.5[t1]" x 14” sideways	A0	11" x 17"
26	8.5" x 11” sideways	A4	8.5" x 14" lengthwise
2C	8.5" x 5.5” sideways	A6	8.5" x 11" lengthwise
84	A3	AC	8.5" x 5.5" lengthwise
85	A4 lengthwise		

1.5 OTHERS

1.5.1 SC630 [RDS COMMUNICATION ERROR]

Frequent occurrence of SC630 indicates a problem in the customer’s communication line or line adapter. To maintain the communications environment in good working order, it is necessary to contact planned inspections periodically.

1.5.2 PM PROCEDURE OR OTHER MAINTENANCE

Before beginning PM or other maintenance procedures, SP5-816-2 should be set to "0". This will disable the RDS function. When maintenance is completed, SP5-816-2 should be set to "1". This will re-enable the RDS function.

NOTE: The RDS function will remain disabled for four hours. Therefore, if maintenance for longer than four hours is required, SP5-816-2 should be set to "0" again to disable RDS.